Raising the Bar:
An Inclusive Global Poverty Line[1]

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Abstract. The first of the United Nations 2015 Sustainable Development Goals is: "End poverty in all its forms everywhere." An implication of this broad goal is the existence of an array of poverty lines, which raises the question of an appropriate lower-bound and an upper-bound to global poverty lines. The 'dollar-a-day' poverty line (updated for inflation to P$2.15 in 2017 PPP) is widely accepted as a global lower-bound poverty line (GLBPL). However, while different countries, organizations, and authors use higher poverty lines, there is no consensus on a global upper bound poverty line (GUBPL). We estimate a GUBPL using two conceptually distinct approaches, both grounded in the tension between the focus axiom for poverty measures and standard economic social welfare measures. We set a candidate GUBPL either at: (i) the consumption consistent with the achievement of adequate material well-being or (ii) the consumption level where marginal utility is "near enough" zero. Using either approach, empirical results across an array of measures of well-being demonstrate that *ad hoc* poverty lines, including the World Bank's highest reported poverty line of P$6.85, are far too low to be plausible candidates for a GUBPL. Using the two approaches across four distinct indicators of well-being all of the empirical results suggest a GUBPL of *at least* P$21.5, *ten times* higher than the standard GLPBL of P$2.15. The use of both a lower bound and upper bound global poverty line balances the radically *exclusive* nature of the 'dollar-a-day' standard, which classifies people with very low levels of material well-being and hence very high marginal utility of income as "not poor" with an equally radically *inclusive* GUBPL which counts only those with globally high material achievement and low(ish) marginal utility of income as "not poor."

Keywords: poverty measurement, global poverty, welfare economics

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I don't mind poverty analysis, as long as the poverty line is infinity

Angus Deaton (oral tradition)

Natura non facit saltus (Nature does not jump)

Epigraph in Alfred Marshall's Principles of Economics, 1890

Introduction

The tension between Sen's (1976) focus axiom for poverty measures and the Pareto Principle for social welfare measures is well known. The focus axiom holds that changes in the consumption (or income)[4] of those who are not poor do not affect a poverty measure.

A long-standing critique of the FGT class of poverty measures (Foster, Greer and Thorbecke, 1984) — and poverty measures more broadly — is that they ignore income changes among those who are defined as "non-poor". That is, the focus axiom, by construction, makes the index insensitive to income changes among those above the poverty line, effectively assigning zero marginal weight to individuals in the near-poor population. This discontinuity at the poverty threshold has motivated a strand of the earlier literature examining the desirability of the focus axiom as an axiomatic restriction in poverty measurement (e.g., Sen 1976; Fields 1980; Foster and Shorrocks 1988; Pattanaik and Sengupta 1995).

In focus axiom compliant poverty measures with a poverty line, such as the widely reported Foster, Greer, Thorbecke (1984) class, gains to households at consumption of PL+ε count for exactly zero in reducing poverty. This exclusion of the non-poor creates two tensions between a focus axiom poverty measure and any social welfare measure that follows the Pareto Principle and has the standard features of continuity, inequality aversion, and non-satiation (strong monotonicity). First, welfare is higher if a household at consumption PL+ε increases their consumption whereas poverty does not decline. Second, the gain to welfare is larger for a marginal consumption gain for a household at PL+ε than at PL+ε+X. These are deep differences in normative evaluation as standard social welfare measures treat "likes like likes" (continuity implies gains to households at PL-ε and PL+ε are treated similarly) and "unlikes like unlikes" (inequality aversion implies the gains to a household at PL+ε and PL+ε+X, where X is large, are treated differently). In contrast, focus axiom compliant poverty line measures, by treating all gains to households above PL as zero, treat "likes like unlikes" and "unlikes like likes."

As Angus Deaton's epigraphic quip illustrates, this tension asymptotes to zero as the poverty line goes to infinity. In contrast, the widely used 'dollar-a-day' poverty line makes the normatively problematic aspects of exclusion of the near-poor in poverty measures severe. The dollar-a-day poverty line implies the consumption gains of Indonesian households at the 3rd percentile count for zero in reducing extreme poverty (Table 4) even though any social welfare measure would give significant weight to income gains at that consumption level. Moreover, poverty measures imply the gains to 3rd percentile Indonesian households count the same in

[4] Henceforth we use consumption for convenience, as most poverty measures in the poorest countries are based on consumption surveys, whereas in richer countries poverty measures tend to be based on income.

reducing extreme poverty as gains to the median Danish household which has consumption levels 30 times higher—or, for that matter, the same as the global rich—gains to households at all these levels all count for exactly zero. Any reasonable social welfare function would put very different weights to the consumption gains of the Indonesian 3rd percentile and the globally well-off.

The 'dollar-a-day' poverty line was never intended to be 'the' global poverty line, just the *lowest plausible* global poverty line. The 'dollar-a-day' poverty line, first used in the 1990 World Development Report on Poverty (World Bank 1990) was based on the observation that the relationship between GDP per capita and national poverty lines was non-linear and appeared to have a lower asymptote (Ravallion, Datt and van de Walle 1991). Using the average of the poverty lines of the poorest countries was just an argument for what should the *lowest* a global poverty line, not an argument it should be "the" or even a dominant poverty line. Using only the poverty lines of the poorest countries necessarily implies that nearly all developing countries have a higher national poverty line than this global lower bound.

The 'dollar-a-day' poverty line, since updated for inflation to P$2.15 per person per day in 2017 PPP units, became widely accepted as a global lower bound poverty line (GLBPL)[5]. At the same time, it is widely accepted this defines not poverty generally but only "extreme" poverty. At this penurious poverty line, nearly everyone in many large developing countries is "not poor." In the February 2025 World Bank data headcount extreme poverty is less than:1.5 percent of Egyptians, 2 percent of Indonesians, 2 percent of Bolivians, 3 percent of Filipinos, and 5 percent of Pakistanis are poor. This is strikingly exclusionary as a normative goal.

The acceptance that the 'dollar-a-day' standard is too low to be the *only* global poverty line has led to a wide variety of alternative higher poverty lines. Most of these are *ad hoc* in that they use a small multiple of the 'dollar-a-day' (twice or three times 'dollar-a-day')an or use the national poverty lines of other sets of countries besides the poorest, or some alternative threshold of material well-being. Until June of 2025 the World Bank reported global poverty at the $2.15 ('dollar-a-day'), P$3.85, and P$6.85 poverty lines, implying P$6.85 was the "highest" global poverty line.

Is there a GUBPL between 'dollar-a-day' and infinity that balances the virtues of a simple headcount measure of global poverty against the normatively problematic features of the focus axiom? As "poverty" is fundamentally a political and social construct, there is no way to avoid what are essentially subjective value judgments. We choose to base our search for an acceptable GUBPL by focusing directly on the normative challenges created by the exclusionary aspect of focus axiom compliant measures of poverty and adopt two different criteria in the estimation of a GUBPL.

The first criterion is "material well-being achievement" and sets the poverty line at the level of consumption at which a given standard of living is achieved. Instead of using a very low level of material well-being, such as achieving food consumption with caloric adequacy, we

[5] Since this paper was written and submitted the PPP have been updated to 2021 units. As this is intended to be just an update for inflation the analytics of our argument are unchanged.

choose a level of material well-being such that a person above that level could be considered globally prosperous as the category above GUBPL poor.

The second criterion is "near enough satiation." While there is little empirical evidence for individual households actually achieving satiation ($MU_c \approx 0$) at levels of consumption near a global poverty line, one can choose a GUBPL such that $MU_c(GUBPL+\varepsilon)$ is "near enough" to zero that the problem of treating likes unlike across the poverty line is limited. Or one can choose a GUBPL such that the marginal utility of the just non-poor is "near enough" the marginal utility of the globally prosperous ($MU_c(GUBPL+\varepsilon)/ MU_c$ ('Typical globally prosperous household')) that it limits the error of treating households very unlike in consumption as exactly alike (both zero).

We apply these two criteria to four measures of material well-being: (i) a parameterized iso-elastic utility function, (ii) food shares in consumption, (iii) household achievement of a set of six indicators of minimal conditions of prosperity, (iv) country level of achievement of an index of basics[6].

Based on our two criteria and four potential measures of well-being we propose a GUBPL of P$21.5 per person per day in 2017 PPP. This GUBPL has (i) the attractive focal point feature of being 10 times the current GLBPL of P$2.15[7], (ii) is in the range of the estimated GUBPL by most of the approaches, although getting "near enough satiation" criterion often leads to very high estimates of the GUBPL, and (iii) is consistent with the social poverty lines (Joliffe et al 2024) of the "just developed" countries.

A GUBPL of P$21.5 is a radically more inclusive definition of global poverty. This high poverty line, used with poverty measures that give importance to the depth of poverty, mitigates the most severe of the normative problems with low-bar poverty lines while maintaining a focus of development and development economics on improving the well-being of those in the world for whom gains in material well-being are most important.

[6] Pritchett and Lewis (2026) construct an index of 'basics' that does not simply assert a priori which indicators are 'basic' but allows an empirical process to identify basics. They start from a list of 22 indicators of well-being and, based on a simple theory of budget expansion paths, choose as 'basic' those indicators most highly correlated with other indicators. They then combine those indicators chosen as 'basic' using principal components to set the weights. One important finding of the Pritchett and Lewis (2026) paper is that indicators of 'basics' tend to be quite robust and highly correlated with each other so the exact method does not matter much for the associations of basics with GDP per capita.

[7] After all, one suspects the 'dollar-a-day' standard itself enjoyed such wide adoption because *one* (dollar-a-day) is a focal point.

I) Setting a global upper-bound poverty line: Challenge and two criteria

I.A) Global distribution versus country

Figure 1 shows the distribution of consumption per person per day (in 2017 PPP) generated by a simulated log-normal distribution for each of four countries[8] in different World Bank classifications by GDP per capita: Ethiopia (low income), Pakistan (lower-middle-income), Indonesia (upper-middle-income), and Denmark (high-income). The x-axis in Figure 1 is consumption per person per day in absolute P$, not the more common log units.

This graph and ancillary calculations highlight two points relevant to setting a global poverty line. First, the 'poor of the rich' have much higher incomes than the 'rich of the poor.'[9] This implies that setting a global poverty line that results in any substantial degree of poverty in rich countries will necessarily imply very high poverty rates in nearly all other countries. Second, the variance of the distribution of consumption in poor countries is small in absolute terms. This implies that poverty rates will be very sensitive to small absolute changes in poverty lines.

While some citizens in poor countries are among the "global super-rich" lists of millionaires or billionaires (in 2025 Indonesia had 33 billionaires), statistically the "poor of the rich" (10^{th} percentile of rich countries) have much higher incomes than the "rich(er) of the poor" (90^{th} percentile of poorer countries). The 10^{th} percentile of income in Denmark is P$35.19 which is two and a half times higher than the 90^{th} percentile of consumption in Indonesia (=35.19/13.5) and four times that of Pakistan (=35.19/8.9).

This massive inequality in income across countries of the world implies that at the national poverty line of an advanced industrial country, nearly everyone in a typical developing country is poor. If we take Denmark's poverty line to be half the Danish median consumption of P$65.53, at P$32.77[10] only 7.4 percent of Danes are poor. But, even in Indonesia, a World Bank upper-middle-income country, 99.6 percent of the population is poor at this Danish poverty line.

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[8] The Simulation Appendix details the simulation of a log-normal distribution with the two parameters set to replicate key summary statistics of the actual distribution.

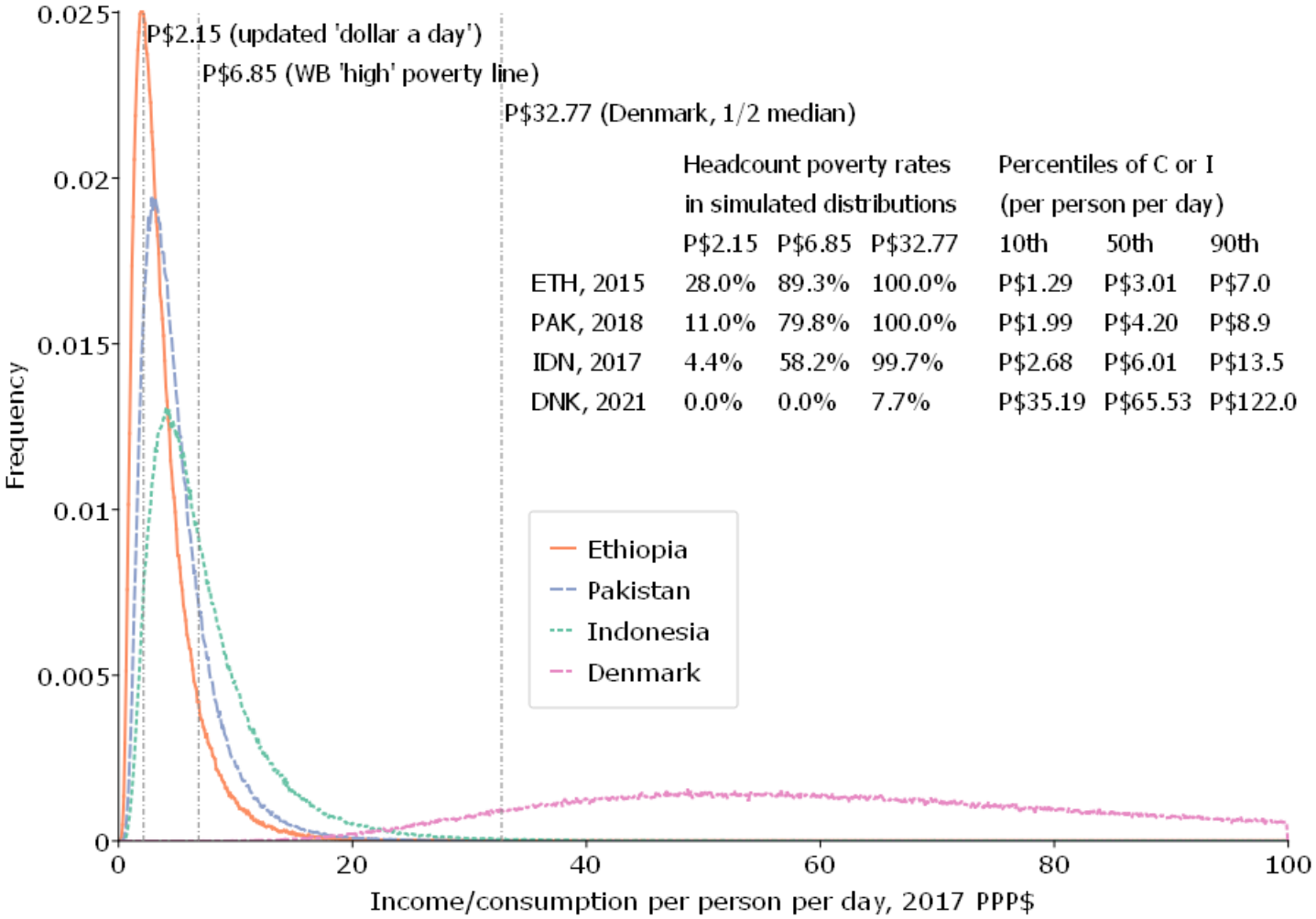
[9] We emphasize this point because Dani Rodrik (2007) has shown this fact is not well known and, when asked, most people in rich countries, even students of development, get this wrong. Moreover, when people are told the facts about income differences between "poor of the rich" and "rich of the poor" rather than accept the facts, they often doubt the data rather than their opinion. People have a sense the "rich of the poor" have higher standards of living because labor (and hence prices) are cheap—but this is precisely what the use of purchasing power parity (PPP) prices is meant to address. Pritchett and Spivack (2013) show that standard of living indicators that do not rely on either national account estimates of GDP or PPP adjustments produce similarly large differences in estimates of the gap between the "rich of the poor" and the "poor of the rich."

[10] The actual poverty line in Denmark is set based on a more sophisticated measure of household consumption, based on equivalized consumption accounting for differential weights by demography and economies of scale, not just household per capita consumption, so this is just using the same relative standard of half of the median.

Labeling a rich(er) household in a poor country as globally poor seems counter-intuitive, but exclusively country driven intuition cannot guide global thinking. It seems counter-intuitive because nearly all economic statistics are reported only at the country level and this encourages comparisons of well-being only across people living in the same country[11]. This implicitly encourages the idea that only relative consumption within countries matters, that, for example, Pakistanis should only compare their well-being to other Pakistanis. Limiting comparisons to households within countries is adequate for most purposes, including setting a national poverty line, but setting a global poverty line must normatively "imagine there's no country" (Bhalla 2002) and compare people. Since a poverty line is a social construct, a global poverty line has to acknowledge that what it means to be globally "not poor" is dependent on the existence of many countries in the world in which, like Denmark, the median (typical) household has consumption that is more than ten times higher than the typical household even in an upper middle-income country like Indonesia.

[11] As Clemens and Pritchett (2008) emphasize, country level statistics don't even reflect the well-being of "nationals" as the income of Haitian nationals (people born in Haiti), for instance, is much higher than the income of people living in Haiti.

Figure 1: Consumption/Income Distribution and Headcount Poverty Rates Under Alternative Poverty Lines



	Headcount poverty rates in simulated distributions			Percentiles of C or I (per person per day)		
	P$2.15	P$6.85	P$32.77	10th	50th	90th
ETH, 2015	28.0%	89.3%	100.0%	P$1.29	P$3.01	P$7.0
PAK, 2018	11.0%	79.8%	100.0%	P$1.99	P$4.20	P$8.9
IDN, 2017	4.4%	58.2%	99.7%	P$2.68	P$6.01	P$13.5
DNK, 2021	0.0%	0.0%	7.7%	P$35.19	P$65.53	P$122.0

Source: Author's calculations with the World Bank's Poverty and Inequality Platform (PIP) data.

Notes: This figure illustrates the distribution of consumption/income across countries and the implications of various poverty lines for estimates of headcount poverty rates. The x-axis shows consumption per person per day in PPP$; the y-axis shows frequency. The vertical lines represent different poverty lines: P$2.15 (WB low); P$6.85 (WB high); P$32.55 (Denmark, ½ median). Country codes: DNK (Denmark); ETH (Ethiopia); IDN (Indonesia); PAK (Pakistan). Acronyms: WB (World Bank); C consumption; I income. Each

country distribution is a simulated log normal distribution of 500,000 observations with log normal parameters chosen as described in Section II.C. The following two facts relevant to a global poverty line can be observed. First, given the huge differences in central tendency (median differs by an order of magnitude) and the limited within country variances the "poor of the rich" (10^{th} percentile) have substantially higher incomes than the "rich of the poor" (90^{th} percentile). Hence any global poverty line which produces a significant degree of poverty in high-income countries will imply poverty rates near 100 percent in nearly all low-income and middle-income countries. Second, given the low level of the central tendency the absolute variance of consumption in low-income countries is small relative to the range of median consumption or income across countries. This implies that poverty line changes that are small relative to cross-national differences will produce large changes in estimated poverty rates.

Figure 1 also illustrates that the absolute differences in consumption within countries are small compared to the absolute gaps across countries. The absolute magnitude by which the "richer of poor" lag the "poor of the rich" is larger than the magnitude by which the consumption of the richer of the poor countries exceed their own country's poorest. The 90^{th}-10^{th} gap in household consumption in Pakistan is only P$6.9 (=P$8.9-P$1.9) whereas the 90^{th} percentile in Pakistan of P$8.9 is P$26.3 below the 10^{th} percentile in Denmark (=P$35.19-P$8.9).

This implies that setting a GUBPL by multiplying the 'dollar-a-day' by a small integer (a common, if *ad hoc,* practice) will change many countries headcount poverty rate dramatically, but this, in itself, does not imply that 2*GLBPL or 3*GLBPL is an adequate GUBPL. At 'dollar-a-day' almost no one is poor, except in the very poorest countries. In our simulated log-normal distribution extreme poverty is only 11% in Pakistan and only 4.4 percent in Indonesia. Only in a very poor country like Ethiopia are even a quarter of the population GLBPL poor: 28 percent.

Whether differences are "big" or "small" depends on the frame of reference. Since the P$2.15 poverty line is so low, raising it by a factor of 2 or 3 is a large relative move but only a small absolute amount, especially compared to the global distribution of income. The WB "high" poverty line of P$6.85 is 3.2 times higher than P$2.15 with an absolute gap of P$4.7. This is both "big" relative to country distributions, for instance the gap between the Indonesian 10^{th} percentile and 50^{th} percentile is only P$3.33 (=6.02-2.69) but, at the same time, very "small" relative to the gap between the Indonesian median and the Danish median of P$59.52 (=65.53-6.01).

Changes in the poverty line that are absolutely small produce large changes in estimated poverty for many countries. Raising the poverty line by P$4.70, from P$2.15 to P$6.85 raises estimated poverty in Pakistan from 11 percent to nearly 80 percent and raises poverty in Indonesia from 4.4 percent to 58.2 percent.

In *Factfulness* (Rosling, Rosling, and Ronnlund, 2019) the world's population is grouped into four levels of income by purchasing power per adult equivalent (and hence not directly comparable to per person): level 1, below P$2/day (close to the current dollar-a-day); level 2, above P$2/day but below P$8/day; level 3, above P$8/day but below P$32 per day; and level 4, above P$32/day. They estimate that, at the time of their calculations, five of seven billion people lived in level 2 and level 3, as only roughly a billion are in level 1 and roughly a billion in level 4. These bounds of "similar" level of well-being are increasingly large: category 2 ranges from P$2 to P$8 (larger than the gap between P$2.15 and P$6.85) and category 3 ranges from P$8 per adult to P$32. This just illustrates identifying households as "globally prosperous" (level 4) cannot rely on the tyranny of small absolute differences created by excessive focus on only within country comparisons[12].

[12] The "100 Homes" project in India illustrates this point of large differences across percentiles of the distribution are still relatively small differences in living conditions. This endeavor used the results of a standard household survey in India (India Human Development Survey 2012) and chose one house at each percentile of the survey's distribution of expenditures per person to produce 100 homes ranked from the 1^{st} to 100^{th} percentile. The

I.B) Achievement-based poverty lines

A straightforward economic definition of a money metric poverty line is that it is the consumption expenditures needed by the i[th] household to attain a given level of material well-being for its members at the prices faced by the household (eq. 1). These prices, at least conceptually, reflect not just the money price but the all-in cost to the household accounting for physical access, subsidies, public provision, etc.

$$1)\ PL^i(X^i) = \exp\ (p^i, U^{Poverty})$$

This makes it clear that a poverty line depends on the specification of a level of human well-being below which a household is deemed poor. As "utility" is unobservable, poverty lines are often set by costing what it takes to achieve some threshold in specific dimensions of consumption (e.g. food, shelter). For instance, the widely used food energy intake approach estimates the food poverty line as the expenditures needed to achieve adequate nutrition, or usually just a given caloric intake, for members of the household from consumption of a specific bundle of food items (Rowntree 1901, Orshansky 1965, Greer and Thorbecke 1986). The "indirect" method then adds an allowance for non-food expenditures based on an Engel curve to arrive at a poverty line (e.g. Ravallion 1998, Pradhan *et al* 2001). The "direct" method for a "cost of basic needs" approach adds to the food poverty line allowances for specific elements of "basics."

National poverty lines increase with country GDP per capita because the level of material achievement required to be "not poor" increases.

The material well-being achievement level for a GUBPL can be plausibly set as some fraction of the highest levels of well-being observed.

I.C) Balancing the normative tensions of poverty measures with "near enough to satiation" GUBPL

The economic evaluation of actions to promote development, such as cost-benefit analysis, did not ignore inequality in the distribution of benefits before the advent of poverty measures. Squire and van der Tak's (1975) *Economic Analysis of Projects* recommended the use of distributional weights in cost-benefit analysis. This approach was grounded in standard welfare economics, published by the World Bank, and widely accepted in principle, if not practice. A simple, easily parameterized, version of a distributionally sensitive approach to cost-

project took pictures and 360-degree videos of these households. including the interior, exterior, kitchen, toilet, and household possessions. One section of the 100 Homes project's website allows viewers to guess from their visual inspection of the household's housing and possessions which has higher and lower measured expenditures per person. The result is that households across a large range of the income distribution are, to most viewers, "observationally equivalent" as guesses about the relative ranking from direct observation is rarely better than random.

benefit analysis (e.g. Acland and Greenberg 2023) assigns different "utility weights" to the gains to households at different levels of income based on an iso-elastic utility function (eq. 2):

$$2)\ U(y) = k * \frac{y^{1-\rho}}{1-\rho}\ if\ \rho \neq 1, else\ U(y) = \ln(y)$$

Iso-elastic utility functions imply declining marginal utility of income at a rate which depends on the parameter ρ (eq. 3):

$$3)\ \frac{\partial U}{\partial y} = k * \frac{1}{y^{\rho}}$$

The utility weight on gains to the i^{th} household relative to a reference level of income (e.g. the median of the population) is therefore (eq. 4):

$$4)\ w_i = \left(\frac{y_{reference}}{y_i}\right)^{\rho}$$

Focus axiom compliant poverty measures produce very different results from standard welfare economics. As major development organizations report poverty measures in the Foster, Greer, Thorbecke (1984) class, which depends on a poverty line and a parameter weighting poverty intensity, we will use this as an illustration. Defined on continuous distribution of consumption, f(c), an FGT poverty measure is the integral over the consumption distribution of the weighted gap between consumption and the poverty line (eq. 5).

$$5)\ FGT(PL, \alpha) = \int_{-\infty}^{PL} ((PL - c)/PL)^{\alpha} f(c) dc$$

The FGT parameter α measures the "intensity" of the contribution to poverty at any given level of y. At α=0 everyone below the poverty line counts equally and hence this is the "headcount" poverty (and if divided by the population, the headcount poverty rate, or percent in poverty). If α=1 then eq. 5 produces the "poverty gap" as the proportionate distance of the income of those below the poverty line from the poverty line. At α=2 this is the "severity" or "squared gap" measure of poverty which puts increasing weight in the poverty measure on those further below the poverty line.

The FGT class satisfies the focus axiom as the derivative of FGT(PL,α) from consumption gains to households above the poverty line is zero at all poverty intensity weights α (eq. 6).

$$6)\ \left.\frac{dFGT(PL,\alpha)}{dc}\right|_{c} = 0, \forall\ c > PL, \forall\ \alpha \geq 0$$

There are two obvious tensions between the normative evaluations using the FGT poverty measures versus the utility weights approach.

First, the FGT measure treats "unlikes like likes" as gains to all those above the poverty line equally—they all count for zero (which is the focus axiom) whereas the iso-elastic utility weights are a continuous declining function of income.

Second, an FGT measure treats "likes like unlikes," as households incrementally above the poverty line get exactly zero weight whereas those below the poverty line count, with the magnitude dependent on the poverty intensity parameter, α. The iso-elastic utility weights, in contrast, are continuous in consumption and hence households at PL-ε and PL+ε have very similar utility weights.

The normative tensions between social welfare measures and poverty measures can be reconciled if there really is a discontinuity in the household's normative evaluations of their well-being with respect to consumption and the "poverty line" is set at that discontinuity. That is, if there were a satiation point in income such that $MU_y(y)=0$ if y>SP then setting GUBPL=SP would reconcile the tension between utility weight and poverty measures as both would give weight zero to gains to those over the satiation point.

However, the empirical evidence is very strong that, if there is a satiation point, which is itself debatable, it isn't anywhere near P$6.85 (an annual income for a household of four of roughly P$10,000)[13]. Stevenson and Wolfers (2013) strongly reject the satiation-in-income hypothesis with both cross-country and individual data. In cross national data they show the gains to country average self-reported well-being from a given (log) change in national income are actually *higher* in richer countries. Using individual data from the 25 largest population countries in the Gallup survey data they find the relationship between individually self-reported life satisfaction and income is linear (in natural log) up to total household income as high as $64,000 (roughly the top-code of their data). Deaton and Kahneman (2010) use Gallup data asking households about their daily experiences and conditions in the USA in 2008 and 2009 to show that there is no satiation in "life evaluation" even at the very high levels of income. While Deaton and Kahneman (2010) do report satiation in "emotional well-being" at a household income around $75,000, Killingsworth (2021) found the relationship was log-linear with no satiation. In a paper based on "adversarial collaboration" to reconcile the findings, Killingsworth, Kahneman, and Mellers (2023) found the relationship of emotional well-being and income was complex with income satiation among the least happy (bottom 20 percent) but, that among the happiest 30 percent, there was no satiation, if anything, the relationship was stronger as income increased. Layard, Mayraz and Nickell (2008) in estimating the marginal utility income using subjectively reported data on happiness from a wide variety of surveys find an iso-elastic specification has an excellent fit up to the highest 5 percent of the observations.

A GUBPL can partly balance the normative tension between focus axiom poverty measures and utility weights by setting a poverty line that is "near enough" to satiation. We define that in two ways. One, in the illustrative iso-elastic utility case the marginal utility of

[13] On a more causal basis, the hypothesis of satiation of well-being with respect to income would produce a huge range of counter-factual predictions about a broad range of phenomena: labor supply (why do non-intrinsically rewarding work beyond the SP), bargaining for higher pay, altruistic giving (why doesn't altruistic giving increase sharply beyond the SP), opposition to higher taxes (should be limited to those below the SP), concern about inflation (why worry about real income reductions above the SP), migration (within and across countries) for higher real wages would be limited to those below the SP, etc. etc.

income at the GUBPL is very low relative to the marginal utility of a household at 'dollar-a-day' poverty line:

$$7)\ \frac{MU_c(GUBPL)}{MU_c('dollar-a-day')} = \left(\frac{P\$2.15}{GUBPL}\right)^{\rho} \text{near enough' } to\ 0$$

Two, the ratio of marginal utility of the just-non-poor at the GUBPL and a reference group that is globally prosperous should be "near enough" to equal.

$$8)\ \frac{MU_c(GUBPL)}{MU_c(Globally\ Prosperous)} = \left(\frac{Globally\ Prosperous}{GUBPL}\right)^{\rho}\ close\ enough\ to\ 1$$

II) Four Empirical Estimates of a Global Upper-Bound Poverty Line

We apply the two criteria applied to four measures of well-being to estimate a GUBPL. First, we use an iso-elastic utility curve. Second, we use a globally estimated Engel curve. Third, we specify a bundle of six basics of well-being that are included in the Demographic and Health Survey data and estimate the level of the asset index (Pritchett and Filmer 2001) at which these basics are reliably reached and then map that into a consumption per person per day measure. Fourth, we use cross-national data on the achievement of basics.

II.A) GUBPL using iso-elastic utility

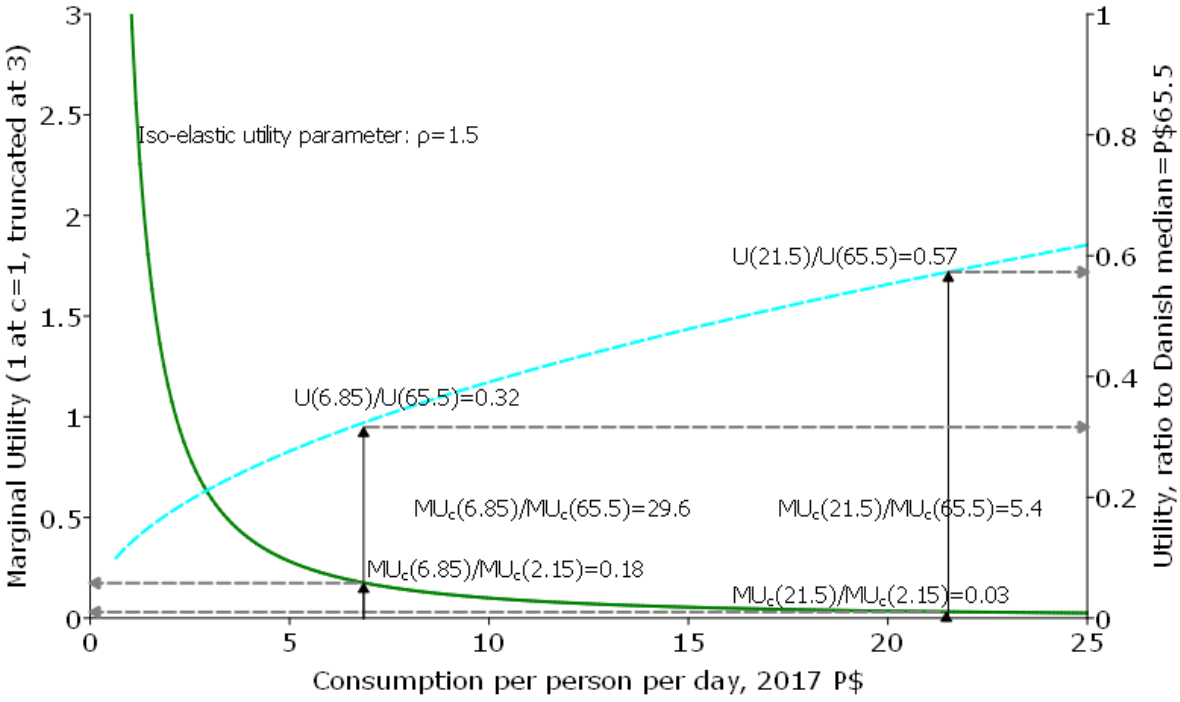
The iso-elastic approach requires a key parameter: the elasticity of the marginal utility of income. Fortunately, as this parameter is key to the wide use of "utility weights" in cost-benefit analysis there are many estimates, from many different countries and using a variety of techniques. Acland and Greenberg (2023) review estimates of the parameter ρ from 168 studies which produce 1,711 distinct estimates using seven different methods (though predominantly lifetime consumption models). The meta-analysis estimate of ρ was 1.61 with a confidence interval range of 1.18 to 2.05. Evans (2005) estimates ρ for 20 OECD countries using personal income tax structure and finds a median of 1.5. Layard, Mayraz, and Nickell (2008) use surveys of subjectively reported happiness/life satisfaction from six different surveys and covering over 50 countries and produce an overall maximum likelihood estimate of ρ of 1.26, with a range from 1.19 to 1.34. There are few developing country specific estimates. Lopez (2008) uses the tax structure method to estimate the parameter in nine Latin American countries and produces an average estimate of 1.5 with a range from 1.1 to 1.9. Bergstrom and Dodds (2023) use well identified estimates of demand functions from Mexico's *Progresa* experience to estimate ρ at 1.6. We use ρ=1.5 as our base case, while exploring robustness.

Figure 2 shows the marginal utility (left axis), which is normalized to equal 1 at the GLBPL of P$2.15 and the total utility (right axis), which is normed to 1 at the Danish median of P$65.47.

Is P$6.85 a viable candidate as the GUBPL? The "near satiation" approach asks whether "likes are treated like likes" and whether "unlikes are treated like likes." The marginal utility of income at P$6.85 is 18 percent of that of households at P$2.15. As the P$2.15 is chosen precisely because marginal utility of households agreed to be very high at that low level of consumption, .18 of that large MU is not inconsequentially small. This implies the just excluded non-poor at P$6.86 are treated as having zero impact on poverty even though their marginal utility is high.

The P$6.85 poverty line also implies that gains to the well-being of those at P$6.86 are treated exactly the same as all households above that line. But marginal utility at P$6.85 is nearly 30 times higher than marginal utility at the Danish median of P$65.5 so utility is not "near enough" satiation to justify treating gains to the income of all the non-poor at P$6.85 as exactly alike.

Figure 2: Iso-elastic Utility Approach to Setting a Global Upper-Bound Poverty Line



Source: Author's calculations with the World Bank's Poverty and Inequality Platform (PIP) data

Notes: This figure presents the iso-elastic utility approach to setting a GUBPL assuming ρ=1.5. The x-axis is PPP consumption per person per day. The left y-axis shows the marginal utility (MU) (normed to 1 at the GLBPL of P$2.15). The right y-axis shows the

total utility (U) (normed to 1 at the Danish median, P$ 65.5). This figure illustrates key facts about MU and U. At P$6.85 is MU 18 percent of MU P$2.15 hence is not "near satiation." U at P$6.85 is only 0.32 that of the median Danish household. MU at P$21.5 is 3 percent of that of households at P$2.15, which could be considered "near satiation." U at P$21.5 is 0.57 that of the median household income in Denmark.

The "achievement" criterion for a GUBPL using the level of utility asks whether P$6.85 is sufficiently high that these households are not poor by a reasonable standard of global poverty. The utility level at P$6.85 is only .32 that of the median Danish household.

Alternatively, at a potential GUBPL of P$21.5 the marginal utility is only 0.032 of that at P$2.15. While "near enough" to satiation is necessarily in the eye of the beholder, 3 percent is much closer to zero than is to 18 percent: the just non-poor at P$21.6 have much lower marginal utility.

Marginal utility is 5.5 times higher at P$21.5 than at the median consumption of a Danish household. Even at this candidate GUBPL households that are very "unlike" in marginal utility are treated as likes.

We know from simple math (and from Angus Deaton) the tension between focus axiom poverty measures and continuous, non-satiation, social welfare measures only asymptotes to zero, but, even without going to infinity, this approach could justify an even higher GUBPL. At a GUBPL of half the Danish median and $\rho=1.5$ the $MU_c(32.55)/MU_c(2.15)$ is only .017, near-ish to zero and $MU_c(32.55)/MU_c(65.5)$ is 2.8, which is only near-ish to 1.

This method depends on the value of ρ, the elasticity of marginal utility. Pushing ρ higher, to $\rho=1.9$, implying greater inequality aversion, has opposing effects on setting a GUBPL. It does cause the ratio of $MU_c(GUBPL)/ MU_c(GLBPL)$ to fall faster, so that at P$6.85 the ratio is only .11 and for P$21.55 is only .01, so the marginal utility of the "just excluded" by a GUBPL relative to the marginal utility at the GLBPL is lower and hence the cost of the exclusion error is lower at any given GUBPL. But a higher ρ of 1.9 also causes the $MU_c(GUBPL)/ MU_c$(Danish median) ratio to rise, such that at P$6.85 the "just excluded" have 73 times higher marginal utility than the globally prosperous and hence the discrepancy in treating "unlikes" like "likes" is much larger. A higher ρ reduces the total utility achievement relative to the globally prosperous (Danish median), so that at P$6.85 the "just excluded" are only at 13 percent of the well-being of the Danish median. Defending a low high bar, like P$6.85 is easier (the marginal utility of the "just excluded" is lower) and also harder as the relative well-being achievement is lower and the marginal utility of the "just excluded" is much lower compared to the globally prosperous.

Table 1: GUBPL calculations with iso-elastic utility across values of the key parameter						
Value of ρ (elasticity of marginal utility)	MU(PL)/MU(P$2.15) "treating likes like unlikes"		MU(PL)/MU(P$65.55) "treating unlikes like likes"		U(PL)/U(p$65.55) Achievement relative to Danish median	
	P$6.85	P$21.5	P$6.85	P$21.5	P$6.85	P$21.5
1.1	0.28	0.08	12.0	3.4	0.80	0.89
1.5	0.18	0.03	29.6	5.3	0.32	0.57
1.9	0.11	0.01	73.1	8.3	0.13	0.37
Source: Authors' calculations.						

Pushing from the base case down to ρ=1.1, intuitively, reverses these trade-offs as the marginal utility of the "just excluded" at P$6.85 is quite high relative to the P$2.15--28 percent--but the ratio of marginal utility to the Danish median is lower (though still high, at 12) and the achievement higher relative to the Danish median much higher.

The intuition for why a GUBPL using this approach gets pushed to high levels is straightforward. The second derivative of an iso-elastic utility function is negative and hence with empirically estimated values of ρ the decline in MU_c is very fast starting from very low levels of income (as consumption approaches zero MU_c asymptotes to infinity) and then falls, but at a decreasing rate. This implies that the GUBPL must increase by a substantial amount in order to reach levels of MU_c "near enough" satiation. Any poverty line that is an *ad hoc* small factor multiple of the 'dollar-a-day' standard (P$2.15) is not assured of reaching either "near enough" satiation levels of marginal utility nor to high levels of achievement at modal values of estimated ρ.

II.B) A GUBPL using Engel's Law

> *The poorer is a family, the greater is the proportion of the total outgo which must be used for food.*
>
> *The proportion of the outgo used for food, other things being equal, is the best measure of the material standard of living of a population.*
>
> Ernst Engel (1857)

Engel's Law is one of the most widely replicated facts in economics and illustrates the non-linearity of the budget expansion path for basics, like food. We use semi-parametric estimates of the Engel relationship to calculate both "achievement" and "near enough" satiation approaches to a GUBPL.

We estimate an Engel relationship using data on food shares of groups of households by consumption (e.g. percentiles) for a large number of countries and years (Data Appendix: Food Shares). In our preferred regression a dummy variable for each country/year survey implies

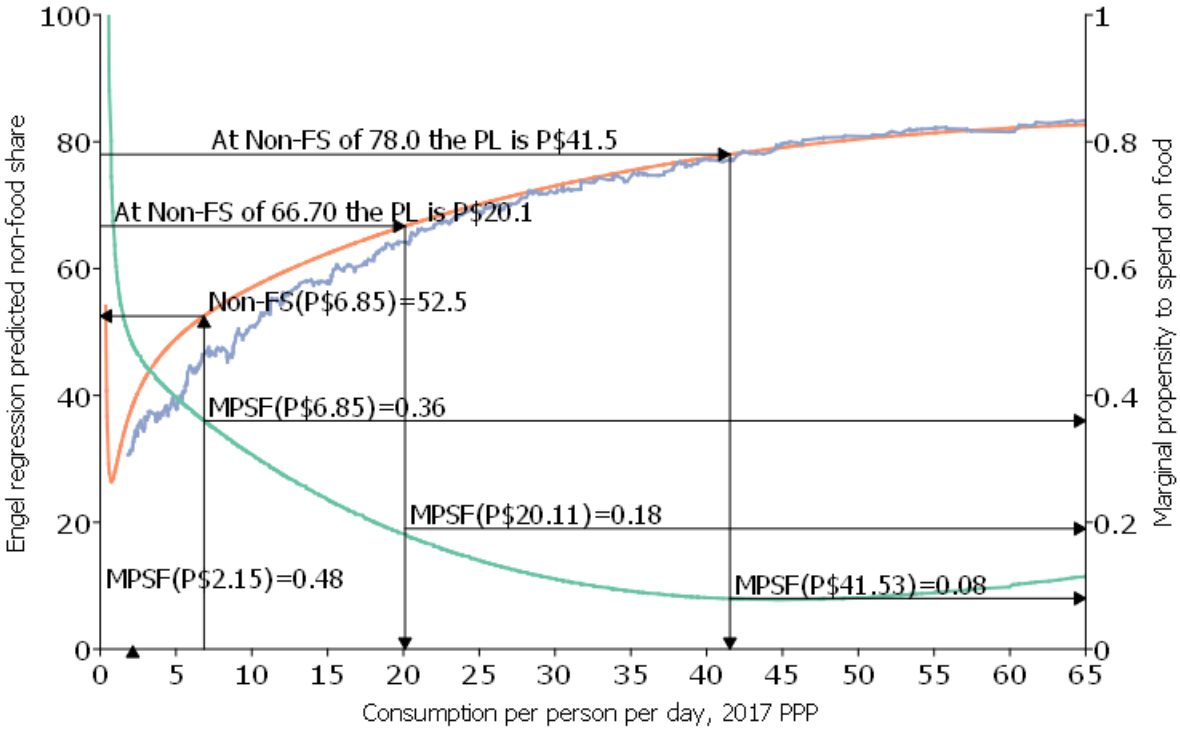
parameters are identified off within survey country/year differences[14]. We minimize constraints of functional form by estimating both (i) a polynomial with powers from -2 to 4 and (ii) the rolling median of food share by consumption which is non-parametric and robust. Results Appendix: Engel reports the estimates are reported using both the flexible polynomial and a standard log of food share on consumption and estimates using all variation, just within country variation, or cross-national variation. The estimates are robust and produce a very tight fit, consistent with the large previous Engel literature (e.g. Pritchett and Spivack 2013).

To be consistent with other graphs where "up" implies higher well-being, Figure 3 shows the predicted non-food share (left axis) as a proxy for achievement of well-being the marginal propensity to spend on food (MPSF) (right axis).

Is P$6.85 "near enough" satiation to be a candidate for a GUBPL? At P$6.85 the predicted non-food expenditure share is just over one-half (52.5%). It is hard to claim a household spending half its budget on food has achieved an adequate standard of living and is not suffering material deprivation. The MPSF is 36 cents of the additional dollar, near the 48 cents marginal propensity at P$2.15. A household spending more than a third of an additional dollar on food has a MU_c that is neither "near enough" to zero that their exclusion is justified nor "like" that of the globally prosperous, whose MPSF is around 8 cents.

[14] This reduces noise from a variety of sources: (i) different survey techniques (e.g. recall periods), (ii) definitions of food share (e.g. whether the measure includes food away from home)), iii) conversion from local currency units to PPP for the country/year, etc.

Figure 3: GUBPL Estimates Using Estimated Non-Food Expenditure Shares of Consumption



Source: Author's calculations with data described in Data Appendix: Food Shares and estimation results presented in the Results Appendix: Engel.

Notes: The left y-axis shows the estimated predicted non-food shares. The right y-axis shows the estimated marginal propensity to spend on food. Non-FS: non-food share; PL: poverty line; MPSF: marginal propensity to spend on food. At P$6.85 non-food expenditure share is 52.5% and MPSF is .36 so standard of living is not high and inferred MU is not "near satiation." If the standard of living achievement level is set to a non-food share of expenditure of two-thirds the implied PL is P$20.1 per day and at that PL the MPSF is .18. If the achievement level is the food share of the European poor of 22 percent, the implied PL is P$41.5 and at that PL the MPSF is .08.

What could be a plausible "achievement" standard to define a GUBPL? Two candidates: the food share of US 1960s poverty lines or food shares of the European poor.

USA money metric poverty lines for non-farm households were developed in the 1960s by Mollie Orshansky, when US GDP per capita was around Mexico's current level. She used the food energy intake method and calculated the food expenditures needed to reach a nutritionally adequate diet for households of various sizes and composition based on the cheapest of the food plans created by the US Department of Agriculture (Orshansky 1965). The total poverty line assumed that the non-food share of expenditures was two-thirds.

A non-food share of two-thirds as an achievement threshold implies a GUBPL of P$20.1. At P$20.1 the MPSF is 18 cents for each dollar, about half of the MPSF at P$6.85, but still more than twice that of the globally prosperous.

European poverty thresholds are, in general, relative. A commonly used measure is that a household is "at risk of poverty" if their post-tax and transfer income is less than 60% of equivalized (for household size and composition) median income. Using those poverty lines about 17% of Europe's population was "at risk of poverty" in 2017. The food share of the bottom quintile of income of households in Europe is 22%. Using a non-food share of 78 percent implies GUBPL of P$41.5. The MPSF at P$41.5 is roughly 8 cents on the dollar.

Table 2: Engel curve, food share, marginal propensity to spend, and poverty lines

Direction of the calculation	Poverty Line	Percent non-food expenditures	Marginal propensity to spend on food
World Bank poverty lines taken as fixed, average food shares and MPS on food estimated	P$2.15 (poverty line exogenous)	**61.5**	**38.3**
	P$6.85 (poverty line exogenous)	**46.6**	**31.8**
GUBPL poverty lines calculated with a fixed food share	**P$20.11 (endogenous)**	66.6 (Fixed to value use in 1960s USA poverty line construction)	**18.25**
	P$41.53 (endogenous)	22.0 (Food share exogenous, Estimated food share of bottom quintile in Europe)	**7.9**

Source: Calculations based on the estimated Engel regressions using distributional data and country and year dummies (Column 2) in the Results Appendix: Engel.

II.C) GUBPL using household achievement of minimal conditions of prosperity in five countries

A third approach to setting a GUBPL using a higher level of material achievement is to estimate the empirical relationship between a household asset index and household achievement of six basic living conditions. We use the Demographic and Health Survey (DHS) data for five large developing countries: Bangladesh, Ethiopia, Indonesia, Nigeria, Pakistan. We estimate the relationship between households' achievement of these conditions and a cubic in the DHS wealth index, controlling for household size and rurality and calculate the wealth index at which the predicted probability of achieving all six conditions is .9. We then map this level of the wealth

index into a consumption per person per day poverty line by matching percentiles of the wealth and consumption distributions.

Using the DHS data, we compute a binary variable for each of six living conditions:

- *Improved sanitation*: household has access to improved sanitation not shared with other households,
- *Electricity*: household has electricity,
- *Safe water*: household has access to an improved source of drinking water,
- *Completed primary*: children in the household (i.e., son/daughter of household head) who are 12 years old or older have completed at least primary schooling,
- *Child survival:* No child born died under the age of 5,
- *Child malnutrition*: No child in the household less than 5 has weight for age less than -2 standard deviations of the reference group.

We consider each of these six as a minimal condition for being out of global poverty. Guiding our choice was the question: "would it make sense to say 'a household is not in global poverty by and upper bound standard but does not achieve X'?" Statements like: 'This household is not globally poor but has a malnourished child' or 'This household is not globally poor but doesn't have improved sanitation' seem implausible to us.

This approach is similar to the multidimensional poverty index (MPI) pioneered by Sabina Alkire (Alkire and Foster 2011, Alkire, Kanagaratnam, and Suppa 2021) which, calculates household poverty status on direct measures of health, education, and household living conditions, including asset ownership. We calculate from our estimates the consumption level at which households are reliably not poor to create a money metric poverty line.

Three technical points about the data. First, for those household living conditions that involve children of certain ages, we count households without children in those age groups as meeting the criteria. A household with no children, or only children above 5, is counted as having no malnourished children aged under 5. This obviously biases the MCP index upwards, but excluding all households without children in the relevant age ranges produces a smaller and selective subset of households. Second, certain of these criteria could be met, by random, sad, chance, even in a very wealthy household—like losing a child or having a child that is small. For that reason, we use a probability threshold of .9 of reaching all six MCP, not 1. Third, the DHS data for Indonesia do not include child anthropometrics and hence do not have a measure of child malnutrition and hence all references to "all six" or "sum of the six" indicators are "all five" or "sum of five" for Indonesia.

Our dependent variable is either: (i) a binary indicator that is 1 if the household meets all six MCP and zero otherwise or (ii) the sum of the six binary MCP indicators.[15]

[15] We assign equal weight to each one of the indicators, and acknowledge this potential limitation in the empirical analysis.

We regress these two dependent variables on the DHS asset index, household size, and rural residence. The DHS household asset index is the first principal component of a set of asset ownership variables (e.g. does the household own a bicycle?) and housing conditions (e.g. does the house have a separate kitchen?) collected in the survey instrument. Filmer and Pritchett (2001) show this asset index is an excellent proxy for household wealth and works at least as well as (and usually much better than) consumption per capita as an indicator of long-run household economic status. Since the DHS asset index is normed to have mean zero and standard deviation one, we shift the wealth index by adding a constant such that the minimum wealth index is zero. The asset index can only be constructed for the household and not per person in the household and hence we include household size as a regressor to allow for household economies of scale[16]. We also include a binary variable for rurality as there may be some rural-urban differences in some material conditions and infrastructure access.

The regressions for both 'all six' and 'sum of six' are OLS even though the dependent variables are limited (to 0/1 or integers 0 to 6). While limited dependent variable estimators are potentially more efficient, OLS estimates are consistent and we don't want the predicted values at the upper tail affected by the constraint that the probability cannot be greater than one or specific assumptions about distributions. Given our large samples, our estimates are sufficiently precise that estimator efficiency is not a key issue. The regression results for the five countries are in Results Appendix: MCP Regressions.[17]

Figure 4a illustrates the procedure and results using Bangladesh, using the estimates to calculate in both directions: poverty line to predicted achievement and achievement to poverty lines.

From any given poverty line we can compute headcount poverty rate, which is a percentile of the consumption distribution, then map to that same percentile in the wealth index distribution, then to a value of the wealth index, and then, via the regression coefficients to the predicted probability a household at that wealth index reaches all six living conditions (equation 7):

$$7)\ Poverty\ Line \rightarrow Percent\ in\ poverty \rightarrow Wealth\ Index\ at\ that\ percentile \rightarrow Predicted\ Probability\ of\ All\ Six\ at\ that\ Wealth\ Index$$

[16] Of course the use of per capita consumption as a household indicator itself makes very strong and empirically dubious assumptions about economies of scale at the household level and is just an accepted convention rather than an evidence based choice.

[17] As a robustness check, we estimate Probit models for all five countries and report average marginal effects in Appendix Table RA: MCP-Binary (Probit). For Pakistan (3.7%) and Indonesia (1.1%), the share of predicted values outside the feasible [0,1] interval is well below the conventional 5% threshold, supporting the use of the Linear Probability Model. For Bangladesh (5.9%) the share is marginally above the threshold. For Nigeria (10.2%) and Ethiopia (9.8%) the share is non-trivial; results for these countries should be interpreted alongside the Probit estimates. Across countries where both estimators are reliable, OLS and Probit average marginal effects are consistent in sign and significance.

At P$2.15, Bangladesh's poverty rate in our simulated log-normal consumption distribution is 14.62%. The (right-shifted) wealth index of the 14.62nd percentile of the DHS sample is .71. At a wealth index of .71 the predicted value of a household reaching all six minimal conditions of global prosperity is only 8 percent.

Is the P$6.85 poverty line high enough to be a GUBPL? At P$6.85 86.9 percent of Bangladeshi households are poor. The 86.9th percentile of the (right shifted) wealth index is 2.98. At that wealth index only 51 percent of households reach all six MCP. Even at the World Bank high poverty line nearly half of households in Bangladesh do not reach the MCP.

We can also ask the question of "near satiation" by examining the elasticity of MCP achievement to the wealth index and, somewhat surprisingly to us, the elasticity is not near zero and is rising at the 87th percentile.

The estimated MCP-wealth index relationship can estimate a GUBPL (equation 8):

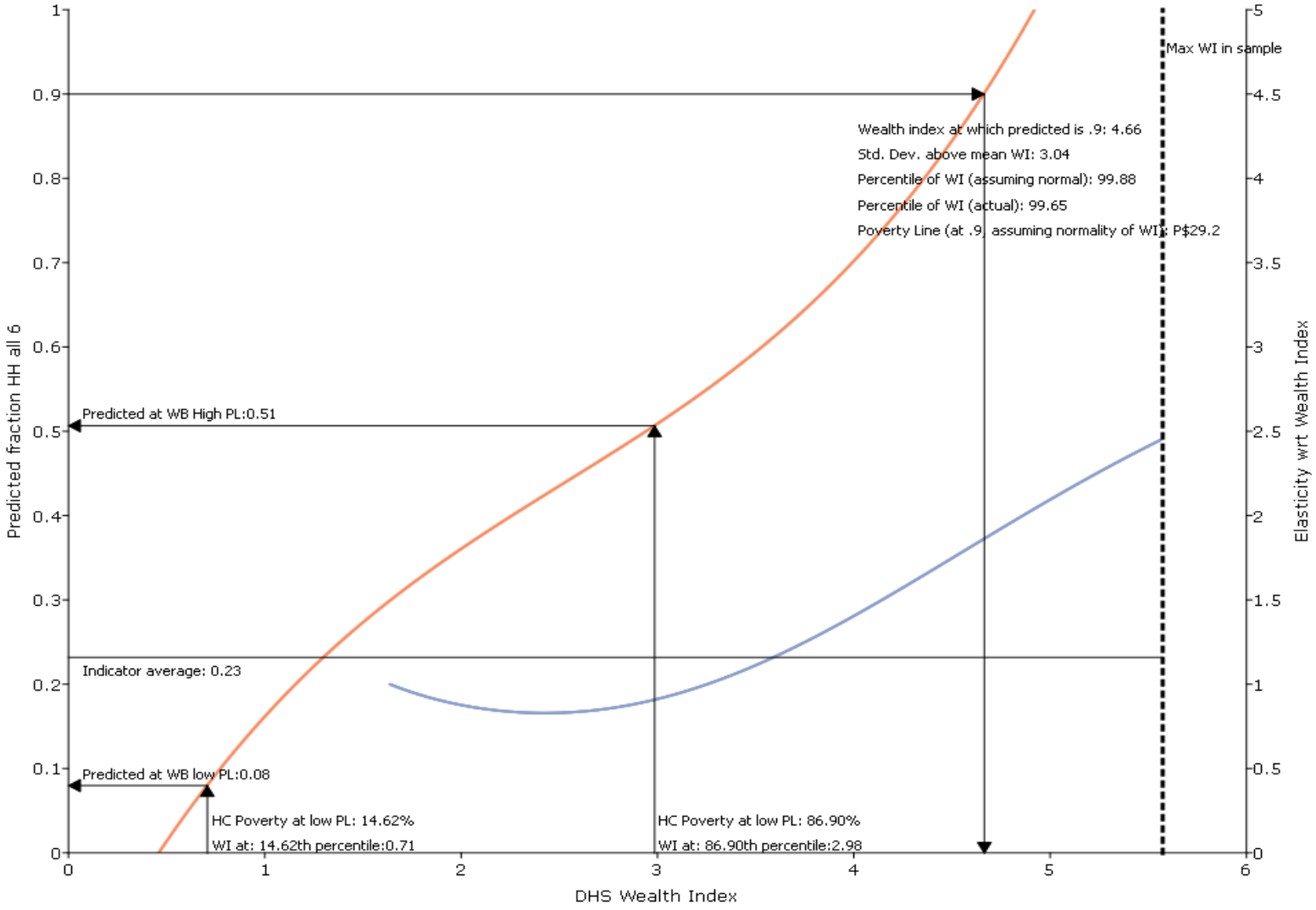
8) $Predicted\ probability\ of\ all\ six\ MCP\ reaches\ high\ threshold \rightarrow Wealth\ Index$
$\rightarrow Wealth\ Index\ percentile \rightarrow Consumption\ percentile$
$\rightarrow "X\ dollars\ a\ day"\ \ GUBPL$

A wealth index of 4.66 in Bangladesh gives the predicted probability of .9 for reaching all six MCP. The DHS wealth index is normalized to a standard deviation of 1 and this is 3.04 standard deviations above the (right shifted) average wealth index. Because the predicted wealth index is so far into the right tail of the wealth distribution we calculate the percentile of the wealth index in two ways. One, we assume the wealth index is Gaussian Normal and calculate the percentile of a z-score of 3.04, which is the 99.88th percentile. Alternatively, we can calculate the percentile of a wealth index of 4.66 in the actual (right shifted) DHS sample and that gives the 99.65th percentile.

We then take the simulated values of the two parameters of the log normal distribution of consumption using parameters that best fit four summary statistics of Bangladesh's actual consumption distribution: the mean, the Gini, the ratio of median to mean, and the average consumption of the 10th decile, which is included alongside the standard summary statistics of mean and inequality to better fit the upper tail (see Simulations Appendix: Log-Normal Simulation).

The 99.88th percentile of the simulated consumption per person per day distribution is P$29.2. The puzzling feature of these estimates is that the elasticity of MCP wrt the asset index is increasing over the entire range of the asset index so "near satiation" in the sense that increased wealth is not increasing consumption of basics is not evident.

Figure 4: Calculating a GUBPL using Six Minimal Conditions of Prosperity (MCP), illustrated with Bangladesh



Source: Author's calculations with Demographic and Health Surveys (DHS) regressions (Results Appendix: MCP Regressions) and World Bank's Poverty and Inequality Platform (PIP) data, as described in text.

Notes: This figure presents an estimate of a global upper-bound poverty line (GUBPL) using six minimum conditions of prosperity (MCP). The six minimum conditions of prosperity examined include the following: (i) electricity: household has electricity; (ii) improved sanitation: household has access to improved sanitation not shared with other households; (iii) safe water: household has access to an improved source of drinking water; (iv) completed primary: children in the household (i.e., son/daughter of household head) who are 12 years old or older have completed at least primary schooling; (v) child survival: no child born died under the age of 5; (vi) child malnutrition: no child in the household less than 5 has weight for age less than -2 standard deviations of the reference group. The left y-axis shows the predicted fraction of households that meet all six MCPs; the right y-axis shows the elasticity with respect to the wealth index. The x-axis shows the DHS wealth index. The following abbreviations have been used in the figure: "HH": household; "PL": poverty line; "WB": well-being; "WI": wealth index; "HC": headcount poverty rate. The following facts can be observed in this figure. First, for any poverty line it is possible to compute a headcount poverty rate. Second, at P$2.15, 14.62 percent of Bangladeshi households are poor. Third, at P$6.85, 86.90 percent of Bangladeshi households are poor.

Table 3 presents the estimates of a GUBPL using various probabilities of reaching all six MCP or a predicted value of six, across the five countries. The results in Column I are quite similar across four of the five countries. The MCP(.9) poverty lines are P$21.1 in Ethiopia, P$27.7 in Indonesia, and P$29.2 in Bangladesh. In Nigeria the predicted value at the highest wealth index in the sample was only .65 but the relationship was upward sloping (Appendix MCP Graphs 6) and we predicted out of sample and .9 was reached at P$23.5 (assuming the wealth index was Gaussian)[18]. In Pakistan the estimated probability reaches a peak and turns down (strangely, we admit, but we only have a cubic, so this is likely an artefact) at the highest predicted all six MCP attainment (.74) the consumption is P$15.7.

Naturally, the median GUBPL estimate is higher when $\hat{p}$=1 at P$33.5 (Column II) and lower when $\hat{p}$=.8 (Column III) at P$20.2. Our focal point proposed GUBPL of P$21.5 occurs at $\hat{p}\approx$.84 (between .8 and .9). As there is nothing sacrosanct about any specific predicted value implying households "reliably" reach all six MCP our modest claim that a GUBPL of P$21.5 is consistent with the MCP approach, but could be higher or modestly lower.

Column IV illustrates the technical problems of using the actual reported wealth index values. Since the wealth index is a principal-components-weighted average of binary indicators, it reaches a maximum value (censored above). This implies the DHS wealth index cannot accurately estimate the upper tail of wealth. This can push the estimated wealth index for achieving the threshold above the maximum of the wealth index in the sample, which mapped to the maximum (100^{th} percentile) of a simulated log normal consumption data, produces a very high value, for instance, P$53.8 in Indonesia.

Column V reports the estimated poverty lines using the "sum of the six" dependent variable and calculating wealth index which predicts the value of six. In this case the median poverty line is P$24.8. Nothing vital hinges on econometric details of binary ("all six"=1) versus integer values ("sum of six").

[18] We acknowledge the low explanatory power in the Nigeria MCP regression.

Table 3: Estimates of a Global Upper Bar Poverty Line using household data on achievement of six basic household living conditions					
Dependent variable:	All six indicators (binary)				Sum of the Six
Column	I	II	III	IV	V
Predicted probability threshold	0.9	1	.8	.9	6
Assumption about Wealth Index:	Wealth Index Assumed to have a Normal Distribution			Using actual DHS sample Wealth Index	Wealth Index Assumed Normal
Country:					
Bangladesh	29.2	34.6	23.9	23.2	25.8
Ethiopia	21.1	23.0	19.8	26.6	26.4
Nigeria	23.8	26.60	20.2	48.1	NR
Pakistan	15.7 (.74)	15.7 (.74)	15.7 (.74)	NR	16.6
Indonesia	27.7	33.5	21.9	53.8	23.8
Median	**23.8**	**33.5**	**20.20**	**40.2**	**24.8**
Notes: NR: Not reached. The "all six" regressions for Pakistan never reach the predicted value of .9 (the maximum is .74) and then turns concave. So P$15.7 is where the predicted value reaches .74 and hence is the same for any probability above .74. In Nigeria the "all six" predicted value at the Wealth Index maximum is only .65 but the slope is positive so the predicted wealth index to attain higher probabilities can be calculated.					

II.D) GUBPL with cross-national consumption and achievement of basics

A fourth approach to setting a GUBPL is a cross-national counterpart of the previous sections' household approaches: (i) at what level of aggregate household consumption are a country's basics of material well-being achieved? (ii) at what level of consumption does the marginal gain in basics fall to "near enough" satiation?

A country level index of "basics" needs to choose indicators and weights. We follow the approach of Pritchett and Lewis (2026) by (i) starting from 22 indicators of well-being from the Legatum Prosperity Index, each scaled from 1 (lowest country value) to 100 (highest country value), (ii) choosing which of those 22 are 'basic' using the notion that basics should share a common budget expansion path and hence choosing 14 of those 22 as "basic" indicators based on which had a median correlation with the all other indicators above .6[19], and (iii) using the first principal component of the 14 indicators. While each of these steps in the creation of a cross-national measure of the achievement of "basics" could be debated, a main finding of Pritchett

[19] The 14 are 5 indicators of living conditions (nutrition, shelter, connectedness, basic services, protection from harm), 5 indicators of schooling and education (pre-primary, primary, secondary, and tertiary enrollment, adult skills), and 4 indicators of health status (life expectancy, health care services, preventive interventions, physical health).

and Lewis (2026) is that all general, plausible, measures of the achievement of the basics of material well-being are strongly correlated.

Our measure of consumption starts with the household and government consumption measure (CCON) from the Penn World Table 10.1 (Feenstra, Inklaar and Timmer 2015). We use the estimated association between this measure, in dollars a day, and the World Bank reported mean household consumption/income measures from the poverty data to scale the national accounts consumption to be consistent with the household measure. We divide CCON by the estimated coefficient of .577 to produce a consumption estimate consistent with the household consumption measures used in poverty calculations.

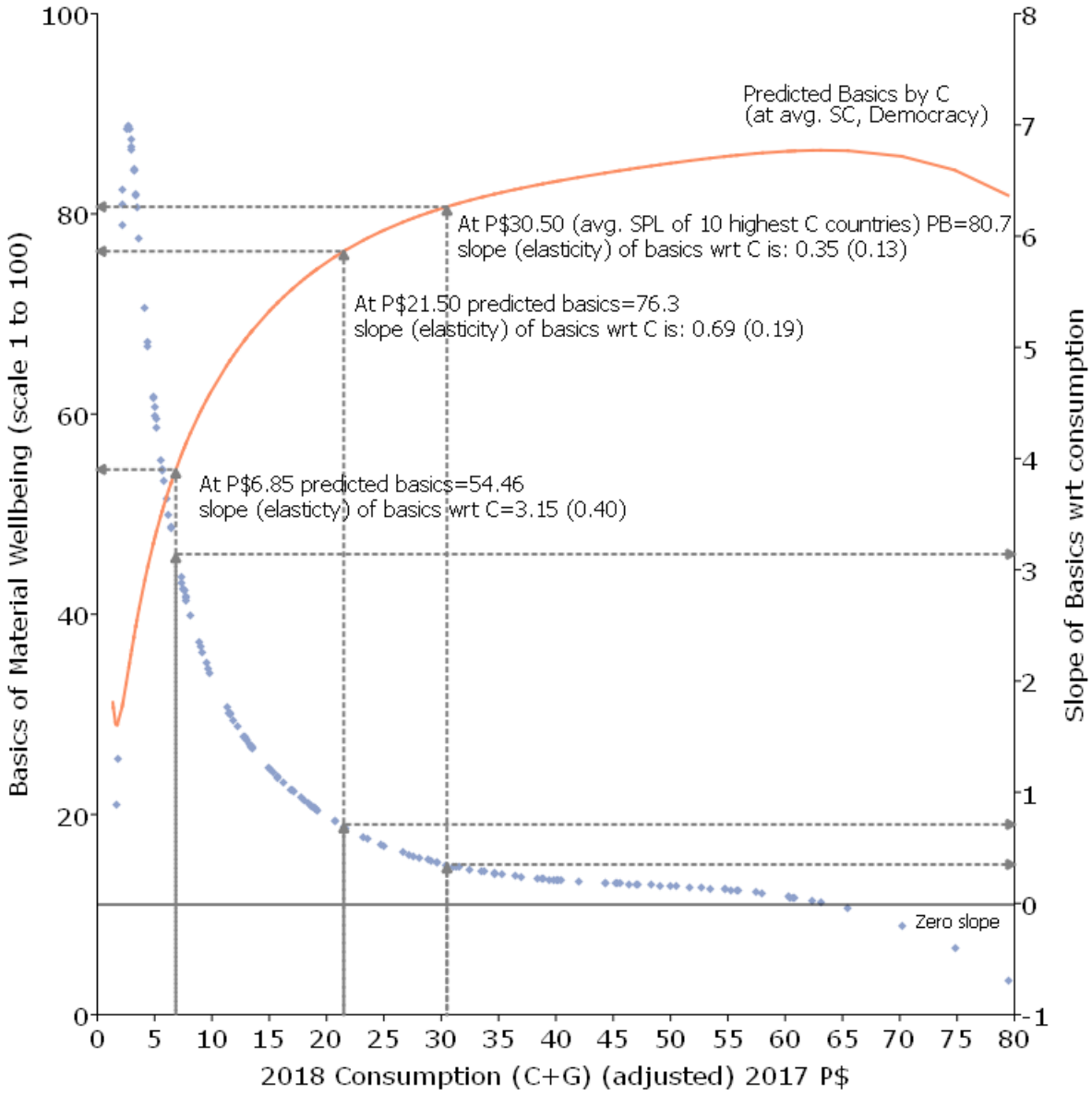
As the index of basics is normed from 1 (worst) to 100 (best) country, we allow for a very flexible polynomial functional form with powers of consumption per person per day from -2 to 4. We also include controls for two other potential correlates of material well-being: state capability and democracy (Pritchett 2022) and also include a dummy for Equatorial Guinea which is a terrible (in both a positive and normative sense) outlier. The estimates are reported in Results Appendix: Cross Country Basics and show a very strong non-linear association of basics with adjusted consumption.

Figure 5 shows that when a country's adjusted average consumption per person per day is P$6.85--and with state capability and democracy at their cross-national average level--the predicted level of basics is 54.5 (about the level of India or Ghana). The slope is still quite high (3.15) and the estimated elasticity of basics wrt to consumption is .40. As with the other methods, P$6.85 is a dubious candidate for a GUBPL on either the "achievement" or "near enough" satiation criteria.

At P$21.5, the predicted basics index is 76.5, about the level of Thailand, Colombia and Türkiye. The slope at P$21.5 is .69 and elasticity of basics is .19, which is not "near" to zero in a mathematical sense but might be considered "near enough" to satiation as it is only about one tenth of the highest slope of 6.9.

At the average Social Poverty Lines (discussed in next section) of the ten highest consumption countries in 2019 (symmetric to the GLBPL at the lowest 10) of P$30.5 the predicted achievement of basics is 80.7, around the level of Serbia or Kazakhstan. This is well below the level of the lower achievers among the traditionally defined developing countries (e.g. Greece at 88.5). The slope is only .35 and the elasticity .13. The basics achievement plateaus and the slope gradually declines to zero at P$65, near the median consumption in Denmark.

Figure 5: Basics of Material Well-Being and Consumption: Levels and Elasticities



Source: Author's calculations with World Bank's Poverty and Inequality Platform (PIP) data and Penn World Tables 10.1

Notes: This figure shows the level (left y axis) and slope (right y axis) of the non-linear association between basics of material well-being (scaled 1 to 100) and per-person per day consumption. The x-axis shows the average PWT10.1 consumption (C+G, CCON) adjusted for the typical discrepancy between macroeconomic consumption and household reported consumption. HH: household; P$: PPP units; C: consumption, SC: state capability. At P$6.85, the predicted basics is 54.5 which is a low level of achievement and the elasticity of basics with respect to consumption is 0.40 which is not "near satiation." At P$21.5 predicted basics are 76.3, a high level of achievement, and the elasticity of basics with respect to consumption is 0.19, which is nearer satiation. At P$65 (roughly the Danish median) basics achievement gains wrt consumption plateaus.

II.E) A GUBPL using cross-national poverty lines

Max Roser (2021, 2025), starting from Pritchett (2006),[20] makes the case for calculating global poverty at rich country poverty lines and Our World in Data reports on poverty at rich country poverty lines in addition to extreme poverty, and other poverty lines. There are two powerful arguments in favor of using rich country poverty lines to set a GUBPL.

First, using rich country poverty lines is exactly symmetric to the method used for creating the dollar-a-day standard in 1990 (Ravallion, Datt, Van de Walle 1991). If it is persuasive that the poverty line in the poorest countries sets the lower-bound, setting the GUBPL based on poverty lines of the richest countries seems equally persuasive.

Second, P$6.85 as a GUBPL would imply that well less than one percent population of the four of the five largest OECD countries is poor, with only Japan above that at 1.45 percent. To deny that, even in rich countries, there are significant absolute deprivations of material well-being that can legitimately be counted as global poverty illustrates just how penurious the standard is. The WB estimates at P$6.85 suggest that in Germany there are fewer people "poor" (.25 percent) than there are people who are homeless (.36 percent).

[20] Pritchett (2006) makes the case that since the World Bank has a governance structure in which countries vote their share of paid in capital, an upper bound definition poverty line for the World Bank as an organization should be the voting power weighted average of member poverty lines. The current calculation, using national poverty lines between 2013 and 2019 and current IBRD voting shares, gives a voting share weighted poverty line of P$19.8 [check this is NPL and not SPL].

Table 4: The World Bank "high" poverty line P$6.85 implies there is essentially no poverty (one percent or less) in rich countries

Country	Year	Pop'l (mns)	Global poverty lines			**National measures of poverty**	**Estimates of percent homeless**
			Lower-bound global lines		GUBPL		
			P$2.15	P$6.85	P$21.5		
Column	I	II	III	IV	V	VI	VII
USA	2021	333.3	0.25%	1.00%	5.15%	11.60%	0.20%
Japan	2013	124.9	0.73%	1.45%	10.93%	16.10%	NA
Germany	2019	83.8	0.00%		5.30%	10.90%	0.36%
UK	2020	67.3	0.50%	0.74%	9.06%	11.20%	0.43%
France	2020	67.9	0.11%	0.43%	7.33%	8.40%	0.31%
Total poor in these five countries (mns)		677.3	2.15	6.14	46.4	81.2	

Source: Columns I-V: World Bank – Poverty and Inequality Platform (https://pip.worldbank.org/poverty-calculator). Estimates for P$21.5 are linear interpolations between P$20.0 and P$25.0. Column V For national poverty rates: OECD data for Germany, UK, France at a poverty line of one half median of equivalized income. US Census for the USA.

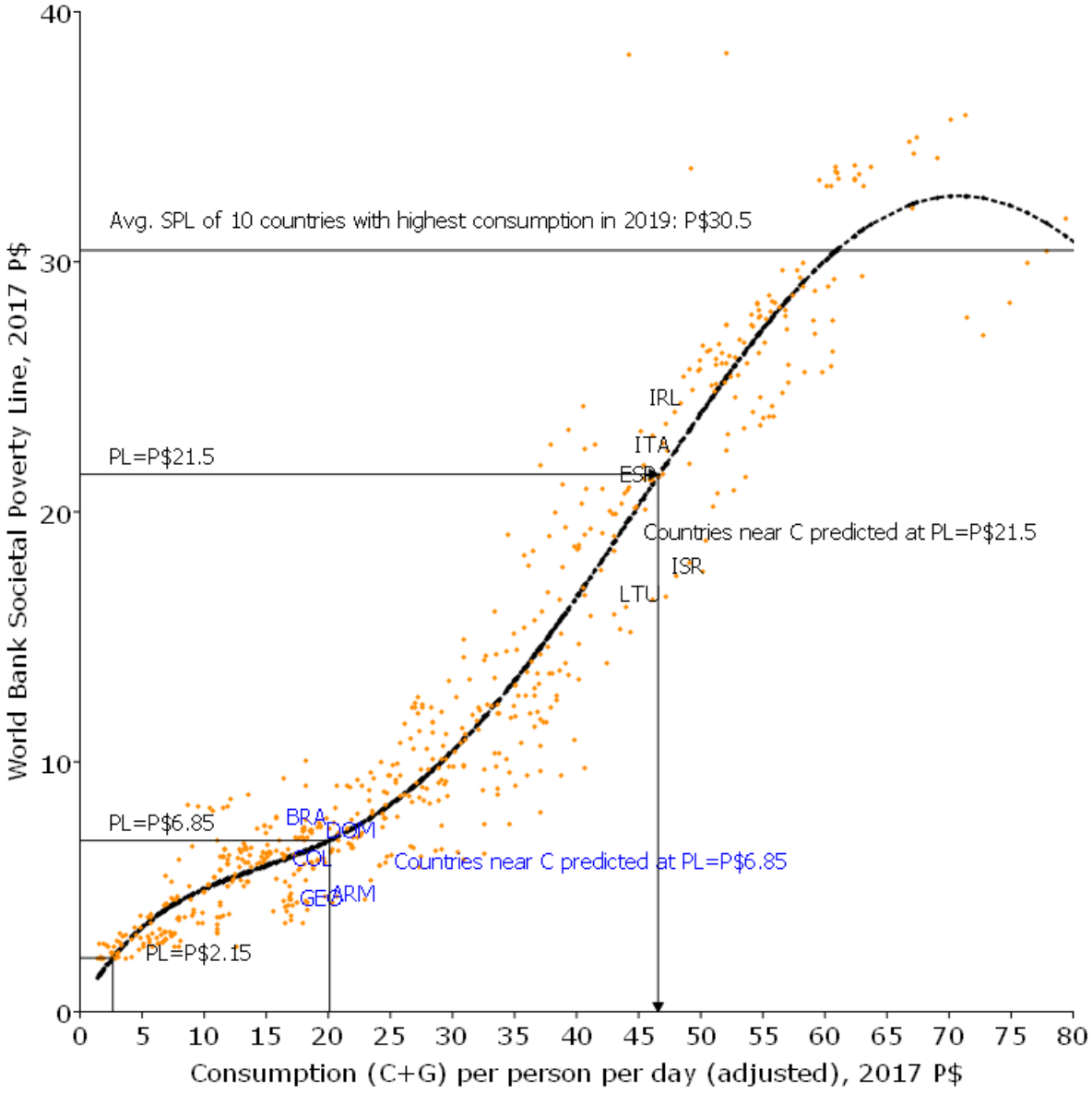
The most compelling objection to adopting some function of rich country poverty lines as the GUBPL is that poverty lines tend to have an "absolute" component based on an achievement standard and a relative component, which depends on local conditions. Ravallion (1998) shows that answers to the question: "How much income does a household need to have a decent lifestyle?" have an absolute and a relative component and the relative component of poverty lines grows as countries get richer. The World Bank poverty data now reports "societal poverty lines" (Jolliffe and Prydz 2021, Tetteh-Baah, et. al. 2024) that equals P$1.15+.5*(country median consumption). This approach forces the degree to which the poverty line depends on the country median constant across countries.

The approach that would be symmetric to setting the 'dollar-a-day' poverty line at the poverty line of the poorest countries would be to set the GUBPL at the "average SPL of the 10 highest consumption countries." This average is P$30.5, substantially higher than P$21.5.

Figure 6 shows that P$46.7 is the level of PWT 10.1 aggregate consumption (household and government) per person per day (divided by .577 as above, to be consistent with the household consumption data) at which P$21.5 is the predicted societal poverty line. The five countries nearest this consumption level are (alphabetically): Ireland, Israel, Italy, Lithuania, and Spain. A GUBPL of P$21.5 would be the typical poverty line of countries nearer lower-end of the traditionally defined "developed" countries.

In contrast, the countries with national accounts consumption levels nearest those at which P$6.85 is the predicted social poverty line are (alphabetically): Armenia, Brazil, Dominican Republic, Colombia, and Georgia. While these are upper-middle-income countries by the World Bank classification, they are not widely touted as countries representing an aspirational upper-bound of development.

Figure 6: Societal Poverty Lines and Consumption per Person Across Countries



Source: Author's calculations with World Bank's Poverty and Inequality Platform (PIP) data and Penn World Tables 10.1

Notes: The left y-axis shows the World Bank's societal poverty line which is P$1+.5(country median consumption per person per day). The x-axis shows PWT 10.1 consumption (C+G), adjusted for the typical discrepancy of macroeconomic and household reported consumption. SPL: societal poverty line; PL: poverty line. The average societal poverty line of the 10 highest consumption countries (which is the symmetric counterpart to how 'dollar a day' was reached as the GLBPL) is P$30.5. Countries with consumption near the level predicted by a poverty line of P$21.5 are countries near the bottom range of the high-income countries (Spain, Italy, Lithuania). Countries with consumption near the level predicted by a poverty line of P$6.85 are in the upper-middle-income range (Colombia, Brazil, Georgia).*

III. Implications of the GUBPL

Our estimates of a GUBPL engage in a long-standing and important debate about the normative core of development. Normative framings affect both how global and national actors nominate, evaluate, and select projects, programs, and policy actions and directly and indirectly influence the research agenda of development economics.

III.A) The Radical Inclusiveness of the GUBPL

We recognize that the implications of a GUBPL of P$21.5 are radical. Figure 7 shows the association between the 2020 headcount poverty rates at a GLBPL of P$2.15, the GUBPL of P$21.5, and a recently adopted World Bank measure of "shared prosperity," the Prosperity Gap at P$25 (PG25), a distribution-sensitive welfare measure (eq. 9) proposed by Kraay et al. (2025) based on its satisfying a set of welfare axioms and simplicity principles. A country's prosperity gap is the average across all individuals in a country of the factor by which their incomes (y_i) would need to be multiplied to reach a reference income, z, in this case P$25. A larger prosperity gap means distribution-weighted incomes are lower (so, like poverty measures, "larger is worse").

$$9)\ W(y;\ z) = \frac{1}{N}\sum_{i=1}^{N} z/y_i$$

The poverty estimates converge to near zero for the lowest Prosperity Gap countries, like Denmark (12th best PG) and converge towards one at very high levels for the highest Prosperity Gap countries like Malawi (181st of 187 in PG ranking), whose headcount is 70 percent at 'dollar-a-day' and 99.9 percent at the GUBPL. But for Pakistan, which is a World Bank lower middle-income country and has the 130th worst Prosperity Gap of 187 countries, very few are GLBPL poor, just 4.8 percent, whereas nearly everyone, 99.4%, are GUBPL poor. In Türkiye, a World Bank upper-middle-income country, the poverty rate is 0.4 percent at a GLBPL but 59 percent at a GUBPL.

While some might object that a range this large makes the word "poverty" meaningless, we think exactly the opposite: poverty is made *more* meaningful by being clear and precise and differentiating its range of meanings. Everyone agrees that an outdoor temperature of 45℃ (113 ℉) is a hot day. But if the relevant question is: "hot enough to melt steel?" then 45℃ is far too cool and the difference between 0, 45, and 100 doesn't matter.

The poverty line is a social construct and hence national poverty lines vary according to national conditions. The "society" for the construct of any global poverty line, the relevant epistemic community, are the people, governments, and organizational actors engaged in development policy, practice and research. There is agreement on the need for more than one poverty line to encompass the range of used and useful meanings of 'global poverty' (even when poverty is limited to money-metric measures).

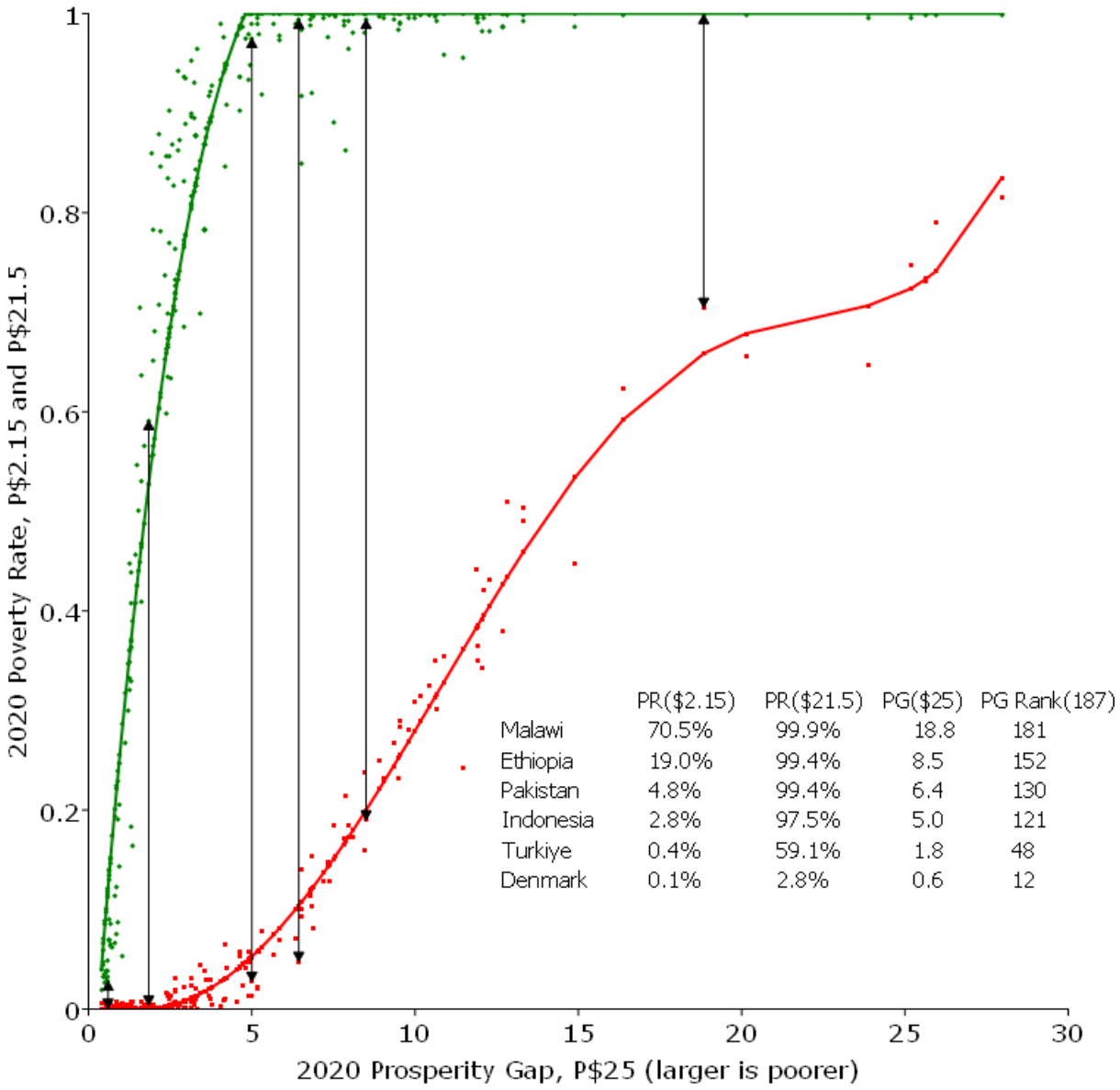
A GLBPL defines one meaning of poverty: absolute material deprivation that is globally very severe, described as 'extreme' poverty or by terms like 'destitution' or 'poorest of the poor' or 'chronic poor'. GLBPL-based measures are meant to be sharply limited and exclusive.

At the same time, the global development community has widely accepted that this is not the only legitimate meaning of the word 'poverty.' Indeed, the Sustainable Development Goals embrace the reduction of poverty "in all its forms" and include an SDG target (1.2) based on reduction of poverty at national poverty lines. The World Bank has been reporting global poverty based on a range of global poverty lines for some time. Our goal was to estimate a GUBPL such that "not GUBPL poor" meant "prosperous" and implies the household/individual is not in serious material deprivation. Since the target discourse community is global, the GUBPL should reflect global possibilities and conditions and whether or not a person is GUBPL poor should not depend on the person's birth or current residence.

We defined a pair of analytical criteria for a GUBPL and the distance between the GLBPL and the resulting GUBPL is determined by our method. Given either of the criteria of achieving a globally adequate level of well-being or reaching "near enough to satiation" the GUBPL depends on the empirically estimated curvature of the relationship between well-being and consumption expenditures. A smaller gap in headcount rates between the GLBPL and GUBPL can be achieved only by either (i) lowering the standards of living that define "prosperity" or (ii) raising the marginal gain to well-being considered "near enough" to satiation.

In contrast, the current "high" poverty lines used by the World Bank are *ad hoc* and not linked to any particular specification of the standards of living or marginal gains to consumption at those lines. That is, one could choose a set of countries' national poverty lines (or social poverty lines) and take the average of that group of countries as the "high" poverty line but, as we have shown, that leaves the standard of living achieved and marginal gains at some arbitrary level. The World Bank "high" level of P$6.85 consistently, across different measures of well-being, does not address the serious normative limitations of GLBPL poverty measures and exclude people with low standards of living and high marginal gains to consumption.

Figure 7: Poverty Rates at the GLBPL (P$2.15) and GUBPL (P$21.5) by Prosperity Gap



Source: Author's calculations with the World Bank's Poverty and Inequality Platform (PIP) data.

Notes: The x-axis shows the prosperity gap (at P$25). The y-axis shows the poverty rate. PR($2.15): Poverty Rate at P$2.15; PR($21.5): Poverty Rate at P$21.5; PG($25) (Prosperity Gap at P$25); PG Rank (187): Rank of 187 countries by PG($25) from worst (187) to best (181). The solid lines are predicted values from a quintic regression of poverty rates on the prosperity gap, which, for the GUBPL, is truncated above at 1 for all countries for PG>$4.8. Using the GLBPL (P$2.15) in many countries, almost no one is poor whereas using a GUBPL (P$21.5) in many countries, nearly everyone is poor.

III.B) The World Bank and a GUBPL

Are there practical and operational implications of a GUBPL for development actors? Addressing that question with precision and rigor would be an entirely separate paper (if not tome) so we will just provide an illustrative narrative of how the World Bank might benefit from the adoption of the use of a GUBPL, alongside the use of the already existing poverty lines and its new shared prosperity measure, the Prosperity Gap.

The distribution of the gains from economic growth has been incorporated into World Bank analysis and practice for over 50 years. In the 1960s and 1970s Robert McNamara, President of the World Bank from 1968 to 1981, de-emphasized GDP as a proxy and advocated a "Basic Needs" approach which incorporate absolute poverty, multiple indicators of deprivation (e.g. malnutrition, child mortality) and the distribution of gains from growth[21]. A major publication by the World Bank in 1974 was *Redistribution with Growth* (1974) led by the World Bank's first Chief Economist Hollis Chenery and included Montek Ahluwalia, Clive Bell, John Duloy and Richard Jolly as co-authors. This report explicitly rejected GNP as a measure or adequate proxy for well-being and proposed assessing development progress with social welfare measures reflecting the distribution of growth across income groups. An important objective of the report was to bring these concerns into World Bank operations. In 1975 the World Bank published a handbook for cost-benefit analysis of its projects Economic Analysis of Projects (Squire and van der Tak 1975) which recommended project cost-benefit analysis weigh the gains from the project by the income of the beneficiaries.

The World Development Report 1990 on poverty, in which the 'dollar-a-day' poverty line was first used, articulated a two-part strategy for poverty reduction: "labor-intensive growth" and "investing in human capital." While the Report recommended some targeted programs for specific groups (children, elderly, chronically) these were explicitly *not* part of the two-part strategy for poverty alleviation.[22] The World Development Report on Poverty emphasized the key to poverty reduction was "sustainable economic growth with equity." The 'dollar-a-day' poverty line and poverty estimates were considered at the time just a means of producing a "headline" number of the world's poor to illustrate the magnitude of the challenge but the specifics of the poverty line played no real role in the two-part strategy.

Over time the 'dollar-a-day' threshold came to be taken more literally. The Millennium Development Goal adopted it for is poverty reduction goal. A "Make Poverty History" movement around the G8 meetings in 2005 got enormous attention. A number of high-profile popular books about development adopted the premise of development as about reducing low-

[21] At the 1973 World Bank Annual Meetings McNamara said: "*…we can no more measure the achievement of multiple development objectives by the GNP alone than we can describe the quality of life in a city exclusively by its size. The Gross National Product is an index of the total value of goods and services produced by an economy; it was never intended to be a measure of their distribution."*

[22] See World Bank President Barber Conable's announcement of the report. (here).

bar poverty: *The End of Poverty* (Sachs 2005), *The Bottom Billion* (Collier 2007), *Creating a World Without Poverty* (Yunus 2008), *Poor Economics* (Banerjee and Duflo 2011).

In April 2013 Jim Kim announced that the World Bank had twin goals: "ending extreme poverty" and "shared prosperity." This, explicitly adopted the 'dollar-a-day' poverty line as the World Bank's key definition of global poverty. The operational measure for "shared prosperity" was the growth of the incomes of a country's bottom 40 percent.

This 'twin goals' approach was a substantial departure for the World Bank. The World Bank's Articles of Agreement mention "productivity" six times and never mention poverty (Pritchett 2014). Prior to this the general (if not consensus) stance had been "reducing poverty generally (and ending extreme poverty in particular) will be one of the many beneficial consequences of sustained, inclusive-enough, economic growth." The "twin goals" were a near complete reversal of this approach as "ending extreme poverty" was the central goal and economic growth was considered as just one of many instruments available to accomplish that goal.

The embrace of "ending extreme poverty" and "shared prosperity" defined in a reasonable, but ad hoc, way as the defining "twin goals" of the World Bank created six conundrums.

First, these new goals opened up divisions within the World Bank's managing Executive Board between the Part I (donor) and Part II (borrowing) countries. The impetus to narrow the objectives of development to low-bar targets was not the result of initiative or advocacy from the borrowing countries but rather reflected shifting domestic and geo-politics among the Part I (donor) countries.

Second, the World Bank had two primary lending instruments, IBRD (International Bank for Reconstruction and Development) lending which charged interest rates which were a mark-up over the IBRD's cost of borrowing and IDA (International Development Association) loans, which had long re-payment periods and very low interest rates and hence were largely concessional. In 2012, the year before the twin goals, IBRD commitments were $20.6 billion and IDA commitments $14.8 billion. Only IDA (or blend) countries can borrow at the concessional rates and countries "graduate" from IDA when they cross an income threshold. All this implied that the goal of "ending extreme poverty" was not a big agenda of governments doing IBRD borrowing as extreme poverty in these countries was already low. Ending extreme poverty therefore was not a goal that applied easily to most of the World Bank's actual lending, and explicitly not to the part of the lending at interests rates that covered costs.

Third, it created enormous tension between two key rhetorics of development assistance. The Paris Principles for effective development assistance emphasized a partnership between countries and donors with five principles: *Ownership, Alignment, Harmonization, Managing for Results, and Mutual Accountability*. Countries that had national poverty lines higher than extreme poverty (as, by construction, nearly all of them did) did not "own" a lower poverty line. Governments generally need to have very broad development agendas and strategies and the

World Bank could not have it both ways, that the World Bank aligned behind strategies that governments owned and pursued two goals.

Fourth, these twin goals at the strategic level could not line up easily with operational tactics and the practices of the design and evaluation of projects, programs, and policies. The ideal of cost-benefit analysis of lending based on distributionally adjusted gains from the funding activities was consistent at the micro-economic level with an organizational strategy of "redistribution with growth" or "growth with equity" or "inclusive growth." But "ending extreme poverty" taken to the micro level creates near impossible demands to reach cost-effectiveness. One could rarely justify a project with its benefits to the extreme poor or even the bottom 40 percent alone unless the project was both very sharply targeted (in ways that are politically and administratively difficult to achieve in practice) and quite effective. If one took the twin goals literally then all benefits from Bank-funded activities that went to anyone above the 40th percentile were "leakage" which was obviously inconsistent with sensible evaluation as the marginal gains to well-being to those at the 41st percentile was, by continuity, nearly equal (Skoufias and Coady 2007).

Fifth, the twin goals at best muddied the waters about whether growth in the incomes of the poor was due to productivity gains or due to tax and transfer schemes to equalize incomes with post-market interventions. Rodrik's (2025) article "On Productivism" emphasizes that economics too easily slid into a mode that emphasized pre-market enhancements of assets (e.g. building human capital) and post-market supplements to market incomes but ignored that productivity and generation of wages and incomes via the market process was crucial to growth of the broad middle class. Large parts of country productivity growth are improvements that are 'in the air,' and not just the result of accumulations of specific capitals, and productivity growth (and its distribution) is a product of how well the economy operates.

Sixth, an emphasis on "extreme poverty" does not place the World Bank in a position to be an effective advocate for their borrowing members on global issues. Just one example. A recent World Bank study (Hallegate et al. 2023) claimed the needs for additional carbon emissions to support the growth necessary to eliminate extreme poverty were near trivial, only a 4.9 percent increase in emissions by 2050[23]. This was true only of extreme poverty; reaching even the poverty line of P$6.85 would raise emissions by almost ten times as much, 45.9 percent. As the authors say: "The challenge to align the world's development and climate objectives is not in reconciling extreme poverty alleviation with climate objectives but in providing middle-income standards of living in a sustainable manner." But, of course, the real goal of all of World Bank's borrowing countries is to have at least "middle-income standards of living" (and the donor countries already have more than this standard of living and definitely do not want less).

The current World Bank President Ajay Banga has shifted the World Bank toward a 'jobs' agenda, which is far more aligned with what governments actually want and are most

[23] "Even in this more pessimistic framing, the global emissions increase associated with eradicating extreme poverty is small, at 2.37 gigatons of equivalent carbon dioxide in 2050, or 4.9 percent of 2019 global emissions. Therefore, the need to eradicate extreme poverty cannot be used as a justification for reducing the world's climate ambitions."

concerned, much more o than "ending extreme poverty" which, as Figure 7 shows, most countries are already at low levels of extreme poverty.

One step is to shift the "shared prosperity" measure to the Kraay et al., 2025 Prosperity Gap measure, which rewards growth across the entire distribution and is an axiomatically sound welfare measure. This measure is also designed to meet as best as possible "simplicity principles" so that World Bank staff, government officials, and the relevant publics can understand why it is a good measure of concepts like "inclusive growth" or "shared prosperity."[24]

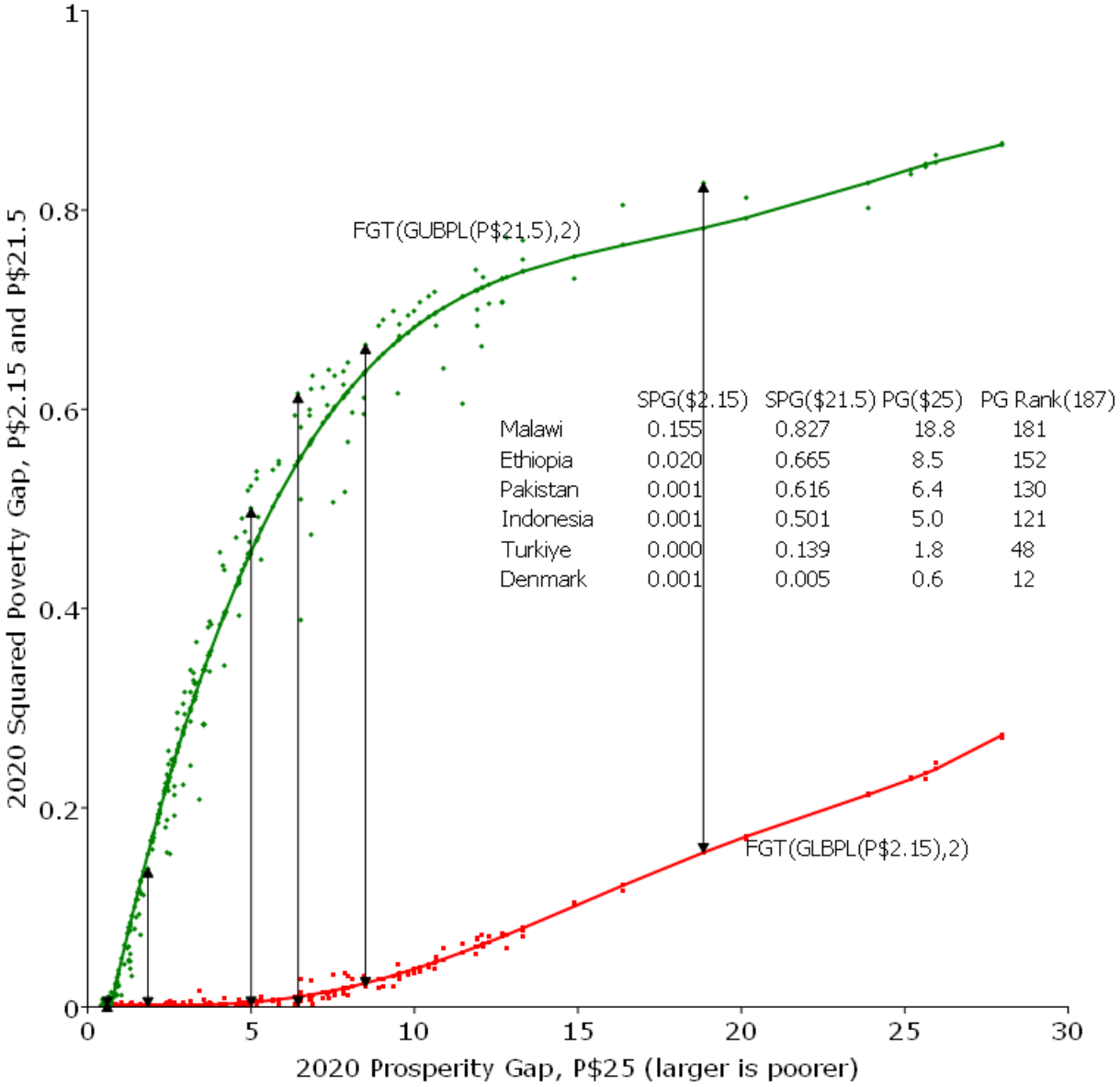
The second step is to acknowledge that every World Bank borrowing country will want a development strategy to reduce at least three measures of poverty: extreme poverty (GLBPL), poverty at the national poverty line, and lack of prosperity poverty (GUBPL). The first can be addressed by targeted programs, the second is of country policy relevance, and the elimination GUBPL poverty is a long-run aspirational goal of reaching the same income levels as the high income countries.

As part of the adoption of the high-bar poverty measure there are two elements. First is using the headcount poverty at a GUBPL to say: "every country and government the World Bank works with has a very substantial amount of global poverty." Second is acknowledging that a headcount measure that just says "about everybody is poor" is not that helpful and does not match into the detailed questions of choosing and prioritizing actions. But the headcount measure at any poverty live is not a good welfare indicator as it is not sensitive to the distribution above or below the poverty line. But a Poverty Gap (FGT(GUBPL,α=1)) or Squared Poverty Gap (FGT(GUBPL,α=2) poverty measures do suggest the use at least some form of income weights for cost-benefit analysis (even if not exactly those in the poverty measures).

Figure 8 shows that the Prosperity Gap(P$25)-FGT(P$21.5,α=2) relationship is not a tautology: they are different measures but, not surprisingly, they are very closely associated. There is a meaningful poverty agenda at standard poverty measures with a GUBPL for every World Bank Part II country as even Türkiye, with a PG(P$25) of 1.8 (48th best of 187), has a Squared Poverty Gap (FGT(P$21.5, α=2)) of .139 and is on a steep part of the curve where higher prosperity lowers squared gap poverty. Whereas at the GLBPL even Pakistan, with a Poverty Gap (P$25) of 6.4 (130th worst of 187) has a Squared Poverty Gap (FGT(P$21.5, α=2)) of only .001 (and the relationship at that point remains relatively flat).

[24] Although the Prosperity Gap measure as reported by the World Bank includes individuals over the reference income of P$25 and hence is a measure over the entire distribution (and many high income countries have a prosperity gap less than one), as Kraay et al. (2025) point out, if this measure were truncated at the reference income it would be a focus axiom compliant poverty measure and still be meet welfare axioms under the assumption of weak monotonicity.

Figure 8: Squared Poverty Gap at GUBPL (P$21.5) and GLBPL (P$2.15) by Prosperity Gap



Source: Author's calculations with the World Bank's Poverty and Inequality Platform (PIP) data.

Notes: The x-axis shows the World Bank's Prosperity gap (at P$25) which is the average multiple each individual's income in a country would need to be multiplied by to reach P$25. The y-axis shows the Squared Poverty Gap (at the GLBPL of $2.15 and at the GUBPL of $21.5). The following acronyms are used in the figure: FGT(GLBPL(P$2.15),2): Squared Poverty Gap at P$2.15); FGT(GUBPL(P$21.5),2): Squared poverty gap at P$21.5. The solid lines are predicted values from a quintic regression of squared poverty gap on the prosperity gap. The figure shows that the Squared Poverty Gap is very low, even for poor countries like Ethiopia and Pakistan whereas the Squared Poverty Gap at GUBPL is significant for most countries and has a smooth upward non-linear relationship with the Prosperity Gap.

This shift of the twin goals to: (i) "reduce poverty in all its forms" (which is already SDG 1) with poverty measures for extreme, national, and lack of prosperity and (ii) expand shared prosperity, measured as the Prosperity Gap at P$25, which counts progress across the entire distribution of income (with diminishing weight) provides both continuity but also the basis to reduce the conundrums of the previous goals. These goals more nearly represent what even moderately benign Part II country governments want. Governments can own strategies for these goals, and the World Bank can be an actual partner. This justifies continued large levels of IBRD lending. The strategic-to-tactic gap is, if not seamless, can at least be stitched together as both approaches use income weights in ways that could be replicated in evaluative analysis of actions. The expansiveness of the goals makes clear that the improvements in productivity (and asset accumulation) have to be economy-wide, as one cannot "redistribute" one's way from poverty to prosperity in any developing country. Finally, these goals put the World Bank on the borrowing countries' side in global debates about the fairness of treatment in global policies.

Conclusion

There is a wide consensus that the 'dollar-a-day' standard, updated for inflation, serves well its original purpose of setting the threshold for the *lowest* a global poverty line could be. But, it is hard to understand how a standard that *excludes* from *any* concern most of the people on the planet ever seemed like progress. This is especially as existing approaches to development had, since the 1970s at least, incorporated both growth and inequality into definitions of progress out of concern for a broad concept of benefits to the poor.

This paper proposes an approach of setting a global upper-bound poverty line (GUBPL) as the most *inclusive* plausible definition of global poverty. Even though any poverty line is a political and social construct, applying economics can help. Any proposed GUBPL needs to acknowledge three features of the relationship between general empirical measures of material well-being and consumption: (i) there is no line (no discontinuities), (ii) in the global poverty relevant ranges there is no satiation of general well-being in income/consumption, and (iii) the relationship of many well-being indicators with income is concave. These three facts, true of every measure used in this paper, has implications for the criteria for GUBPL and the empirical intuition about its level.

Our proposed GUBPL of P$21.5 puts development actors and development economics back onto more solidly grounded economics. Using alongside measures of extreme poverty and national poverty lines the GUBPL used in a variety of poverty measures, enables an inclusive and distribution sensitive, normative core.

References

Acland, Daniel J. and David H. Greenberg (2023) "Distributional weighting and welfare/equity tradeoffs: a new approach," Journal of Benefit-Cost Analysis;14(1):68-92. doi:10.1017/bca.2023.5.

Alkire, Sabina, and James Foster. "Counting and Multidimensional Poverty Measurement." Journal of Public Economics 95, no. 7 (2011/08/01/ 2011): 476-87. https://dx.doi.org/https://doi.org/10.1016/j.jpubeco.2010.11.006.

Alkire, Sabina, U. Kanagaratnam, and N. Suppa. "The Global Multidimensional Poverty Index (Mpi) 2021." OPHI MPI Methodological Note 51, Oxford Poverty and Human Development Initiative, University of Oxford. (2021). https://ophi.org.uk/mpi-methodological-note-51/.

Banerjee Abhijit and Ester Duflo (2011) *Poor Economics: A Radical Rethinking of the Way to Fight Global Poverty*, New York, NY: PublicAffairs.

Bergstrom, Katy and William Dodds (2023) "Using schooling decisions to estimate the elasticity of marginal utility of consumption," Journal of Public Economics, Volume 224, 104948, https://doi.org/10.1016/j.jpubeco.2023.104948.

Bhalla, Surjit S. (2002) "Imagine there's no Country: Poverty, Inequality and Growth in the Era of Globalization," Washington, DC: Institute for International Economics.

Clemens, Michael and Lant Pritchett. "Income per Natural. Measuring Development for People rather than Places." Population and Development Review, 34, 3 (September 2008): 395-434. https://doi.org/10.1111/j.1728-4457.2008.00230.x.

Collier, Paul (2007) "The Bottom Billion: Why the Poorest Countries Are Failing and What Can Be Done About It," Oxford, UK: Oxford University Press.

Deaton, Angus, and Daniel Kahneman (2010) "High Income Improves Evaluation of Life but Not Emotional Well-Being." PNAS 107 no. 38: 16489-93. https://dx.doi.org/10.1073/pnas.1011492107.

Evans, David J. "The Elasticity of Marginal Utility of Consumption: Estimates for 20 Oecd Countries." Fiscal Studies 26, no. 2 (2005): 197-224. Accessed 2025/10/27/. http://www.jstor.org/stable/24440019.

Feenstra, Robert C., Robert Inklaar, and Marcel P. Timmer. 2015. "The Next Generation of the Penn World Table." American Economic Review 105 (10): 3150–82.

Fields, G. S. (1980). Poverty, Inequality, and Development. Cambridge University Press.

Filmer, Deon, and Lant Pritchett. "Estimating Wealth Effects without Expenditure Data—or Tears: An Application to Educational Enrollments in States of India." Demography 38, no. 1 (2001): 115-32.

Foster, J. E. (1984): "On Economic Poverty: A Survey of Aggregate Measures," Advances in Econometrics, 3, 215-251.

Foster, J. E., and Shorrocks, A. F. (1988). “Poverty Orderings.” Econometrica, 56(1), 173–177.

Foster, James, Joel Greer, and Erik Thorbecke (1984) "A Class of Decomposable Poverty Measures," Econometrica 52, no. 3: 761-766. https://dx.doi.org/www.jstor.org/stable/1913475.

Greer, Joel and Erik Thorbecke (1986) “A methodology for measuring food poverty applied to Kenya,” Journal of Development Economics, Volume 24, Issue 1, pp. 59-74 https://doi.org/10.1016/0304-3878(86)90144-6.

Hallegatte, Stéphane, Philip Wollburg, and Daniel Mahler. "The Climate Implications of Ending Global Poverty." World Bank Policy Research Working Paper 10318 (2023). https://dx.doi.org/10.21203/rs.3.rs-2570491/v1.

India Human Development Survey 2012 – Indian Human Development Survey (IHDS) Series - https://www.icpsr.umich.edu/web/DSDR/studies/36151.

Jolliffe, Dean and Espen Beer Prydz 2021. "Societal Poverty: A Relative and Relevant Measure." World Bank Economic Review, 35, 1 (February 2021): 180-206. https://doi.org/10.1093/wber/lhz018.

Jolliffe, Dean, and Samuel Kofi Tetteh-Baah (2024) “Identifying the poor – Accounting for household economies of scale in global poverty estimates,” World Development, Volume 179, 106593, https://doi.org/10.1016/j.worlddev.2024.106593.

Killingsworth, Matthew A. Experienced well-being rises with income, even above $75,000 per year, Proc. Natl. Acad. Sci. U.S.A. 118 (4) e2016976118, https://doi.org/10.1073/pnas.2016976118 (2021).

Killingsworth, Matthew A., Daniel Kahneman, and Barbara Mellers. "Income and Emotional Well-Being: A Conflict Resolved." Proceedings of the National Academy of Sciences 120, no. 10 (2023/03/07 2023): e2208661120. Accessed 2025/10/03. https://dx.doi.org/10.1073/pnas.2208661120.

Kraay, Aart; Lakner, Christoph; Özler, Berk; Decerf, Benoit; Jolliffe, Dean; Sterck, Olivier; Yonzan, Nishant (2023) “A New distribution sensitive index for measuring welfare, poverty, and inequality,” World Bank.

Layard, R., G. Mayraz, and S. Nickell. "The Marginal Utility of Income." Journal of Public Economics 92, no. 8 (2008/08/01/ 2008): 1846-57. https://dx.doi.org/https://doi.org/10.1016/j.jpubeco.2008.01.007.

Miguel, Edward, and Michael Kremer. "Worms: Identifying Impacts on Education and Health in the Presence of Treatment Externalities." https://doi.org/10.1111/j.1468-0262.2004.00481.x, Econometrica 72, no. 1 (2004/01/01 2004): 159-217. Accessed 2022/11/17. https://dx.doi.org/https://doi.org/10.1111/j.1468-0262.2004.00481.x.

Muralidharan, Karthik, and Paul Niehaus. "Experimentation at Scale." Journal of Economic Perspectives 31, no. 4 (2017): 103-24. https://dx.doi.org/10.1257/jep.31.4.103.

Orshansky, Mollie (1965) "Counting the Poor: Another Look at the Poverty Profile," Social Security Bulletin 28, no. 1: 3-29.

Pattanaik, P. K., and Sengupta, M. (1995). An alternative axiomatization of Sen's poverty measure. Review of Income and Wealth, 41(1), 73-80.

Pradhan, Menno, Asep Suryahadi, Sudarno Sumarto, and Lant Pritchett (2001) "Eating Like Which "Joneses?" an Iterative Solution to the Choice of a Poverty Line "Reference Group," Review of Income and Wealth 47, no. 4: 473-87. https://dx.doi.org/https://doi.org/10.1111/1475-4991.00030.

Pritchett, Lant. "Unboiling the Frog: Can the World Bank Legally Adopt "Ending Extreme Poverty" as a Goal?", 2014. https://www.cgdev.org/blog/unboiling-frog-can-world-bank-legally-adopt-%E2%80%9Cending-extreme-poverty%E2%80%9D-goal.

Pritchett, Lant. "Who Is Not Poor? Dreaming of a World Truly Free of Poverty." The World Bank Research Observer 21, no. 1 (2006): 1-23. Accessed 2021/06/10/. http://www.jstor.org/stable/40282341.

Pritchett, Lant and Addison Lewis. "Economic Growth Is Enough and Only Economic Growth Is Enough", 2023. Unpublished manuscript.

Pritchett, Lant and Marla, Spivack (2013) "Estimating Income / Expenditure Differences across Populations: New Fun with Old Engel's Law," Center for Global Development Working Paper No. 339, 2013.

Ravallion, Martin (1998) "Poverty Lines in Theory and Practice. Living Standards Measurement," Study Paper 133. Washington DC: World Bank.

Ravallion, Martin, Gaurav Datt, and Dominique van de Walle, 1991, "Quantifying Absolute Poverty in the Developing World," Review of Income and Wealth 37: 345-61.

Rodrik, Dani (2007) "One Economics, Many Recipes: Globalization, Institutions, and Economic Growth," Princeton, NJ: Princeton University Press.

Roser, Max. 2021. " Global Poverty in an Unequal World: Who Is Considered Poor in a Rich Country? And What Does This Mean for Our Understanding of Global Poverty?" Published online at OurWorldinData.org. Retrieved from: 'https://ourworldindata.org/higher-poverty-global-line' [Online Resource].

Roser, Max. 2025. "Economic Growth, Inequality and Reducing Global Poverty." March 20, 2025 https://brewminate.com/economic-growth-inequality-and-reducing-global-poverty/.

Rosling, Hans; Ola Rosling and Anna Rosling Rönnlund (2019) "Factfulness: Ten Reasons We're Wrong About the World - and Why Things Are Better Than You Think," London, England: Sceptre.

Rowntree, Seebohm (1901) "Poverty, A Study of Town Life," New York, NY: Macmillan & Co.

Sachs, Jeffrey (2005) "The End of Poverty: Economic Possibilities for Our Time," New York: The Penguin Press.

Sen, A. K., (1976) Poverty: An Ordinal Approach to Measurement, Econometrica, 44, 219-231.

Skoufias, Emmanuel, and David P. Coady. "Are the Welfare Losses from Imperfect Targeting Important?", Economica 74, no. 296 (2007): 756-76. Accessed 2024/02/03/. http://www.jstor.org/stable/4541570.

Squire, Lyn and Herman Van Der Tak (1975) "Economic Analysis of Projects," London, UK: Johns Hopkins University Press.

Stevenson, Betsy and Justin Wolfers (2013) "Subjective Well-Being and Income: Is There Any Evidence of Satiation?" American Economic Review 103 (3): 598–604.

World Bank (1990) "World Development Report 1990: Poverty," Washington D.C.: World Bank Publication.

World Bank (2025). June 2025 Update to the Poverty and Inequality Platform (PIP). Global Poverty Monitoring Technical Note 44, Washington, DC: World Bank Publication.

Yunus, Muhammad (2008) "Creating a World Without Poverty: Social Business and the Future of Capitalism," PublicAffairs.

Data Appendix:

Food share data for Engel estimates

A) Distributional data (by percentiles)

The data come from four sources.

A.1) Japanese Historical Data

Data are taken from the tables for Annual Average of Monthly Receipts and Disbursements per Household that are available each year from 1951 to 2007. We use the ratio of Food Expenditure to Living Expenditure.
This is presented by quintile group for Workers Households ("workers" are non-agricultural, forestry or fishery) with households of two or more members.

Although the data are annual we only use one observation per decade, producing six observations from 1951-2001.

A.2) ILO Data

Downloaded from LABORSTA, the International Labour Organization (ILO) Labor Statistics Data Base, from the topic "Household Income and Expenditure Statistics" Table H2 "Distribution of Household Expenditure Groups" which is compiled from various sources and includes data on expenditure shares on "Food and non-alcoholic beverages" in total expenditure (consumption and non-consumption (e.g. taxes)). The expenditure groups for which food share and total expenditure was reported were deciles, quartiles, or survey specific ranges. The data was extracted in 2013 and includes data from 1998 to 2004 and data for 44 different countries.

A.3) FAO

From a publication of the FAO in 1981 we recover estimates of food expenditures and total expenditures and hence food shares from 26 countries, by various income groups (either percentiles or survey specific categories). The data are for the period between 1969 and early 1980s.

A.4) US Consumption expenditures

The data for the USA for 2017 are from the Consumer Expenditure Survey, Table 1110. Deciles of income before taxes: Annual expenditure means, shares, standard errors, and coefficients of variation.

B) Cross national data

The cross-national data is based on country averages. The data is from the FAO and ILO sources above, plus data from the LIS/Eurostat, a paper by Hoyos and Lessen (2008), data from the LSMS, and some we collected directly from national sources.

Minimal Conditions of Prosperity

The data on the six minimal conditions of prosperity is provided by the Demographic and Health Surveys (DHS) Program.

The data is extracted for the following indicators:

- Electricity: household has electricity,
- Improved sanitation: household has access to improved sanitation not shared with other households,
- Safe water: household has access to an improved source of drinking water,
- Completed primary: children in the household (i.e., son/daughter of household head) who are 12 years old or older have completed at least primary schooling,
- Child survival: No child born died under the age of 5,
- Child malnutrition: No child in the household less than 5 has weight for age less than -2 standard deviations of the reference group.

The following survey waves have been used for the analysis:

- Bangladesh, 2017-18
- Ethiopia, 2019
- Indonesia, 2017
- Nigeria, 2018
- Pakistan, 2017-18

Estimates of a Global Upper Bar Poverty Line

Table (Appendix): Estimates of a Global Upper Bar Poverty Line (Prosperity Line) using household data of achievement of six basic household living conditions					
Dependent variable:	All six indicators (binary)				Sum of the Six
Column	I	II	III	IV	V
Predicted probability threshold	0.9	1	.8	.9	6
Assumption about Wealth Index:	Wealth Index Assumed to have a Normal Distribution			Using actual DHS sample Wealth Index	Wealth Index Assumed Normal
Country:					
Bangladesh	29.2	34.6	23.9	23.2	25.8
Ethiopia	21.1	23.0	19.8	26.6	26.4
Nigeria	23.8	26.60	20.2	48.1	NR
Pakistan	15.7 (.74)	15.7 (.74)	15.7 (.74)	NR	16.6
Indonesia	27.7	33.5	21.9	53.8	23.8
Median	**23.8**	**33.5**	**20.20**	**40.2**	**24.8**
Notes: NR: Not reached. The "all six" regressions for Pakistan never reach the predicted value of .9 (the maximum is .74) and then turns concave. So P$15.7 is where the predicted value reaches .74 and hence is the same for any probability above .74. In Nigeria the "all six" predicted value at the Wealth Index maximum is only .65 but the slope is positive so the predicted wealth index to attain higher probabilities can be calculated.					

Results Appendix: Engel

Table RA-Engel: Estimates of Engel's Law: Regressions of food share on total consumption.						
	Data by income/consumption groups within countries		Data by income/consumption groups within countries		Cross-national averages	
	Standard Engel	Polynomial (c^{-2} to c^4)	Standard Engel	Polynomial (c^{-2} to c^4)	Standard Engel	Polynomial (c^{-2} to c^4)
Column	I	II	III	IV	V	VI
Constant	75.60	56.74	69.77	47.52	80.21	55.76
Ln(y)	-14.01		-11.91		-15.33	
c^{-2}		-11.675		-13.997		-34.959
c^{-1}		29.770		37.249		37.438
c		-1.485		-1.156		-1.068
c^2		0.017		0.014		0.000
c^3		-8.14E-05		-6.67E-05		1.78E-04
c^4		1.28E-07		1.06E-07		-1.12E-06
Country/year dummies	No	No	Yes	Yes	No	No
R-Squared	0.736	0.760	0.932	0.943	0.795	0.823
N (country, year, income group)	593	593	593	593	191	191
N country/year observations	51	51	51	51	191	191
Notes: The standard error on the estimate of ln(y) with dummy variables (column III) of -11.91 has a standard error of .331 and hence t-statistic of -35.96 and a p-level of essentially zero. Standard errors are not reported on the individual terms in consumption in the polynomial regressions, but all have p-levels less than .000 and the joint test of all income terms is the F-test, which is a function of the R2, which is very high.						

Results Appendix: MCP Regressions

Table RA: MCP-Binary (OLS). OLS regression of binary indicator for "all six" living conditions						
Variable		Bangladesh	Ethiopia	Indonesia	Nigeria	Pakistan
Wealth Index	coeff	0.448***	0.263***	0.462***	-0.054	0.202**
	std err	0.037	0.056	0.050	0.043	0.066
Wealth Index^2	coeff	-0.121***	-0.154***	-0.093***	0.019	0.035
	std err	0.018	0.028	0.017	0.018	0.037
Wealth Index^3	coeff	0.016***	0.030***	0.009***	0.002	-0.010
	std err	0.003	0.004	0.002	0.002	0.006
Household Size	coeff	-0.021***	0.000	-0.015***	-0.002***	-0.023***
	std err	0.001	0.001	0.001	0.001	0.001
Rural	coeff	0.095***	-0.004	0.076***	0.004	-0.014
	std err	0.012	0.006	0.011	0.008	0.019
Constant	coeff	-0.182***	-0.139***	-0.380***	0.036	0.104***
	std err	0.023	0.033	0.044	0.032	0.026
R-Squared		0.172	0.332	0.100	0.150	0.212
N		19457	8663	47963	40427	14540
Share outside range [0,1]		5.9%	9.8%	1.1%	10.2%	3.7%
Notes: Indonesia lacks anthropometric data on malnutrition and so the dependent variable is "all five"; The following survey waves were used in the analysis: Bangladesh 2017-18; Ethiopia 2019; Indonesia 2017; Nigeria 2018; Pakistan 2017-18. For Nigeria (10.2%) and Ethiopia (9.8%), the share of predictions outside [0,1] is non-trivial; results for these countries should be interpreted alongside the Probit estimates reported in Table RA: MCP-Binary (Probit).						

Table RA: MCP-Binary (Probit). Probit regression of binary indicator for “all six” living conditions						
Variable		Bangladesh	Ethiopia	Indonesia	Nigeria	Pakistan
Wealth Index	dy/dx	0.866***	0.386***	1.213***	0.967***	0.065***
	std err	0.054	0.079	0.086	0.117	0.121
Wealth Index^2	dy/dx	-0.302***	-0.116***	-0.316***	-0.234***	-0.161***
	std err	0.026	0.027	0.027	0.034	0.048
Wealth Index^3	dy/dx	0.038***	0.013***	0.030***	0.021***	0.016**
	std err	0.004	0.003	0.003	0.003	0.007
Household Size	dy/dx	-0.022***	0.001	-0.016***	-0.003***	-0.025***
	std err	0.001	0.001	0.001	0.001	0.001
Rural	dy/dx	0.095***	0.006	0.072***	0.001	-0.010
	std err	0.011	0.007	0.011	0.007	0.017
Pseudo R-Squared		0.173	0.449	0.084	0.209	0.182
N		19457	8663	47963	40427	14540
Notes: Indonesia lacks anthropometric data and so the regression is “all five”. The following survey waves were used in the analysis: Bangladesh 2017-18; Ethiopia 2019; Indonesia 2017; Nigeria 2018; Pakistan 2017-18. Probit coefficients reported as average marginal effects (AME) computed via the delta method. Pseudo R-Squared refers to McFadden's Pseudo R-Squared.						

Table RA: MCP-Sum. OLS regression of sum across binary indicator for each of six living conditions (values of integers 0 to 6).

Variable		Bangladesh	Ethiopia	Indonesia	Nigeria	Pakistan
Wealth Index	coeff	2.756***	2.604***	1.893***	1.099***	2.834***
	std err	0.115	0.269	0.108	0.222	0.184
Wealth Index^2	coeff	-0.954***	-0.574***	-0.441***	0.032	-0.901***
	std err	0.055	0.110	0.034	0.077	0.087
Wealth Index^3	coeff	0.112***	0.054***	0.039***	-0.019*	0.101***
	std err	0.008	0.014	0.003	0.008	0.013
Household Size	coeff	-0.080***	-0.119***	-0.031***	-0.074***	-0.060***
	std err	0.003	0.005	0.002	0.003	0.004
Rural	coeff	0.155***	-0.127*	0.111***	-0.132***	-0.035
	std err	0.027	0.064	0.017	0.030	0.033
Constant	coeff	2.865***	1.009***	1.542***	1.587***	2.787***
	std err	0.070	0.200	0.107	0.202	0.159
R-Squared		0.321	0.601	0.212	0.465	0.400
N		19457	8663	47963	40427	14540

Notes: Indonesia lacks anthropometric data and so the regression is “all five”.
The following survey waves were used in the analysis: Bangladesh 2017-18; Ethiopia 2019; Indonesia 2017; Nigeria 2018; Pakistan 2017-18.

Simulations Appendix: Log Normal Simulations

The parameters for the log-normal simulations of consumption expenditures for each country are done with a simple grid search over the two parameters of the log-normal distribution to minimize the squared error of the simulated distribution in matching four reported statistics about the distribution from the World Bank PIP web site.

The statistics reported about the consumption distribution used are:

1) The mean (in dollars a day)
2) The Gini coefficient
3) The mean less the median, which is a summary statistic of the inequality in a log-normal distribution.
4) The mean consumption of the top decile. We include this as a key summary statistic for the log-normal simulation to replicate accurately as the estimated GUBPL are all in the top end of the distribution and hence we want the simulation to be accurate at the top end.

Using these four we seek to produce a log-normal that produces an accurate estimate of the central tendency (mean), inequality (Gini and mean less median), with special weight on the upper tail.

For each pair of parameters of the log-normal we simulate a log-normal distribution with 10,000 observations.

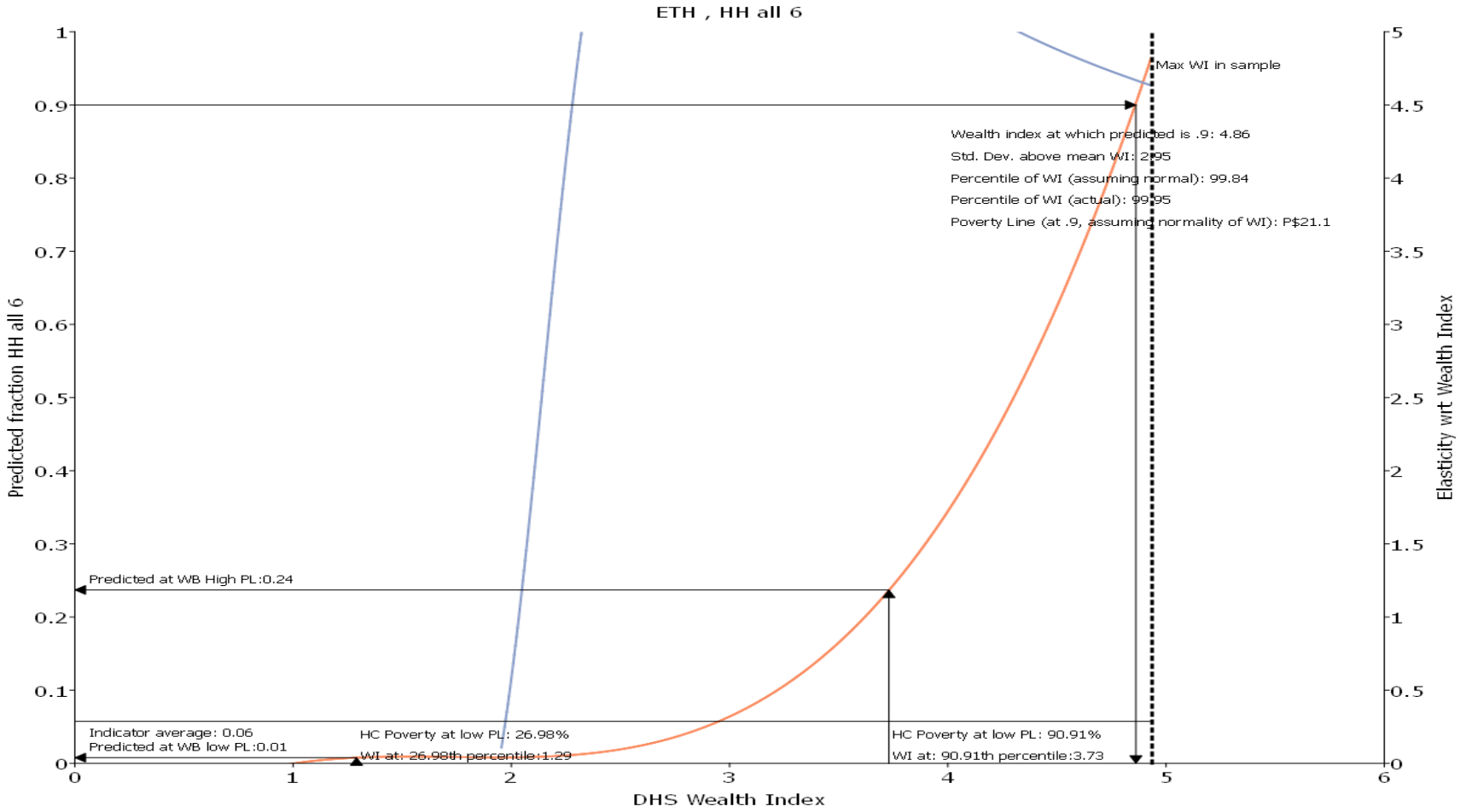
We then compute the weighted sum of the squared errors for each of the four statistics between the actual statistic and the computed value from the simulated distribution.

The grid search starts from parameters produced early just replicating the mean and Gini. From that starting point the grid is 15 steps in each direction, in units of 100ths for the parameters. We double check and in no case are the chosen parameters at the edge of the search grid.

Our default is to choose the parameters that produce the smaller sum of squares errors against each of the four reported distribution statistics equally. But we also iterate over giving the mean of the top decile more and more weight, adjusting the others, which gives roughly the same parameters.

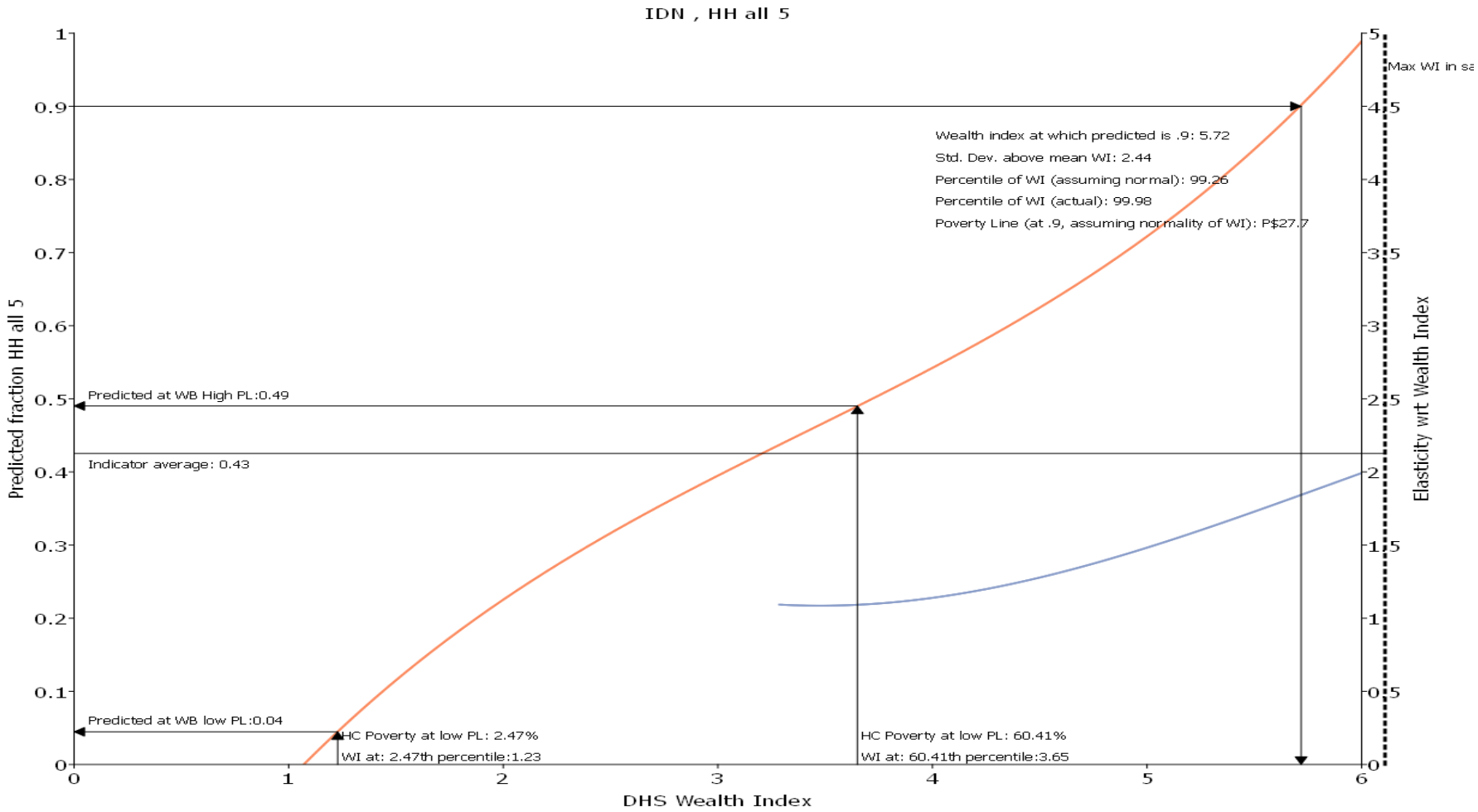
Figures Appendix: Calculating a GUBPL using six minimal conditions of prosperity (MCP)

Figure A.1: Calculating a GUBPL using Six Minimal Conditions of Prosperity (MCP), illustrated with Ethiopia



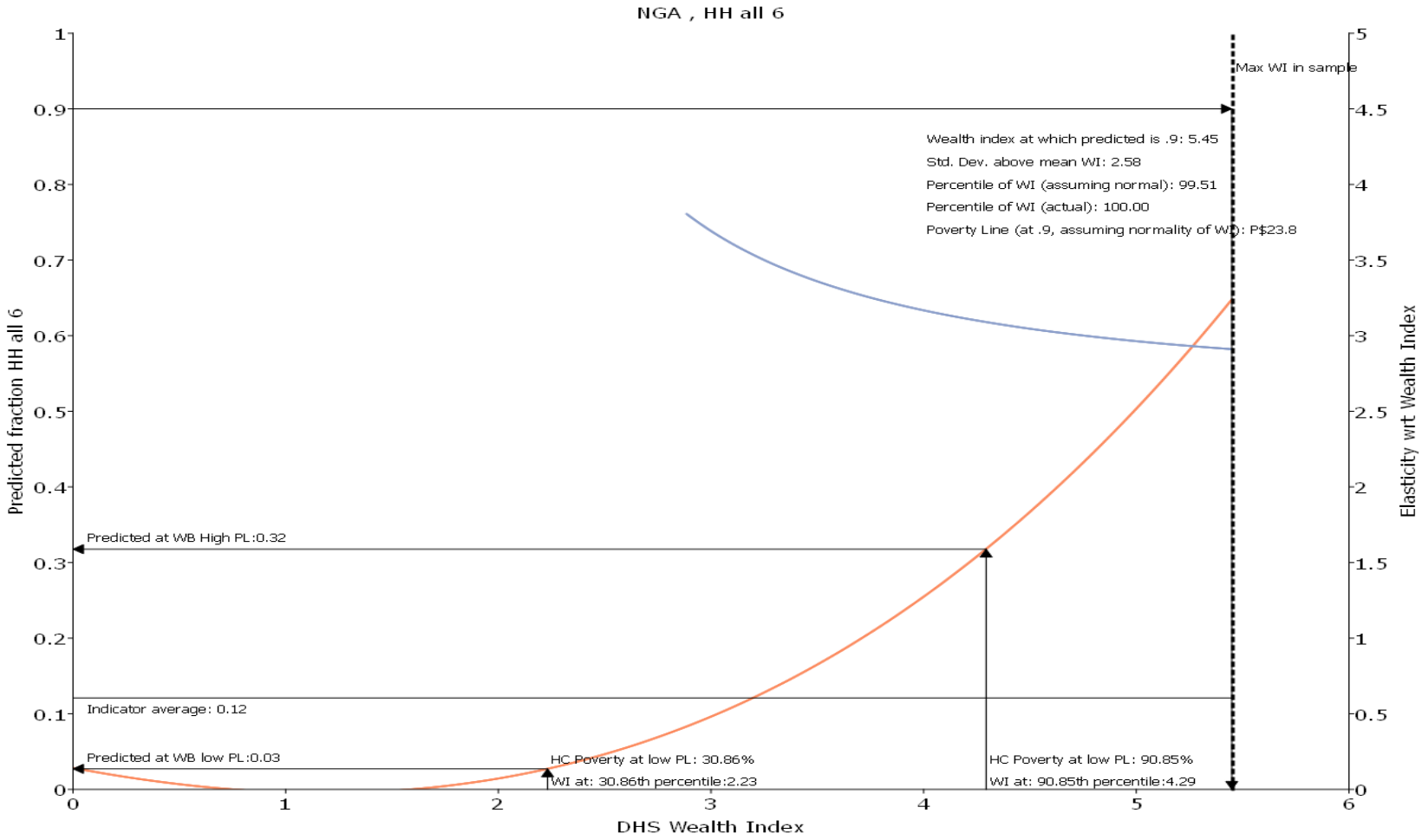
Source: Author's calculations with Demographic and Health Surveys (DHS) regressions (Results Appendix: MCP Regressions) and World Bank's Poverty and Inequality Platform (PIP) data, as described in text.

Figure A.2: Calculating a GUBPL using Six Minimal Conditions of Prosperity (MCP), illustrated with Indonesia



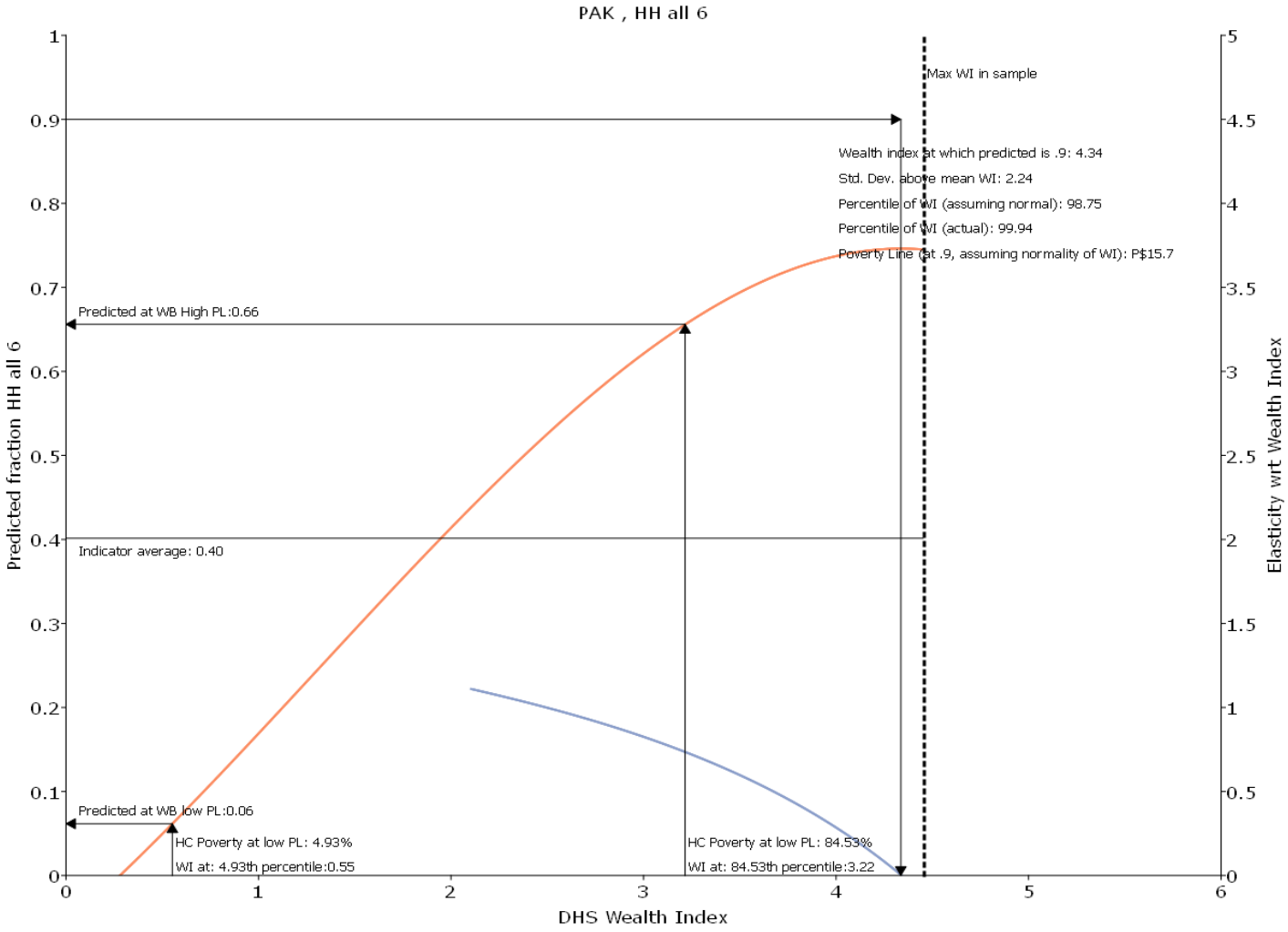
Source: Author's calculations with Demographic and Health Surveys (DHS) regressions (Results Appendix: MCP Regressions) and World Bank's Poverty and Inequality Platform (PIP) data, as described in text.

Figure A.3: Calculating a GUBPL using Six Minimal Conditions of Prosperity (MCP), illustrated with Nigeria



Source: Author's calculations with Demographic and Health Surveys (DHS) regressions (Results Appendix: MCP Regressions) and World Bank's Poverty and Inequality Platform (PIP) data, as described in text.

Figure A.4: Calculating a GUBPL using Six Minimal Conditions of Prosperity (MCP), illustrated with Pakistan



Source: Author's calculations with Demographic and Health Surveys (DHS) regressions (Results Appendix: MCP Regressions) and World Bank's Poverty and Inequality Platform (PIP) data, as described in text.