THE HIDDEN GREAT LEVELLING: SUBSISTENCE, GROWTH AND SURPLUS DISTRIBUTION

ANDRÉS IRARRÁZAVAL

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The Hidden Great Levelling: Subsistence, Growth and Surplus Distribution

Andrés Irarrázaval*

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Abstract

This paper reveals a global *Great Levelling*, hidden by standard top income shares. The average top 1% share of national income was 18% in 1820 and is 18% today. This apparent persistence suggests that elite control over resources has survived the rise of organised labour, democracy, and decolonisation. However, in poorer times, much of national income was tied to subsistence. Transferring this income to the top 1% would leave the other 99% below what they need to survive. I factor this subsistence constraint into inequality measurement and study how the surplus, income above subsistence and therefore transferable, is distributed across 48 countries over two centuries. The average top 1% share of national surplus fell from 53% in 1820 to 40% in 1920 and 19% today, a near threefold decline in elite control over transferable resources. Growth, by lifting incomes above subsistence, expanded the share of income that could accrue to the top 1%. Yet top income shares did not rise over the long run. The new surplus went mainly to the other 99%. To separate redistribution from pre-distribution, I construct new long-run post-tax, post-transfer inequality series. Taxes and transfers account for only a tenth of the levelling, pointing to pre-distribution forces such as workers' rising bargaining power. Case studies of the US under Jim Crow, colonial India, and low-income countries today also show that unremarkable top income shares can hide elites holding most of a limited surplus.

Keywords: inequality; surplus distribution; subsistence; top income shares; growth; institutions

JEL codes: D02, D31, D63, H23, N30, O15

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1 Introduction

The average top 1% share of national income was 18% in 1820, 20% in 1920, and is 18% today (World Inequality Database 2026, hereafter WID).[1] Taken at face value, this suggests that two centuries of democratisation, organised labour, and decolonisation have left elite control over resources unchanged. A similar puzzle emerges across the development spectrum. The average top 1% share of national income is 16% in both low-income and high-income nations today, as if development were orthogonal to elite power over resources.

These figures come from a vast literature that has placed top income shares and their long-run path at the centre of economics and public debate (Piketty and Saez 2003, Atkinson et al. 2011, Piketty 2014, Chancel and Piketty 2021). However, they sit uneasily with another highly influential literature, which argues that "extractive" institutions, those that channel resources from society to a narrow elite, are a fundamental cause of underdevelopment (Acemoglu et al. 2001, 2005, Acemoglu and Robinson 2012). If past societies were governed by institutions far more favourable to elites than those of today, and if poor nations tend to have more extractive institutions than rich ones, why do their elites not capture larger shares of national income? Either past societies and poor nations today are unexpectedly inclusive, or standard inequality measures are not designed to capture elite power over resources.

This paper makes the second argument. Standard measures misrepresent elite power over resources by implicitly treating all national income as equally available for concentration, whether in 1820 or today, or in DR Congo or the US. However, in poorer eras, as in poor nations today, much of national income is tied to subsistence. Transferring this income to the top 1% would leave the other 99% below what they need to survive. I factor this subsistence constraint into inequality measurement and study how the surplus, income above subsistence and therefore transferable, is distributed across 48 countries over two centuries.

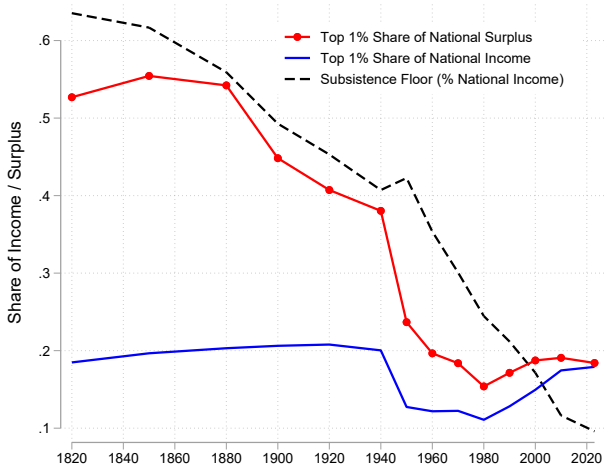
Doing so reveals a global *Great Levelling*. The average top 1% share of national surplus fell from 53% in 1820 to 40% in 1920 and 19% today, a near threefold decline in elite control over transferable resources (Figure 1A). Top income shares hide this decline because they are measured against all national income, including the part needed for subsistence. I call this part the *subsistence floor*. In 1820, that floor made up most of national income. Today it is a small part (Figure 1B). The same 18% of national income was therefore a much bigger slice of the surplus then than it is now.

The two metrics also tell different stories about the 20th century. Top income shares fell during and after WWII but have since returned close to their pre-WWII level. Read this

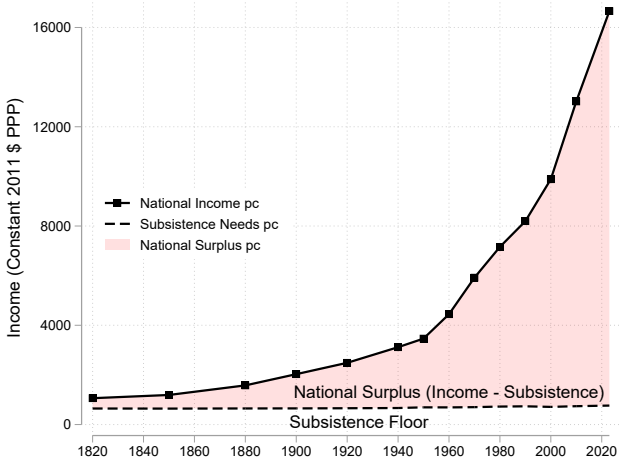
[1] This is the country average weighted by population, so the top 1% corresponds to 1% of the population. Following the literature cited in this introduction, headline top income shares reported here are pre-tax.

Figure 1: From Persistent Inequality to a Great Levelling

A. Top 1% Share of Surplus and Income



B. Subsistence Floor, GDP, and Surplus



Note. The top 1% share of surplus = (top 1% income share × national income − 1% × subsistence floor) / (national income − subsistence floor). The subsistence floor (as % of Y) is the subsistence per capita over national income per capita. The world series is the country average weighted by population, so that the top 1% corresponds to 1% of the global population. It captures average within-country inequality. The post-tax top income shares are my own based on the WID (2026). GDP data are from the Maddison database (Bolt and van Zanden 2025). Subsistence is based on a lower version of Allen's (2020) cost-of-basic-needs data, country estimates traced back in time by Moatsos et al. (2021). See details in Section 3.4.

way, elite control over resources looks resilient (Scheidel 2017, Chancel and Piketty 2021). Despite a partial reversal since 1980, top surplus shares remain half their pre-WWII level.

The same logic resolves the development puzzle across nations today. By headline top income shares, Chile, a high-income democracy, is the 3rd most unequal country in the world, while the DR Congo, a low-income autocracy and a canonical case of extractive legacies, ranks 61st. Yet in the DR Congo, 65% of national income is tied to subsistence, against 3% in Chile. As a result, headline top 1% shares of 19% and 29% translate into surplus shares of 52% and 30%.[2] The Congolese elite controls nearly twice the share of transferable resources. This changes rankings: the DR Congo rises to 3rd and Chile falls to 55th. More broadly, Sub-Saharan Africa shifts from looking as equal as East Asia to becoming the most unequal region in the world, surpassing both Latin America and North America.

What a top income share reveals about elite control over resources therefore depends on how much income is tied to subsistence. Once subsistence is taken into account, inequality levels align more closely with what the political economy and development literatures predict. I formalise this idea by building what I call the *Surplus Distribution Framework* (SDF). The

[2]Figures are pre-tax for comparability with the headline rankings; Table 1 reports the post-tax values.

SDF defines a subsistence floor and measures how the income above that floor is divided among groups, from the top 1% to the bottom 50%.

Subsistence caps top income shares. I call this cap the *Maximum Income Concentration* (MIC): the highest top 1% share of national income that is compatible with the subsistence of the other 99%. Where 41% of national income is tied to subsistence, as in low-income countries, only the remaining 59% can be concentrated (the MIC is 59%); where 3% is, as in high-income nations, the MIC is 97%. The same holds over time, since subsistence made up far more of national income in the past. Top income shares are therefore measured against very different ceilings, which makes them hard to interpret across countries and over time.

Surplus shares put all countries and periods on a common scale. The most any group can hold is always 100% of the surplus. For the top 1%, the surplus share is approximately its income share divided by the MIC. It therefore measures how close a society is to the maximum inequality allowed by its GDP and living costs. The Congolese top 1% holds 52% of the surplus and is about halfway to that maximum. The Chilean top 1%, with 30%, is less than a third of the way there.

Comparing actual inequality with the subsistence-compatible maximum follows Milanovic, Lindert, and Williamson (2011, hereafter MLW), who call this ratio the *extraction ratio* and compute it for the Gini in pre-industrial societies.[3] They interpret this ratio as measuring how extractive elites are. The Gini, however, summarises the whole distribution and is most sensitive to its middle. Applied to the top 1%, the ratio speaks directly to the role of elites, the actors at the centre of the inequality, institutions, and political economy literatures.

To measure subsistence, I rely on Allen's (2017) cost-of-basic-needs method: the minimum cost of basic calories and shelter, traced back to 1820 for 140 countries by Moatsos et al. (2021). Unlike MLW's fixed floor, this allows for different subsistence costs across nations and over time. Because a floor fixed at physiological needs could overstate the levelling if needs rise with income, I also estimate an income-elastic floor as an upper bound, based on the present-day elasticity of national poverty lines with respect to GDP (see Ravallion 2012).

To separate redistribution from pre-distribution, I construct the first long-run post-tax, post-transfer inequality series (hereafter post-tax). These series also matter for measuring the surplus itself. Transfers help enforce the subsistence floor, lifting households above it when they have little or no market income. While the WID pre-tax series begin in 1820, the corresponding post-tax series begin only in 1980. I extend them back to 1820 for the 48 countries with long-run pre-tax series, which account for 85% of the world population. I trace the redistributive effect of each tax and transfer instrument using the year it was

[3]MLW build on Milanovic's (2006) study of the Gini in Byzantium in the year 1000. Following MLW, Piketty (2020, Figure 6.6) also derives a subsistence-constrained maximum top income share, but only to illustrate why wealth inequality is not bounded by subsistence. He does not formalise it or apply the concept.

introduced and its size as a share of GDP over time.

I first test whether subsistence constraints on top 1% income shares bind, comparing actual top shares to their predicted maximum. I study societies widely regarded as among history's most unequal, from slave colonies to Tsarist Russia, which are the most likely to approach the MIC. Their actual top income shares came close to, but did not exceed, their MIC. Subsistence constraints therefore yield an empirically meaningful inequality frontier. This result is not mechanical: the MIC is calculated independently from actual inequality, using GDP and living-cost data.

Then, I test whether surplus shares capture well-known differences in elite power over resources better than top income shares. I study legacies of slavery on inequality across US states during Jim Crow (1930s). By top income shares, former slave states appear more equal than non-slave states, paradoxically suggesting that slavery legacies are conducive to less inequality. Using historical living-cost data, I construct state-level subsistence floors. Former slave states were poorer, so a larger share of income was needed for subsistence. This limited how high their top income shares could rise. Accounting for this reveals that elites in former slave states held 1.5 times the surplus share of those in non-slave states. Surplus shares therefore align better with historical accounts and micro evidence on the pro-elite effects of Jim Crow institutions (Wright 2013, Althoff and Reichardt 2024).

Next, I test whether surplus-share series offer a history of inequality more consistent with the historical and institutional record. India (1910–2023) is a natural case. It moved from extractive colonialism to democratic rule, and it has unusually long and reliable inequality series (Banerjee and Piketty 2005, Bharti et al. 2024). The top 1% income share was 20% in 1910, under the British Raj, and is 23% today, as if decolonisation and democratisation had left elite power over resources unchanged, if not stronger. Surplus shares tell a different story. The top 1% share of surplus peaked at 68% in 1920 and fell to 24% today, with most of the decline after independence. Under the Raj, subsistence made up around 60% of national income, and the top 1% held the lion's share of what surplus remained. Today, elites hold a smaller share of a far larger surplus.

Finally, I revisit the history of global inequality. The top 1% share of the surplus peaked at 55% in 1850–1880, fell to a low of 15% in 1980, and has since risen to 19% (Figure 1A). The timing of this near threefold long-run decline fits the history of institutional change. The levelling began with the rise of organised labour and democracy in the late 19th century, and accelerated with the post-war welfare state and decolonisation (Lindert 2004, Piketty 2022). The bottom 50% has been the main long-run winner. Its share of surplus rose from below 3% before the 1940s to 13% today. This matters because surplus income gives households the means to pursue goals beyond immediate necessity: to save, afford leisure, or pay for a child's education. That capacity underpins what Sen (1999) calls *substantive freedoms*, and

it is now far more widely shared.

Is the levelling simply a mechanical result of growth? Growth enlarged the surplus and raised the MIC from 38% of income in 1820 to 90% today. With flat top income shares, a larger surplus does lower the top surplus share. But nothing mechanical kept top income shares flat, since growth allowed them to rise. In two periods they moved towards the MIC, as top surplus shares rose between 1820 and 1880 and again between 1980 and 2010. Over the long run, however, the new surplus went mainly to the other 99%. Had it been captured by the top 1%, their share of national income would have risen sharply, not stayed at 18%.

What drove the levelling? Redistribution played a secondary role. Comparing pre-tax with post-tax surplus shares, I find that taxes and transfers account for only a tenth of the long-run fall in the top 1% surplus share. The timing points the same way. The levelling began in the late 19th century, before progressive taxes and transfers emerged in the early 20th century. The levelling also does not fit the view that inequality falls substantially only through violent shocks such as mass-mobilisation warfare (Scheidel 2017). WWII, the largest such shock, accelerated the levelling but did not start it. All this points to pre-distribution forces that raised workers' market incomes.

Two forces are consistent with my results: how much surplus elites *can* capture, and how much they *want* to. The first is institutional: collective bargaining and minimum wages can raise the effective income floor elites face well above bare subsistence. By the late 19th century, industrialisation had concentrated workers in factories, where they could organise, threaten unrest, and press for a higher floor (Acemoglu and Robinson 2000). The second is intertemporal: as production became more skill-intensive, workers' incentives and human-capital accumulation became crucial to future surplus, raising the cost of taking surplus today (Galor and Moav 2006). Elites may therefore prefer a smaller share of a larger future surplus (see Appendix B for a model). Between 1880 and 1980, the core of the levelling, elites' share of the surplus fell 3.5-fold, yet their surplus income doubled. With growth, levelling need not be zero-sum.

Related Literature and Contributions. The paper speaks to four strands of literature. First, it contributes to the long-run inequality literature (Bourguignon and Morrisson 2002, Chancel and Piketty 2021, Milanovic 2024b) by revealing a *Great Levelling*, invisible in headline pre-tax income shares. It does so by factoring in subsistence constraints, through the SDF, and redistribution, through the new post-tax series. Both speak to Kuznets's (1955) inverted-U curve between inequality and development. The SDF recovers the loosening of subsistence constraints with growth behind its rising phase, and the post-tax series quantify

a force he expected to drive its declining phase, redistribution.[4] That force turns out to be secondary, pointing to pre-distribution forces, such as workers' rising bargaining power. Bozio et al. (2024) reach a similar conclusion for long-run top income shares in France and the US. This paper shows that it holds globally and for surplus shares as well.

Second, it contributes to the top-incomes literature (see Alvaredo et al. 2013 for a review). It shows that a given top income share can imply radically different degrees of elite power over resources in rich and poor countries. This matters because top-income studies have extended to Asia, Latin America, and Africa (Piketty et al. 2019, De Rosa et al. 2024, Chancel et al. 2023), where incomes remain tied to subsistence. Surplus shares offer a complementary metric that is comparable across income levels. Metrics shape policy and public debate. Countries, UN agencies, and experts are pressing for an International Panel on Inequality to track "extreme inequality" and resolve "disparities in measurements" (Stiglitz et al. 2026). Whether countries such as the DR Congo count as extremely unequal depends precisely on the measurement choices examined here.

Third, it contributes to the institutions and development literature (see Nunn 2014 for a review). Top surplus shares offer an outcome measure of elite "extraction": how much of society's surplus elites capture. This helps resolve a long-standing empirical puzzle: the elusive link between extractive legacies and economic inequality (Acemoglu et al. 2008, Bruhn and Gallego 2012). Extractive institutions cause lower incomes. At those lower incomes, subsistence represents a larger share of total income, limiting how much can flow to elites (the MIC). This explains why Raj India, the 1930s US South, and the DR Congo today combine unremarkable top income shares with elites holding the lion's share of the surplus. Surplus shares recover the elite capture that economists theorise and historians describe but that top income shares alone miss.

Fourth, this paper contributes to inequality measurement by extending MLW's extraction ratio from the Gini to surplus shares across groups, with subsistence floors that vary across countries and over time. Doing so reconnects modern inequality measurement with classical political economy, which studied how the surplus is distributed across groups (Quesnay 1758, Ricardo 1817, Marx 1867). I return to this classical question using modern data.

The rest of the paper proceeds as follows. Section 2 derives the SDF. Section 3 applies it, first across societies and countries, then over time. Section 4 discusses plausible drivers of the *Great Levelling* and what surplus shares imply for inequality today. Section 5 concludes.

[4] Kuznets (1955, pp. 21–23) saw progressive taxes and transfers in advanced economies as a key force but lacked the data to quantify their role. For subsistence constraints see Section 2.2.

2 The Surplus Distribution Framework

The SDF factors subsistence constraints into inequality measurement to recover underlying elite control over resources. This section derives it, formalising how subsistence constrains top income shares, how this constraint relaxes with development, and who gets the surplus.

2.1 The Subsistence Floor

At the individual level, the subsistence floor (SF) is the minimum income required to live and work: enough calories, clothing, and housing. For an individual i at time t with income $Y_{i,t}$, the *Surplus Income* (SI) is all income above that floor:

$$Y_{i,t} = \mathrm{SI}_{i,t} + \mathrm{SF}_{i,t}, \tag{1}$$

$$\mathrm{SI}_{i,t} = Y_{i,t} - \mathrm{SF}_{i,t}, \qquad \mathrm{SI}_{i,t} \geq 0. \tag{2}$$

$\mathrm{SI}_{i,t}$ is the income not strictly tied to subsistence and therefore transferable across the distribution —i.e., transferable without placing anyone in a materially impossible position.

The condition $\mathrm{SI} \geq 0$ has a simple intuition. If we observe a person, their income must have met a minimum subsistence floor; otherwise, they would be dead. In practice, incomes typically sit above the floor endogenously. Employers have an incentive to pay above bare subsistence because nutrition raises labour productivity, as the efficiency-wage literature theorises (see Strauss and Thomas 1998) and the long-run wage data show (see Allen 2021). Under coercion, elites also have a self-interest in preserving the surplus-generating population they extract from, and provide the consumption necessary to sustain labour, received as income in kind (see Fogel and Engerman 1974).

Even where incomes do not clear the floor endogenously, such as during shocks like wars and droughts, the subsistence constraint is enforced. In pre-modern times, and in very poor countries today, population levels adjust endogenously to subsistence availability through Malthusian forces (see Kelly and Ó Gráda 2014). Fertility falls in times of scarcity (the preventive check), some individuals migrate, and, where these adjustments are insufficient, mortality rises (the positive check). In richer, modern settings, state safety nets (transfers) ensure subsistence even when households have little or no market income (Lindert 2004).

Empirically, I estimate SF using Allen's (2017, 2020) cost-of-basic-needs (CBN) method: the cheapest basket that meets minimum food, housing, and clothing needs in a given place. An advantage is that CBN series have been traced back in time by Moatsos et al. (2021) using historical living-costs data for 140 countries back to 1820.

To allow for malnutrition, I take a lower version of the CBN. The CBN is based on 2,100 calories per day, yet caloric supply in the most malnourished cases is around 1,660 per day, such as in Rwanda in 1965, the worst performer in the first comparative tables of the World Bank (Fogel 2004). Fogel also finds historically similar lows, such as in 18th century France. As food accounts for 3/4 of the CBN basket —the rest being housing and clothing— allowing for these lower calories (1,660) scales it down to 84%. The other components are already minimal. Housing, the second largest, is 3 square metres per person, reflecting conditions in Indian slums in the 1900s.

I also consider alternative definitions: a fixed lower-bound SF based on a lower version of the World Bank poverty line, and an upper-bound SF that allows subsistence standards to rise with GDP levels —above 1,660 calories and 3 square metres per person (Section 3.3).

2.2 The Maximum Income Concentration (MIC)

At the societal level, the subsistence floor caps income concentration. I call that ceiling the Maximum Income Concentration (MIC): a society's surplus income (SI) —what remains once subsistence needs are met— as a share of national income. Let $Y_{c,t}$ denote income per capita (pc) in country c at time t and $\mathrm{SF}_{c,t}$ its average per-capita subsistence cost. Then:

$$\mathrm{MIC}_{c,t} = \frac{\mathrm{SI}_{c,t}}{Y_{c,t}} = \frac{Y_{c,t} - \mathrm{SF}_{c,t}}{Y_{c,t}} = 1 - \frac{\mathrm{SF}_{c,t}}{Y_{c,t}}. \tag{3}$$

I use per-capita terms to make explicit that every member of society must attain the subsistence floor; aggregate values yield the same result.

The MIC is the upper bound on the top 1% share of income compatible with the subsistence of the other 99%. The ratio $\mathrm{SF}_{c,t}/Y_{c,t}$ is the strictly non-transferable share of national income, not households' actual spending on basic needs, which is endogenous to income. Richer people obtain their calories from costlier items than the cheapest option, e.g., oats.

Kuznets (1955, pp. 21–23) anticipated the idea. He noted that the capacity of top groups to concentrate income is bounded by the subsistence needs of the bottom groups; otherwise, these "groups could not survive". The closest formal antecedent is MLW's subsistence-constrained maximum Gini.

The MIC is a frontier. It says how much income is transferable, not which group holds it. It can be read as the inequality limit of a fully extractive economy, in which elites take all the surplus, leaving workers only the consumption needed to keep working. The applications later show that colonial economies in Africa and the Caribbean exhibit top income shares that come closest to their predicted MIC. Today, most countries lie far below this frontier, as elites face an effective income floor well above bare subsistence, set, for example, by minimum

wages, collective bargaining, or social norms.

How far realised top shares lie below the MIC is therefore a political-economy question, which I take up in Section 2.5. Answering it, however, first requires characterising how the frontier itself moves with development.

2.3 Economic Growth and the MIC

Here, I quantify how development expands the frontier. If one holds subsistence fixed in real terms, an assumption I relax later, the MIC rises with income levels, as equation (3) shows. It is zero when $Y_{c,t} \leq \text{SF}_{c,t}$, since no surplus exists to be concentrated, and converges to 100% as income rises. At US income levels, taking subsistence to be 84% of Allen's (2020) CBN, the maximum top 1% share is 98%; in the DR Congo, it is 32%.

Figure 2 illustrates this positive relation. As the floor shrinks relative to income per capita (Figure 2A), $\text{SF}_{c,t}/Y_{c,t}$ falls and the MIC implied by this constraint rises (Figure 2B). This first illustration uses a fixed floor at 84% of Allen's (2020) CBN for low-income countries as a global lower bound at \$600 in 2011 PPP —the unit of Maddison's long-run GDP data (Bolt and van Zanden 2025, hereafter Maddison). The horizontal axis runs to \$5,000 pc. Pre-industrial societies, like the world in 1820, earned roughly \$1,000, and industrial ones, like the world by 1970, about \$5,000.

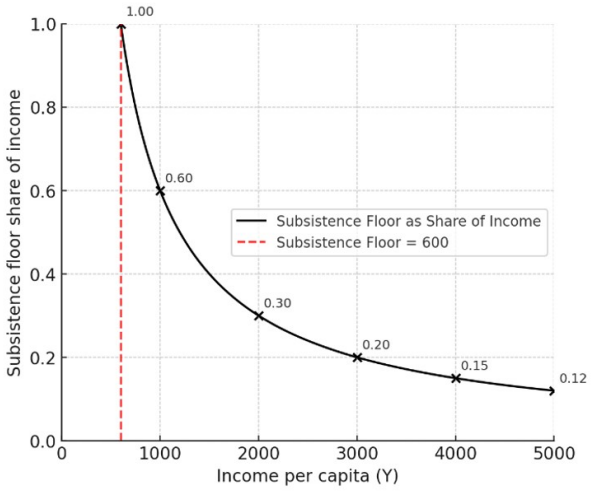
The resulting MIC curve traces the rising segment of Kuznets's inverted-U curve between GDP and inequality. When $Y_{c,t} \leq \$600 = \text{SF}_{c,t}$, the MIC is zero. In a society at subsistence there is no surplus to distribute unequally; income goes strictly hand to mouth and everyone is equally poor. As $Y_{c,t}$ rises above $\text{SF}_{c,t}$, surplus emerges and inequality becomes feasible. At $Y_{c,t} = \$1{,}000$, world GDP pc in 1820, \$400 lies above subsistence and can be transferred to the top 1% without pushing the other 99% below subsistence. The MIC is therefore 40%. At \$4,000, world GDP pc by 1960, the MIC rises to 85%.

Different SF Definitions. What counts as subsistence can rise with development. As people move to cities, transport becomes a necessity, the scope for subsistence farming contracts, and services once produced within the household —childcare above all— are purchased in the market. National poverty lines reflect this. They rise with GDP and increasingly incorporate items beyond physiological needs (Ravallion 2012, Jolliffe and Prydz 2016). Rich societies therefore face a higher effective floor, which I call a *societal* SF, distinct from the *physiological* floor of the CBN basket.

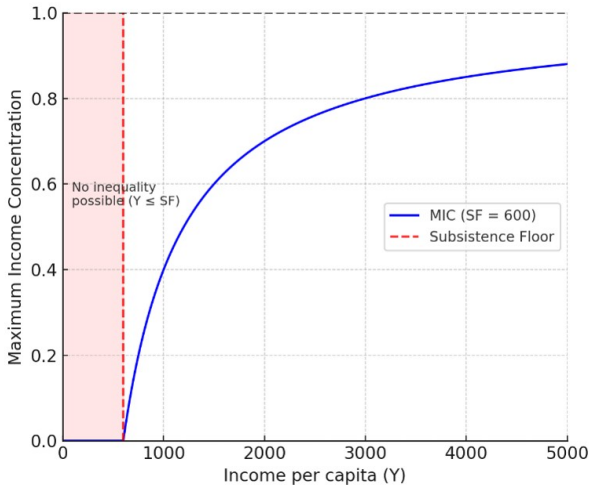
Consistent with this, Figure 2C shows that the MICs implied by the two SF definitions diverge as income grows. The societal MIC tracks the physiological one at low incomes,

Figure 2: The Maximum Income Concentration (MIC)

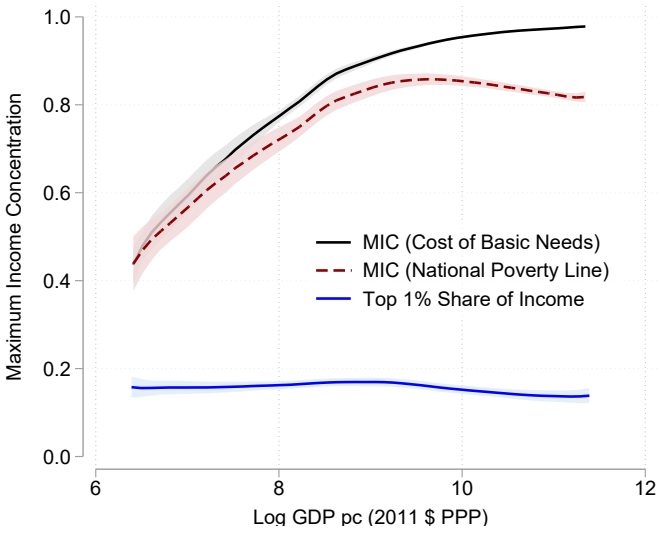
A. Subsistence Floor (as % of Y)



B. Maximum Income Concentration



C. The MIC Using Actual Data (c. 2011-2017)



Note. Panels A and B: illustration with a subsistence floor fixed at approximately $600 per capita. Panel A plots the subsistence floor as a share of national income, $\text{SF}_{c,t}/Y_{c,t}$; Panel B plots the implied ceiling, $\text{MIC}_{c,t} = 1 - \text{SF}_{c,t}/Y_{c,t}$. Panel C: cross-country MIC against log GDP per capita, with 95% confidence intervals, for circa 2016–17. The physiological floor is 84% of Allen's (2020) country-level CBN estimates; the societal floor is 84% of the national poverty lines harmonised by Jolliffe and Prydz (2021). Realised top 1% income shares are from WID (2026). GDP per capita is from Maddison (Bolt and van Zanden 2025). All values are in constant 2011 PPP dollars.

then falls increasingly below it as nations get richer. The figure plots each MIC against log GDP pc, taking Allen's (2020) CBN estimates as the physiological floor and the national poverty lines of Jolliffe and Prydz (2021) as the societal one, both in constant 2011 PPP. I scale both floors to 84% of their value: the CBN to allow for malnutrition (Section 2.1), and the poverty line because a non-trivial share of the population subsists below it even in rich countries. Applying the same factor to both keeps them comparable.

First, the two floors imply different ceilings for rich countries: 100% against 82–85%. But they agree that the constraint binds hardest where incomes are lowest. Rising subsistence standards first slow the expansion of the MIC and, past a point, tighten it again, as poverty lines rise faster than GDP. The maximum inequality compatible with societal needs therefore traces an inverted-U curve with development, echoing what Kuznets predicted for actual inequality.

Second, actual top shares lie far below both ceilings, and increasingly so at higher GDP. Top 1% income shares are flat at 15–18% across the whole income range. This widening distance between actual and maximum inequality compatible with the subsistence needs of society (even under the societal floor) is the cross-sectional counterpart of the long-run *Great Levelling* (Section 3.4). As nations grow richer, elites have not filled the additional income space that growth liberates.

2.4 The Distribution of Surplus

The previous sections characterised the *size* of the space available for income concentration; this section studies who fills that space. Equation (4) defines the surplus share of any group G —the top 1%, next 9%, middle 40%, and bottom 50% in what follows:

$$S^G_{c,t} = \frac{\text{Group } G \text{ income share}_{c,t} \times Y_{c,t} - \text{Group } G \text{ pop. share}_{c,t} \times \text{SF}_{c,t}}{Y_{c,t} - \text{SF}_{c,t}}. \tag{4}$$

The numerator is the income held by group G in excess of the subsistence needs of its own members, where the group's income share is its share of national income and its population share is the share of the population it represents; the denominator is the surplus available to society as a whole, with $Y_{c,t}$ and $\text{SF}_{c,t}$ the income and subsistence cost per capita of country c at time t. $S^G_{c,t}$ is therefore the share of national surplus held by group G.

S recovers the share of transferable resources accruing to a group. Unlike the maximum top income share, which varies with income levels and subsistence floors, the maximum surplus share is always 100%. Surplus shares therefore provide a common scale for studying inequality across countries and over time —the property that the applications exploit.

Nothing restricts S to conventional income groups. It applies equally to social classes,

such as the aristocracy, the bourgeoisie, and workers (Milanovic 2024a).

To avoid negative values, I bound S between 0 and 100%. Shocks such as droughts and wars can push a group's income below subsistence, and since population adjusts only slowly to a fall in available subsistence —people do not die the moment they drop below SF— a snapshot can return a negative S. I set these cases to $S = 0$ and normalise the remaining groups to sum to 100%. The bound binds only in very poor settings where $Y_{c,t}$ lies close to $\text{SF}_{c,t}$, and it is conservative. Leaving S unbounded would strengthen my main long-run equalisation result rather than weaken it.[5] The paper's other applications are unaffected.

2.5 A Political Economy Interpretation of S

Before applying the SDF, I offer a way to interpret variation in S. Because the top 1%'s own subsistence term is negligible relative to its large income, its surplus share reduces to the ratio of its realised income share to the MIC:

$$\begin{aligned} S_{c,t}^{\text{Top 1\%}} &= \frac{\text{Top 1\% income share}_{c,t} \times Y_{c,t} - 1\% \times \text{SF}_{c,t}}{Y_{c,t} - \text{SF}_{c,t}} \approx \frac{\text{Top 1\% income share}_{c,t} \times Y_{c,t}}{Y_{c,t} - \text{SF}_{c,t}} \\ &= \frac{\text{Top 1\% income share}_{c,t}}{\text{MIC}_{c,t}} = \frac{\text{Realised inequality}_{c,t}}{\text{Maximum inequality}_{c,t}}. \end{aligned} \tag{5}$$

S therefore measures how close a society's observed concentration lies to the subsistence-constrained maximum. MLW, using the Gini, term the ratio of realised to maximum inequality the *extraction ratio*, which they read as capturing how extractive elites are in the sense of the institutions and political economy literature. S is its analogue for top shares. Unlike the Gini, which is a society-wide inequality statistic more sensitive to the middle of the distribution, S is defined for a specific group —here the top 1%— and therefore speaks directly to the role of elites. $S = 100\%$ means that top income shares sit right at the MIC. Elites hold all the surplus. $S < 100\%$ means that shares are below the MIC. Some surplus remains with the 99%.[6]

The benchmark $S = 100\%$ has a long pedigree in classical political economy. Ricardo (1817) and Marx (1867) took workers' real wages to be pinned at subsistence, so that all output above it accrued as profits and rents to those at the top. Growth therefore inexorably

[5] A negative S for the bottom 50% implies that top groups end up with S above 100%. Such cases are concentrated in earlier periods, when economies were less resilient to shocks and $Y_{c,t}$ lay closer to $\text{SF}_{c,t}$.

[6] Under the exact definition, $S > 100\%$ means that the top group holds more than society's total measured surplus, implying that at least one other group has income below its subsistence floor. Such a configuration may arise temporarily during severe shocks but cannot persist without transfers or demographic collapse.

raised inequality, one of the "general laws of capitalism" (Acemoglu and Robinson 2015). The MIC is the top 1% share this classical world implies: the share that would prevail if the other 99% remained at subsistence as the economy grew. That classical assumption reflects a world before democracy and labour rights. Here the MIC is therefore a frontier, not a prediction. Elites need not reach it. The lower S, the further a society has departed from a world in which the 99% retain no surplus.

For example, a top 1% surplus share of 52% in the DR Congo against 30% in Chile places the DR Congo much closer to this classical world than Chile. Congolese elites have pushed inequality 1.7 times as far towards their maximum as Chilean elites.

Two forces plausibly shape why some nations operate closer to the ceiling than others: how far elites *can push* inequality, and how far they *want to*. The first concerns institutional *constraints*. The relevant floor elites face is not necessarily bare subsistence but an effective income floor above it set by political representation, labour rights, unions, or social norms, for example, through minimum wages or collective bargaining. Stronger constraints plausibly place democratic Chile further from its MIC than the autocratic DR Congo.

The second is *intertemporal*: how far elites *want to push* inequality. Leaving the 99% with little surplus today can reduce future surplus by eroding their incentives to work, invest, and accumulate human capital. Olson's (1993) "stationary" elites have reason to preserve those incentives, whereas "roving" elites with short horizons discount the future surplus they destroy and may push inequality towards the maximum. In the colonial setting of Acemoglu et al. (2001), for instance, high settler mortality discouraged permanent settlement and led to extractive elite behaviour.

Development can also raise intertemporal costs. In primary economies, output depends little on workers' skills. As industrialisation makes production depend on human capital and innovation (Galor and Moav 2006), surplus taken today costs more future surplus. Elites may therefore prefer a smaller share of a larger future surplus. Industrialisation can also strengthen the first force, as workers concentrated in factories are better able to organise and press for a higher floor through the threat of unrest (Acemoglu and Robinson 2000).

In sum, S should be highest where constraints are weak and intertemporal costs are low. Appendix B formalises these forces in a two-period elite optimisation problem. The purpose here is simpler: to guide the interpretation of S in the applications below. Section 3.1 asks whether the ceiling is an empirically meaningful frontier; Section 3.2 asks whether S recovers known differences in elite power; Section 3.3 asks whether the evolution of S aligns with institutional changes, and Section 3.4 traces S in 48 countries over two centuries.

3 Empirical Applications

3.1 Do Subsistence Constraints on Top Income Shares Bind?

I first test whether the MIC is an empirically meaningful ceiling on top income shares. The application examines two predictions. First, realised top income shares should not exceed the MIC, which is calculated independently from GDP and subsistence-cost data. Second, societies in which elites faced weak institutional constraints and short horizons should lie close to that ceiling. Primary economies in colonial Africa and the Caribbean are natural candidates: elites had both the scope and the incentive to capture much of the surplus.

To cover these societies, I use data from social tables, historical reconstructions of income distributions based on censuses, tax records, and other sources. The sample contains 71 society-year observations, drawn from Milanovic's (2024a) compilation and my own calculations based on published work (see Appendix C1). It spans slave colonies, absolutist regimes, settler colonies, and parliamentary democracies, allowing me to examine both whether top shares remain below the ceiling and how close different societies come to it.

Five cases offer particularly demanding tests: the Cape Colony (present-day South Africa) in 1700 (Fourie and von Fintel 2011), Jamaica in 1774 (Burnard et al. 2019), Haiti in 1780 (Piketty 2020), Tsarist Russia in 1811 (Korchmina and Malinowski 2024), and Kenya in 1914 (Milanovic 2024a). Marked by slavery, serfdom, colonial rule, or absolutism, these societies are widely regarded as among history's most unequal (e.g., Engerman and Sokoloff 1994, Piketty 2020). If elites could push inequality beyond the subsistence constraint, these are precisely the settings in which we should see it.

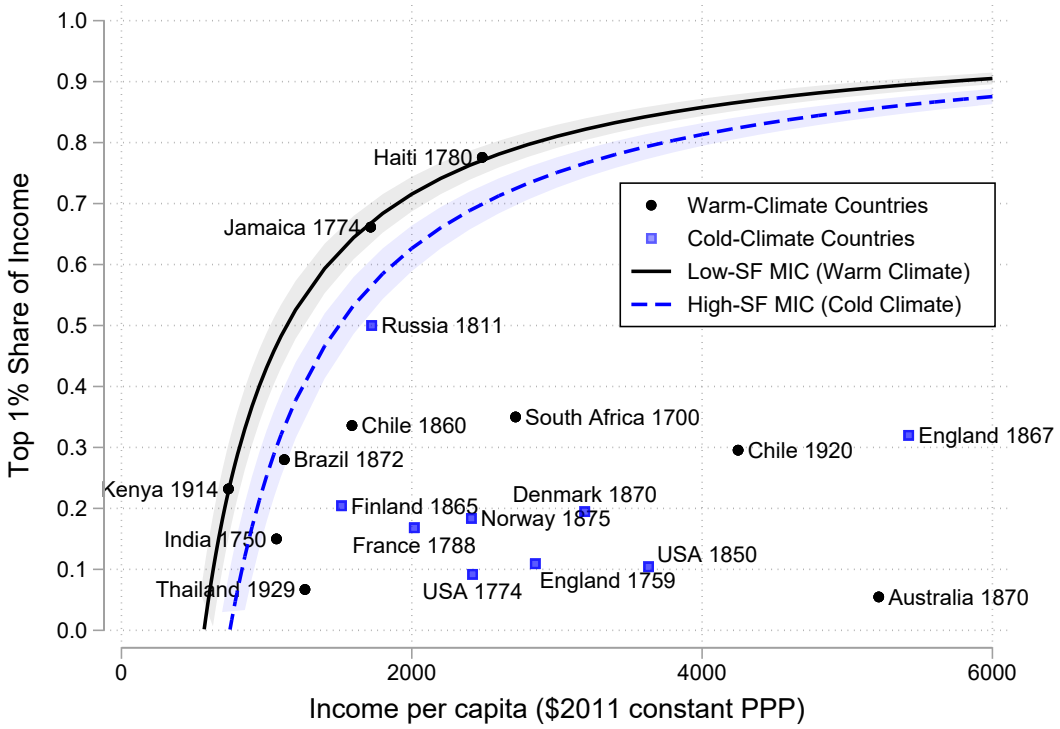
The exercise follows MLW's comparison of observed Ginis with their subsistence-constrained maximum, but applies it to top shares and allows subsistence costs to differ across countries. MLW apply a single floor to all societies. Yet subsistence requires more calories, heating, and clothing in colder countries, such as Russia, than in warmer ones, such as Brazil. In particular, daily caloric requirements for moderate work are 28–36% higher in colder climates than in tropical ones (FAO 1971). The CBN data of Moatsos et al. (2021) capture differences in clothing and heating needs across climates, which I use to construct separate MICs for warm- and cold-climate countries. Because the basket fixes calories at 2,100 regardless of climate, I do not apply the 84% malnutrition scaling to cold countries (see Appendix D2).

Using the earliest CBN observations, from circa 1820, I estimate subsistence floors of \$570 for warm countries and \$747 for cold ones: 82% and 107% of the World Bank extreme-poverty line, respectively. These broad benchmarks allow comparisons where place-specific subsistence data are unavailable. Figure 3 plots the observed top 1% income shares against

the MICs implied by these floors and each society's GDP per capita from Maddison.[7]

No society in the sample exceeds its predicted MIC. Figure 3 shows a selected sample that covers the most unequal and least unequal society-years so that markers do not overlap; Appendix C1 plots all 71 observations and the pattern holds. This result is consistent with the political-economy forces discussed. Even extractive elites have a self-interest in preserving the surplus-producing population from which they extract. Their optimal strategy is to capture a share of surplus over time, not to plunder the means of subsistence and risk population collapse or revolt. Pre-state and civil-war cases, where roving elites might breach the floor by plundering, as they heavily discount the future (see Olson 1993), lie outside both the sample, for lack of data, and the focus of this paper.[8]

Figure 3: Subsistence Constraints Bind: Historical Top 1% Shares and the MIC



Note. The shaded bands around each MIC curve allow a 10% margin on either side of the subsistence floor, because the floors are climate-zone medians rather than country-specific costs. Cold countries (blue squares) are those with most of their territory in cold climates and warm countries (black circles) are those with mainly warm climates, based on FAO (2011) thermal-zones data. The MIC equals $1 - \mathrm{SF}/Y$. Subsistence is based on the earliest data from Moatsos et al. (2021). Inequality data from social tables are from Milanovic (2024a) and my own calculations following Milanovic's (2024a) method for South Africa, Haiti, and Brazil. Income data are from Maddison (2025); when missing, I estimate them directly from the source. See Appendix D1.

[7] Where Maddison data are unavailable, I estimate income using the data from the respective social table paper. See Appendix D1 for details.

[8] Any such breach should be transitory. Consumption below subsistence raises mortality, and population falls until it is again consistent with subsistence availability, bringing the society back within its MIC.

Colonies in the Caribbean and Africa, where elites faced weak institutional constraints and short horizons, operate closest to the MIC. The slave colonies of Jamaica (1774) and Haiti (1780), where 90% or more of the population was enslaved, sit right at the MIC. This compares with 18% enslaved in the US (1774) and 15% in Brazil (1872), which lie further from the MIC. Likewise, Tsarist Russia (1811), characterised by serf-based agriculture and absolutist rule, also sits near its MIC. In both Tsarist Russia and the Caribbean colonies, elites therefore held most of the available surplus. Realised top shares sat close to their MIC, leaving the rest of society, mainly serfs or enslaved workers, with relatively little beyond what was required to sustain them.[9]

By contrast, settler colonies —Australia and the US— lie farthest from their MIC. Following Acemoglu et al. (2001), their institutions were more inclusive. During colonial times, rights remained racially restricted, but Europeans formed the majority of the population in these settler colonies and therefore most of society enjoyed institutional protection. The US and Australia also featured open frontiers, giving part of the population an exit option from elite-controlled labour markets through access to land (Turner 1893). These two factors plausibly made it more difficult for elites to push inequality towards the maximum.[10]

In sum, the MIC is an empirically meaningful frontier, and countries' distance from that frontier recovers the differences in elite economic power that the institutions and historical literature describe, but that headline top income shares alone miss. The next section examines this result using more granular, place-specific living-cost data.

3.2 Does S Recover Known Differences in Elite Economic Power?

This application tests whether surplus shares better reflect elite power over resources than headline income shares. It studies how slavery legacies relate to known differences in inequality between former slave and non-slave states in the 1930s Jim Crow US —a link identified at the individual level (Althoff and Reichardt 2024) but not at the societal level of US states.

I focus on 1935 for three reasons. First, 1935 is the earliest year with state-level living costs, produced by the new US Works Progress Administration agency as part of the New Deal response to the Great Depression (Stecker 1937). Second, the 1930s mark peak US inequality before the rise of the welfare state and the World War II compression (Piketty and Saez 2003). Third, by 1935, state outcomes remained more strongly tied to state-level institutional choices (Jim Crow laws) as federal redistributive intervention in the US South

[9]Russia sits a bit further from its MIC. Serfs retained legal personality and more rights than slaves did, and its landed elites faced longer horizons than planters in high-mortality colonies.

[10]By contrast, Caribbean colonies relied on enslaved Africans deprived of political protection, while their small island geography sharply limited exit. They acted more like open-air prisons than open frontier land.

remained minimal (Wright 2013).

Here, rather than looking solely at the top 1%, I go up to the top 10% earners to capture not only rich capital owners (the top 1%), but also the white professional classes who benefited from discrimination in education and labour markets during Jim Crow (Althoff and Reichardt 2024). Following the literature, a higher historical prevalence of slavery leads to persistent inequality through extractive economic institutions (Engerman and Sokoloff 1994, Nunn 2007). This effect should be most visible in the 1930s, when Jim Crow institutions, including labour market discrimination, educational inequality, and political disenfranchisement, were prevalent in former slave states across the US South (e.g., see Wright 2013).

However, the data offer a puzzling picture. States with a higher historical prevalence of slavery appear more equal than non-slave states during Jim Crow. Figure 4 plots the relation between slavery as a share of the state population in 1860 from Nunn (2007) and the top 10% income share in 1935 from Frank et al. (2020) dataset —which follows the WID method.[11] By top income shares, former slave states paradoxically appear more equal. Mississippi and South Carolina—with 55-57% of their populations under slavery in 1860 —exhibit the lowest top 10% share of income in 1935 among states, below 30% of income. Conversely, New York and California, with practically no slaves by 1860, appear 20 points more unequal, with a top 10% share of income of 49-50%.

This suggests the legacy of slavery had not just disappeared but reversed within a century after emancipation, contradicting both historical accounts (Wright 2013) and micro evidence of persistent discrimination during Jim Crow (Althoff and Reichardt 2024).

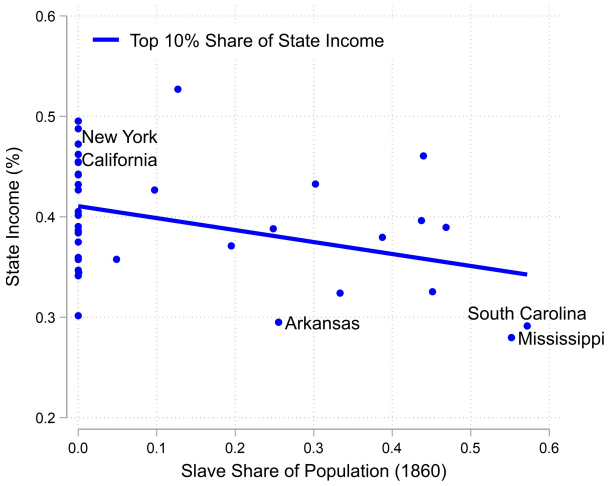
Surplus shares show that former slave states are indeed the most unequal. To show this, I first construct state-level subsistence costs using Stecker's (1937) "Emergency" budget—city-level living costs across 59 US cities. Stecker's "emergency" budget better reflects my physiological-needs SF definition; she also reports a more demanding "maintenance" budget, more akin to a poverty line. I convert the data to per capita 2011 dollars to match Maddison data. Following the federal methodology, I set rural subsistence at 75% of urban levels, then weight by each state's rural/urban population share using census data. In 2011 dollars, the average subsistence floor obtained across all states is \$3,227 —that is, 60% of the US official poverty line set in 1965, after adjusting for inflation.[12] State-level costs ranged from \$2,694 in Arkansas (80% rural) to \$4,293 in California (29% rural).

[11] Frank et al. (2015) uses Piketty et al.'s tax-based method, adjusting for fewer tax filers in poorer states. I exclude Delaware given its exceptional taxation law, which operates differently from other states, so its data are not directly comparable. Still, if I include Delaware, the overall pattern does not change: former-slave states remain the most equal by top income shares and the most unequal by surplus shares.

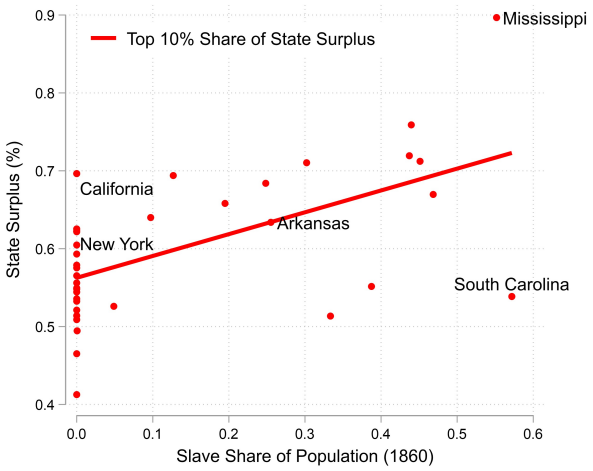
[12] In 1965, the poverty line was \$3,000 for a family of four: \$5,360 pc in 2011 USD. After adjusting for the rural population share of each state, who face 75% of this line, this yields an average subsistence of \$4,548.

Figure 4: The Legacy of Slavery on Inequality in the United States (1935)

A. Slavery and Top 10% of Income



B. Slavery and Top 10% of Surplus



Note. Top 10% surplus share = (state top 10% share of income × state income - 10% × state subsistence floor) / (state income - state subsistence floor). Slave population (slaves/population) in 1860 is from Nunn (2007). Top 10% income shares and state income are from Frank et al. (2015, dataset version 2020), who follow WID methodology; I convert their income data to 2011 dollars using Maddison income per capita for the US as the benchmark. State-level subsistence floors are based on Stecker's (1937) state living costs data.

Second, I apply the SDF using this state-level SF data and average state incomes from Frank et al. (2020), harmonised to match US GDP from Maddison. The resulting surplus shares reveal that elites in former slave states concentrated most of the surplus. Despite significantly cheaper subsistence costs in more rural, former slave states, income levels were so much lower than in non-slave states that the SF as a share of Y remained higher, mechanically compressing how high top income shares could rise. As a result, states like Mississippi, despite appearing equal, sat much closer to the MIC than states without a history of slavery, such as New York. In Mississippi, by taking 28% of all income, the top 10% held 90% of the state's surplus. In New York, despite much higher living costs, by taking 50% of state income, the top 10% held 60% of surplus.

Weak constraints combined with low intertemporal costs predict higher S (Section 2.5), and Figure 4B bears this out. Former slave states remained largely agrarian while the North industrialised, as rural population shares show (83% in Mississippi against 9% in Massachusetts). Agrarian production depends little on workers' human capital, effort, and innovation, which lowers the intertemporal cost of extraction. Leaving workers a claim on the surplus buys correspondingly little future output. White elites in former slave states also faced far weaker institutional constraints. The Jim Crow labour, education, and voting laws

discussed above were designed to serve them.

Consistent with this interpretation, the federal minimum wage introduced a few years later by the Fair Labor Standards Act of 1938 excluded agricultural and domestic work, the sectors in which Black workers were concentrated —an exclusion secured by Southern representatives in Congress (Derenoncourt and Montialoux 2021). These are precisely the less skill-intensive sectors where the intertemporal cost of surplus extraction should be lowest. The effective income floor of Section 2.5 is therefore not universal. It can bind for some groups and not others, so surplus inequality should be higher where more workers fall outside it. Before the Act, the same gap likely operated through social norms about what counted as a fair floor for different racial groups.

These results are robust to a more agnostic floor: the US poverty line set in 1965, converted to 1935 prices and scaled to 84% as in Section 2.3 (to allow for people living below it). The 1965 threshold of $3,000 per year for a family of four corresponds to $5,360 per capita in constant 2011 dollars. Weighting by each state's rural population who face 75% of this line as per the official method yields an average floor of $3,820 (84% of $4,548), 18% above the $3,227 implied by Stecker's emergency budget. Under this more demanding subsistence definition, the link between slavery and surplus inequality is sharper still and even more so if I use 100% of the poverty line instead (Appendix C2).

In sum, surplus shares show that former slave states did exhibit persistent elite power over resources, reconciling micro-level evidence with state-level outcomes: the recovery of Southern elite wealth within generations of emancipation (Ager et al. 2021), educational and labour market inequality benefiting white upper classes (Althoff and Reichardt 2024), and the broader prediction that extractive places, even after abolishing slavery, kept economic systems serving elites (Engerman and Sokoloff 1994, Acemoglu et al. 2001, Nunn 2007). Surplus shares also align with historical accounts of persistent inequality in the US South by the mid-1930s, when federal redistributive interventions remained minimal (Wright 2013).

3.3 Does S Track Institutional Change?

I now turn to time-series evidence to test whether surplus-share series are more consistent with the historical and institutional record than standard top income shares. This requires two inputs: an income-elastic floor, which lets subsistence needs rise with income, and long-run post-tax, post-transfer inequality series, which account for the transfers that have helped ensure subsistence since the post-war expansion of the welfare state. I first apply both to India (1910–2023), then to the global series in the next subsection.

The Income-Elastic Subsistence Floor. My baseline CBN floor captures physiological needs. Holding it fixed at food and shelter, however, risks understating how subsistence costs rise with GDP, and therefore over time (Section 2.3). I therefore build an upper-bound SF that rises with growth. This extends Milanovic (2013), who allows subsistence to rise with income in his subsistence-constrained Gini framework. I advance on this by estimating the income elasticity of subsistence directly from the data, rather than assuming it.

I exploit the present-day link between GDP levels and national poverty lines. I regress the official poverty lines from Jolliffe and Prydz (2021)—who harmonise country lines for 2016–17 in 2011 PPP— on log GDP per capita for this period from Maddison and on the Allen CBN basket costs (Allen 2020). The CBN term captures country variation in the cost of physiological needs—geographic endowments and climate—and the GDP term identifies the income elasticity of subsistence needs. Based on the estimated coefficients, I then predict the income-elastic SF back to 1820 for each country and year using the long-run CBN series (Moatsos et al. 2021) and historical GDP series (Maddison 2025). I then scale the resulting estimates to 84% to allow for people living below the national poverty line (see Section 2.3).

This floor is an upper bound for two reasons. First, it applies today's elasticity of subsistence costs to GDP back to 1820, although that elasticity was likely lower in the past, when fewer needs, such as childcare or transport, were met through the market. Second, I set its minimum as the baseline CBN floor. In any country-year where the predicted floor falls below the baseline, the baseline binds. This handles wartime collapses and droughts, where a sharp income drop would otherwise imply an implausibly low floor. On average, the resulting floor rises from \$653 in 1820, 94% of the World Bank poverty line, to \$950 in 1920 (137%) and \$2,916 in 2023 (421%).

Post-Tax, Post-Transfer Inequality Series (1820–1980). Transfers play a key role in lifting households above subsistence when they have little or no market income, and they are typically financed by taxing middle- and upper-income households (see Besley 1997 for a model). Therefore, accounting for taxes and transfers is important for applying the SDF, notably after WWII, when the welfare state expanded (Lindert 2004, Piketty 2022). However, while WID pre-tax series start in 1820, the corresponding post-tax series by Fisher-Post and Gethin (2026, hereafter FPG) start only in 1980.

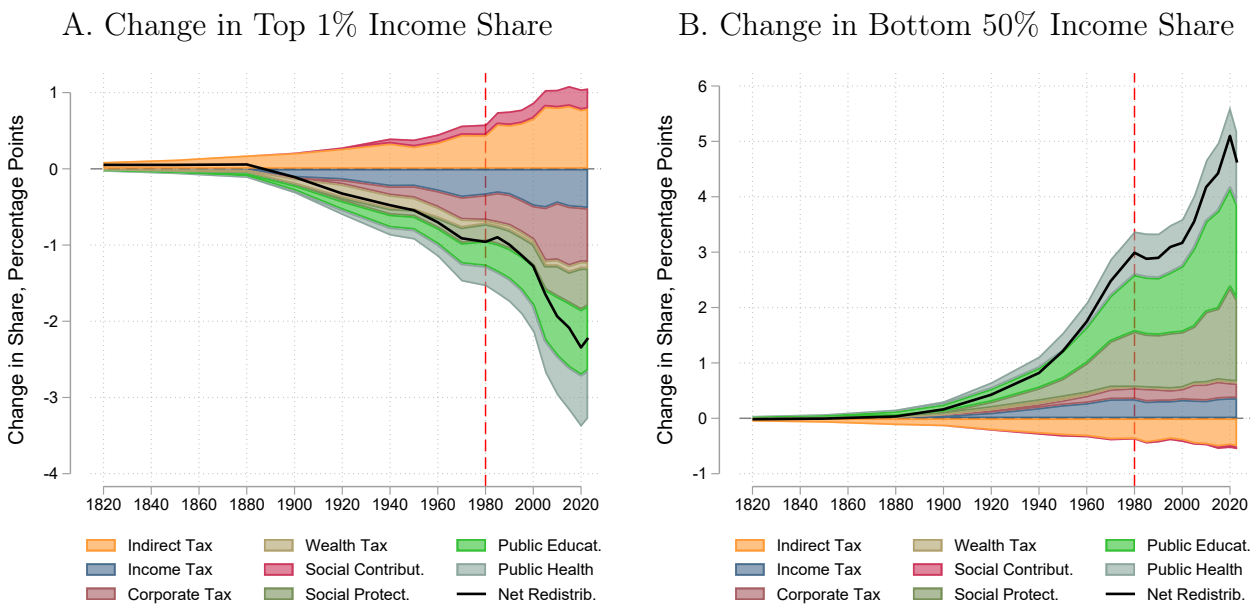
I draw on three sources to extend redistribution estimates before 1980. The Tax Introduction Database (Seelkopf et al. 2021) provides country years of introduction for each instrument: personal income tax, corporate tax, inheritance taxes, and social security contributions. Bharti et al. (2026) provide the historical evolution of tax revenue and public social expenditure by category (social protection, education, health) as a share of GDP since

1820; FPG provides the distributional incidence of each tax and transfer for each country in 1980, their earliest data. Together, I have data for 48 countries, which account for 85–90% of the world population between 1820 and 2020.

The procedure follows two steps. First, for each country and income group (top 1%, next 9%, middle 40%, bottom 50%), I decompose the 1980 redistributive effect from FPG into all the components of the WID post-tax series: 5 taxes (indirect taxes, personal income tax, corporate income tax, wealth and inheritance taxation, social security) and 3 transfers (social protection, education, health).[13] Second, I interpolate the redistributive effect of each component between 1820 and 1980 using the country-specific year of introduction as the zero-redistribution anchor (if the instrument did not exist, its effect was zero), and the share of that instrument in GDP as the level scaling between the year of introduction and 1980.[14] After 1980, I rely on FPG estimates.

As a result, redistributive effects are close to zero before 1900, as most progressive tools had not yet emerged. Most of the action happens in the 20th century (Figure 5). These are the first long-run post-tax, post-transfer inequality series. They extend the WID post-tax

Figure 5: Redistribution Through Taxes and Transfers (1820–2020)



Note. Before 1980, these are my post-tax series. From 1980 onward, they draw on Fisher-Post and Gethin (2026). I use their preferred specification, which assigns education spending based on actual take-up.

[13] For education, I follow FPG who —unlike DINA— assign education spending based on actual take-up.

[14] A limitation is that the 1980 per-unit-of-GDP incidence needs to be held fixed when projecting backwards; it abstracts from variation in targeting. Still, anchoring in 1980 has the advantage of capturing the incidence before the 1980s Reagan- and Thatcher-era reforms, and thus, reflects the post-war welfare state.

series before 1980 and will be documented in a forthcoming WIL Technical Note. Still, my results are robust to two alternatives. One is a simple linear interpolation of redistribution between 1910, when the first progressive taxes emerged, and 1980, when FPG data begin, as in Andreescu et al. (2025). The other is an agnostic two-point comparison of 1820 data from the WID pre-tax series with post-tax data from FPG. Both yield a similar long-run fall in surplus inequality, but miss the historical variation in between.

India (1910–2023). India's shift from extractive towards more inclusive institutions offers a clear benchmark for comparing income and surplus shares, and its inequality series are unusually long and reliable (Banerjee and Piketty 2005, Bharti et al. 2024). In 1947, an extractive colonial regime was succeeded by a democracy, one that did not collapse shortly afterwards as many other former colonies did. The new constitution had egalitarian aims, guaranteeing universal suffrage and equality before the law, and abolishing caste discrimination. If surplus shares capture elite control over resources, they should be markedly lower under democracy than under the Raj.

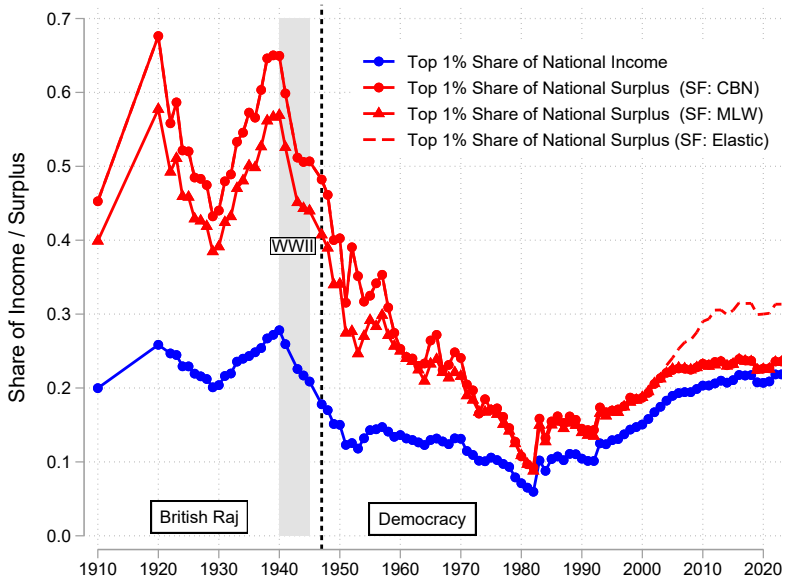
Figure 6A offers income and surplus series. Headline top income shares suggest persistence, as if India lived under the thumb of history, in line with its extractive colonial legacies. The top 1% share of income stood at 20% in 1910 under the British Raj and stands at 22% in 2023. Read from these endpoints, today's elites command roughly the share of national income that colonial elites did a century ago. The compression that followed independence appears to have faded after 1980. Decolonisation and democratisation would thus seem to have left elite economic power unchanged.

By contrast, surplus shares deliver a history of equalisation since independence in 1947, consistent with the institutional record. Under my baseline CBN floor, the top 1% held 68% of surplus at the colonial peak of 1920 and reached a second peak of 65% in 1940, at the start of WWII, before falling sharply to 9% by the 1980s and then rising to 24% in 2023. Surplus inequality is therefore also U-shaped, but the recovery is far from complete. While the top 1% income share has returned close to its colonial level, its surplus share remains at about one-third of its colonial peak.

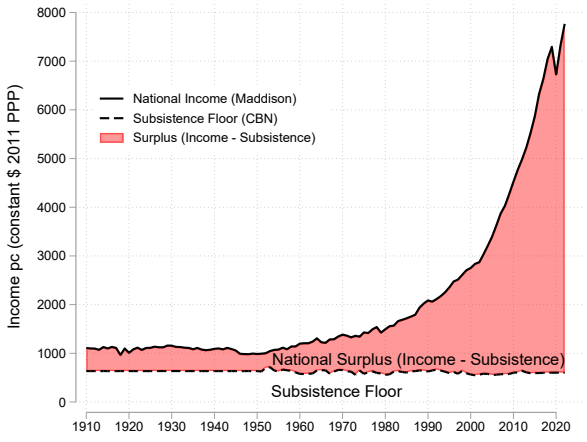
Still, independence did not initiate the fall in elite control over surplus so much as it converted a wartime shock into a sustained four-decade decline. The top 1% surplus share reaches its second peak in 1940 and falls through WWII. A similar decline appears in headline income shares yet it is overlooked by the literature, which focuses on the post-1947 "socialist" policies under Nehru (Banerjee and Piketty 2005). One driver of this early decline is India's fiscal contribution to the British war effort. The Excess Profits Tax Act (1940) taxed business profits at very high rates (66% from 1941), while progressive individual income tax was

Figure 6: Long-Run Surplus Distribution in India: From Colonial Rule to Democracy

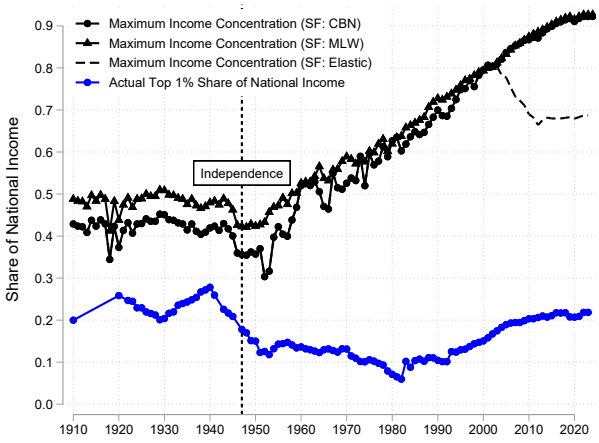
A. Top 1% Share of Income and Surplus



B. Subsistence and GDP Levels



C. Distance to Maximum Inequality



Note. The top 1% share of surplus = (top 1% share of income × income pc − 1% × subsistence pc) / (income pc − subsistence pc). Top 1% income shares are post-tax, post-transfers, following the series described above, so that they are directly comparable with the surplus shares. National income per capita is from the Maddison Project Database and is expressed in constant 2011 USD PPP. Panels A and C report the three subsistence specifications: the baseline CBN floor builds on Moatsos et al. (2021), who apply Allen's cost-of-basic-needs methodology to historical living-cost data, harmonised here with Allen's (2020) contemporary estimates; the MLW floor is fixed at 82% of the World Bank extreme-poverty line ($569 in constant 2011 PPP); and the income-elastic floor is bounded below by the baseline CBN floor but rises with national income once the predicted societal subsistence requirement exceeds the CBN level. Panel B plots levels under the baseline CBN floor. The vertical line denotes Indian independence in 1947.

steepened alongside (Scheidel 2017, ch. 5). The "socialist" policies, under Nehru and then Indira Gandhi, came to reinforce this. Europe saw a similar process. The equalising effect of WWII was continued by the post-war redistributive welfare state, which relied on the progressive taxation achieved during wartime (Lindert 2004, Scheidel 2017, Piketty 2022).

Why was headline inequality so low during the Raj? In the colonial period, the top 1% share of income was heavily constrained by a large subsistence floor, which absorbed around 60% of national income, yet elites held most of a limited surplus. In 1920, GDP pc was about $1,000 in constant 2011 PPP, against a subsistence floor of approximately $635. Subsistence therefore absorbed 63% of national income, leaving only 37% as surplus and setting the MIC at that level. A realised top 1% income share of 26% consequently placed India close to the maximum inequality compatible with the subsistence of the other 99% —hence the 68% surplus share reported above.

Economic growth then loosened this constraint. Real GDP per capita rose from around $1,100 in 1910 to almost $7,800 in 2023, while the baseline CBN floor remained around $600 per person (Figure 6B). The MIC therefore expanded from 37% in 1920 to 92% today, even as the realised top share stood at only 22% (Figure 6C). The distance between realised and maximum inequality widened enormously. Contemporary elites hold a similar share of national income, but a much smaller share of a vastly larger pool of surplus. The surplus that growth liberated from subsistence did not accrue primarily to the top 1%; most of it accrued to the other 99%.

This conclusion is robust to alternative definitions of subsistence. As a lower bound, I follow MLW and fix the floor at 82% of the World Bank extreme-poverty line, approximately $569 in constant 2011 PPP.[15] A lower floor implies a less restrictive colonial MIC, and hence a lower colonial surplus share, yet the top 1% share still falls from 58% in 1920 to 23% today —a remarkable overall 2.5-fold decline.

At the other extreme, I allow the floor to rise with income. This income-elastic specification is bounded below by the baseline CBN floor and becomes more demanding once India is rich enough for a broader societal notion of subsistence to exceed physiological needs, reaching roughly $2,430 by 2023.[16] Even against this far higher contemporary floor, the top 1% holds 31% of surplus today against 68% at the colonial peak —a decline of more than twofold. The level of surplus inequality therefore depends on the subsistence concept; its long-run trajectory does not.

Another important feature concerns how top income shares translate into surplus shares.

[15] MLW take subsistence to be $300 in 1990 PPP; 82% of the World Bank poverty line in 1990 PPP ($365). Applying the same proportion to the World Bank $1.90-a-day line in 2011 PPP gives a floor of $569.

[16] By construction, the income-elastic SF cannot fall below the baseline CBN floor, and therefore departs from the CBN SF only once its predicted value exceeds that floor. In India, this occurs in the early 2000s.

Since $S^{\text{Top }1\%} \approx$ top 1% income share/MIC (Section 2.5), a one-point rise in the top income share raises the top surplus share by 1/MIC points. Where the MIC is tight, an extra point in headline inequality implies a much larger rise in elite control over transferable resources. India's series show this. The colonial increases of 1910–1920 and 1930–1940 are far more modest in top income shares than in surplus shares, which reach their two historical peaks (close to 70%), whereas after 2000, with the MIC above 80%, income and surplus shares rise closer to one for one.

This amplification reflects varying welfare costs. The material cost of inequality is higher where income levels are lower. During the Raj, an extra point accruing to the top 1% pushed the other 99% much closer to bare subsistence than the same increase does today. Kuznets (1955) made this point across countries: a higher income concentration entails "much greater material and psychological misery than similar proportional deviations from the average in the richer, more advanced countries". This also applies when comparing a country over time.

In sum, contemporary elites hold a smaller share of a far larger surplus, offering a trajectory that aligns more closely with the institutional record. It also aligns with micro evidence on individual outcomes. Caste-based gaps narrowed sharply, leading Banerjee and Duflo (2014) to note that India does not live under the "thumb of history". The WWII shock initiated the fall in top surplus shares, but what sustained it over four decades was the post-1947 regime change, including the abolition of colonial extraction systems (the zamindari), land reform, the prohibition of caste discrimination, and the introduction of minimum wages.

3.4 The Global Great Levelling, 1820–2023

Having validated surplus shares across countries, within a country, and over time, I return to the puzzle that opened the paper. The average top 1% share of national income has barely changed in two centuries, suggesting persistent inequality despite major institutional change. Once subsistence constraints are factored in, this apparent persistence gives way to a global *Great Levelling*.

Figure 7 shows the contrast. By headline pre-tax income shares, the average top 1% share stood at 18% in both 1820 and 2023 (Figure 7C). As Chancel and Piketty (2021) argue, this suggests persistent elite power over resources. Its share of surplus, by contrast, fell from 53% in 1820 to 45% in 1900 and 19% in 2023, a 2.8-fold compression since 1820 and 2.1-fold since 1920 (Figure 7A). The decline occurred during one century, between 1880 and 1980, accelerating sharply in the post-war period before partially reversing between 1980 and 2010.

These series apply the SDF to the 48 countries for which long-run WID pre-tax data and my post-tax estimates are available, representing 85–90% of the world population between

1820 and 2023.[17] They are population-weighted country averages, so that the top 1% represents 1% of the population covered by the panel. I study within-country inequality, not inequality between countries, because both the subsistence floor and the resulting surplus are defined nationally. Since pre-1900 WID series rest partly on backward projections, I show below that the results also hold using an alternative pre-1900 data source: social tables.

Is the result mechanical? Top income shares could have risen with the MIC, but they did not. Algebraically, the fall in top surplus shares reflects that divergence (Section 2.5). The allocation of surplus behind it, however, is not determined by growth. The surplus that growth generates can accrue either to the top 1% or to the other 99%, and in two sub-periods the top 1% captured more than its existing share of it. Top income shares moved closer to the MIC between 1820 and 1880 and again between 1980 and 2010, increasing surplus inequality.

Yet, over the full period, most of the new surplus accrued to the 99%. Growth expanded the MIC from 38% in 1820 to 90% today while actual top income shares remained flat and even fell post-tax, from 20% pre-1940 to 16% today (Figure 7C). Had the top 1% kept its 19th-century share of the surplus, its income share would have risen hand-in-hand with the MIC and would be 47% today, not 16%. Elites hold a falling share of a growing surplus.

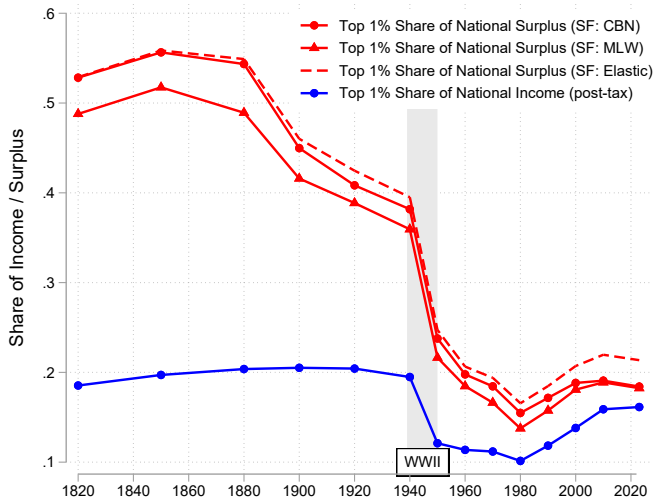
Three Historical Phases. This movement away from the MIC was not uniform and unfolded in three phases. First, between 1820 and 1880, top income shares rose alongside the MIC and moved closer to it. Surplus inequality rose or remained stable at high levels, and top surplus shares stood higher in 1880 than in 1820. This coincides with the expansion of colonialism in Africa and Asia and of oligarchic regimes in Latin America, where a commodity boom —fuelled by demand from industrialising OECD economies— consolidated the power of land- and resource-owning elites (e.g., Bértola et al. 2010, Rodríguez-Weber 2017). In the industrialising OECD, booming trade and finance pushed top shares upward.

Second, from 1880 to 1980, surplus inequality fell sharply. The MIC kept rising, but top income shares plateaued at around 20% and then fell. In OECD countries this coincides with the compression of top income shares during WWII and its redistributive aftermath (Piketty 2014, Scheidel 2017), itself tied to the rise of mass democracy since the 1900s, as poorer citizens finally had a say in politics (Lindert 2004). In the rest of the world it coincides with decolonisation in Asia and Africa and the rise of socialism in China. The decline was steepest after 1940. Between 1940 and 1980, the top 1% share of surplus fell by a factor of

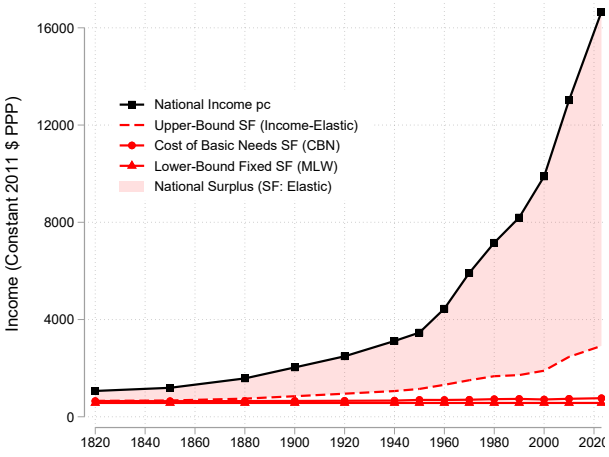
[17] These include Algeria, Argentina, Australia, Bangladesh, Brazil, Canada, Chile, China, Colombia, Côte d'Ivoire, DR Congo, Denmark, Egypt, Ethiopia, France, Germany, India, Indonesia, Italy, Japan, Kenya, Mali, Mexico, Morocco, Myanmar, the Netherlands, New Zealand, Niger, Nigeria, Norway, Pakistan, the Philippines, Russia, Rwanda, Saudi Arabia, South Africa, South Korea, Spain, Sudan, Sweden, Taiwan, Thailand, Turkey, the UAE, the UK, the US, Vietnam, and Zimbabwe.

Figure 7: The Great Levelling: Top 1% Shares of Income and Surplus, 1820–2023

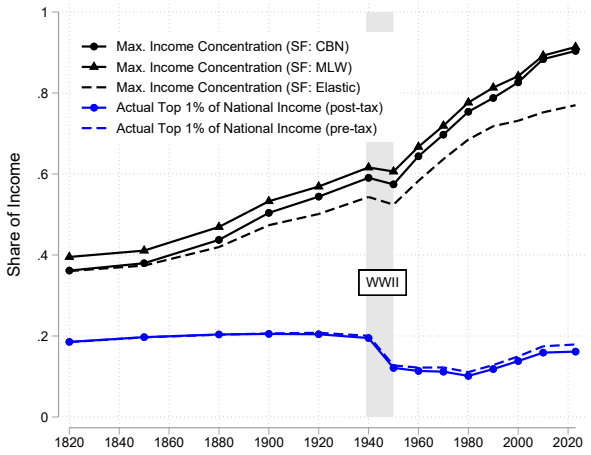
A. Top 1% Share of Surplus vs Income



B. Subsistence and GDP Levels



C. Distance to Maximum Inequality



Note. The top 1% share of surplus = (top 1% share of income × income pc − 1% × subsistence pc) / (income pc − subsistence pc). All series are population-weighted country averages, so that the top 1% reflects 1% of the global population. Pre-tax inequality data are from the WID (2026), which I use to construct post-tax series pre-1980 by interpolating back the series of Fisher-Post and Gethin (2026); from 1980 onward I use their post-tax series. Panel C reports both the pre-tax and post-tax realised top 1% income shares against the three MIC ceilings; Panels A and B use the post-tax series. GDP levels are from Maddison (2025). The CBN line is based on Moatsos et al. (2021). I harmonise their series to match Allen's (2020) present-day data. The MLW SF is fixed at $569 (constant 2011 USD PPP). The income-elastic SF is my own. Where data are missing for subsistence or GDP levels, I extrapolate them following the pattern for other countries using the closest observation. Overall results do not change if these observations are dropped.

2.5, from 38% to 15%, its lowest level in the series. That fall exceeds the entire movement between 1820 and 1940.

The 1940s are revealing because WWII also tightened the frontier itself. The destruction of productive capacity during WWII pushed $Y_{c,t}$ back towards $SF_{c,t}$, compressing the MIC (Figure 7C). With less surplus, there was less room for concentration. Part of the WWII fall in top income shares is therefore a mechanical by-product of war, in line with Scheidel (2017). Surplus shares strip out this mechanical channel. They measure the top's share of whatever surplus exists, so a shrinking surplus does not by itself move them. Had headline shares fallen only because the MIC contracted, surplus shares would have stayed flat. Instead, the top 1% surplus share fell 1.6-fold over the 1940s. The WWII decline was therefore also a redistribution of the surplus, driven by forces such as heavier taxation and state intervention (see Piketty 2014), not just a by-product of wartime destruction.[18]

The post-WWII decades sustained this equalisation. Rapid growth expanded the MIC while top 1% income shares kept falling, opening a persistent and widening gap between feasible and realised inequality. Growth freed national income from subsistence while the top captured a declining share of it, amid the redistributive aftermath of WWII. This dual movement produced an unprecedented compression of surplus inequality. The shift took different forms: the post-war settlement in the democracies of Western Europe and the US, and a range of socialist and revolutionary experiments in Eastern Europe, Asia, Africa, and Latin America (Piketty 2022). It also ran beyond taxes and transfers to pre-distribution policies, such as labour-market regulation and antitrust laws (see discussion in Section 4.1).

Third, the period 1980–2010 brought a partial reversal, coinciding with the end of these socialist experiments, the debt crises and fiscal adjustment of the 1980s in Latin America and Africa, and rising top income shares in Asia as economies liberalised and opened up to trade. Both the 1820–1880 and 1980–2010 episodes show that growth does not mechanically reduce surplus inequality. What matters is who gets the surplus.

Even after this post-1980 reversal, the average top 1% surplus share in 2023 stands 2.9 times below its 1820–1880 average and 2.2 times below its pre-WWII level. For most of history, surplus was limited, and so was the space for inequality. Modern growth progressively relaxed this constraint, creating far more room at the top than elites ultimately occupied.

Robustness Checks. Pre-1900 estimates should be read as broad historical patterns rather than precise points. Individual tax records —on which the WID series rest— generally became available with the introduction of modern taxation in the early 20th century, so pre-

[18]India shows this well: its productive capacity was largely spared and its GDP per capita broadly stable through the war, yet its top 1% surplus share still fell steeply during WWII (Figure 6A).

1900 estimates combine the best available evidence with backward projections (Arias-Osorio et al. 2025). Rather than abandon the long-run exercise, I confront this limitation with three checks: alternative early inequality data, large stress tests on the early WID estimates, and alternative subsistence floors. The OECD series below, which start in 1900, when data coverage improves, provide a fourth.

First, an independent source of early data reproduces both pictures. Taking the earliest available top income share from the historical social tables of Section 3.1 for 28 countries, drawing on Milanovic (2024a) and my own compilation, yields an average top 1% income share of 18%, against 19% for the same countries in 2023 (Appendix C1).[19] This reproduces the headline inequality persistence of Chancel and Piketty (2021). Their average top 1% surplus share, in turn, falls from 52% in the historical sample (whose average year is 1843) to 19% in 2023 —a 2.7-fold compression, against 2.8-fold in the WID panel. This reproduces the *Great Levelling*, which is therefore not specific to the early WID estimates.

Second, I shift every pre-1900 country top income share from the WID upward or downward by 3.4 percentage points —the average pre-1900 cross-country standard deviation in my 48-country sample. Even under these large uniform stress tests, the compression remains substantial. The top 1% surplus share declines by a factor of about 2.4 under the low-inequality pre-1900 scenario and 3.3 under the high-inequality scenario, compared with 2.8 under the baseline estimates.[20]

Third, the result survives all three definitions of subsistence: a lower version of the CBN from Moatsos et al. (2021), my baseline; the fixed lower bound set at 82% of the World Bank poverty line as in MLW; and the income-elastic upper bound designed to capture the societal SF (Section 2.3). Even under the income-elastic floor, which rises to over four times the World Bank poverty line by 2023, the average top 1% surplus share in 2023 stands 2.6 times below its 1820–1880 average and 2.0 times below its pre-WWII level, against 2.9 and 2.2 under the baseline (Figure 7A).

Country experiences. The *Great Levelling* went furthest in OECD countries. Appendix C3 reports surplus series for OECD and non-OECD countries from 1900, when coverage broadens. Even under the income-elastic floor, the OECD top 1% surplus share falls 2.6-fold, from 35% in 1900 to 13.5% in 2023, against 2.2-fold elsewhere. This is where the forces

[19]For each country, I take the earliest available observation between 1700 and 1945, with 1945 chosen as the upper limit because it marks the beginning of the post-war equalisation. The average year is 1843. The sample includes Algeria, Argentina, Australia, Brazil, Cameroon, Chile, China, Denmark, Finland, France, Germany, Haiti, India, Indonesia, Italy, Jamaica, Kenya, Mexico, the Netherlands, Norway, Peru, Russia, South Africa, Thailand, Uganda, the UK, the US, and Vietnam. I compute population-weighted averages to remain consistent with my 48-country WID panel population-weighted series.

[20]In 1820, the top 1% surplus share is 44% in the low-inequality scenario and 60% in the high-inequality.

discussed above arrived earliest and ran deepest —growth, organised labour, and democracy. This also implies that the *Great Levelling* holds in advanced societies and after 1900, when data coverage is better.

Appendix A reports the country series behind the aggregate for five cases chosen for long-run data coverage and regional relevance: the US, France, Nigeria, China, and Chile (1920–2023). In each, surplus inequality bends at a datable institutional event: the New Deal in the US, the post-war settlement in France, decolonisation in Nigeria, revolution in China, and post-Pinochet democratisation in Chile. The long-run surplus decline is stronger in the liberal democracies, France and the US.

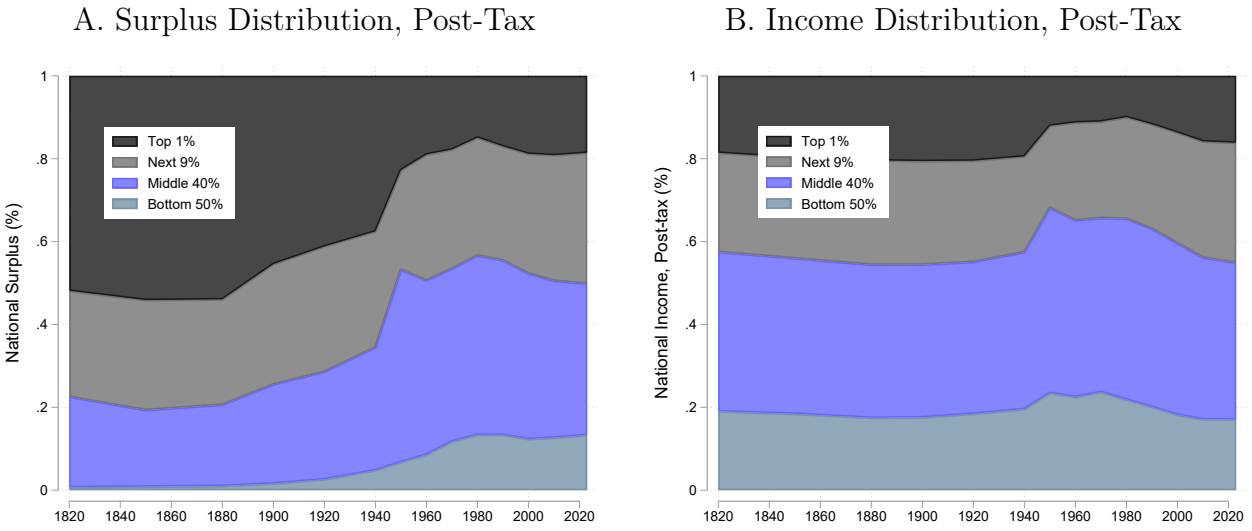
By contrast, China after 1978 and Chile under Pinochet combined rising surplus inequality with rapid growth, further evidence that growth alone does not level the surplus. Pinochet's Chile (1973–1989) is the sharpest case, documented in Appendix A. Surplus inequality rose alongside rapid growth, with most of the new surplus accruing to the top 1% under the severe repression of political opposition and organised labour. This amounted to a collapse in the institutional constraint of Section 2.5. The minimum wage floor, for example, fell sharply in real terms.

Who won in the long run? Figure 8B reports how post-tax income distributes across groups. The top 10% is the long-run winner. Its share goes from 43–46% during the 19th century to a low of 32.0% in 1950, then climbs back to 45.1% by 2023, recovering the whole of its 20th-century loss. The bottom 50% is the long-run loser. Its share peaks at 23.6% in 1970 and declines thereafter to 17.1% today, the lowest value in two centuries. Read off headline incomes, the 20th century delivered a compression that has since been undone, and the working classes end the period with a smaller claim than they began with.

Surplus shares reverse this picture. In Figure 8A the bottom 50% is the main winner. Its share of national surplus rises from around 1–3% before the 1920s to 13% today.[21] The bottom 50%'s larger headline share before 1920 reflects a subsistence floor that consumed most of national income, not a stronger command over the surplus. Until then, workers lived hand-to-mouth. As the classical economists observed in the 19th century, real wages sat at or just above subsistence, leaving the working classes only a marginal claim on the surplus. As the floor shrank relative to total incomes, the same group came to hold a non-marginal claim on the surplus, notably after 1920 with organised labour and mass democracy. The decline in the headline share thus tracks a shrinking floor, while the rise in the surplus share

[21] The result holds under the alternative floors (Appendix C3): under the MLW fixed lower bound, the bottom 50%'s surplus share rises from near 0% in 1820 to an all-time high of 14% today. Under the upper-bound income-elastic SF, it rises from near 0% in 1820 to a peak of 10% in 1980 and stands at 7.5% today.

Figure 8: The Rise of the Bottom 50% During the 20th Century



Note. Same data as Figure 7. Panel A reports surplus shares under the baseline CBN floor; Appendix C3 reports the same decomposition under the MLW and income-elastic floors. Surplus shares are floored at zero to avoid negative values (see Section 2.4).

tracks the emergence of a working-class claim on income above immediate necessity.

Over the long run, households' capacity to pursue goals beyond immediate necessity —from saving to paying for education and affording leisure— has become far more equal.

In sum, my findings challenge accounts of persistent elite power and older narratives that portray a pre-modern *Golden Age* of the working classes (e.g., Polanyi 1944). What appears as historical equality often reflected widespread subsistence, with elites capturing much of a very limited surplus; what appears today as comparable inequality can conceal a much more broadly distributed surplus.

4 Discussion

This section discusses plausible drivers of the *Great Levelling* and what surplus shares imply for inequality today and its political economy.

4.1 Plausible Drivers of the *Great Levelling*

This paper develops the tools that reveal the *Great Levelling*. Causally identifying its drivers is left for future research. Organised labour, institutions, structural change, and the supply of skills are all plausible candidates. Here, I discuss those most consistent with the timing

of the decline and with how much of it occurred before and after taxes and transfers.

My results show that the *Great Levelling* ran deeper than progressive taxes and transfers. Most of the widening gap between the MIC and actual top income shares came from pre-tax incomes (Figure 7C). This points to pre-distribution policies such as labour-market regulation, antitrust laws, and collective bargaining, which raised market earnings at the bottom. Bozio et al. (2024) reach a similar conclusion for long-run top income shares in France and the US. The long-run post-tax series constructed here show that it holds globally, and for top surplus shares as well.

Structural change fits both this pre-tax channel and the timing of the decline, which began in the late 19th century, when progressive taxes and transfers had barely emerged outside a few countries. Section 2.5 develops the idea that, as industrialisation makes production more dependent on workers' skills and effort, the intertemporal cost of capturing surplus rises. Surplus taken today erodes the incentives on which future surplus depends. Industrialisation also concentrated workers in factories, facilitating collective action and strengthening their bargaining power through the threat of unrest and even revolution (e.g., Russia in 1917). To preserve incentives and avoid being displaced, elites may prefer a smaller share of a larger and more secure future surplus.[22]

Indeed, surplus growth makes the *Great Levelling* tolerable for elites. If growth expands the surplus sufficiently, elites can become richer while capturing a smaller share of it. This is what happened between 1880 and 1980. Surplus per capita multiplied sevenfold while the top 1% share of it fell 3.5-fold, so elite surplus income still doubled. The 1940s are the only sub-period in which elites lost surplus share and became poorer, reflecting wartime destruction of capital and punitive taxation to fund the war effort, making it the one period in which the levelling was close to zero-sum.

Redistribution also mattered, more for the rise of the bottom 50% than for the decline of the top 1%. Where the 19th-century state was regressive, channelling income from society toward the top, the post-war welfare state channelled income from middle and top earners toward those at the bottom, through social protection, healthcare, and education (Lindert 2004). Its role was more about lifting the bottom than heavily taxing the top (Kato 2003), and my series reflect this. Taxes and transfers account for only a tenth of the fall in the top 1% surplus share, but a quarter of the bottom 50%'s long-run gain. This is a lower bound. The accounting captures only the direct incidence of taxes and transfers, not their indirect effects on market incomes, such as the earnings gains from free access to education and the productivity gains from healthcare.

Institutions likely shape how much of the growing surplus reaches the bottom, and a rising

[22] In Russia and China, communist revolutions displaced old elites and sharply reduced their surplus share.

societal floor links both channels. As democracy, organised labour, and social movements raised what society deems an acceptable minimum —the societal floor of Section 2.3— that floor came to be enforced both through transfers and in the labour market. In Besley's (1997) model, bringing households above a higher socially defined floor requires larger transfers to bottom groups, and post-tax inequality falls further if these are financed by taxing the top. Minimum wages and collective bargaining can also enforce this floor before taxes, by raising the market incomes of bottom groups. Disentangling these channels, theoretically and empirically, is a promising avenue for future research.

4.2 Present Inequality, Policy Consequences, and Welfare Costs

Here, I ask how subsistence constraints change the way we read inequality today. I show where standard measures yield counter-intuitive results, how surplus shares align better with nations' institutional contrasts, and what this implies for the welfare costs of inequality.

What counts as high inequality, and how countries rank, is a policy-relevant question. Countries, UN bodies, and experts are pressing for an International Panel on Inequality, a global body to track extreme inequality and advise on policy (Stiglitz et al. 2026). Table 1 reports inequality levels in 2023 for selected countries and their World Bank income-group averages, giving the top 1% share of national income alongside the corresponding share of national surplus under my baseline CBN floor and the income-elastic one. It also reports how countries rank by income and by surplus shares.

The headline pre-tax top income share yields a puzzling result. The average top 1% share is 16% in both low- and high-income countries, as if elite control over resources were the same across the development spectrum. This changes once subsistence constraints are incorporated. Under the CBN floor, the average top 1% surplus share is 30% in low-income countries and 13% in high-income countries —about 2.2 times as high in the former. The gap also remains substantial under the income-elastic floor: 30% versus 15%.

Surplus shares reshuffle inequality rankings. Relative to the headline pre-tax income shares, the D.R. Congo rises from 61st place to become the world's third most unequal country under both subsistence specifications. Chile moves in the opposite direction, falling from third place to 55th under the baseline CBN floor and to 49th under the income-elastic floor. At the regional level, Sub-Saharan Africa shifts from appearing as equal as East Asia to exhibiting the highest surplus inequality (Appendix C5). Latin America and South and South-East Asia also emerge as more unequal than North America in terms of elite power over transferable resources.

This surplus-based picture is more consistent with the colonial legacies emphasised by the

Table 1: How Subsistence Constraints Change Inequality Levels and Rankings (2023, selected countries)

	Top 1% share, income		Max. top 1% (MIC)		Top 1% share, surplus		Inequality ranking (n°)		
Year = 2023	Pre-tax	Post-tax	CBN	Elastic	CBN	Elastic	SF = 0	CBN	Elastic
A. Low-income countries									
D.R. Congo	19.4	18.8	34.7	34.7	52.3	52.3	**61**	**3**	**3**
Sierra Leone	15.0	14.1	57.5	57.5	23.8	23.8	**126**	**18**	**37**
Mali	12.1	11.5	75.9	75.9	14.9	14.9	**165**	**94**	**106**
Chad	12.8	11.3	58.6	58.6	18.6	18.6	**157**	**56**	**78**
Average	**16.4**	**16.1**	**60.5**	**59.8**	**29.5**	**29.7**	–	–	–
B. Middle-income countries									
India	23.1	21.8	92.5	74.5	23.5	29.0	**15**	**19**	**13**
Egypt	19.1	17.4	93.2	75.1	18.6	22.9	**65**	**54**	**43**
Brazil	26.5	17.6	95.1	78.4	18.4	22.1	**4**	**58**	**46**
China	15.8	14.0	96.8	82.2	14.5	16.9	**115**	**96**	**89**
Average	**19.0**	**16.9**	**92.5**	**76.8**	**18.3**	**22.0**	–	–	–
C. High-income countries									
Russia	23.8	22.7	93.4	78.2	24.2	28.8	**11**	**16**	**15**
Chile	26.7	18.0	96.8	83.0	18.6	21.5	**3**	**55**	**49**
Japan	12.6	9.4	94.2	81.7	9.9	11.2	**158**	**122**	**125**
United States	20.7	15.5	98.0	89.7	15.8	17.2	**53**	**86**	**87**
Saudi Arabia	23.2	24.9	98.9	90.7	25.2	27.3	**14**	**15**	**19**
Average	**16.3**	**12.9**	**96.7**	**86.1**	**13.4**	**14.9**	–	–	–
World average	**18.2**	**16.1**	**90.4**	**77.0**	**18.5**	**21.4**	–	–	–

Note: Income groups follow the World Bank's 2024 classification, which is based on 2023 GDP. SF = 0 denotes the inequality ranking based on the World Inequality Database (2026) headline pre-tax series, which does not account for the subsistence floor. For each income group, the averages include all countries in that group. Averages are population-weighted, so that the top 1% represents 1% of the population in each group. The "Elastic" SF is my predicted income-elastic subsistence floor. I prefer this measure to countries' official poverty lines as not all countries have one and, where they do, its level is likely endogenous to national policy choices. Post-tax data are from Fisher-Post and Gethin (2026). CBN refers to Allen's (2017, 2020) cost-of-basic-needs method, using country-level data from Allen (2020) in constant 2011 PPP dollars. GDP per capita is from Maddison (2025). As in the rest of the paper, both floors are set at 84% of their value: 84% of the CBN basket to allow for malnutrition (Section 2.1), and 84% of the predicted societal subsistence line, since a non-trivial share of the population subsists below the national poverty line (Section 2.3).

literature (Engerman and Sokoloff 1994, Acemoglu et al. 2001, 2005, Nunn 2014). Surplus shares therefore reconcile the puzzling top-income-share patterns discussed in the introduction with the institutional literature. As in most of the world before the *Great Levelling*, elites in poor nations can hold most of the surplus behind an ordinary headline top share.

Welfare implications. As Smith (1776) put it, "the affluence of the few supposes the indigence of the many". This is particularly true at low incomes, where an additional point of national income accruing to the top 1% takes a much larger share of the surplus available to the other 99%. Kuznets (1955) made a similar point. The same income concentration, he wrote, entails "much greater material and psychological misery" in poorer societies. Surplus shares capture this amplification.

The welfare cost of a given rise in top income shares therefore falls as income rises. Future research could examine whether this helps explain the political economy of rising inequality since 1980. This trend that has been sharper in affluent societies such as the US, while inequality has fallen in many developing nations, including much of Latin America (Alvaredo et al. 2025). At high incomes, a given increase in the top 1% share of income imposes smaller material costs on the 99% and may therefore provoke less political resistance. This mechanism could help explain why top income shares have risen more sharply in the US than in Europe (e.g., Bozio et al. 2024).

5 Conclusion

The top 1% share of income can never be 100% given the subsistence needs of the other 99%. Only the surplus, income above subsistence, can be concentrated. For most of history, that surplus was limited, and so was the space for inequality. Modern economic growth radically expanded the surplus, and with it the space for income concentration. Yet elites did not fill that space; the rest of society did.

This paper has shown that top income shares, which abstract from the subsistence needs of society, are ill-suited to comparing elite power over resources across countries and over time. The Surplus Distribution Framework (SDF) corrects this by measuring how the surplus —income above subsistence— is distributed. It brings MLW's insight that subsistence caps the Gini to the top-income literature, and reconnects modern inequality measurement with the classical political economy of surplus distribution and with Kuznets's (1955) question of how development shapes inequality. To apply it, the paper also constructs the first long-run post-tax, post-transfer inequality series.

Four applications illustrate the framework's value. First, societies considered among

history's most unequal, from slave colonies to Tsarist Russia, cluster near, but not above, their predicted maximum top 1% income share given GDP and living costs. Subsistence constraints bind. Second, former US slave states during Jim Crow exhibit paradoxically lower top income shares than non-slave states, yet substantially higher surplus shares. The SDF recovers the elite economic power that micro evidence and historical accounts document. Third, in India, where headline shares suggest a return to colonial inequality, surplus shares reveal a sustained decline since independence.

Fourth, applied to the world from 1820 to 2023, it replaces a picture of persistent headline inequality with a *Great Levelling* in surplus distribution since the late 19th century, in which the bottom 50% emerged as the long-run winner. This trajectory aligns better with the institutional record: from the rise of organised labour and mass democracy to decolonisation. The levelling occurred mostly before taxes and transfers, which account for only a tenth of the fall in the top 1% surplus share, pointing to the labour-market and structural forces that raised workers' market incomes.

These findings have three main implications. First, the same top income share can imply radically different degrees of elite control over resources in high- and low-income settings. This matters because the top-income literature has expanded to Asia, Latin America, and Africa (Piketty et al. 2019; De Rosa et al. 2024; Chancel et al. 2023). By providing surplus shares, a complementary metric that is comparable across income levels, the SDF offers a new basis for inequality comparisons.

Second, surplus shares capture elite extraction. The institutions literature argues that extractive institutions, those designed to channel resources from society to a narrow elite, are a core cause of underdevelopment. Yet extraction itself is rarely measured. Empirical work relies on institutional conditions that are expected to constrain it, such as secure property rights. Surplus shares are an outcome measure that can be related directly to these arrangements. Future research can use these shares to study when and why institutions translate into greater elite control over surplus.

Third, surplus underpins the *substantive freedoms* emphasised by Sen (1999). It gives households the material capacity to pursue goals beyond immediate necessity, from saving and investing to paying for education and affording leisure. Surplus shares therefore offer a complementary perspective on welfare gaps across nations and over time. They show that elite control over this surplus is far greater in poorer nations today than headline income shares suggest. The same was true in past centuries. This may help explain why similar top income shares carry very different political consequences across nations and over time. Future research should explore these consequences, from social conflict and revolution to perceptions of inequality and preferences for redistribution.

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Appendix A: Long-Run Country Case Studies —USA, France, China, Nigeria, and Chile (1920-2023)

Does economic growth always reduce surplus inequality? When does the subsistence constraint matter, and which floor is the relevant one? This appendix clarifies the scope of the SDF through five cases: the US, the global growth front-runner; France, which reached high incomes in the post-war decades; Nigeria, the largest country in Africa by population and a case, like India, where decolonisation reshaped the distribution of surplus; Chile, a late-comer that reached high incomes after Pinochet's 1973–89 free-market reforms; and China, a late-comer under a state-led model.

As in the rest of the paper, both floors are set at 84% of their value: 84% of Allen's (2017, 2020) CBN basket using Moatsos et al. (2021) CBN historical series, to allow for malnutrition (Section 2.1), and 84% of the predicted societal line, since a non-trivial share of the population subsists below the national poverty line even in rich countries (Section 2.3). Headline shares are the WID pre-tax series; income shares used to compute surplus shares are post-tax, post-transfer. The figures also report the post-tax, post-transfer top income shares constructed in this paper.

The figures for all five countries appear in the pages that follow, and they carry the argument more directly than the text can. In each case the surplus series bends at a datable institutional rupture, and the event markers on the figures make the correspondence visible at a glance: colonial extraction and its unwinding at independence in Nigeria, war and revolution displacing an old elite in China, authoritarian rule capturing the growth dividend and democratisation reversing it in Chile, and the New Deal, WWII and the post-war settlement compressing surplus at the income frontier in the US and France. Headline income shares register the same episodes faintly, later, or not at all. The reader is encouraged to consult them alongside the discussion below, which draws out what each one shows.

United States. By 1913, when Piketty and Saez's (2003) series begin, US income per capita already matched world GDP per capita in 2000, so physiological needs were a small share of national income. Under the baseline CBN floor, the top 1% shares of income and surplus practically overlap after WWII: as SF/Y shrinks, the transferable share of income converges to 100% and the surplus share converges to the income share (Figure A1A). In the post-war affluent society, the CBN constraint fades.

The income-elastic floor remains informative throughout and documents a sharper compression through the New Deal, WWII and the post-war decades: the top 1% surplus share peaked at 27% in 1926, fell to 8.6% by 1978 —a 3.1-fold decline— and has since risen to 17%

in 2023 (22%, 7.6% and 16% under the CBN floor). While the baseline floor is uninformative within the post-war US, it remains essential for comparisons with poorer settings. In 1940, the US and colonial Nigeria had almost identical headline top 1% income shares, 20% and 21%, yet top 1% surplus shares of 19% and 43%. The same holds against Raj India, whose colonial peak of 68% in 1920 was 3.7 times the contemporaneous US figure of 18%.

France. France had reached the 1960s world GDP per capita by 1920, so the CBN floor still absorbed around 10% of national income in the interwar decades and became marginal from the 1960s; the income-elastic floor is informative throughout. Both specifications document a sharper post-war *Great Levelling* than headline shares. Under the income-elastic floor, the top 1% surplus share fell from 32% in 1923 to 6.5% in 1983 —a 4.9-fold decline— and stands at 8% today, still four times below its interwar peak (3.6-fold under the CBN floor). From the early 1900s through the 1970s, falling top income shares coincided with rapid growth: shares fell sharply while the MIC rose as sharply.[23]

Nigeria. Nigeria is the natural African counterpart to India: the largest country on the continent by population, with colonial and post-colonial income-tax data among the longest and most reliable in the Global South (Alvaredo et al. 2021; Chancel et al. 2023), and a clean institutional break at independence in 1960. It also shows the paper's central point in its starkest form. In 1940, Nigeria's subsistence floor absorbed 51% of national income against 7% in the US, so the two countries' nearly identical headline top 1% shares (21% and 20%) corresponded to surplus shares of 43% and 19%. Headline inequality was the same; elite control over transferable resources differed by a factor of 2.2.

The top 1% surplus share peaked at 43% in 1940, stood at 29% at independence in 1960 and 30% in 1970, and fell to 12% today (14% under the income-elastic floor): a 3.5-fold decline from its colonial peak, more than half of which came after independence.[24] Headline shares also decline, from 22% to 12%, but only 1.8-fold. As in India, decolonisation registers in the surplus series at roughly twice the magnitude that headline shares suggest.

Chile. Chile shows that declining surplus inequality is not a mechanical effect of growth. By 1973 Chile had incomes and top-share levels comparable to 1940s Western Europe, and

[23]This is consistent with Piketty's (2014) emphasis on the equalising role of growth, though, rather than operating through a capital-return-versus-growth-rate dynamic, it operates through growth lifting incomes above subsistence.

[24]The steepest fall occurs during the 1970s, which coincides with a change in the underlying WID sources for Nigeria; as in Section 3.3, pre-1980 estimates should be read as capturing broad patterns rather than precise turning points. The CBN and income-elastic floors coincide for Nigeria until the mid-2000s, since the elastic floor is bounded below by the CBN.

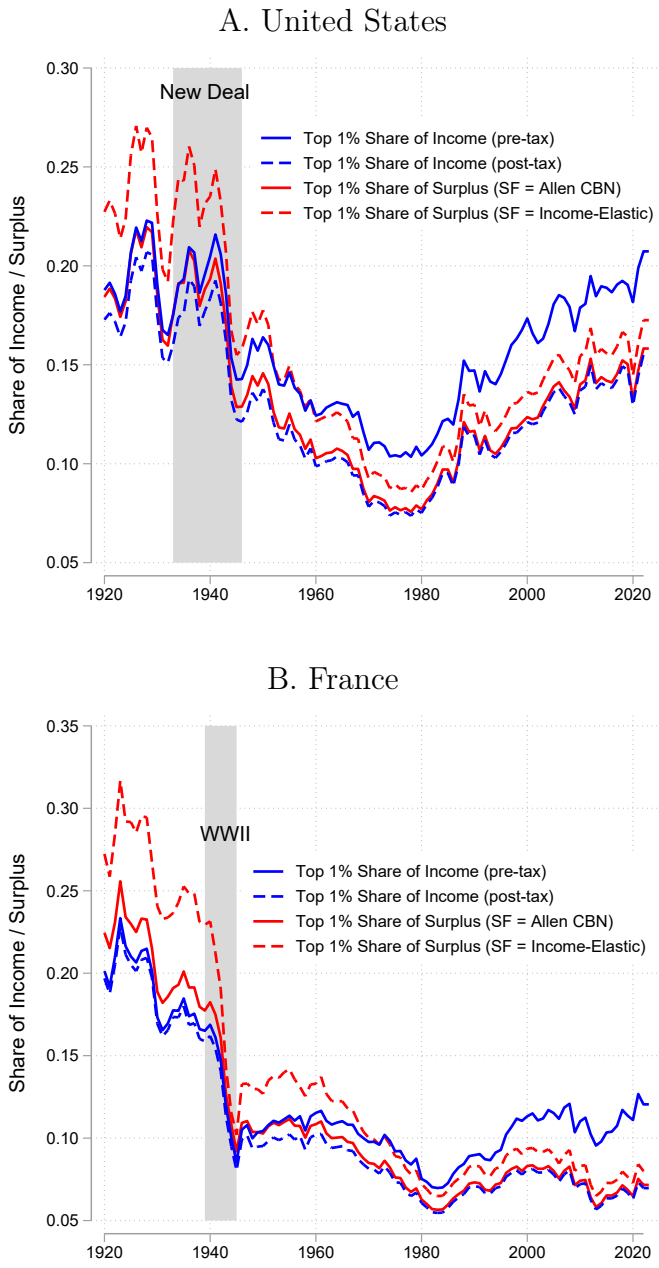
converged rapidly with OECD incomes thereafter, joining the OECD in 2010. Yet unlike Western Europe's *golden age of growth*, the Pinochet-era dividend (1973–89) mainly benefited elites. With democracy gone missing, labour unions repressed and political opposition eliminated, the top 1% surplus share rose from 24% under Allende in 1972 to a peak of 35% in 1987 (20% to 27% under the CBN floor) and remained above 31% through the transition until 2006, when a constitutional reform removed the last authoritarian enclaves.[25] Only then did it fall, reaching 22% in 2023 —below its pre-coup level and the lowest in the series since 1950.

China. China shows a parallel dynamic under a different model. Its top 1% surplus share was 50% in 1920, when subsistence absorbed 56% of national income, and 43% in 1940 — among the highest in my panel— before collapsing to 15% by 1950 and 7.6% by 1970 as the revolution displaced the old elite. Deng Xiaoping's reforms (1978–92) then launched a state-led model that retained control over strategic sectors while liberalising at the margin, and surplus inequality reversed: from 9% in 1978 to 17% today under the income-elastic floor (14% under the CBN floor). Despite starting from far lower incomes than Chile or post-war Europe, and growing faster and for longer, China's reform-era surplus accrued disproportionately to the top. Two distinct development models —state-led in China, free-market in Chile— produced the same outcome, and in neither did the *golden age of growth* compress surplus inequality as it had in the post-war US and Western Europe.

Scope of the SDF. Three lessons follow. First, the CBN floor is indispensable wherever incomes lie near subsistence —colonial Nigeria, Republican China, Raj India— and for any comparison involving such settings, but it becomes uninformative within rich countries after mid-century, where income and surplus shares converge. Second, the income-elastic floor remains informative at all income levels and is the natural choice for within-rich-country histories; it consistently yields sharper long-run declines. Third, growth is permissive rather than equalising: it expands the surplus, but who captures it is an institutional question —as the contrast between post-war France and the US on one side, and Pinochet's Chile and reform-era China on the other, makes plain.

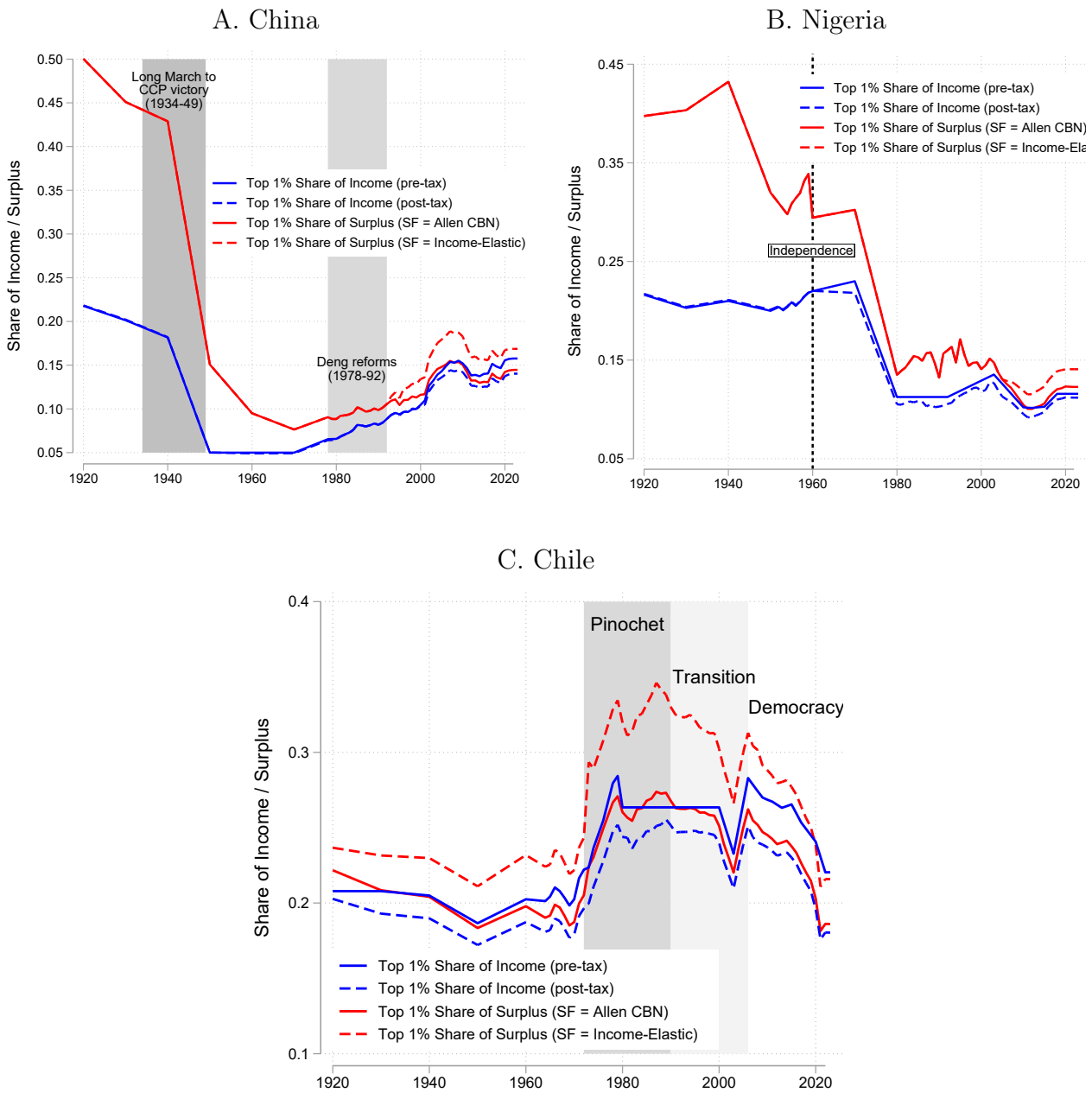
[25] Pinochet ruled from 1973 to 1989; the transition began in 1990. Pinochet held a senator-for-life seat until 2002, and the remaining designated senators left office in 2006.

Figure A1: Long-Run Case Studies: The Early Developers



Note. The top 1% share of surplus = (top 1% share of income × income pc − 1% × subsistence pc) / (income pc − subsistence pc). The income shares used to compute surplus shares are post-tax, post-transfer. Pre-tax series data are from the WID (2026); post-tax series are my own, constructed by interpolating back Fisher-Post and Gethin (2026). GDP data are from Maddison (Bolt and van Zanden 2025). Country- and year-specific subsistence follows Moatsos et al. (2021), who apply Allen's (2017) CBN method to historical living-cost data; I harmonise their series to Allen's (2020) contemporary estimates. The income-elastic floor takes the CBN floor as its minimum and then rises with GDP per capita following the present-day relation between official national poverty lines and GDP pc (Section 3.3). As in the rest of the paper, both floors are set at 84% of their value.

Figure A2: Long-Run Case Studies: Late-Comers and Decolonisation



Note. Same definitions, data and sources as Figure A1. The vertical line in Panel B denotes Nigerian independence in 1960. Pinochet ruled Chile from 1973 to 1989; the democratic transition began in 1990 and culminated in 2006, when a constitutional reform became effective and removed the remaining authoritarian enclaves. Pinochet held a senator-for-life seat until his resignation in 2002, while the other designated senators (former members of the regime) remained in office until 2006. Because the income-elastic floor is bounded below by the CBN floor, the two surplus series coincide for China until the early 1990s and for Nigeria until the mid-2000s.

Appendix B: A Model of Surplus Extraction

A Two-Period Model of Surplus Extraction This section offers a 2-period model that formalises the intuition of the surplus concentration dynamics presented in Section 2.5. Recall that S is the share of surplus accruing to a specific group, here the elite proxied by the top 1%. This model formalises why elites choose $S < 1$, namely why they don't capture all surplus from society ($S = 1$), as surplus appropriation is constrained by intertemporal costs and institutional constraints. The equilibrium surplus concentration S^* maps exactly to the top 1% share of surplus, $S^{\text{Top 1\%}}$, providing a political-economy interpretation of the object measured in the empirical applications.

Model Setup Two periods, $t = 1, 2$. Two groups: an elite group (the top 1%, of population share $\varepsilon = 1\%$) and a mass of workers (the other 99% of society). Period 1 national income per capita Y_1 and subsistence floor SF are given. Surplus per capita is $SI_1 = Y_1 - SF$. Letting s_t be the elite's share of the surplus at t, incomes per member of each group are:

$$y_t^E = \text{SF} + \frac{s_t}{\varepsilon}\,\text{SI}_t, \qquad y_t^W = \text{SF} + \frac{1 - s_t}{1 - \varepsilon}\,\text{SI}_t. \tag{M1}$$

Substituting (M1) into equation (4) gives $S^{\text{Top 1\%}} = s_t$ exactly at any date, so s_t is the object measured in the applications rather than an approximation to it. The elite chooses the period 1 extraction rate $s \in [0, \bar{s}]$, anticipating period 2 consequences. For simplicity, its period 2 share $s_2 \equiv q$ is taken as given. This is what a two-period horizon requires: a period 2 elite faces no intertemporal cost, so its own choice would mechanically be the ceiling, and μ stands in for a continuation game.

With discount factor $\beta \in [0, 1]$ capturing tenure security (Olson 1993), let $\mu \equiv \beta q \in [0, 1]$ be the discounted value of that claim. $\mu \to 0$ describes *roving* elites — those facing high turnover, civil conflict, or high mortality, as in tropical colonies. $\mu \to 1$ describes *stationary* elites with secure long-term claims.

The ceiling on extraction Institutions may guarantee workers an income floor $F \geq SF$ —through minimum wages, collective bargaining, transfers, or an outside option such as access to frontier land— covering a fraction λ of them. Feasibility then requires:

$$s \leq \bar{s}(F, \lambda) = 1 - \frac{\lambda(1 - \varepsilon)(F - \text{SF})}{\text{SI}_1}, \qquad \frac{\partial \bar{s}}{\partial F} \leq 0, \qquad \frac{\partial \bar{s}}{\partial \lambda} \leq 0, \tag{M2}$$

with strict inequalities when $\lambda > 0$ and $F > SF$ respectively. In income-share terms the ceiling on the top 1% is 1 - (1 - ε)[λF + (1 - λ)SF]/ Y_1. This is the exact group-

specific ceiling; when $F = SF$ it exceeds the MIC of Section 2.2 by $\varepsilon \cdot SF / Y_1$, the elite's own subsistence term, which Section 2.5 treats as negligible.

A floor therefore binds through its coverage as well as its level, which the applications illustrate twice. The exclusions later written into the Fair Labor Standards Act of 1938 — agricultural and domestic work— indicate how narrowly such protections applied in precisely the sectors where extraction had been highest (Section 3.2). And an exit option raises F without any statute: the open frontier is one reason the settler colonies sit farthest from their ceiling (Section 3.1).

Production and worker incentives period 2 surplus depends on the surplus left to workers, which finances their investment in human capital and innovation:

$$\mathrm{SI}_2(s) = \mathrm{SI}_1 \left[1 + g - \alpha\, d(s)\right], \qquad d(0) = d'(0) = 0, \quad d' > 0, \quad d'' \geq 0, \tag{M3}$$

with $1 + g$ - $\alpha d(\bar{s}) > 0$. Where $g > 0$ is the maximum feasible growth rate of the surplus and $\alpha \in [0, 1]$ indexes economic structure. $\alpha = 0$ captures a pure primary economy (plantation slavery, resource extraction): output is independent of workers investment in human capital and innovation. Intuitively, in such cases, extracting all surplus from workers can be optimal for rational elites, as under slavery in the antebellum US South plantations (Fogel and Engerman 1974). In turn, $\alpha \to 1$ captures a purely non-primary economy in which growth depends fully on the share of surplus left to workers, as investment in human capital and long-term returns to innovation are more relevant (Galor and Moav 2006).

Note that g is the growth rate of the surplus, which exceeds that of income: as Section 2.3 shows, growth both raises income and, by lifting income away from a floor fixed in real terms, raises the share of income that is surplus at all.

Institutional constraints Surplus extraction can trigger a redistribution event —high progressive taxes and transfers, or more pro-worker legislation— as well as unrest or expropriation. Pressing the claim harder raises that risk at an increasing rate, at a cost to the elite of:

$$\text{political cost} = \psi\, \mathrm{SI}_1\, c(s), \qquad c(0) = c'(0) = 0, \quad c' > 0, \quad c'' \geq 0. \tag{M4}$$

Where $\psi \geq 0$ indexes institutional checks on elite power: democracy, labour rights, free press, an independent judiciary, which give the mass of workers the power to push for redistribution or legislation against elites in case of high S (Acemoglu et al. 2001, 2005). $\psi = 0$ captures unchecked autocracy.

For simplicity, checks enter as a direct cost rather than as the probability that the elite loses all its period 2 income. The latter would conflate a constraint with a horizon: raising the probability of expropriation both penalises extraction and makes the future worth less, so it can lead elites to front-load and extract *more* today. Equation (M4) isolates the constraint, which is the force Section 2.5 describes.

Both the damage in (M3) and the cost in (M4) are proportional to SI_1: a given extraction rate destroys a given fraction of future surplus and provokes a given fraction of it in political cost, whatever the size of the economy. Nothing in the model therefore implies that rich societies extract more, or less, than poor ones at equal institutions.

Elite optimisation The elite maximises:

$$V(s) = \mathrm{SI}_1\Big\{s + \mu\,[1 + g - \alpha\, d(s)] - \psi\, c(s)\Big\}, \qquad 0 \le s \le \bar{s}. \tag{M5}$$

Note that $V(s)$ is measured in income units: the elite maximises its absolute income, not its share of the surplus. Nothing in the problem gives it a preference over s itself, which matters for the accounting result below. Dividing (M5) by $SI_1 > 0$ leaves an objective in s alone, so the problem is scale-free; and g enters that objective only through the additive term $\mu(1 + g)$, so it drops out of the first-order condition:

$$\underbrace{1}_{\text{static gain}} = \underbrace{\mu\,\alpha\, d'(s^*)}_{\text{intertemporal cost}} + \underbrace{\psi\, c'(s^*)}_{\text{institutional cost}} . \tag{M6}$$

Two forces therefore shape the optimum against the static gain from extraction: the intertemporal cost, rising in α and μ, and the institutional cost, rising in ψ. Write $\Psi(s) = \mu\alpha d'(s) + \psi c'(s)$ for the total marginal cost and $D = \mu\alpha d'' + \psi c''$ for its slope. Since d and c are convex, $D > 0$, so Ψ is strictly increasing, V is strictly concave, and the optimum is unique: the second-order condition holds by construction rather than by assumption. Because $\Psi(0) = 0$, there is always some extraction; the optimum is interior if and only if $\Psi(\bar{s}) > 1$, and otherwise the ceiling binds and $s^* = \bar{s}$.

Predictions Implicit differentiation of (M6) yields three comparative statics, mapping directly onto the taxonomy discussed in Section 2.5, plus one negative result:

P1 (Olson). $\partial s^*/\partial \mu = -\alpha d'(s^*)/D < 0$. More patient and more securely established elites extract less. The channel operates through the intertemporal cost, so it requires $\alpha > 0$.

P2 (Acemoglu–Robinson). $\partial s^*/\partial \psi = -c'(s^*)/D < 0$. Stronger institutional checks lower extraction, at any interior optimum and with no further conditions.

P3 (Galor–Moav; Fogel-Engerman). $\partial s^*/\partial \alpha = -\mu d'(s^*)/D < 0$. Non-primary economies sustain lower extraction. The channel works through the value the elite places on the future, so it requires $\mu > 0$.

P4 (Economic Growth). $\partial s^*/\partial g = 0$. Growth expands the surplus but does not determine its division. By (M2), a higher or more widely applied income floor lowers the ceiling instead: $\partial \bar{s}/\partial F \leq 0$ and $\partial \bar{s}/\partial \lambda \leq 0$.

In the terms of Section 2.5, ψ, F and λ govern how far elites *can* press their claim, while μ and α govern how far they *want* to. P1 and P3 also interact: because the horizon channel runs through α, longer elite horizons cannot by themselves place a primary economy further from its ceiling. Where two primary economies differ, as Tsarist Russia does from the Caribbean plantation colonies in Section 3.1, the work is done by ψ —the legal personality and minimum rights retained by serfs, and the racial ideology that licensed extraction from enslaved Africans that was not applied to a serf population sharing its landowners' nationality and religion.

Two corner cases close the taxonomy:

(a) Weak constraints and either a primary economy or no continuation claim ($\psi \to 0$, and $\alpha = 0$ or $\mu \to 0$): $\Psi \equiv 0$, so $s^* = \bar{s}$. The elite captures the whole transferable surplus, and where no floor above subsistence is enforced its income share sits at the MIC. Note that a short horizon alone does not deliver this outcome when political checks remain strong. **(b) Stationary elite, strong constraints, non-primary economy** ($\mu \to 1$, $\psi \to 1$, $\alpha \to 1$): $\Psi(\bar{s})$ is large and s^* falls well below the ceiling.

Intermediate configurations — primary-economy democracies (Chile) and non-primary autocracies (China) — yield intermediate s^*, consistent with the empirical patterns documented in Sections 3 and 4.

Taking $d(s) = c(s) = s^{1+\eta}/(1+\eta)$ with $\eta > 0$, which satisfies the assumptions above, makes this concrete:

$$s^* = \min\left\{\bar{s},\ (\mu\alpha + \psi)^{-1/\eta}\right\}. \tag{M7}$$

Extraction then depends on a single index, $\mu\alpha + \psi$, which combines the elite's horizon, the skill-intensity of production and the strength of institutional checks, with η governing how sharply the two costs bite. The corner case (a) arises when that index is small. Neither growth nor the level of income appears.

Growth and absolute elite income Since the elite maximises income rather than its share, a smaller share of a larger surplus can be worth more to it than a larger share of a smaller one. Let $E_t = s_t \cdot SI_t$ be the elite's surplus income, $\Lambda = s_1/s_2$ the factor by which

its share falls between two dates, and $\Gamma = SI_2/SI_1$ the factor by which the surplus grows. Then:

$$\frac{E_2}{E_1} = \frac{\Gamma}{\Lambda}, \qquad \text{where} \qquad \Gamma = \frac{Y_2}{Y_1} \times \frac{\text{MIC}_2}{\text{MIC}_1}. \tag{M8}$$

The elite is better off in absolute terms if and only if $\Gamma > \Lambda$: the surplus must grow by more than the elite's share of it falls. Equivalently, if the surplus grows at rate γ and the elite's share declines at rate δ, elite income grows at γ - δ. As the second expression in (M8) shows, growth enters Γ twice: it raises income, and by lifting income away from a fixed floor it raises the share of income that is surplus at all. Both channels expand the pool from which a shrinking share is drawn, which is what makes a lower share tolerable to elites. Where there is no growth, $\Gamma = 1$ and any fall in s is a pure loss: distributional conflict is zero-sum.

This is how the model reads the *Great Levelling*. A *Great Levelling* means $\Lambda > 1$; if in addition $\Gamma > \Lambda$, the elite's share of the surplus falls while its absolute surplus income rises. Section 3.4 gives $\Lambda = 2.8$ for the world series between 1820 and 2023, while Γ is far larger: income per capita rose many times over and the MIC expanded from 38% to 90%. Elites therefore ended the period holding a much smaller share of a much larger surplus, and richer in absolute terms than at the start. The decline in S did not require elites to become poorer, only to grow more slowly than the surplus.

Two caveats. For a given configuration the model implies $\Gamma = 1 + g$ - $\alpha d(s^*)$ and $\Lambda = s^*/q$, but it does not generate the decline itself, since q is given; historical movements in Λ are comparisons across configurations with different μ, α, ψ, F and λ. And (M8) is an accounting statement about incomes, not about consent: that elite incomes rose does not establish that elites welcomed democratisation, labour rights or redistribution, and nothing here identifies the political process through which ψ, F and λ changed.

Mapping to the SDF The model's s corresponds directly to the top 1% share of surplus measured in the applications. Section 2.5 showed that, for the top 1%, this object approximates the MLW extraction ratio (equation (5)): $S^{\text{Top 1\%}} \approx$ Top 1% Income Share / *MIC*. The model fixes the intuition: the observed top 1% surplus share is the equilibrium choice of an elite trading off static extraction against intertemporal costs and institutional checks, subject to a ceiling set by the effective income floor.

This disciplines how I read the applications. The slave-economy clustering at the MIC (Section 3.1) matches corner case (a): high European mortality lowered μ, colonial labour regimes lowered ψ, plantation production fixed $\alpha \approx 0$, and no floor above subsistence was enforced. The Jim Crow result (Section 3.2) combines a low α in agrarian production, a low ψ under disenfranchisement and discriminatory labour and education law, and a low λ

where wage floors did not reach. The post-1900 *Great Levelling* (Section 3.4) reflects rising ψ — democratisation, labour rights, the welfare state — rising α — structural change from agriculture toward services and skill-intensive production — and rising F and λ through minimum wages and transfers, with (M8) showing why that decline coincided with rising absolute elite incomes. Finally, the Chile/China parallel (Appendix A) is consistent with P4: both grew fast without the post-war compression seen in France and the United States, because growth on its own leaves the division of the surplus unchanged.

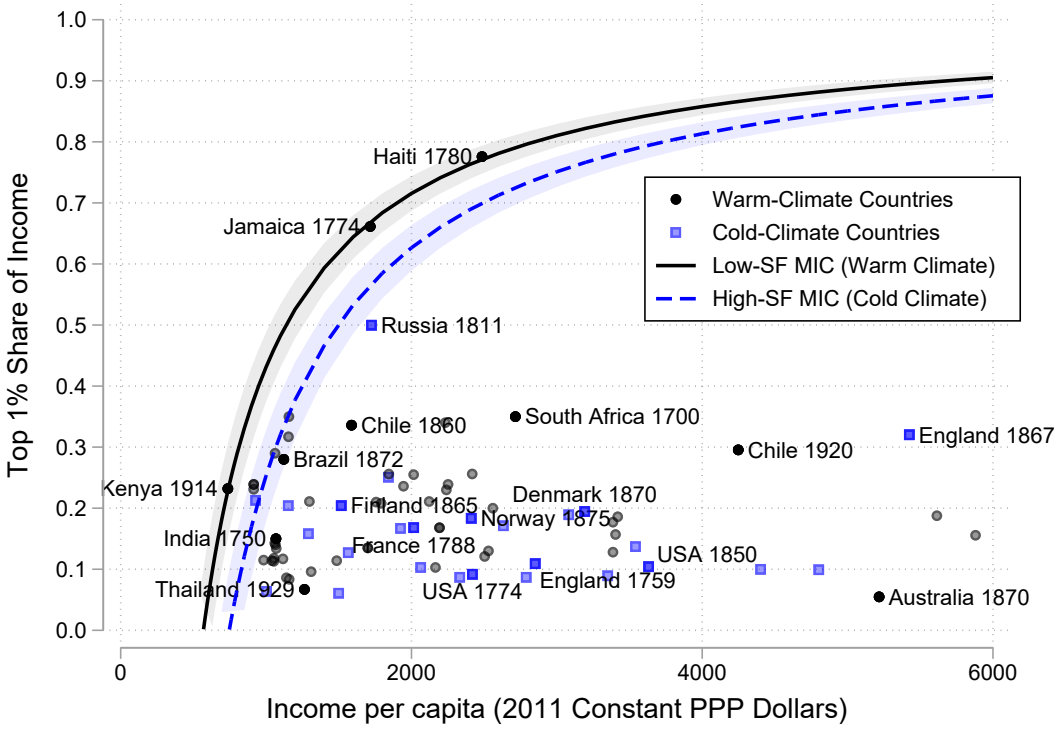
Three limitations bound what the model claims. The extraction rate is chosen once, so the model compares configurations rather than generating a path. The applications measure s but do not estimate μ, α, ψ, or the curvature of d and c, so the model organises the interpretation of the empirical patterns without being tested by them. And the model imposes $s \leq \bar{s} \leq 1$, so it says nothing about settings in which subsistence itself is not enforced —civil war or state collapse, where Malthusian checks reactivate— which are in any case absent from the social tables for lack of records.

Appendix C: Robustness Check

Appendix C1: Robustness — The MIC and Historical Inequality

What this robustness check does. Figure 3 in Section 3.1 plots a selected subsample of the historical observations, chosen to cover the most and least unequal cases while keeping the labels legible. Figure C1 plots the full sample: every society-year observation available before 1950, against the same two MIC ceilings for warm- and cold-climate settings. The pre-1950 restriction keeps the exercise on the settings the test is about, societies in which subsistence absorbed a large share of national income, before the post-war equalisation; post-1950 coverage comes from the WID panel of Section 3.4. The lightly coloured squares and circles are all the additional observations not included in Section 3.1. As noted there, none of the 71 society-year observations breach the MIC.

Figure C1: The MIC and Historical Inequality Levels: Full Sample, Pre-1950



Note. Cold countries (blue squares) are those with most of their territory in cold climates and warm countries (black circles) are those with mainly warm climates. The MIC equals $1 - \mathrm{SF}/Y$. Subsistence is based on the earliest data from Moatsos et al. (2021). Inequality data from social tables are from Milanovic (2024a) and my own calculations following Milanovic's (2024a) method, see details below. Income data are from Maddison (2025); when missing, I estimate them directly from the source (see Appendix D1). All observations are plotted, while labels are shown for the selected societies presented in Section 3.1. The full source list of societies is given below.

Where the data come from. Income per capita is from Maddison (Bolt and van Zanden 2025); where Maddison has no observation for a society-year, I estimate it from the underlying study, with the two cases requiring most construction —Jamaica 1774 and Haiti 1780— detailed in Appendix D1. The inequality estimates come from the following sources:

- *Milanovic (2024a)*: England 1290, 1381, 1688, 1759, 1801 and 1867; Tuscany 1427; Cracow 1578; Sweden 1613; Holland 1732; the Netherlands 1808; Moghul India 1750; Bihar 1807; India 1938; Cape Colony 1757; France 1788, 1831 and 1866; Nueva España 1790; Kingdom of Naples 1811; Bavaria 1847; Prussia 1863; the United States 1774, 1850, 1860 and 1870; Peru 1876; Maghreb (Algeria) 1880; Java (Indonesia) 1880 and 1924; China 1880; European Russia 1904; Kenya 1914 and 1927; Tonkin 1929; Cochinchina 1929; Siam (Thailand) 1929,
- *Aaberge and Atkinson (2010)*: Norway 1875.
- *Alvaredo (2010)*: Argentina 1932.
- *Alvaredo and Atkinson (2022)*: South Africa 1914, 1920, 1930 and 1940.
- *Alvaredo, Cogneau and Piketty (2021)*: Algeria 1932; Cameroon 1945; Tunisia 1946.
- *Atkinson and Søgaard (2016)*: Denmark 1870.
- *Burnard, Panza and Williamson (2019)*: Jamaica 1774.
- *De Haas (2022)*: Uganda 1925, 1935 and 1948.
- *Korchmina and Malinowski (2024)*: Moscow province (Russia) 1811.
- *Panza and Williamson (2021)*: Australia 1870 and 1910.
- *Rodríguez Weber (2017)*: Chile 1860, 1880, 1900 and 1920.
- *Roikonen and Heikkinen (2020)*: Finland 1865 and 1880.
- *Own calculations*: Cape Colony 1700, based on Fourie and von Fintel (2011); Haiti 1780, based on Piketty (2020, ch. 6) and Henochsberg (2016); Brazil 1872, based on Bértola et al. (2010); New England, the Middle Atlantic and the South Atlantic 1860, based on Lindert and Williamson (2016); Mexico 1895, 1910, 1930 and 1940, based on Castañeda Garza and Bengtsson (2020); Kenya 1947, based on Lukkari and Mwaipopo Fibaek (2025).

How the top 1% shares are obtained. The observations fall into three groups. First, most come from a source that reports a top 1% income share, either from a social table or from income-tax records, and are taken as published. Second, for Cape Colony 1700, the three US regions in 1860, Mexico 1895–1940 and Kenya 1947, the underlying study reports a distribution by social class or occupational group but no top percentile. I compute it following Milanovic's (2024a) procedure: classes are ranked by mean income, population shares are cumulated from the top, and the top percentile is obtained by interpolating within the richest class. Third, Brazil 1872 (Bértola et al. 2010) and Haiti 1780 (Piketty 2020, ch. 6) report a top decile but not a top percentile. For these, I take the top 1% share to be the

reported top 10% share multiplied by the top 1%-to-top 10% ratio observed in a closely comparable setting for which the data are good: Chile 1870 (Rodríguez Weber 2017) for Brazil 1872, both Southern Cone primary-export economies with coerced rural labour, and Jamaica 1774 (Burnard et al. 2019) for Haiti 1780, both Caribbean sugar-plantation slave colonies.[26]

Additional references (cited only in this appendix):

Aaberge, Rolf, and Anthony B. Atkinson. 2010. "Top Incomes in Norway." In *Top Incomes: A Global Perspective*, edited by A. B. Atkinson and Thomas Piketty, 448–80. Oxford: Oxford University Press.

Alvaredo, Facundo. 2010. "The Rich in Argentina over the Twentieth Century, 1932–2004." In *Top Incomes: A Global Perspective*, edited by A. B. Atkinson and Thomas Piketty. Oxford: Oxford University Press.

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Atkinson, Anthony B., and Jakob E. Søgaard. 2016. "The Long-Run History of Income Inequality in Denmark." *Scandinavian Journal of Economics* 118 (2): 264–91.

Castañeda Garza, Diego, and Erik Bengtsson. 2020. "Income Inequality in Mexico, 1895–1940: Industrialisation, Revolution, Institutions." Lund Papers in Economic History, Lund University.

De Haas, Michiel. 2022. "Reconstructing Income Inequality in a Colonial Cash Crop Economy: Five Social Tables for Uganda, 1925–1965." *European Review of Economic History* 26 (2): 255–83.

Lindert, Peter H., and Jeffrey G. Williamson. 2016. *Unequal Gains: American Growth and Inequality since 1700*. Princeton: Princeton University Press.

Lukkari, Valeria, and Maria Mwaipopo Fibaek. 2025. "Income Inequality and Its Drivers in Kenya, 1921–1960." Unpublished manuscript, SSRN.

Panza, Laura, and Jeffrey G. Williamson. 2021. "Always Egalitarian? Australian Earnings Inequality 1870–1910." *Australian Economic History Review* 61 (2): 228–46.

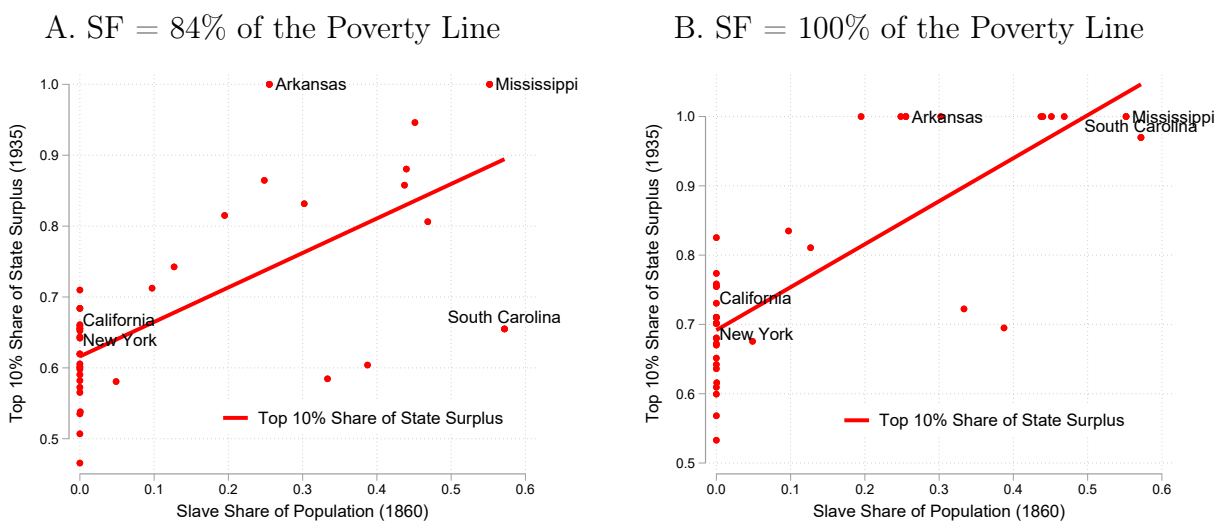
Roikonen, Petri, and Sakari Heikkinen. 2020. "A Kuznets Rise and a Piketty Fall: Income Inequality in Finland, 1865–1934." *European Review of Economic History* 24 (1): 46–79.

[26]The choice of reference country addresses the under-reporting of top incomes in some historical sources, notably in the case of Brazil where the original paper does not address this issue. Reconstructions built from occupational and wage data often compress the top of the distribution: they capture labour income by occupation but miss much of the capital income —profits, rents, and the return on slave ownership— concentrated in the top percentile. I take the ratio instead from studies whose sources confront this problem directly: Chile and Jamaica. Still, in most historical societies, capital income is much lower than in present-day societies where finance plays a bigger role.

Appendix C2: Robustness— Jim Crow USA (1935)

Section 3.2 builds state subsistence floors from Stecker's (1937) "emergency" budget, which is closer to the physiological definition of the floor used throughout the paper. This appendix takes a more agnostic approach and replaces it with the first US official poverty line, set in 1965 (Orshansky 1965). Expressed in constant 2011 dollars, the same units as the income data, its threshold of $3,000 per year for a family of four is $5,360 per capita. Following the official method, rural households face 70% of that level, and weighting by each state's rural population share gives an average floor of $4,548. I report two versions: the line scaled to 84%, as in Section 2.3, to allow for the non-trivial share of the population that subsists below the official threshold, which gives an average floor of $3,820; and the full line, $4,548. These stand 18% and 41% above the $3,227 implied by the baseline emergency budget.

Figure C2: The Legacy of Slavery on Surplus Inequality Under the US Poverty Line (1935)



Note. Top 10% surplus share = (state top 10% share of income × state income − 10% × state subsistence floor) / (state income − state subsistence floor). Slave population (slaves/population) in 1860 is from Nunn (2007). Top 10% income shares and state income are from Frank et al. (2015, dataset version 2020), converted to constant 2011 dollars using Maddison income per capita for the US as the benchmark. The subsistence floor is the first US official poverty line (Orshansky 1965): $3,000 per year for a family of four, or $5,360 per capita in constant 2011 dollars, with rural households set at 70% of that level following the official method and state floors obtained as the rural/urban population-weighted average using census data. Panel A scales the line to 84%, as in Section 2.3; Panel B uses the full line. The resulting average state floors are $3,820 and $4,548, against $3,227 under the baseline budget in Section 3.2.

The link between slavery in 1860 and surplus inequality in 1935 holds under both floors, and is sharper than in the baseline. This follows from the SDF: a higher floor absorbs a

larger share of income where income is lower, so it tightens the MIC most in the poorer, more rural former slave states and raises their surplus shares by more than it raises those of the industrial North. Mississippi, South Carolina and Arkansas therefore pull further above New York and California as the floor rises from 84% to the full line, and the positive gradient steepens. The reversal documented in Section 3.2 —the states that appear most equal by top income shares are the most unequal by surplus shares— is therefore not an artefact of Stecker's price data.

The more demanding floor also carries a substantive reading in terms of welfare inequality. The 1965 line was constructed as a socially acceptable minimum rather than a physiological one: it scaled a minimum food budget by the share of income that households actually spent on food, and so embeds contemporary norms about what a household needs. It therefore sits closer to the societal floor of Section 2.3 than to the CBN basket, and arguably closer to what households themselves counted as subsistence. Figure C2 can then be read as the distribution of income above a socially defined minimum —the material basis of the *substantive freedoms* emphasised by Sen (1999), from saving to affording leisure to paying for education. On that reading, several former slave states sit close to the upper bound of one: the top 10% held virtually the entire surplus, leaving the remaining 90% at, rather than above, a socially acceptable minimum.

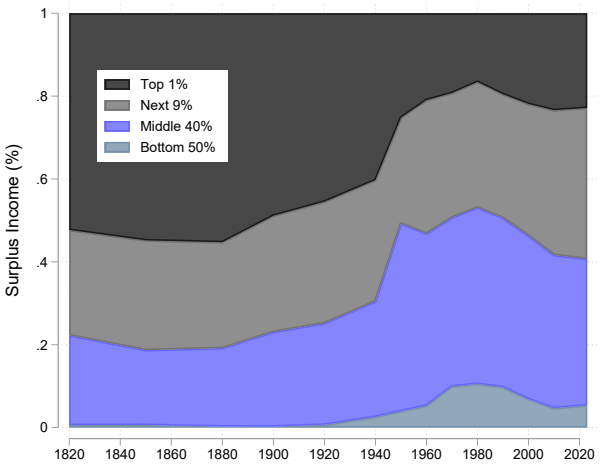
Appendix C3: Robustness — The Great Levelling

Figure 8 in Section 3.4 reports the surplus decomposition under my baseline CBN floor, and the global series pool all 48 countries. This appendix does two things. Figure C3A and Figure C3B repeat the decomposition under the two alternative floors: the income-elastic upper bound and the MLW fixed lower bound. Figure C3C splits the top 1% surplus series by OECD membership from 1900, the point at which data coverage broadens.

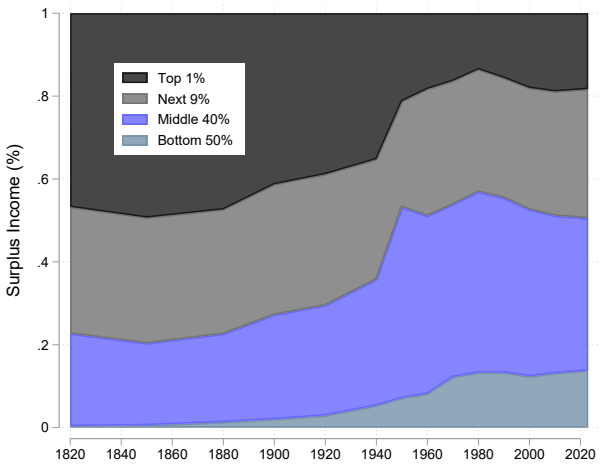
The long-run reversal between income and surplus shares does not depend on the floor. Under the MLW fixed lower bound, the bottom 50%'s surplus share rises from near 0% in 1820 to an all-time high of 14% today. Under the more demanding income-elastic floor, it rises from near 0% in 1820 to a peak of 10% in 1980 and stands at 7.5% today, the post-1980 retrenchment being visible only under this specification. The bottom 50% is the main long-run winner in both cases, and the top 1% declines in both: as reported in Section 3.4, the income-elastic floor still yields a 2.5-fold fall in the top 1% surplus share, to 21.4% against a pre-1900 average of 54%. The level of surplus inequality therefore depends on the subsistence concept, its long-run trajectory does not.

Figure C3: The Great Levelling Under Alternative Subsistence Floors

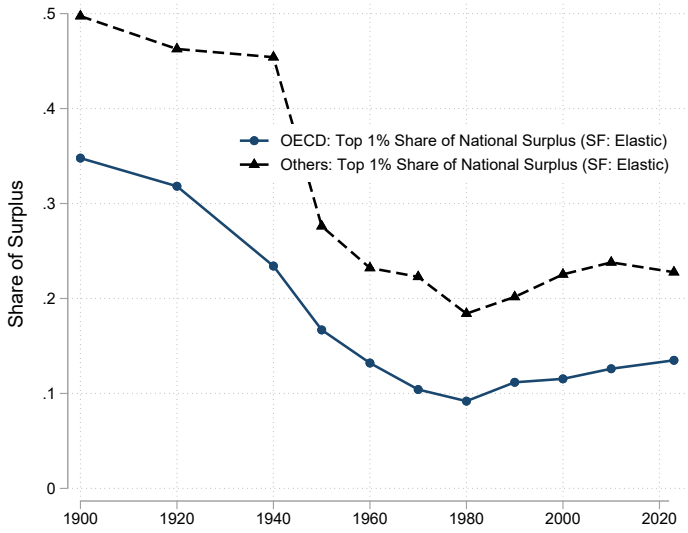
A. Surplus Distrib., Elastic SF



B. Surplus Distrib., MLW SF



C. Top 1% Surplus, OECD vs Others



Note. Same data, definitions and sources as Figure 8. Panels A and B report the post-tax surplus shares of the top 1%, next 9%, middle 40% and bottom 50% under the two alternative floors: the income-elastic upper bound described in Section 3.3, and the MLW fixed lower bound of $569 per capita in constant 2011 PPP. Surplus shares are floored at zero to avoid negative values (see Section 2.4). Panel C reports the population-weighted top 1% share of national surplus for OECD and non-OECD countries under the income-elastic floor, from 1900.

Splitting the panel by OECD membership shows where the *Great Levelling* went furthest. Even under the income-elastic floor, the OECD top 1% surplus share falls 2.6-fold, from 35%

in 1900 to 13.5% in 2023, against 2.2-fold in non-OECD countries over the same period. The two series also diverge in timing: the OECD decline is concentrated in the World Wars and the post-war decades, while the non-OECD decline comes later, with decolonisation and the post-1950s expansion of progressive taxes and transfers documented in Figure C4. This is consistent with the forces discussed in Section 3.4 arriving earliest and going furthest in the OECD: growth, organised labour, mass democracy and redistribution.

Appendix C4: Pre-1980 Redistribution — My Series versus the 1910–1980 Rule

Section 3.3 extends the post-tax series before 1980 by exploiting variation across countries and over time in when each tax and transfer was introduced and in its size as a share of GDP. This appendix explains why I depart from the uniform rule used so far to fill this gap, and how the two approaches differ.

The 1910–1980 rule. The World Inequality Lab (WIL) addresses the lack of pre-1980 country redistribution data by imposing a uniform rule. Pre-tax and post-tax series are assumed to coincide in 1910, the date when the first progressive taxes emerged (e.g., the US income tax in 1913). Redistribution is then linearly interpolated between 1910, when it is assumed to be zero, and each country's 1980 level from Fisher-Post and Gethin (2026, hereafter FPG). Andreescu et al. (2025) use this rule. It is simple and transparent. But it is not country-specific, and this creates two limitations.

First limitation: the timing of the progressive state. The rule overlooks large variation in when countries shifted to a progressive state. OECD economies introduced the first progressive taxes and transfers in the 1910s, and some did so earlier: the Nordic states by the 1880s–90s. Most countries in Africa and Asia introduced them only in the 1950s–60s, after decolonisation.[27] A uniform 1910 start therefore attributes redistribution to non-OECD countries decades before their tax and transfer systems existed, and misses it in the early OECD redistributors. My series instead sets the effect of each instrument to zero before its country-specific year of introduction (Seelkopf et al. 2021), and scales it afterwards by its observed share in GDP (Bharti et al. 2026).

[27] The average year of introduction of taxes on corporate profits, for example, is 1913 in North America, 1949 in Latin America, 1955 in Sub-Saharan Africa and Asia, and 1960 in the Middle East and North Africa (Seelkopf et al. 2021).

Second limitation: the pre-1910 state was not neutral. The rule treats pre-1910 states as distributionally neutral. Yet they relied heavily on indirect, regressive taxation of basic goods (beer, salt, imported grain), which fell more heavily on the poor —those closest to the subsistence floor. This matters for the SDF. Taxes on basic goods raise the cost of the subsistence basket for precisely the households nearest the floor. My series factors this in, since indirect taxes enter with their observed share in GDP rather than being set to zero. Indirect taxation is the one instrument that works against the bottom 50% (Figure 5B).

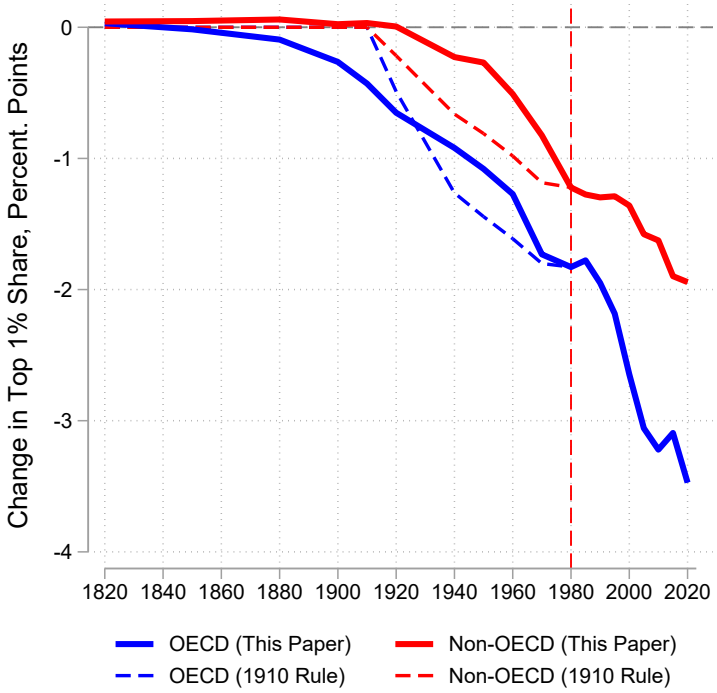
How the two approaches differ. Figure C4 shows the change in the top 1% income share from pre-tax to post-tax under my series, separately for OECD and non-OECD countries. The timing differs across the two groups. In the OECD, redistribution starts before 1910 in early redistributors such as the Nordic states and expands through the 20th century. Outside the OECD, it remains close to zero until the 1940s–50s and expands with decolonisation.

The 1910–1980 rule would instead impose the same start date on both groups and a straight line to their 1980 levels. It therefore overstates redistribution outside the OECD before decolonisation, understates it in early redistributors, and turns the wartime and post-war expansion of the redistributive state into a linear trend.

Implications for the long-run results. The choice of rule matters for the timing of the *Great Levelling*, not for its size. Applying the 1910–1980 rule yields a similar long-run reduction in surplus inequality. So does an agnostic two-point comparison, which sets 1820 data from the WID pre-tax series against post-tax data from FPG. Both, however, flatten the historical variation in between: the first through linear interpolation, the second by comparing endpoints only. What the country-specific series adds is the timing of redistribution, which matters for reading the surplus series against datable institutional events (Appendix A).

Both approaches share one limitation. They anchor on FPG's 1980 incidence and hold it fixed when projecting backwards, and therefore abstract from changes in targeting (Section 3.3). Anchoring in 1980 has the advantage of capturing the incidence of the post-war welfare state before the Reagan- and Thatcher-era reforms.

Figure C4: Pre-1980 Redistribution in OECD and Non-OECD Countries (1820–2020)



Note. Change in the top 1% share of national income, in percentage points, from pre-tax to post-tax, for OECD and non-OECD countries. Before 1980, these are my post-tax series, which set the effect of each instrument to zero before its year of introduction (Seelkopf et al. 2021) and scale it afterwards by its share in GDP (Bharti et al. 2026). From 1980 onward, they draw on Fisher-Post and Gethin (2026). The 1910–1980 rule used in Andreescu et al. (2025) would instead set redistribution to zero in 1910 in every country and interpolate linearly to its 1980 level.

Appendix C5: Regional Surplus Inequality (2023)

Section 4.2 shows that accounting for subsistence constraints reshuffles inequality rankings across countries. This appendix reports the same exercise across world regions, where the reshuffling is starkest. Figure C5 reports, for each region in 2023, the top 1% share of national income (pre-tax and post-tax), the top 1% share of national surplus, and the subsistence floor as a share of national income. Figure C5A uses my baseline CBN floor and Figure C5B the income-elastic floor of Section 3.3, so the comparison doubles as a test of whether the regional ranking depends on the definition of subsistence. Regions are ordered by their top 1% surplus share.

The regional reshuffling. By headline pre-tax income shares, Sub-Saharan Africa is the second most equal region in the world: its top 1% holds 15% of national income, marginally below East Asia's 16% and five points below North America's 20%. Once subsistence constraints are accounted for, it becomes the most unequal. Subsistence absorbs 26% of national income in the region, against 2% in North America and 3% in Western Europe and East Asia, so the Sub-Saharan MIC stands at 74% against 97–98% in those regions. The Sub-Saharan top 1% consequently holds 23% of national surplus, against 15% in North America and 14% in East Asia: 1.6 times the East Asian figure on a marginally lower headline share.[28]

Two regions move in the opposite direction. North America falls from joint third to sixth most unequal of the eight regions, and Latin America from first to fourth, though it remains four points above North America. Western Europe is the most equal region on every measure, with a top 1% surplus share of 9%. Because the reshuffling pushes the poorest regions up and the richest down, cross-regional dispersion widens rather than narrows: the gap between the most and least unequal region rises from 2.2-fold in headline pre-tax income shares to 2.6-fold in surplus shares. The redistributive wedge between the two blue bars is itself informative, being largest in Latin America and North America and close to zero in Sub-Saharan Africa, where progressive taxes and transfers arrived late (Figure C4).

Why the ranking changes. Section 2.5 shows that the top 1% surplus share is approximately the realised top income share divided by the MIC. Two regions with the same headline share therefore exhibit very different surplus shares when their floors differ, and a given rise in the headline share translates into a larger rise in elite control over transferable resources where the floor is high: one additional point of national income accruing to the top 1% raises its surplus share by 1.35 points in Sub-Saharan Africa against 1.02 points in North America. This is the cross-regional counterpart of the amplification documented for colonial and democratic India in Section 3.3, and it carries the same welfare reading: where surplus is scarce, an additional point accruing to the top pushes the other 99% much closer to the floor (Kuznets 1955; Section 4.2).

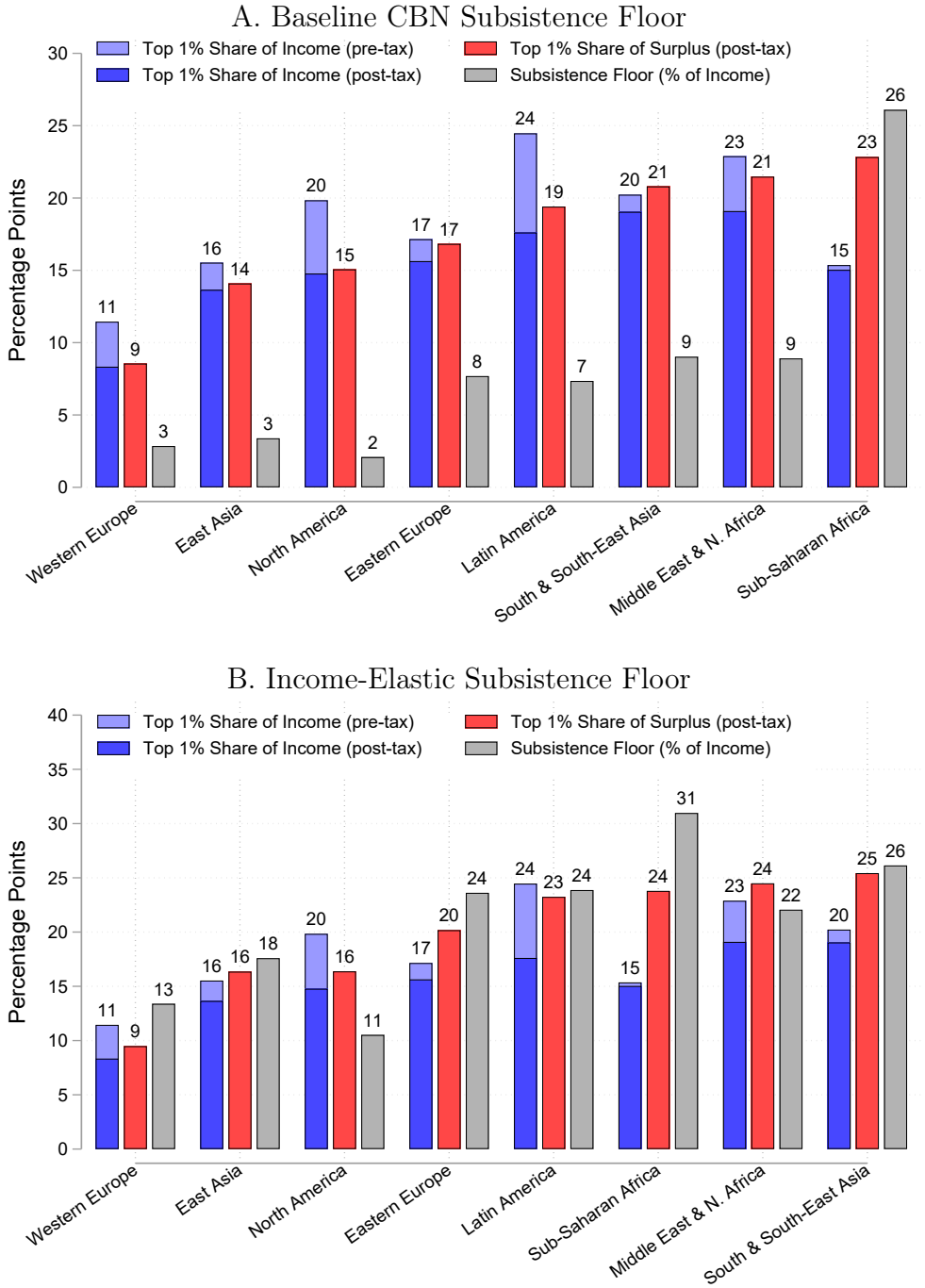
Income-Elastic floor. Figure C5B repeats the exercise under the income-elastic floor, which raises subsistence most where incomes are highest: from 3% to 13% of national income in Western Europe and from 2% to 11% in North America, against 26% to 31% in Sub-Saharan Africa, since the elastic floor is bounded below by the CBN and therefore barely

[28]The Sub-Saharan average (23%) lies below the low-income-country average reported in Table 1 (31%) because the region includes middle-income economies such as South Africa and Nigeria, while the low-income group includes countries outside the region. Within-region dispersion is wide: the top 1% surplus share is 56% in the DR Congo (Table 1) against 12% in Nigeria (Appendix A).

moves in poor regions. This compresses the cross-regional gap in MICs — from 69% in Sub-Saharan Africa to 89% in North America, against 74% and 98% under the CBN floor — and raises surplus shares almost everywhere. The ranking nonetheless survives. Sub-Saharan Africa, South and South-East Asia and the Middle East and North Africa remain the most unequal regions at 24–25% of surplus; North America and East Asia sit at 16% and Western Europe at 9%; and dispersion is slightly wider than under the CBN floor (2.8-fold against 2.6-fold). The one change is at the top: South and South-East Asia edges ahead of Sub-Saharan Africa (25% against 24%), so Sub-Saharan Africa is the single most unequal region under the physiological floor and tied for most unequal under the societal one.

These patterns align with the institutional record in a way that headline shares do not. The regions in which elites hold the largest share of transferable resources — Sub-Saharan Africa, South and South-East Asia, and Latin America — are those with the most extractive and persistent colonial legacies (Engerman and Sokoloff 1994; Acemoglu et al. 2001), while those in which they hold the least — Western Europe and North America — are where organised labour, mass democracy and redistribution arrived earliest and went furthest (Lindert 2004; Section 3.4). Headline top income shares reverse part of that ordering; surplus shares recover it.

Figure C5: Regional Inequality Averages: Surplus Shares and the Subsistence Floor (2023)



Note. Same underlying data as in Table 1 (Section 4.2). All series are population-weighted country averages, so that the top 1% corresponds to 1% of each region's population. Panel A uses the baseline CBN floor, based on Allen's (2020) CBN estimates; Panel B uses my predicted income-elastic floor (Section 3.3). Both floors are set at 84% of their value.

Appendix D: Data Construction

Appendix D1: GDP Data Social Tables

GDP per capita Levels All income data is in 2011 constant PPP dollars, the unit in Maddison data.

Jamaica 1774 Burnard et al. (2019), the paper with the inequality (social table) data, provides income per capita data for the free population only—8% of the total—estimated at four times the UK income after PPP adjustment (the UK had an income of $2834 in 1773), thus $11,336 pc in 1774). For the enslaved population (the remaining 92%), I assume subsistence-level income, using Moatsos et al.'s earliest estimate for Jamaica ($877 pc in 1820). This yields an aggregate income per capita of $1,716.

This estimate sits comfortably between two independent benchmarks.

Upper bound ($1,904): Federico and Tena-Junguito (2019) provide export-based income estimates for Jamaica. Their earliest observation, for 1820, estimates that Jamaica was 1.05 times richer than the US—driven by extraordinarily high exports per capita ($27.3 in 1913 dollars, roughly three times the US level of $9.7, and well above Mexico's $2.1 or Brazil's $3.2). Projecting this income ratio back to 1774 using Maddison's US benchmark, and applying Burnard et al.'s PPP deflator, yields $1,904 for Jamaica in 1774.

Lower bound ($1,577): Maddison (2025) database estimates $1,117 for Jamaica in 1820. Yet this is an unsuitable benchmark for pre-1800s. This estimate rests on Prados de la Escosura (2009) estimate for 1850 for Jamaica—point by which point Jamaica's sugar economy had substantially deteriorated. As Federico and Tena-Junguito (2019) show, Jamaican sugar exports peaked in 1809, then declined by about 10% to the levels observed in the 1820s and continued to fall thereafter (from $27.3 in the 1820s to $15 in 1850), as slavery became increasingly contested in Britain after the early 1800s and was finally abolished in 1834. Applying a correction for this export decline—under the reasonable assumption that GDP per capita tracked export performance closely in a fully export-oriented Caribbean economy (as Jamaica was)—yields a lower-bound estimate of approximately $1,577 for 1820. This comes from multiplying the 1850-point estimate for Jamaica, based on Prados de la Escosura (2009) by 1.82, which reflects the change in export prices between 1820 and 1850.

My estimate of $1,716 lies between these two bounds, and is corroborated by their average ($1,740), which is virtually identical to the figure proposed here.

Haiti 1780 Piketty (2020, chapter 6) provides inequality data for Haiti but no income per capita estimate. The underlying inequality figure appears to derive from Henochsberg (2016),

a thesis supervised by Piketty, which does offer GDP per capita estimates. Henochsberg (2016, Figure 19) estimates Haitian income per capita at 1.37 times that of the US in 1780. Using Maddison's US benchmark of $2,419 for that year yields $3,314 in nominal terms. To convert to PPP-adjusted income, I apply the US–Jamaica PPP ratio from Burnard et al. (2019) as a proxy. Jamaica is the only Caribbean sugar slave economy for which such an adjustment is available; the deflation is warranted because plantation economies of this type typically faced elevated price levels, having imported the majority of their consumption goods. Applying this correction yields an income per capita estimate of $2,485 for Haiti in 1780. This figure is consistent with Haiti's exceptional economic standing at the time: then known as the "jewel of the French crown," the colony sustained one of the most profitable sugar industries in the Atlantic world, with very high export levels (Henochsberg 2016).

Additional references (cited only in this appendix):

Federico, Giovanni, and Antonio Tena-Junguito. 2019. "World Trade, 1800–1938: A New Synthesis." *Revista de Historia Económica / Journal of Iberian and Latin American Economic History* 37 (1): 9–41.

Henochsberg, Simon. 2016. "Public Debt and Slavery: The Case of Haiti (1760–1915)." Master's thesis, Paris School of Economics.

Prados de la Escosura, Leandro. 2009. "Lost Decades? Economic Performance in Post-Independence Latin America." *Journal of Latin American Studies* 41 (2): 279–307.

Appendix D2: Subsistence Costs Data

Climate and the subsistence floor. Colder climates face a tighter inequality ceiling because subsistence costs more there. My CBN-based floor has two components: the quantity of calories, heating and clothing a person needs, and the price of those goods. Climate drives the quantity component. Allen (2020) finds that the CBN basket in Scandinavia costs roughly twice as much as in Iberia even after PPP adjustment, since PPP corrects for prices but not for needs. The historical CBN series of Moatsos et al. (2021) embed this heterogeneity: a Norwegian requires more clothing and heating to live than a Spaniard.

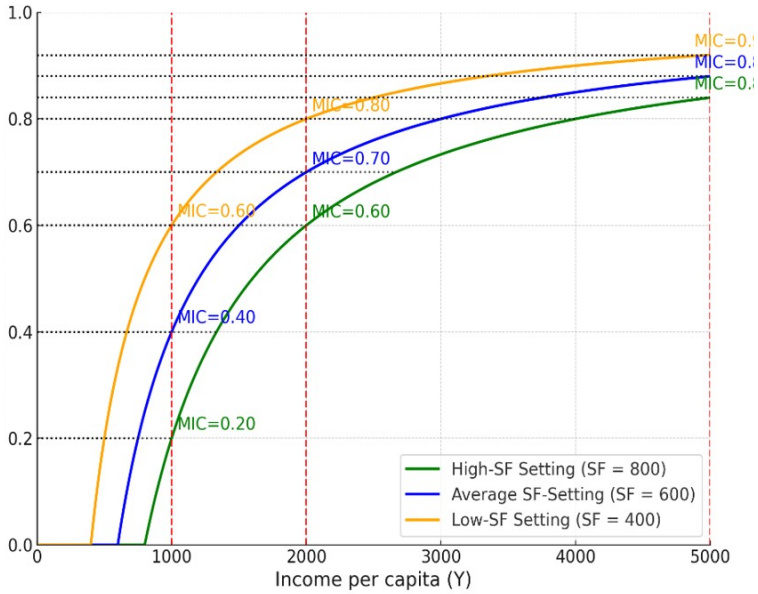
Climate also raises caloric needs, which the CBN misses. Allen's 2,100 kcal standard is fixed, so climate enters the basket only through non-food items. Yet, as is well documented, cold climates have higher caloric needs: average daily requirements for moderate work are 3,400 kcal in extreme cold, 3,200 in temperate climates, and 2,500 in tropical ones (FAO 1971). I account for this premium in Section 3.1 by not applying the 84% malnutrition scaling to cold countries: there, 2,100 kcal is already a conservative floor.

Prices tighten the MIC through a second channel. Anything that raises the cost of the

basket —taxes on basic goods through tariffs or VAT, or food and rent inflation— raises the floor. I incorporate these effects indirectly by working with post-tax, inflation-adjusted incomes.

Figure D1 illustrates the size of the climate effect. It plots three MIC curves: a high floor ($800), an average floor ($600), and a low floor ($400), where the two-fold Scandinavia–Iberia gap motivates the two extremes. At $2,000, the income of Spain and Norway by the mid-19th century (Maddison), the ceiling stands at 80% under the low floor but at 60% under the high one. At the same income, a cold-climate society can therefore sustain 20 points less income concentration than a warm one. This is why Section 3.1 uses separate ceilings for warm and cold countries.

Figure D1: The MIC under Different Subsistence Needs



Note. The MIC equals $1 - \mathrm{SF}/Y$. The two-fold SF difference ($400 vs. $800 in 2011 PPP dollars) reflects Allen's (2020) estimate that subsistence costs in colder climates are roughly double those in warmer regions. The average floor ($600) is the lower end of Allen's (2020) estimates.