Shortfall of Domestic Resources to Eradicate Extreme Poverty

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February 11, 2024

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Abstract

JEL codes: Keywords:

Contents

1 Introduction

The very first Sustainable Development Goal (SDG) reads: "By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than \$2.15 a day". As we have passed the halfway point since the adoption of the SDGs in 2015, it is time to assess progress towards this universally accepted goal.

In this paper, I assess whether growth and domestic redistribution are sufficient to eradicate extreme poverty by 2030. I first study the effect of different growth scenarios on poverty. Then, I calculate the extent of domestic redistribution required in each country to eradicate poverty in 2030. I mobilize different indicators. I estimate the parameter of two tax policies that would raise enough revenues to eradicate poverty. In the "antipoverty cap", I fix the rate (at 100%) and find the taxation threshold. In the "antipoverty tax", I fix the threshold and find the required rate. As a last indicator, I fix both the threshold and the rate and compute the income floor that the tax could finance. In the lowest income countries, extreme poverty is estimated to persist even after strong growth and radical redistribution. This has implications for the international community, as international solidarity appears the only way to achieve the first SDG. I complete the analysis by exemplifying international transfers that would eradicate poverty by 2030.

Literature The idea to measure the domestic capacity to eradicate poverty with an antipoverty tax dates back to Ravallion (2010).[19] Ravallion then found that even with a 100% tax above the U.S. poverty line, 29 countries could not eradicate extreme poverty, or 37 countries if extreme poverty was defined with a higher poverty line. Using this higher poverty line (which corresponds to \$3.65/day in 2017 PPP \$), Bolch, Ceriani & López-Calva (2022) — hereafter "BCL" — update the computations with more recent data and find that 62 countries do not have sufficient resources to eradicate extreme poverty.[5]

The present paper employs a similar methodology to assess which countries have sufficient domestic resources to achieve the first SDG. There are three reasons why BCL cannot be used for that purpose. First, the most recent data was not available to BCL (their most recent survey year is 2012 with most years in 2009–2010, compared to 2018–2021 in the present paper). Second, BCL study that data as it stands rather than imputing growth and using it to infer the income distributions in 2030. Third, they focus on a poverty line higher than the one officially used in the first SDG.

Consistently with Ravallion (2010), Hoy & Sumner (2016) find that below a GDP per capita of $\$_{2011}$2,000 per year (in 2011 PPP \$), a country does not have the domestic capacity to eradicate extreme poverty (measured as an antipoverty tax below 50%).[9] They show that 52% of global extreme poverty can be eliminated with a 50% antipoverty tax above $\$_{2011}10$/day. They also consider the reallocation of public spending and show that this antipoverty tax together with the reallocation of fossil-fuel subsidies and military spending could eliminate 77% of global extreme poverty.

Ortiz et al. (2018) estimate the cost relative to GDP of a basic income at the national poverty line. In low-income countries, the national poverty line is on average equal to 79% of the GDP, and 8 countries have a GDP below the national poverty line (which is often itself below $2.15/day).

2 Results

2.1 Data

The percentiles of each country's post-tax income (or consumption) are estimated by the Poverty and Inequality Platform (PIP) of the World Bank (ex-PovcalNet). PIP aggregates the most recent household surveys (60% of countries were surveyed between 2018 and 2021). This data is based on purchasing power parity (PPP) and given in constant 2017 $.

In low-income countries (those of greatest interest to us), PIP provides data on the per capita *consumption* (rather than income). Thereby, the data does not capture services procured by the government. Another potential concern with household surveys is that the aggregate (national) consumption they imply is generally lower than the one estimated in national accounts.[6,18] This discrepancy comes from measurement errors on both sides: on the one hand, household surveys suffer from the underreporting of top incomes and large expenditures; on the other hand, national accounts do not properly account for informal work and tend to inflate agricultural output.[3] Furthermore, authoritarian countries have been shown to produce inflated GDP statistics, except for countries below the GDP threshold of eligibility for preferential loans by the World Bank.[14] While Household Final Consumption Expenditures (HFCE) from national accounts is 44% greater than the aggregate consumption from household surveys, the "discrepancy ratio" is largest for middle-income countries and is only 12% for low-income countries. Because household surveys are best suited to estimate consumption by the poorest, I use unadjusted PIP data in our baseline.

As a robustness check, I also re-derive our main results after adjusting aggregate consumption by the discrepancy ratio (computed using World Bank data). In line with the literature,[2,13] I impute the extra consumption to the top percentile. I do not perform the rescaling on the 15% of countries (like Burundi or the D.R.C.) with HFCE lower than its aggregate consumption from PIP, and I assume a discrepancy ratio of +12% for the 20% of countries lacking data on HFCE.

As is common in this literature,[4,7,11] my baseline assumes "balanced growth", meaning that each percentile grows at the same rate between the country's survey year and 2030. I rescale incomes by the observed growth of GDP p.c. (in PPP) up to 2022 (using World Bank data) and by different methods for the 2022–2030 period. These methods include: extending the 2014–2019 growth trend (which excludes COVID years); extending the trend for growing countries and assuming no growth when GDP p.c. has contracted between 2014 and 2019; assuming a constant growth (of either 0%, 3%, 4.5%, 6%, or 7%); using IMF forecasts[10] (extended up to 2030 by replicating the 2026–2028 forecasted growth in 2028–2030); projecting future growth using an autoregressive quadratic model that predicts the 2011–2019 growth based on the 1991-2011 growth (then applied to 2022–2030 using the 2002–2022 growth). Besides, I deviate from this two-step procedure to assess the original SDG goal, by assuming a constant growth of 7% starting in 2015.

2.2 The effect of balanced growth

To estimate global poverty rates, the World Bank scales up the percentiles measured in household surveys by the country's GDP growth between the survey year and the year of interest. I project global poverty rates and poverty gaps in 2030 using the same assumption of balanced growth (i.e., constant inequality), for a range of growth scenarios (Table 1).

My estimates of 2022 global poverty rates closely align with the 2019 estimates from the World Bank: 9% of the world population live with less than 2.15$/day, 24% below 3.65$/day, and 47% below 6.85$/day. The poverty gap is the cost that separates people below the poverty line from that line. For example, if 10% of the population earns 1.65$/day and 90% of the population earns more than 2.15$/day, the poverty gap is $0.1 \cdot (2.15 - 1.65) = 0.05$\$/day. I estimate the extreme poverty gap at 0.25% of the world GDP. This is a first approximation of what it would cost to lift everyone out of extreme poverty, defined with the $2.15/day poverty line.

Assuming that each country will continue to grow at the same rate as in the recent

Table 1: Global poverty rates and poverty gaps in 2030 under different growth scenarios. Poverty rates are expressed in % of world population and poverty gaps in % of world GDP. Poverty lines are in PPP $/day.

Growth scenario	Poverty rate (%)				Poverty gap (% of GDP)			
(Poverty line in $/day)	2.15	3.65	6.85	18.15	2.15	3.65	6.85	18.15
2022 Estimate	7.4	21.4	45.3	73.3	0.27	1.40	7.20	44.09
Trend (2014–2019)	6.3	14.4	35.3	67.2	0.19	0.84	4.28	31.14
Autoregressive projection	6.1	15.0	37.8	66.3	0.18	0.87	4.77	32.86
3% growth	5.2	15.3	38.5	68.5	0.15	0.77	4.50	31.99
7% growth	3.1	8.5	25.4	60.8	0.05	0.29	1.97	18.53
7% growth since 2015	1.1	3.1	16.5	52.5	0.01	0.08	0.76	10.38

past, I estimate that 6% of the world population will live in extreme poverty in 2030. I find very similar estimates using a simple yet realistic model to predict a country's growth (an autoregressive projection based on its growth over the last 20 years). If each country grows by 3% each year, extreme poverty would decline slightly more than in the realistic projections, at 5%. Although steady growth reduces poverty, growth alone cannot achieve the first SDG: If the world grows by 7% each year, the extreme poverty rate would still be 3% in 2030. Even if the world had experienced a 7% growth rate starting in 2015 (when the SDGs were adopted), extreme poverty would not have been completely eliminated, at 1% of the world population in 2030. As we cannot rely on growth alone to eliminate poverty, let us add domestic redistribution to the equation.

2.3 Idealized redistributive policies

Studying the arithmetics of inequality at the country level, I use the poverty gap to approximate the revenues required to eliminate poverty. More specifically, I consider taxes on top incomes to finance a transfer to the poorest that would lift them at the poverty line. I consider two types of redistributive policies to close the poverty gap: (i) an "antipoverty cap" that would establish a ceiling on top incomes (and tax income at a 100% rate above that threshold); (ii) an "antipoverty tax" that would raise a linear tax above a certain threshold.

These policies are idealized. The estimate of revenue they generate should be seen as an upper bound of what could be achieved in practice, if they were implemented. First, I ignore any costs associated with raising a tax or transferring money, as if the lowest-income countries already had sufficient administrative resources. Second, any tax (and a fortiori a 100% tax) reduces economic activity (real or declared). In this exercise, I abstract from tax distorsions and assume that the policies would not affect the taxable base.

If it were possible to expropriate top income individuals without reducing their economic activity, capping top incomes to finance an income floor would eliminate poverty at the lowest welfare cost. However, to protect private property and diminish the deterring effect on economic activity, governments would rather tax at a lower rate (than 100%) and on a broader base (starting at a threshold deemed reasonable). Therefore, both the antipoverty cap and the antipoverty tax can be thought as rough but revealing approximations of the capacity to mobilize domestic resources.

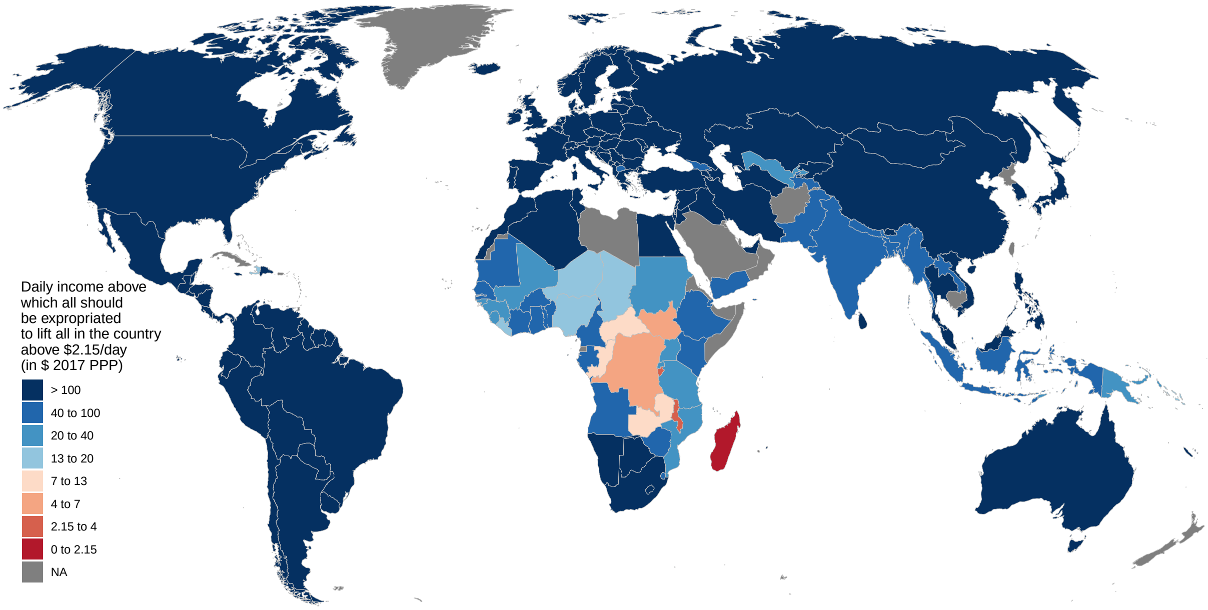
In low-income countries, we measure household consumption rather than income, meaning that we do not capture investment nor government spending. In other words, our idealized policies would leave productive investment and public services unaffected, an appropriate treatment given that these channels already contribute to growth and poverty reduction.

Unless otherwise stated, I use the scenario of balanced growth at a rate of 3%. I choose this rate as a baseline as it is an upper bound of growth rates recently experienced in the lowest-income countries. Indeed, among the 8 countries with an average consumption below 3$/day, growth was on average negative over 2014–2019 (or 2014–2022), and the highest growing country (Central African Republic) grew at a rate of 2.4% per year.

2.4 Antipoverty caps

I estimate the income cap that each country should impose to fill the extreme poverty gap with the exproriated income (Figure 1). In some countries like the D.R.C., even capping incomes at \$7/day would not suffice to raise revenues equal to the extreme poverty gap, despite a steady growth of 3% per year between 2022 and 2030. In a very optimistic scenario of 7% growth, the antipoverty cap would be \$14/day in the D.R.C. Also, note that there is no indication that the resources of this country are underestimated, as the aggregate consumption from household surveys is greater than HFCE from national accounts for the D.R.C. Besides, the D.R.C. is not the poorest country. In Madagascar, the average consumption would fall short of \$2.15/day in the baseline scenario, at \$2.02/day. This means that even with extreme redistribution, Madagascar does not have the domestic resources needed to eliminate extreme poverty by 2030. To give a last example of the shortfall of resources in the lowest-income countries, the antipoverty cap for Burundi in the scenario of 7% growth would need to be as low as 8.60$/day.

Figure 1: Income cap eradicating extreme poverty (in $/day). In this idealized policy, all income above the cap is transferred to the extreme poor and lift them at $2.15/day, assuming away distorsions, and after a yearly growth of 3% over 2022–2030.

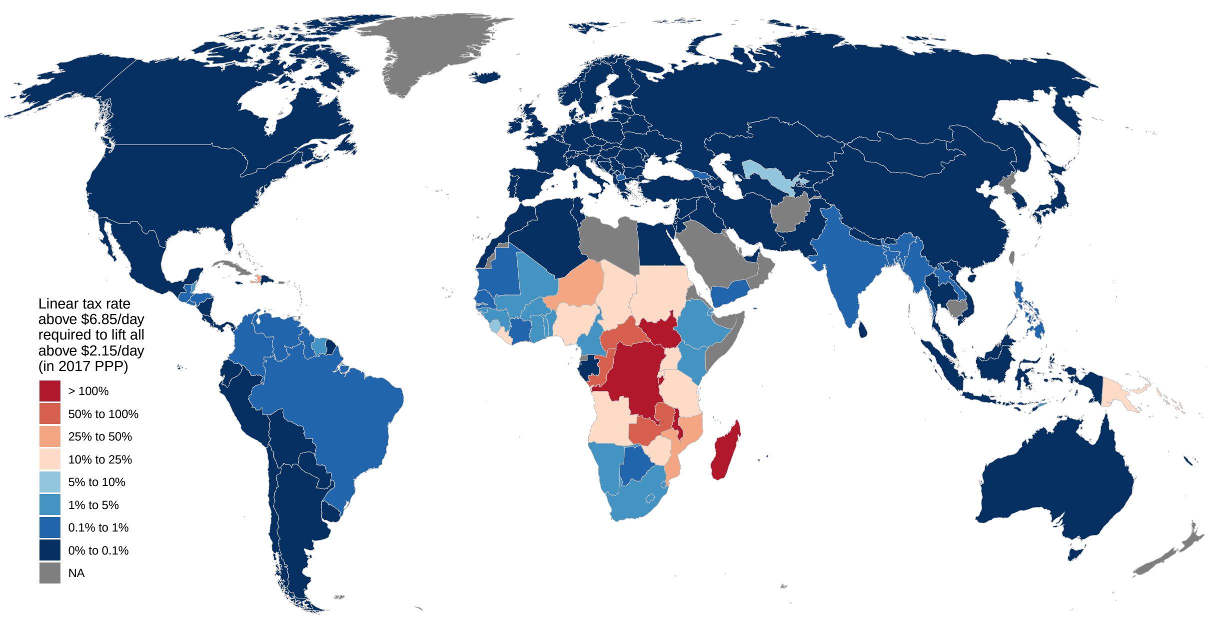


In most of the paper, I focus on the definition of extreme poverty employed in the first SDG. However, the $2.15 threshold has been criticized for inaccurately measuring poverty. First, this poverty line is barely sufficient to satisfy one's caloric requirements and is too low to procure a healthy diet or non-food necessities. Second, the PPP adjustments applied to PIP data before computing the poverty rates are based on prices of an average consumption basket rather than on prices of subsistence goods.[20] Therefore, the cost of a subsistence diet varies across countries. For instance, it is $1.44 in Malawi vs. $4.10 in Kenya (in 2011 PPP $).[15] Buidling on earlier work by Robert Allen that addresses these issues,[1] Michail Moatsos computes a country-specific poverty line. This basic consumption (or *BCS*) poverty line corresponds to the local price of the cheapest diet that meets caloric and protein requirements, completed with a ration of fat, sugar, and basic non-food requirements.[15,16,20] This alternative measure indicates that poverty is more prevalent than the official poverty line suggests. Despite missing data in many countries (including India and the D.R.C.), 14 countries have an average consumption level below this basic consumption poverty line in 2030 in the 3% growth scenario. These countries (which include e.g. Nigeria) do not have sufficient domestic resources to lift their population above the BCS poverty line, equal to $4.35/day in median, even after extreme internal redistribution.

2.5 Antipoverty taxes

Figure 2 presents the (additional) tax rate above $6.85/day required to generate enough revenues to close the domestic extreme poverty gap, in the baseline scenario of 3% growth. The threshold of $6.85/day corresponds to a poverty line defined by the World Bank, which can be understood as the consumption level that can sustain a minimally decent life.[8,12] In contrast, the extreme poverty line of $2.15/day corresponds to the consumption per capita below which one is undernourished.[1]

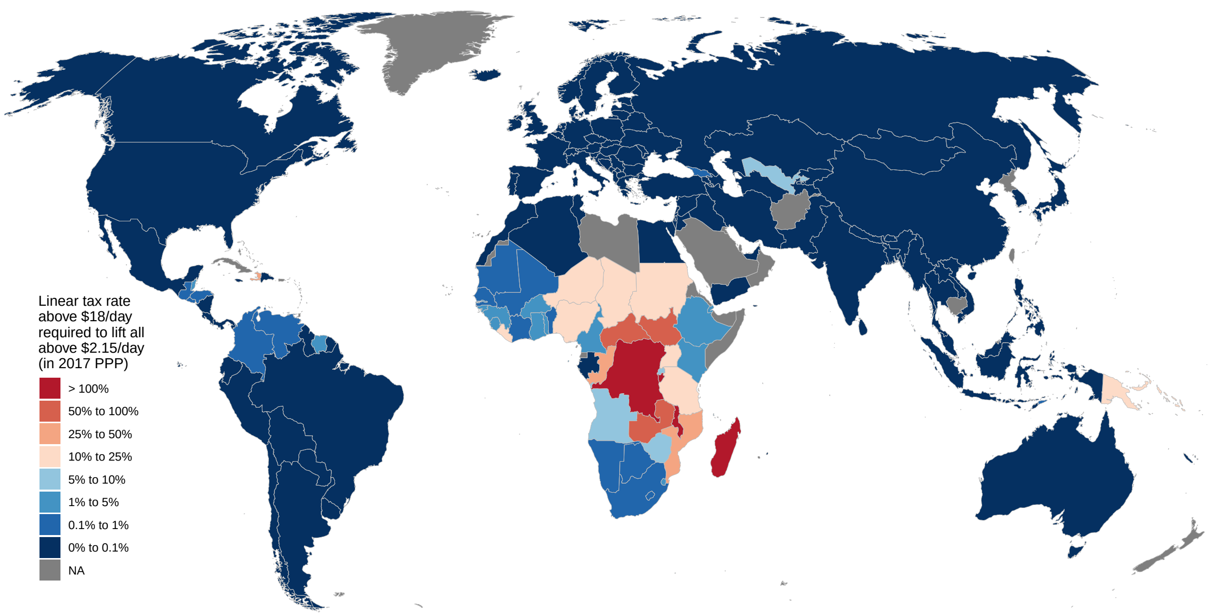
Figure 2: Linear tax rate above $6.85/day eradicating extreme poverty (in %). In this idealized policy, all tax revenue is transferred to the extreme poor and lift them at $2.15/day, assuming away distorsions, and after a yearly growth of 3% over 2022–2030.



Consistently with the previous findings, taxing income at a 100% rate above $6.85/day would not generate enough revenues to eliminate extreme poverty in the five poorest countries. In Nigeria, closing the extreme poverty rate would require taxing the "non-needy" at a marginal rate of 20%. On average over Sub-Saharan Africa, the anti-extreme-poverty tax would be 49%, and 70% in low-income countries (defined by the World Bank as countries with a GNI per capita below $1,135 per year). Yet, imposing such a large tax burden on any income above just $6.85/day seems unrealistic.

Figure 3 presents the anti-extreme-poverty tax on incomes above $18.15/day, in a very optimistic scenario of 7% growth. The threshold of $18.15/day per person corresponds to the U.S. federal poverty line for a family of four and represents a more realistic threshold above which taxes could be increased in the Global South. The anti-extreme-poverty tax rates on the "non-poor" in this 7% growth scenario are comparable to the rates on the non-needy in the baseline scenario. In India, the required tax rate would be % in the scenario of 7% growth, and % if growth until 2030 replicates the 2014–2019 trend. The contribution required of the Indian non-poor seems significant but not unreasonable. Therefore, India seems able to eliminate extreme poverty by 2030 with its domestic resources. The same thing cannot be said of Sub-Saharan Africa.

Figure 3: Linear tax rate above $18.15/day eradicating extreme poverty (in %). In this idealized policy, all tax revenue is transferred to the extreme poor and lift them at $2.15/day, assuming away distorsions, and after a yearly growth of 7% over 2022–2030.



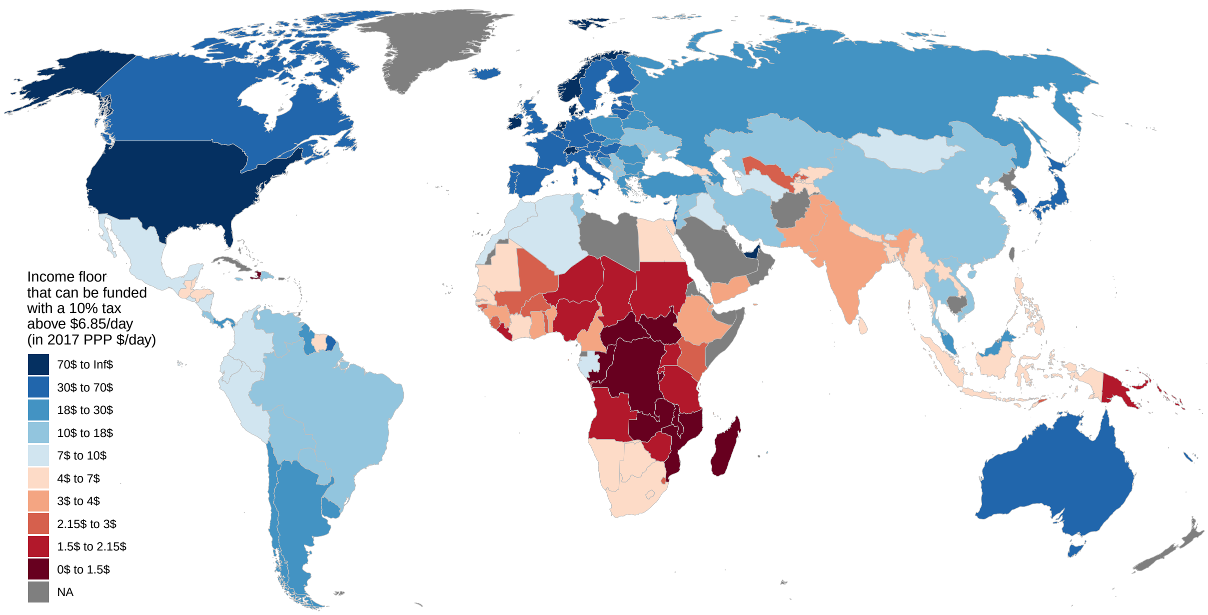
2.6 The credible potential of domestic redistribution

A final way of approaching the issue is to set a tax schedule, compute how much revenues it would generate in each country, and estimate the income floor that these revenues could finance, by topping up the incomes of the poorest to the income floor. As I have already explored extreme redistributive policies, I analyse here a more reasonable tax schedule. Namely, I consider a 10% marginal tax rate on income above $6.85/day. Although the taxation threshold may be low and the tax rate low for top incomes, this simple tax schedule seems to correctly reflect the fiscal capacity of governments. Note that the value of the income floor depends on the whole income distribution: the top of the distribution determines the revenues that can be generated; and the bottom dictates the cost of raising low incomes up to a given floor.

Figure 4 presents the income floor that can funded in 2030 with our simple tax in a 3% growth scenario. Although there are about as many countries that cannot close the extreme poverty gap with this tax (23) as there are low-income countries (27), only 13 countries fall into both of these groups. For example, while Ethiopia (a low-income country) can finance an income floor of $3.08/day, Nigeria (classified as a lower-middle-income country) can only finance a floor of $1.83/day. Even in a scenario with 7% growth from 2023 onwards, 10 countries have an income floor below $2.15 in 2030. Note that the picture does not significantly change when adjusting top incomes so that aggregate consumption matches national accounts: 8 countries are still unable to close the extreme poverty gap despite very optimistic growth in this robustness check. In contrast, if the 7% growth had started in 2016 (as the SDGs were set up), the 10% tax would have been sufficient to eliminate extreme poverty in all countries except in Madagascar, where a tax of 23% would have been required.

At least two of the SDGs spell out how the elimination of extreme poverty could be funded. First, the target 8.1 aims for "at least 7 per cent gross domestic product growth per annum in the least developed countries". As we have seen, a sustained high growth would have permitted the least developed countries to eliminate extreme poverty through the mobilization of their domestic resources. However, high growth has never materialized in these countries. Second, the target 17.2 calls for "Developed countries to implement fully their official development assistance commitments, including the commitment by many developed countries to achieve the target of 0.7 per cent of [Official Development Assistance]/GNI to developing countries and 0.15 to 0.20 per cent of ODA/GNI to least developed countries" (LDCs). Foreign aid falls short of both the overall target (at 0.36% of developed countries' GNI) and the LDCs' target (at 0.06%). While European countries as a whole are meeting their commitments, most others are not. In particular, the U.S. only allocates 0.22% of its GNI to foreign aid.[17] The global extreme

Figure 4: Income floor that can be funded with a 10% marginal tax on income above \$6.85/day (in 2017 PPP \$/day). In this idealized policy, all tax revenue is transferred to the poorest and lift them at the income floor, assuming away distorsions, and after a yearly growth of 3% over 2022–2030.



poverty gap (0.17% of global real GDP) is a bit lower than the shortfall of foreign aid relative to the target (0.2% of global nominal GDP), suggesting that extreme poverty could be eradicated if developed countries respected their commitment. To meet the broader SDGs and "end poverty in all its forms", the 0.7% target would not suffice and global redistribution would need to be significantly increased.

2.7 The potential of global redistribution

In this section, we explore the potential of globally redistributive policies to close the global poverty gap in 2030 in the baseline scenario of 3% growth.

If applied to the global level, the tax of the previous section would bring the global Gini from .62 down to .51 and finance an income floor at \$8.4/day, thereby closing the \$6.85/day poverty gap. By comparison, applied at the national level, it would only bring the global Gini down to .59 and reduce the poverty gap from 4.5% to 3.7% of global income.

To close the *extreme* poverty gap, a 1.2% marginal tax above 100\$/day (i.e.

$36,500/year) would suffice. Such a tax would result in 3.4% of global income being transferred from the rich to the extreme poor, but would only involve 0.14% of global income being transferred from one country to another. With contributions of up to 0.4% of a country's income (in the U.S.), aggregate consumption would increase by more than 10% in 9 countries.

In reality, the global tax rates required to eradicate poverty may well be lower than just indicated, because our calculations used the raw PIP data instead of converting them to nominal terms and rescaling them to national accounts. Once I rescale the data to national accounts (which are more accurate in high-income countries), a mild 0.5% marginal tax above $100,000/year (i.e. $274/day) suffices to close the extreme poverty gap. Raising that rate to 15% would collect 5% of the world income, enough to finance a global income floor of $250/month (or $8.2/day) and end poverty in all its forms. These rates are expressed on top of the current tax system and apply to post-tax income. For example, the last tax schedule would leave unaffected the 99% of the world population with a post-tax income per capita below $100,000/year and reduce by 5% the post-tax income at $150,000/year.

To conclude, whereas poverty alleviation cannot be achieved rapidly without international solidarity, it can be easily financed by reasonable contributions from the global top 1%.

3 Discussion

Methods

Data quality.

Data and code availability

All data and code of as well as figures of the paper are available on github.com/bixiou/domestic_poverty_eradication.

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