



Capitalism and extreme poverty: A global analysis of real wages, human height, and mortality since the long 16th century

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ABSTRACT

This paper assesses claims that, prior to the 19th century, around 90% of the human population lived in extreme poverty (defined as the inability to access essential goods), and that global human welfare only began to improve with the rise of capitalism. These claims rely on national accounts and PPP exchange rates that do not adequately capture changes in people's access to essential goods. We assess this narrative against extant data on three empirical indicators of human welfare: real wages (with respect to a subsistence basket), human height, and mortality. We ask whether these indicators improved or deteriorated with the rise of capitalism in five world regions – Europe, Latin America, sub-Saharan Africa, South Asia and China – using the chronology put forward by world-systems theorists. The evidence we review here points to three conclusions. (1) It is unlikely that 90% of the human population lived in extreme poverty prior to the 19th century. Historically, unskilled urban labourers in all regions tended to have wages high enough to support a family of four above the poverty line by working 250 days or 12 months a year, except during periods of severe social dislocation, such as famines, wars, and institutionalized dispossession – particularly under colonialism. (2) The rise of capitalism caused a dramatic deterioration of human welfare. In all regions studied here, incorporation into the capitalist world-system was associated with a decline in wages to below subsistence, a deterioration in human stature, and an upturn in premature mortality. In parts of South Asia, sub-Saharan Africa, and Latin America, key welfare metrics have still not recovered. (3) Where progress has occurred, significant improvements in human welfare began several centuries after the rise of capitalism. In the core regions of Northwest Europe, progress began in the 1880s, while in the periphery and semi-periphery it began in the mid-20th century, a period characterized by the rise of anti-colonial and socialist political movements that redistributed incomes and established public provisioning systems.

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1. Introduction

The standard public-facing narrative about global extreme poverty (defined as the inability to access essential goods such as food) holds that widespread absolute destitution is the natural condition of humanity, and that the rise of capitalism delivered a steady and dramatic reduction in global poverty over time (e.g., [Pinker, 2018](#); [Radelet, 2015](#); [Rosling, Rosling, & Rosling-Ronnlund, 2018](#); [Kristof, 2019](#); [Sachs, 2005](#)). This narrative relies in large part on a graphic that was first developed by Martin Ravallion ([2016](#)), using historical data drawn from a paper by [Bourguignon & Morrisson \(2002\)](#) ([Fig 1](#)). The graphic was later updated and brought to prominence

by Steven Pinker, featuring centrally in his bestselling book *Enlightenment Now* (2018) ([Fig 2](#)). It has since spread widely across social media.

The image gives the impression that 90% of humanity was in “extreme poverty” prior to the 1800s; i.e., living on less than the equivalent of \$1.90 per day (2011 PPP), a threshold associated with extreme calorie and nutrient deficits and an inability to access basic goods ([Wagstaff, 2003](#); [Allen, 2017](#)). Pinker used this graph to claim that “industrial capitalism launched the Great Escape from universal poverty in the 19th century” (2018, p. 364, pp. 87–96). Hans Rosling and his associates ([Rosling et al., 2018, p. 38, p. 52](#)) have claimed that “Human history started with everyone [living in extreme poverty] ... All over the world, people simply did not have enough food.” According to Rosling, this dismal state of affairs continued “for over 100,000 years” until the industrial revolution.

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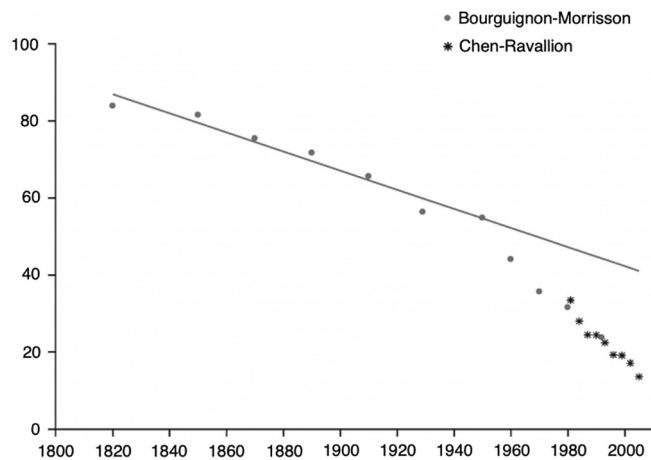


Fig. 1. Percent of world population living in extreme poverty, as depicted by Ravallion (2016).

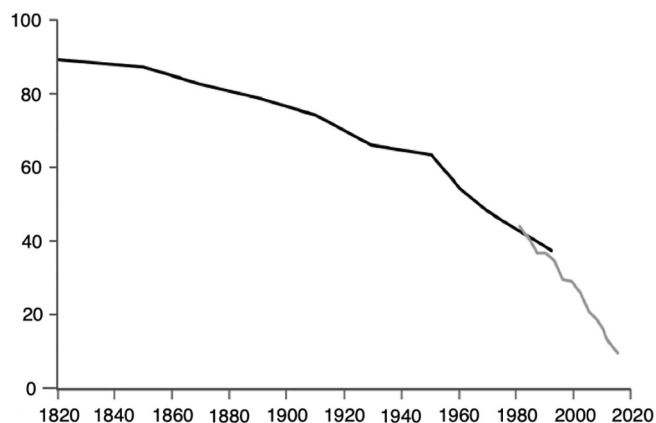


Fig. 2. Percent of world population living in extreme poverty, as depicted by Pinker (2018).

In other words, virtually all of humanity, for all of history, was starving and destitute – in a condition of perpetual humanitarian crisis – until the 19th century when, thanks to the rise of capitalism, extreme poverty finally began to decline. This narrative has been promoted prominently by Bill Gates, as well as by right wing outlets like the Cato Institute and the Foundation for Economic Education (e.g., Vásquez, 2001; Hammond, 2017). These claims would appear to contradict over a century of critical scholarship on capitalism and human welfare (Marx, 1867; Luxemburg, 1913; Amin, 1976; Wallerstein, 1983; Federici, 2004; Patnaik & Patnaik, 2017; Hitchcock & McClure, 2021).

The Ravallion/Pinker graph suffers from several empirical problems, however. The first thing to note is that it relies on two different kinds of data. For the period 1981 to the present, it uses household ‘National Samples Surveys’ (NSS), which capture incomes as well as some non-commodified goods derived from subsistence activities and social provisioning systems, represented in monetary terms (2011 PPP). For the period prior to 1980, however, the graph relies on estimates from Bourguignon & Morrisson (2002), who use historical GDP data in National Accounts Statistics (NAS), from Maddison (1995). This is problematic because GDP fails to adequately account for non-commodity forms of provisioning, such as subsistence farming, foraging, and access to commons, which are important sources of consumption for much of the

world’s population, particularly during historical periods. In Appendix I we give a detailed discussion of historical national accounts, describing how non-commodity goods are typically treated.¹ We also demonstrate that Bourguignon and Morrison’s use of this data to estimate poverty runs into several methodological problems. To summarize briefly here, B/M use GDP per capita growth rates as a proxy for changes in household consumption over time, assuming that the two move together. But we know empirically that they do not; in fact, NAS and NSS growth rates tend to differ quite substantially (Ferreira, 2015, p. 27; Deaton, 2001). As Ravallion himself acknowledges:

“There are well-known problems in measuring illegal, informal, household-based, and subsistence outputs in the NAS for developing and transitional economies. As an economy develops, the household-based production activities that are not measured in the NAS sector become ‘formalized,’ imparting an upward bias to measured NAS growth rates of output [relative to NSS growth rates] (Ravallion, 2003, pp. 646–647).

In light of this, the growth of consumption in the NAS cannot be used as a proxy for changes in household consumption among the poor.² This is particularly true for the period from 1820 to 1950, which for much of the world was characterized by colonization, the destruction of subsistence economies, and the enclosure of commons (Wood, 1999; Hochschild, 1998; Dunaway, 2010). These interventions may have increased GDP, by expanding processes of commodification and capitalist production, but also clearly constrained people’s access to livelihoods. To use Ravallion’s language, production was forcibly “formalized,” which we should expect to cause “an upward bias to measured NAS growth rates of output.” If a forest is enclosed for timber, or subsistence farms are razed and replaced with cotton plantations, GDP goes up. But this tells us nothing about what local communities lose in terms of their use of that forest or their access to food. The impact on livelihoods is swept under the statistical rug. For instance, historical national accounts suggest that GDP per capita in the Spanish-occupied Philippines increased by over 15% between 1820 and 1902 (Bolt & van Zanden, 2020). Yet parish records indicate this was a period of increasing mortality, due to “a general deterioration of peasant livelihoods... a consequence of the rapid commercialization of peasant agriculture” (Smith, 1978, pp. 51–52). Similarly, Indian GDP per capita increased by 27% from 1870 to 1921 (Bolt & van Zanden, 2020). Yet during that time, British colonial policy induced serial famines that killed tens of millions of people, with life expectancy collapsing by 20%, “a deterioration in human health probably without precedent in the subcontinent’s long history of war and invasion” (Davis, 2002, p. 312). GDP data obscures this immiseration and implies instead a significant improvement in welfare.

The second problem with the graph has to do with its reliance on the World Bank’s poverty line of \$1.90 PPP, per day. This approach has come under criticism for several years (Allen, 2017; Reddy & Pogge, 2010). PPP equivalents are calculated based on prices across the whole economy, while what matters for the purposes of assessing poverty is the prices of essential goods that are necessary to meet basic needs (such as food, housing, fuel). To correct for this, the economic historians Robert C. Allen (2017, 2020)

¹ In Appendix I, we focus on the national accounts for India (Maddison, 1985; Heston 1983; Sivasubramanian, 2000) and England (Broadberry, Campbell, Klein, Overton, & Leeuwen, 2015).

² The literature points to three additional reasons for the discrepancy between NSS and NAS (see, Ravallion, 2003; Deaton, 2001). First, consumption surveys tend to understate incomes at the top end of the distribution. Second, the surveys exclude some forms of consumption accounted for in NAS, including imputed rents for owner-occupier dwellings, and expenditure by unincorporated businesses. Third, in NAS, consumption is partly “derived as residuals, so that errors and omissions elsewhere in the accounts are automatically absorbed into consumption” (Deaton, 2001, p. 133).

and Michail Moatsos (2017; 2021) have developed an alternative approach. They use price data to calculate a 'Basic Needs Poverty Line' (BNPL) which consistently allows people to consume 2,100 calories per day, 50 g of protein, 34 g of fat, and various vitamins and minerals, all from the cheapest available foods, in addition to some non-food items like clothing, housing, fuel, and lighting. The contents of this subsistence basket are not narrowly defined, but are allowed to change as prices change, so that people may meet these nutrient requirements at the least cost.

The results of this method demonstrate there is often a significant divergence between the poverty rate as defined by the World Bank's \$1.90 method and the BNPL. Consider the case of China, for example. According to the \$1.90 method, the poverty rate in China fell from 66% in 1990 to 19% in 2005, suggesting capitalist reforms delivered dramatic improvements (World Bank 2021). However, if we instead measure incomes against the BNPL, we find poverty *increased* during this period, from 0.2% in 1990 (one of the lowest figures in the world) to 24% in 2005, with a peak of 68% in 1995 (data from Moatsos, 2021).³ This reflects an increase in the relative price of food as China's socialist provisioning systems were dismantled (Li, 2016). It is likely that something similar occurred across the global South during the 19th century, as colonial interventions undermined communal provisioning systems. As a result, the \$1.90 PPP line likely reflects a changing standard of welfare during the period that the Ravallion/Pinker graph refers to.⁴

Finally, the third limitation of the graph is its starting date (1820). The graph has been used to tell a story about capitalism, but the world capitalist economy was established in the late 15th and early 16th centuries (Wallerstein, 1974; Frank, 1978; Braudel, 1981; Moore, 2003; Federici, 2004). In other words, the graph excludes more than 300 years of relevant history. During this period, economic growth in Western Europe depended on processes of dispossession that caused major social dislocation (e.g., the European enclosures, mass enslavement of Africans, the colonization of the Americas and India, etc.). The graph excludes this history and gives the impression of poverty in 1820 as a primordial condition.

Even B/M's method would likely suggest that poverty rose in the periphery during these early centuries of capitalism. Between 1600 and 1820, GDP per capita declined by 21% in Poland and 26% in India (data from Bolt & van Zanden, 2020). From 1700 to 1820, China, Peru, South Africa, and Mexico saw their incomes drop by 43%, 28%, 56% and 32%, respectively (ibid.). China and India did not return to their earlier peak until the 1960s and 1970s (see Appendix II). As we have noted above, GDP data cannot be used to assess trends in poverty. But if it *could* be used in this way, starting the analysis in 1820 omits three centuries of evidence, producing a partial and misleading representation of historical trends in human welfare under capitalism.

Allen (2020) has put forward alternative estimates of historical extreme poverty, designed to avoid some of these issues.⁵ Allen uses historical price records and social tables to estimate the share of the population living below the BNPL in three key regions: Eng-

land, the U.S., and India.⁶ His conclusions differ markedly from the standard public narrative. According to Allen (2020, p. 125), even at the height of feudalism, in 1290, extreme poverty in England reached no higher than 20–30%. By the time of the 1688 revolution, the extreme poverty rate was only around 5–10%, and by the 19th century it had been eliminated (ibid., pp. 125–126). In other words, England has never experienced anything like universal extreme poverty. For the United States, Allen (2020, p. 108) finds no evidence of extreme poverty in the mid-19th century: "this includes, in particular, enslaved persons who turn out to have had material consumption levels just above the poverty line." Of course, this is not to say that U.S. Americans were not poor, but that very few were living without access to basic food, clothing, fuel, and housing.

To estimate the extreme poverty rate in India, Allen draws on consumption surveys carried out by the East India Company in the region of Bihar. He finds that in 1810 only 23% of Indians lived below the poverty line (Allen, 2020, p. 128). He also points out that Indian real wages were much lower at that point than they were under the reign of Akbar in the late 16th and early 17th centuries. On the basis of real wages, Allen (2020 p. 9, pp. 129–130) estimates that India's poverty rate around 1600 may have been "on a par with the developing parts of Western Europe." Judging by Allen's estimate for England in 1688, this suggests Mughal India may have had a poverty rate of only 5–10%. This means poverty in India increased under British rule, and the high rates of extreme poverty revealed by household consumption surveys in the 1980s (over 50%) are a modern phenomenon, "a development of the colonial era," as Allen puts it (ibid, p. 107). "Many factors may have been involved, but imperialism and globalization must have played leading roles" (ibid. p. 129). Figure 3 plots Allen's estimates, along with World Bank survey data from 1977 to 2011.⁷ This series should be treated with caution because the 1600 figure is based on indirect evidence from real wages, and the 1810 figure for Bihar may not be representative of the rest of India.

Given these issues, it is clear that the standard public narrative about the history of extreme poverty needs reassessment. In this paper we assess this narrative against three indicators of welfare (real wages, human height, and mortality) for five world regions (Europe, Latin America, sub-Saharan Africa, South Asia, and China) from roughly the 16th century onward. These datasets point to three conclusions:

First, it is unlikely that 90% of the global population lived in extreme poverty prior to the rise of capitalism. Historically, unskilled urban labourers in all regions tended to have wages high enough to support a family of four above the poverty line by working 250 days or 12 months a year. Extreme poverty seems to arise predominantly in periods of severe social and economic distress, like famines, wars and institutionalized dispossession, particularly under colonialism. Rather than being the natural condition of humanity, extreme poverty is a symptom of social dislocation and displacement. It is important to emphasize that the data here focuses on extreme poverty, as it is defined in the relevant

³ Moatsos questioned the validity of this finding on the grounds that goods may not have actually been available at official government-set prices in China in 1990. However, there is an extensive literature showing that China's socialist provisioning systems were generally capable of delivering key goods, and improving health outcomes for the population (e.g., Dreze & Sen, 1989; Li, 2008).

⁴ Moatsos (2021) estimates that the global poverty rate was 72% in 1820, and then declined throughout the 19th century. However, as we discuss in Appendix I, Moatsos estimates the historical incomes of the poor using national income growth rates. As we have argued, this method is empirically unsound.

⁵ Allen (2020, pp. 108–109, p. 130) notes that social tables allow for more direct measure of historical poverty than do national accounts statistics. However, more research is needed to determine whether social tables adequately account for all forms of non-commodity provisioning.

⁶ Allen allows non-food requirements of the BNPL to change in different contexts. He assumes that people living in colder climates require more clothing and fuel than those in warmer climates. He also assumes that populations prior to c. 1840 required less non-food items to meet their basic needs, as social expectations of the minimum acceptable dress and lighting changed as the cost of cloth and kerosene declined during the industrial revolution. This is in line with the concept of basic needs and absolute poverty promoted by Adam Smith ([1937] 1776, pp. 821–22) and Amartya Sen (1983). It is worth noting that, in our analysis of real wages (below), we use poverty lines with constant non-food requirements, and reach similar conclusions to Allen (2020) about the extent of progress against poverty.

⁷ The figures for 1977 to 2008 were obtained from Moatsos (2021), who has estimated basic needs poverty rates with household survey data and price information from the ILO. The 2011 figure is obtained from Allen's (2020, p. 115) calculations using the survey data and detailed price statistics from the International Comparisons Program.

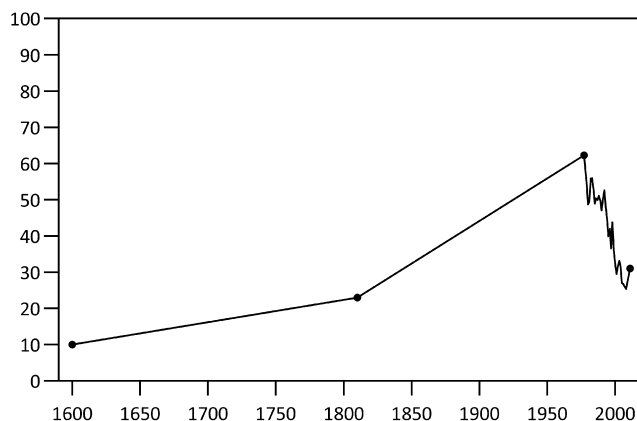


Figure 3. Indian population living in extreme poverty (% below the BNPL), 1600–2011 (rough estimate). Source: Allen (2020); Moatsos (2021); see text for details.

literature, not the higher consumption thresholds that are required to achieve “decent living” today (e.g., Edward, 2006; Kikstra, et al. 2021).

The second conclusion is that the rise of capitalism coincided with a deterioration in human welfare. In every region studied here, incorporation into the capitalist world-system was associated with a decline in wages to below subsistence, a deterioration in human stature, and a marked upturn in premature mortality. In parts of Latin America, sub-Saharan Africa, and South Asia, key welfare metrics have still not recovered.

Our third conclusion is that in those regions where progress has occurred (as opposed to recovery from an earlier period of immiseration), it began much later than the Ravallion/Pinker graph suggests. In the core regions of Northwest Europe, welfare standards began to improve in the 1880s, four centuries after the emergence of capitalism. In the periphery and semi-periphery, progress began in the mid-20th century. Further research is needed to establish the causal drivers of these improvements, but existing data indicates that progress was achieved with the rise of organized labour, the anti-colonial movement, and other progressive social movements, which organized production around meeting human needs, redistributed wealth, and invested in public provisioning systems (Sen, 1981; Dreze & Sen, 1989; Navarro, 1993; Cereseto & Waitzkin, 1986; Prashad, 2007; Szreter, 1997; 2003; Lena & London, 1993).

2. Research approach

Historical data on the poverty rate is not available for most regions. Given this limitation, we analyse extant datasets of three empirical indicators of human welfare. By human welfare, we mean the ability to access basic-needs satisfiers such as food, clothing, and shelter, leading to improvement in health outcomes. The first indicator we analyse is the real wages of unskilled urban labourers. The economic history literature measures real wages in terms of ‘welfare ratios,’ in other words, the ratio between nominal wages and the price of a subsistence basket, over a year (e.g., Allen, 2001, 2007; De Zwart, van Leeuwen, & van Leeuwen-Li, 2014). Since annual wages are rarely available, economic historians estimate yearly earnings by multiplying the daily wage by 250 (in the case of India, where monthly wages are available, a 12-month working year has also been used). If a labourer has a welfare ratio of 1, their wage was high enough to support a four-person family, with each family member consuming 1,940 to 2,200 calories per day, in addition to a small quantity of cloth, candles, and fuel. If the labourer’s wage was lower than 1, they were unable to purchase this basket.

They or their family would need to work more than 250 days, or very basic needs could not have been met. A welfare ratio higher than 1 indicates the family had income above subsistence, which could be used to attain higher order goods like medical care and luxuries, or to substitute work with leisure.

Welfare ratios are particularly well suited for assessing trends in global poverty, as the price of a subsistence basket may be interpreted as an extreme poverty line (De Zwart et al., 2014, pp. 75–76; Allen, Murphy, & Schneider, 2012, p. 876; De Zwart & Lucassen, 2020, p. 652; De Zwart & van Zanden, 2015, p. 229). Research by Allen (2020, p. 122) suggests the welfare ratios of unskilled labourers are strongly correlated with the prevalence of poverty in the broader community. Countries where a labourer earns more than 2 welfare ratios tend to have relatively few people living below the BNPL (on average, only 5% of their population). Even in countries with welfare ratios between 1 and 2, the average poverty rate is only 18%. If real wages drop below 1, however, poverty rates become high (on average, 36%). If we assume this relationship holds in the past, welfare ratios provide us with a proxy for the trend, and to some extent even the level, of the historical poverty rate.

A notable limitation of the welfare ratios literature is that scholars have used different subsistence baskets in different contexts (for a full discussion of the subsistence baskets used in this paper and the changes we have made to them, see Appendix III).⁸ Most of the early studies used subsistence baskets that included 1,940 calories per day, while more recent studies require 2,100 calories. Some scholars working on Latin America include larger quantities of animal protein in their basket, while scholars working on India have included less non-food items. The most extensive dataset of European wages is based on a more generous basket than elsewhere (including more expensive foodstuffs and double the quantity of candles and clothing; see, Allen, 2001). Future research is needed to calculate welfare ratios with a consistent basket across regions. Nevertheless, despite their limitations, all of the poverty lines reviewed in this paper are based on the price of goods necessary to meet basic needs. They are therefore more useful than the World Bank’s \$1.90 threshold.

The second indicator we analyse is average adult male height. Malnutrition and poor health tend to limit childhood growth, so the average height of a population can be used as a rough proxy for access to basic-needs satisfiers (Baten & Komlos, 1998; Koepke & Baten, 2005; Baten & Blum, 2012). Of course, trends in the average level of welfare attainment may not accurately reflect the incidence of poverty if there is significant inequality. Nevertheless, human height provides one of the few indicators we have of a population’s access to nutrition. For data on human height, we use the historical figures compiled by Baten & Blum (2013) for 1,490 country-years since the 16th century, on the basis of archaeological evidence, military records, health surveys, and other sources. Where appropriate, we have augmented Baten and Blum’s figures with other data (e.g., Clark, 2007, p. 61; Pechenkina, Benfer, & Ma, 2007). If human welfare improved with the rise of capitalism, these sources should reveal a rise in human stature from the 16th century.

The third indicator we analyze is the mortality rate. As Amartya Sen (1998) argues, economic welfare has a substantial influence on mortality. If the share of people unable to access essential goods

⁸ The early literature calculates welfare ratios so that a wage of one could purchase three subsistence baskets: one for each adult, and half for each child (e.g., Allen, 2001; Allen, 2007; Abad et al., 2012; Challu & Gomez-Galvarriato, 2015). Allen (2015, p. 5) criticized this approach on the grounds that children require more than half a subsistence basket in order to grow healthily. More recently, economists have calculated welfare ratios so that all family members receive a full subsistence basket (e.g., Ronnback, 2016; De Zwart & Lucassen 2020; Allen, 2020). For comparability, we have re-calculated all real wage estimates in line with the new method. This means our figures are often lower than the original estimates.

required for survival increases, then mortality may also be expected to increase. There are, to be sure, some intervening variables. If there are gains in healthcare (e.g., due to the invention of new vaccines), it is plausible that mortality may decline even as access to food and shelter deteriorates. Mortality may also rise due to reasons other than increased poverty, such as a rise in crime, excessive drinking, or other anti-social behaviors. Furthermore, mortality rates are sensitive to the age-structure of the population because older populations experience more deaths than younger ones. Nevertheless, mortality indices are widely used in studies of hunger and deprivation (e.g., Dreze & Sen, 1989), and they are worth looking at for earlier historical periods. Data on the mortality rate per 1,000 people is available from government records, while contemporary time series provide information on the incidence of famines, epidemics, and population decline (e.g., Alfani & Gráda, 2018; Lee, 2014).

It is important to note from the outset that there are several limitations to these datasets. Real wages are generally calculated with the prices and wages paid by large institutions which kept records for centuries, such as monasteries, heritage projects, and colonial trading companies, which may be unrepresentative of conditions in the broader economy. Furthermore, the assumption that labourers worked 250 days a year is arbitrary. If they worked less due to unemployment or a preference for other activities, their incomes would be lower than those reported below.⁹ Similarly, human height figures often rely on records of prisoners and soldiers, groups whose welfare may, at times, have moved differently from the rest of the population. Data on the mortality rate often relies on records kept by governments and it is plausible that there was underreporting of deaths. If the level of underreporting changed over time, this could interfere with the results. In light of these limitations, the results outlined below should be treated with caution. Indeed, this is why we have opted to use three different welfare indicators. By ensuring that the trends discussed here are evident in multiple independent datasets, we minimize the possibility that they are merely artefacts of poor data quality.

We use these welfare indicators – real wages, human height, and mortality – for each region to assess the standard public narrative about global poverty. Economic historians look at the wages of unskilled labourers in order “to capture trends at the bottom of the income pyramid” (van Zanden et al., 2014, p. 25). If we find people at the bottom of the pyramid lived above the extreme poverty line, it is unlikely that 90% of the human population was living in extreme poverty. Moreover, if human welfare improved with the rise of capitalism, we should expect to see an improvement in these three welfare indicators around the time when each region was incorporated into the capitalist world-system.

For our chronology of capitalist history, we rely on the work of Immanuel Wallerstein and other world-systems theorists (Wallerstein, 1974, 1989; Frank, 1978; Basu, 1979; So & Chiu, 1995; Moore, 2003; Li, 2016). According to world-systems theorists, capitalism is a system predicated on the “constant accumulation of capital,” or endless economic growth (Wallerstein, 1983). Under capitalism, some regions – the ‘core’ – monopolize highly-profitable production processes, allowing them to extract resources from the ‘periphery,’ i.e., regions that are made to specialize in low-profit goods sold in highly competitive markets (Hickel, Sullivan, & Zoomkawala, 2021). This system initially arose in the 16th century Atlantic, with Northwest Europe as the core in relation to Eastern Europe and the Western Hemisphere as periphery, while Southern Europe assumed an intermediary or ‘semi-peripheral’ position (Wallerstein, 1974). Capitalism expanded across most of the rest

of the world during the 18th and 19th centuries, as European colonial powers forcibly integrated Africa, South Asia, and China into the core-periphery division of labour (Wallerstein, 1989). While no theoretical framework can capture the full complexity of economic history, the world-systems chronology is useful for assessing the social impact of capitalist expansion.

3. Overview of empirical evidence

3.1. Europe

According to Wallerstein (1974), the rise of capitalism in Europe occurred during the ‘long sixteenth century’ (c. 1450–1640).¹⁰ This development has its roots in the ‘crisis of feudalism’ (c. 1300s), when the exploitation of the peasantry and the desolation of the land by the *seigniors* led to malnutrition, famines and epidemics, including the Black Death (Wallerstein, 1974, pp. 15–63; Moore, 2002). This crisis spurred peasant and worker rebellions across Europe during the 14th and 15th centuries which, to varying degrees, succeeded in abolishing serfdom and securing control over common lands (Wallerstein, 1974; Federici, 2004, pp. 21–60; Cohn, 2006; Hilton, 1973). During the long 16th century, Europe’s elite responded to this popular uprising by forcing the working class into wage labour through enclosures; by reinstituting serfdom on semi-colonial export-estates throughout Eastern Europe; and by militarily expanding into the Americas in search of cheap land and labour (Wallerstein, 1974, pp. 15–129; Federici, 2004, pp. 47–131; Moore, 2003). These efforts to reconstitute class power created a novel economic system predicated on international trade – in food, fuel, ships, and enslaved persons – across the Atlantic, fueling economic growth in England, the Netherlands, and northern France (Wallerstein 1974; 1980; 1983). Here we look at extant data on real wages, human height, and mortality to explore the social impact of these political-economic changes in Europe.

Figure 4 presents wages of unskilled labourers from 1325 to 1875, as calculated by Allen (2015). Where the wage equals 1, a labourer could support a four-person family annually consuming 170 kg of oatmeal, in addition to some beans, meat, butter, and a modest quantity of clothing, soap, and fuel (see Appendix III). A more extensive dataset of European wages – covering the entire period from 1301 to 1913 for 16 cities – is available from Allen (2001). These figures are calculated with a more generous ‘respectability’ poverty line (Allen, 2020). In Appendix IV, we use price data from the U.S. Bureau of Labour Statistics (2020) to show that purchasing this basket would cost over \$4.33 in 2011 USD. We have multiplied Allen’s (2001) figures by \$4.33 to render them in a version of PPP-income indexed to the price of basic need-satisfiers, in other words, a ‘welfare-adjusted PPP’ (see Figure 5). This allows us to measure early modern European incomes in a way that is theoretically similar to the World Bank’s method (i.e., in terms of what \$1 could purchase in the USA in 2011). But unlike the World Bank, purchasing power here is based on the prices of goods most relevant to those living in poverty. We calculated the series for the ‘European periphery’ as the average of Polish, German, Austrian, Italian, and Spanish cities, while the ‘European core’ is based on cities in southern England, northern France, and the Low Countries.

Figures 4 and 5 suggest extreme poverty was not a natural condition. Unskilled labourers across Europe appear to have been able to support a family of four above the extreme poverty line by working 250 days a year for most of the past 600 years (Fig. 4), and could afford more than \$1.90 worth of goods in 2011 US prices, at least as far as food and fuel are concerned (Fig. 5). Working class

⁹ On these limitations, see, Hatcher, 2018; Deng & O’Brien, 2018; Mocarelli, 2018; Stephenson, 2018.

¹⁰ The following analysis and data does not include Russia and the Ottoman Balkans, as Wallerstein argues these regions were not incorporated into the capitalist world-system until the mid-18th century.

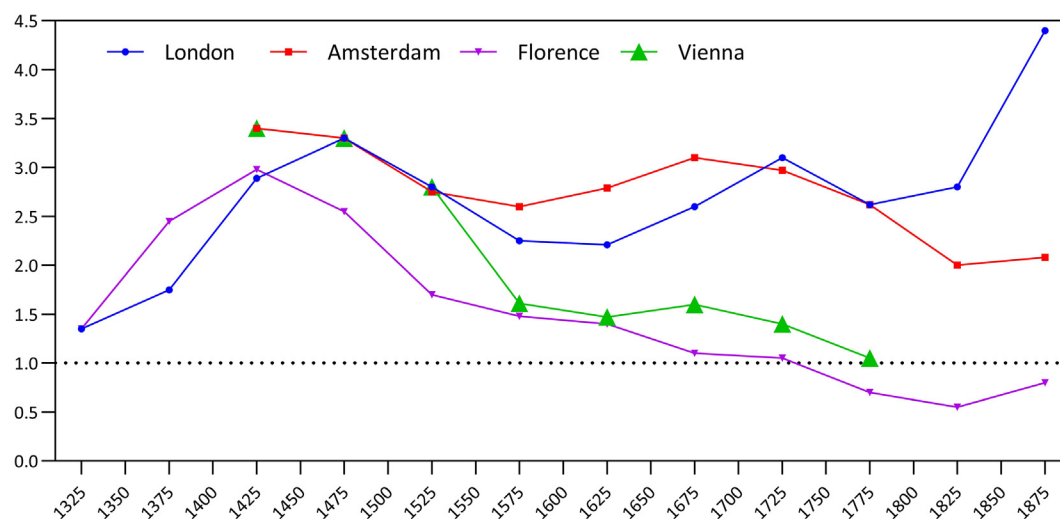


Figure 4. Daily income per person for a family of four, with one family member working 250 days a year as an unskilled urban labourer, 1325–1875 (1 = extreme poverty line). Source: Allen (2015); see text and appendix III for details.

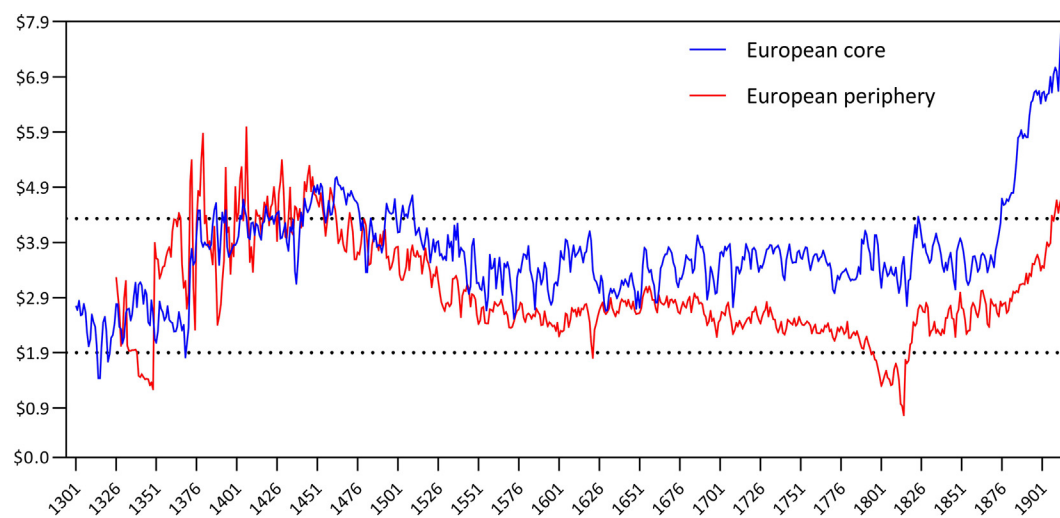


Figure 5. Daily income per person for a family of four, with one family member working 250 days a year as an unskilled labourer, 2011 welfare-adjusted PPP \$ (1301 – 1913). Source: Allen (2001); U.S. Bureau of Labour Statistics (2020); see text and appendices III – IV.

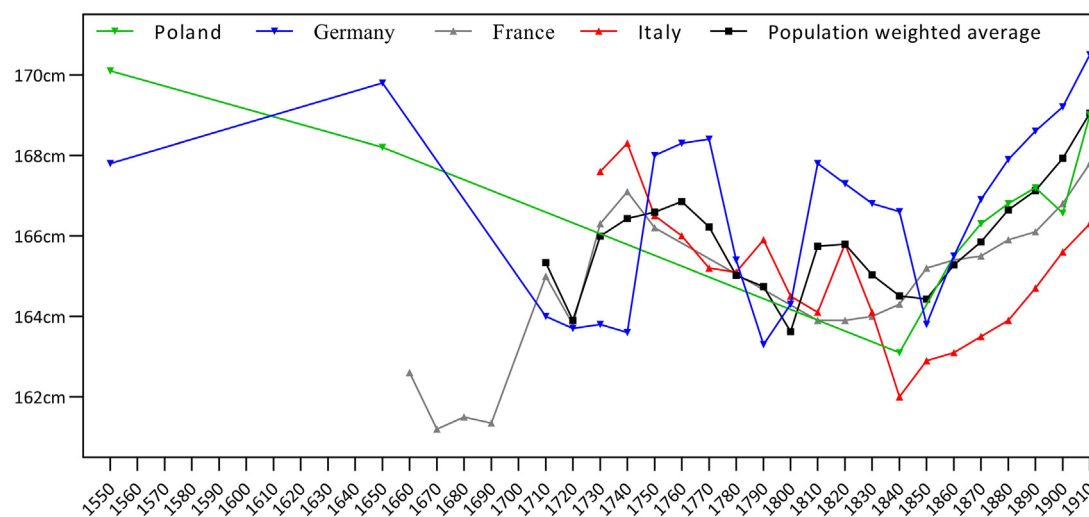


Figure 6. Average adult male height in Europe (1500s–1910s). Graph shows selected countries, with the population-weighted average calculated across the whole dataset. Source: Bateman & Blum (2013); see text for details.

Table 1

Number of famine-years per century in Western Europe, 1300s–1900s.

	1300s	1400s	1500s	1600s	1700s	1800s	1900s
All famines	35	16	46	61	48	26	6
Multi-region famines	13	3	24	31	23	8	4

Source: authors' calculations from data in supplementary table 1 of Alfani & Gráda (2018).

incomes only seem to fall below the poverty line in periods of extreme social and economic distress, such as the 14th century famines and epidemics. The European periphery also suffered extreme poverty during the turmoil of the French Revolutionary and Napoleonic wars (1792 – 1815). Outside of these catastrophes, it is unlikely that most Europeans lived in extreme poverty. Of course, there are several reasons these results may not capture the full story.¹¹ Due to unemployment, workers may not have been able to work a full 250 days a year. On the other hand, if workers were able to derive additional incomes from commons and household production, and if women and children contributed to family incomes, consumption would have been higher than recorded here. While the precise level of real consumption is difficult to reconstruct, real wages suggest unskilled laborers generally earned incomes above the extreme poverty line.

The wage data also reveals that, rather than delivering progress against poverty, the rise of capitalism was associated with a deterioration in human welfare across Europe.¹² Following the peasant and worker rebellions in the 14th century, wages rose high enough to support a family of four above the ‘respectability’ line (i.e., \$4.33, represented by a dotted line on Figure 5). But during the long 16th century wages plummeted, particularly in the European periphery, which was de-industrialized and reduced to a raw material supplier for English and Dutch manufacturers (Wallerstein, 1974; Moore, 2010a; Frank, 1978; Watson, 2017). In the core, wages only began to rise above their 15th-century level in the 1880s – around four centuries after the rise of capitalism and 50 years later than the standard narrative suggests. For most of the European periphery, poverty alleviation began later, “indeed, only in the post-World War II boom” (Allen, 2001, p. 435). This trend corresponds with the rise of organized labour and socialist parties across Europe (Pelz, 2016, pp. 83–102; Geary, 1981). As we shall see, progress in Europe has been much more extensive than elsewhere. Flush with surplus extracted from the colonies, European capitalists could respond to the demands of popular movements, and improve working class incomes, without significantly threatening the accumulation of capital (Cope, 2019; Lauesen, 2021). By the 2000s, Europe's population-weighted average welfare ratio was 22.¹³

Figure 6 depicts adult male height from the 16th to 20th centuries (data obtained from Baten & Blum, 2013). The data for 1650 and earlier is based on 50-year averages, while the post-1650 figures depict the average height of people born in a given decade. Data is only available from the 16th century for two countries – Germany and Poland. Other states become available from

1710 onwards, and we have used that data to calculate a population-weighted average with historical population data from Fink-Jensen (2015). Note that for the population-weighted averages in this paper, some annual fluctuations may reflect changes in data availability.¹⁴

Figure 6 confirms that access to basic-needs satisfiers in Europe declined markedly with the rise of capitalism: Europeans born in the 1850s were considerably shorter than 16th-century Germans and Poles. Europe did not recover from this prolonged period of deprivation until the 20th century. There was substantial progress from that point, with the population-weighted average reaching 177cm in the 1980s. Historians attribute this improvement in human health to sanitation systems, and access to public health-care and adequate housing – provisions that were secured by socialist and other progressive movements demanding social reforms (Szreter, 1997; 2003; Porter, 1999; Navarro, 1993).

Table 1 shows the number of years per century wherein Western Europe experienced famine. This time series is based on data from Alfani & Gráda (2018). In the revolutionary 1400s, Europe experienced only 13 years of famine, only three of which occurred in multiple regions. As capitalism developed, however, Western Europe entered a period of endemic mass starvation, with the 17th century seeing 61 famines – more famine years than regular years – 31 of them occurring in multiple regions. Famine in Europe did not improve beyond its 15th-century level until the 20th century. This progress is attributable to the rise of democracy and press freedom – another product of the labour movement, and the movement for women's suffrage – as historical data indicates that famines rarely occur under democratic conditions (see, Sen, 1999; Dreze & Sen, 1989; Hickman, 2019; de Waal, 2018).

The European data, then, does not support the standard poverty narrative. Extreme poverty is not the natural condition in Europe, but a symptom of extraordinary social and economic collapse. The rise of capitalism, rather than delivering improvements in human welfare, was associated with plummeting wages, a reduction in human stature, and a marked upturn in the incidence of famine. Progress did not begin until the 1880s in the European core, and the 20th century in the European periphery, the latter roughly a century later than the standard narrative suggests.

3.2. Latin America:

The Spanish and Portuguese conquest of the Americas from 1492 marked the bloody expansion of capitalism into the Western Hemisphere (Wallerstein, 1974; Frank, 1967; Moore, 2010b). The conquistadors extirpated over 90% of the Indigenous population through slavery, land grabs, massacres, and disease (Resendez, 2016; Frank, 1979; Galeano, 1973). Over the following centuries, capitalist control over Latin America was perpetuated through constant imperialist interventions. From c. 1750 to 1810, Spain implemented mercantilist policies known as the “Bourbon reforms” – dubbed ‘the second conquest of America’ by historian John Lynch (1986, pp. 1–18) – which strengthened commercial mining and

¹¹ Stephenson (2018) argues that Allen has overestimated the recorded wages for London labourers between 1650 and 1770. Meanwhile, Mocarelli (2018) holds that Allen underestimates the wage level in 18th century Milan. We do not have the space here to assess these debates. However, substantial revisions for London and Milan would not change the overall analysis we present here.

¹² The validity of the wage trends has been questioned by Hatcher (2011), who claims that workers in the 19th century were employed on a more regular basis than in the 15th century, so that their annual incomes were ultimately higher. This argument has been disputed by Christopher Dyer (2015) and Gregory Clark (2013; Clark, Cummins, & Smith, 2012; Clark & McComb, 2018). As we shall see below, the wage data is supported by trends in adult height (see also our discussion of English height from the 15th to 19th centuries in Appendix I).

¹³ This figure is calculated from De Zwart et al. (2014), with population data from Fink-Jensen (2015). De Zwart et al. use a slightly less generous basket compared to the historical estimates.

¹⁴ To maximize data coverage, we have interpolated missing years in the Fink-Jensen (2015) dataset along an exponential curve. Because this dataset lacks figures for Sudan, we have added Bolt & van Zanden's (2020) estimates of Sudan's population when dealing with Africa.

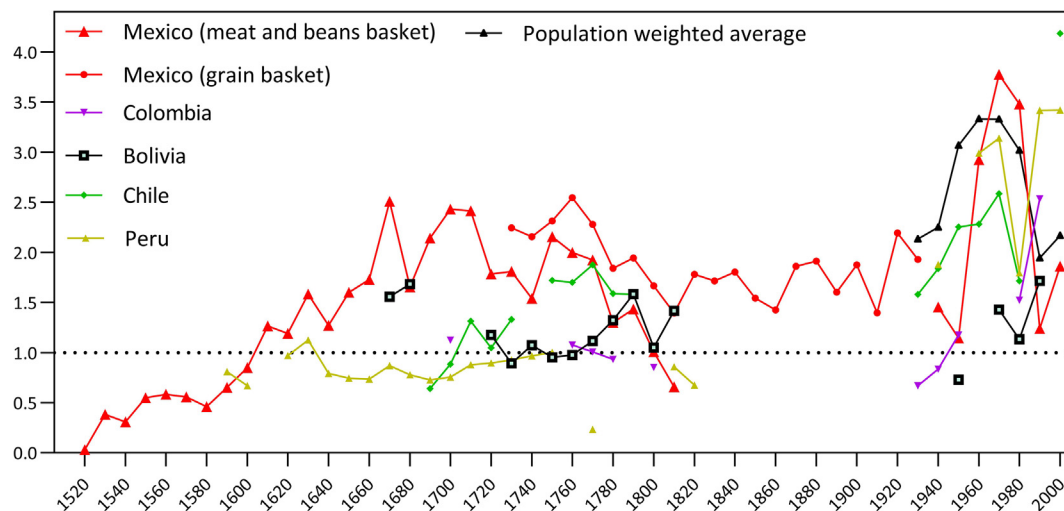


Figure 7. Daily income per person for a family of four, with one family member working 250 days a year as an unskilled urban labourer, decadal averages (1 = extreme poverty line). Graph shows selected countries, with the population-weighted average calculated across the whole dataset. Source: [Abad et al. \(2012\)](#); [Challu & Gomez-Galvarriato \(2015\)](#); [De Zwart et al. \(2014\)](#); see text and appendix III for details.

agriculture while creating a captive market for European industry ([Frank, 1967](#), pp. 51–55; [Frank, 1978](#), pp. 182–189; [Wallerstein, 1989](#), pp. 213–217). When the Iberian powers withdrew from the Americas in the 19th century, independence was curtailed by U. S. military interventions and occupations ([Chomsky, 1987](#); [LaFaber, 1993](#); [Livingstone, 2009](#); [Calder, 1984](#); [Schmidt, 1971](#)).

[Figure 7](#) illustrates welfare standards over this period, with data obtained from several sources. [Abad et al. \(2012\)](#) provide data for 6 Latin American countries from the 16th to 19th centuries, while [De Zwart et al. \(2014\)](#) cover the same countries with the same subsistence basket for the 19th and 20th centuries. [De Zwart et al.](#) provide data for an additional 13 states after 1930. We have calculated a population-weighted average series with this data, which provides a broader picture of welfare standards in the region as a whole. There is additional data for Mexico (1730s–1930s) from [Challu & Gomez-Galvarriato \(2015\)](#), which uses a subsistence basket that contains less meat and beans than the basket used by [Abad et al.](#)

It seems extreme poverty was not a normal condition in Latin America. Workers in Mexico earned more than double the poverty line in the 18th century, while workers in Bolivia and Chile approached similar levels. In fact, Argentinian workers (not displayed here) enjoyed wages up to 9 times higher than the poverty line. For the most part, labourers seem to fall below the line in times of severe social distress, including genocide in 16th century Mexico ([Resendez, 2016](#); [Frank, 1979](#); [Galeano, 1973](#)). Only in Peru, and to a lesser extent Colombia, did the working class live in extreme poverty for most of the period in question. There are important caveats that need to be kept in mind. The income data displayed here is based on arbitrary assumptions about the number of days worked and does not account for non-commodity incomes or the incomes of women and children. Nevertheless, there is no evidence that extreme poverty rates approached 90% in most periods.

The data does not support the claim that capitalism delivered improvements in human welfare. Although pre-Columbian wages are not available, it is clear that the conquest saw a marked reduction in human welfare. In the 1520s, Mexican workers subject to forced labour received only 3% of a subsistence basket, the lowest welfare ratio we have found in the literature. After the resulting demographic collapse, wages recovered during the 16th and 17th centuries. This trend was reversed during the Bourbon reforms of

the mid-18th century, with wages in Mexico declining by around 70% to 1810.

Wages started to improve from the 1940s, as labour unions grew rapidly, and populist or left-wing governments assumed power ([Rock, 1994](#); [Prashad, 2007](#), pp. 25–27, 62–74). Over the following decades, these governments created anti-colonial developmentalist institutions (such as the UN Economic Commission for Latin America based in Santiago de Chile), and pursued import-substitution policies aimed at independent industrialization ([Klein, 2007](#), pp. 54–55; [Prashad, 2007](#), pp. 62–74; [Chang, 2007](#)). Most countries surpassed their 18th century peak in the 1960s. However, these gains were reversed under the structural adjustment programmes imposed by the World Bank and IMF during the 1980s and 1990s (*ibid*; [Klein, 2007](#), pp. 156–168; [Hickel, 2017](#), pp. 149–166). In Mexico, the welfare ratio declined from 4.22 in 1982, to 1.01 in 1984. As of the 2000s, Mexico had lower wages than three centuries earlier.

Turning to human stature, [Baten & Blum's \(2013\)](#) dataset is displayed on [Figure 8](#) (we calculated the weighted average series with data from [Fink-Jensen, 2015](#)). Our analysis focuses on the three countries that have data for the whole period since the 18th century: Mexico, Peru, and Argentina. [Figure 8](#) confirms that the Bourbon reform period (c. 1750–1810) witnessed a deterioration in human welfare. In Mexico and Argentina, height began to recover following independence in the 1810s, and then surpassed its mid-18th century level in the 1930s and 1940s. According to the final birth cohort in this dataset (those born in the 1990s), the people of Peru had not yet recovered from the impacts of Spanish imperial exploitation.

What about mortality? The population of Latin America was about 40 to 60 million people before 1492, with some estimates as high as 100 million ([Denevan, 1992](#), p. 370). After a century of genocide, slavery, and disease, that figure was reduced to 4 million ([Brea, 2003](#), p. 5). Despite the immigration of European settlers and enslaved Africans, the population did not recover to its pre-colonial level until the early 20th century (*ibid*). Indeed, there is evidence of a second major mortality crisis in the late 19th century. Mike Davis records that the shift from subsistence to commodity production in Brazil's *nordeste* region undermined resilience to drought, causing 2 million deaths from famine ([Davis, 2002](#), p. 7). There may also have been a rise in mortality in Chile at that time. According to Chilean government figures, the death rate increased from around 22

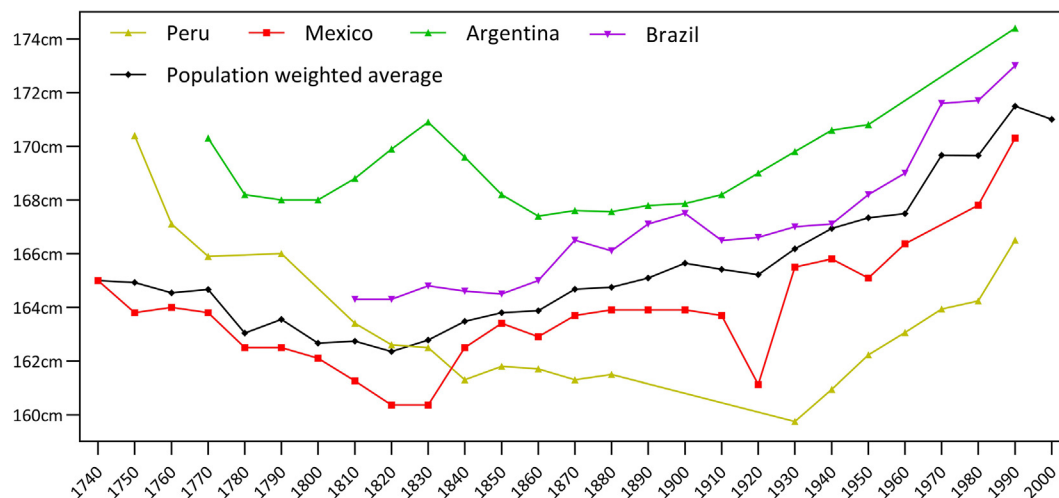


Figure 8. Average adult male height in Latin America, 1740 – 2000. Graph shows selected countries, with the population-weighted average calculated across the whole dataset. Source: [Baten & Blum \(2013\)](#)

per 1,000 people in the 1850s to 32 in the 1900s (data from [Mitchell, 2013](#)). Assuming this represents an actual increase in deaths rather than an increase in registration, excess mortality between 1860 and 1940 was 1.7 million people (see the discussion in [Appendix V](#)). Mortality returned to its 1850 level in the early 1940s, before declining rapidly throughout the 20th century, reaching around 5 today ([World Bank, 2022](#)). Jean [Dreze and Amartya Sen \(1989, p. 230\)](#) attribute this progress to the public provisioning of health care, food, and education, all “intimately linked with the trade union movement and other forms of political activism.” These achievements were undermined by the U.S.-backed Pinochet regime’s neoliberal policies, which caused an explosion in unemployment, two recessions, and a stagnation in life expectancy at age one (*ibid.*, pp. 231–237; see also, [Frank, 1976](#); [Klein, 2007](#), pp. 75–87). It was popular movements pushing for distributive justice, not capitalism, that brought progress to Chile and Latin America.

The historical evidence regarding Latin America does not support the standard public narrative about global poverty. Extreme destitution was not the normal condition of the population. Such conditions were induced by conquest and genocide in the 16th century, during incorporation into the capitalist system. After recovery, unskilled labourers in the 18th century in most countries earned incomes above the extreme poverty line. Thereafter, the deepening of capitalist trade in the Bourbon period led to a decline in access to food and other essentials. Progress in human welfare did not begin until the rise of progressive social movements and state-led industrial policies in the 1940s.

3.3. Sub-Saharan Africa

From its base in the 16th century Atlantic, the capitalist world-system expanded east, drawing in cheap labour and resources to finance the industrial revolution ([Wallerstein, 1989](#); [Beckert, 2014](#); [Patnaik, 2018](#); [Cope, 2019](#)). Sub-Saharan Africa was one of the first regions to be affected. In the 17th century, European demand for plantation labour caused a rise in slave raiding and warfare on the African west coast ([Wallerstein, 1989](#), pp. 164–166, p. 170, pp. 187–188; [Law, 1992](#); [Rodney, 1972](#)). These processes accelerated from roughly 1750 to 1850 as the trade in enslaved persons and slave-produced commodities (e.g., palm oil and peanuts) reached its peak. [Wallerstein \(1989, pp. 129–189\)](#) describes this as the ‘incorporation’ of West Africa into the capitalist world-system. Those areas, particularly in East and Central Africa, that were less involved in these asymmetrical trade

arrangements, were incorporated into the capitalist world-system during the ‘scramble for Africa’ in the 1880s ([Rodney, 1972](#), pp. 147–261).

[Klas Ronnback \(2014; 2016\)](#), has calculated real wages for unskilled labourers in Ghana from 1660 to 1750, while [De Zwart et al. \(2014\)](#) have estimated wages for 35 countries after 1850. [Figure 9](#) combines these two datasets. Ronnback’s subsistence basket is more generous in terms of food than De Zwart et al.’s (it contains 2,251 calories instead of 1940, and 56 g of protein instead of 40 g). Conversely, De Zwart et al.’s basket contains more fuel than Ronnback’s (3mbtu vs 2mbtu). Despite these issues, the baskets are broadly similar and can be used to compare human welfare over time.¹⁵

During the 17th and early 18th century, wages in Ghana appear to have been higher than the extreme poverty line. Ronnback argues this is a conservative estimate because African labourers worked shorter days than in other regions, and may have used their time off to earn additional incomes from trading, hunting, farming and fishing: “Under such an assumption, it would be necessary to revise the estimated subsistence ratio upwards by some seventy to ninety per cent” (*ibid.*, p. 174). Ghanaian incomes in the 17th century “might have been on a par with or even higher than those of many North or Central European labourers” (*ibid.*, p. 174). This changed, however, as Ghana was incorporated into the capitalist world-system, with wages declining by 81% from the 1720s to 1860s. [Ronnback \(2016, pp. 169 – 170\)](#) suggests this decline in human welfare was due to the social and economic dislocations wrought by the trans-Atlantic slave trade. As African polities were increasingly involved in warfare and slave raiding, prices rose and refugees fled to coastal cities, putting downward pressure on urban wages.

Wages in Africa generally remained below subsistence during the 19th century colonial period, but recovered in the 1930s to 1950s. These decades saw the rise of the African labour movement ([Cooper, 1996](#)), while radical anti-colonial movements, represented at the Afro-Asian conferences at Bandung (1955) and Cairo (1957), sought to reorganize production around meeting local needs ([Prashad, 2007](#)). Ghana’s wage finally surpassed its 1660’s level in the 1950s, corresponding with the rise of the Ghanaian independence movement, led by the socialist Kwame Nkrumah, which won Africa’s first free election in 1951, followed by full independence in 1957 ([Botwe-Asamoah, 2005, p. 7](#)). Over the next few dec-

¹⁵ Ronnback multiplies monthly earnings by 12 to estimate the annual wage. He notes this is likely equivalent to about 250 days” (Ronnback 2016, pp. 172–173).

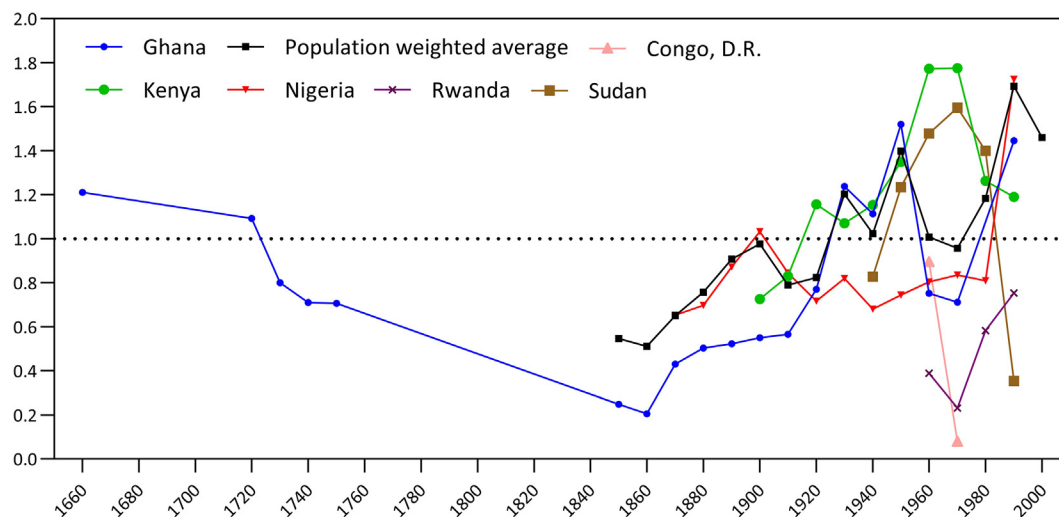


Figure 9. Daily income per person for a family of four, with one family member working 250 days a year as an unskilled urban labourer, decadal averages (1 = extreme poverty line). Graph shows selected countries, with the population-weighted average calculated across the whole dataset. Source: De Zwart et al. (2014); Ronnback (2016); see text and appendix III for details.

ades, however, Western states intervened extensively in African affairs, undermining newly independent governments. In the 1960s, the U.S. and Britain cut Ghana off from international finance and drove down the price of Ghana's main export, cocoa, before backing a military coup against Nkrumah in 1966 (see, Mwakikagile, 2015; Nkrumah, 1968). Ghana's welfare ratio dropped from 1.9 in 1960 to 0.4 in 1967. In the Democratic Republic of Congo, the Prime Minister Patrice Lumumba was assassinated in a 1961 coup backed by the U.S., Britain, and Belgium, which brought the Mobutu dictatorship to power (Hickel, 2017: ch. 4). The DRC's welfare ratio collapsed to 0.07 by 1978. During the 1980s and 1990s African countries were forced to implement structural adjustment programs by the IMF and World Bank, which often caused wages to stagnate or even decline (Chang, 2007; Hickel, 2017: ch. 5; see Kenya and Sudan in Figure 9). As of the 1990s, Ghana's wage was only 0.2 subsistence baskets higher than 330 years earlier.

Figure 10 shows average adult male height from the birth cohort of the 1780s to the 1980s (data from Baten & Blum, 2013). This data shows an impressive increase to 1850, with the population-weighted average rising from 161 cm to 168 cm. It is

not clear, however, whether this represents progress from baseline conditions or is simply a period of recovery following the low welfare standards that likely arose during the slave trade. After 1850 the picture becomes more robust. As Figure 10 shows, the late 19th and early 20th century saw a significant decline in human height across sub-Saharan Africa. Regression analysis by Baten & Maravall (2021) indicates this decline was driven by European colonialism, likely because land grabs, forced labour programs and diseases impaired local welfare. Figure 10 shows that African heights did not surpass their 1860 level until the 1950s. During the 1970s and 1980s, there was a renewed height decline, as Africa was subject to Western-backed coups and structural adjustment programs. According to the population-weighted average series, the birth cohort of the 1980s was only half a centimeter taller than their ancestors from 1860. In many countries, including Tanzania, South Africa, Mozambique, and Madagascar, human height has not yet recovered from the impacts of colonization as of the most recent year of data.

Data on mortality also indicates there was a deterioration in population health during the colonial period. In Mauritius, under British rule, deaths per 1,000 people rose from an average of 28.3

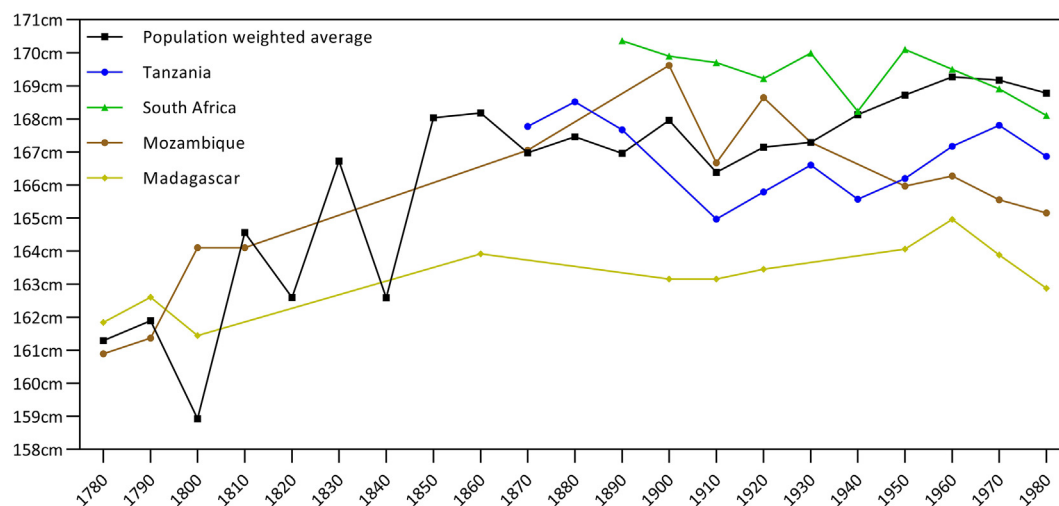


Figure 10. Average adult male height in sub-Saharan Africa (1780–1980). Graph shows selected countries, with the population-weighted average calculated across the whole dataset. Source: Baten & Blum (2013).

in the 1870s, to 37.5 in the 1900s (Mitchell, 2013). Unless there were anomalies in the rate of registration over time, these figures suggest there were 74,505 excess deaths between 1885 and 1920 (see Appendix V for a full discussion). Meaningful progress against mortality only began in the 1940s. This coincides with a series of popular protests, beginning with mass riots by sugar workers in 1937, which culminated in the rise of the Mauritian Labour Party, the extension of the franchise in 1948, and the construction of Africa's first welfare state (Seekings, 2011). Unfortunately, we do not have 19th century mortality figures for any other African countries. Nevertheless, estimates of population growth by Frankema & Jerven (2014) affirm there was a serious mortality crisis in colonial Central and East Africa during the period of incorporation into the capitalist world-system. Table 2 highlights the 10 worst cases of population collapse, as well as the total across the affected regions.

The evidence does not support the claim that extreme destitution was a universal condition in Africa. In the early 18th century, Ghanaian labourers earned more than the extreme poverty line. The expansion of capitalism, however, caused a collapse in African welfare, first through the slave trade and later through direct colonization. While there is some evidence from the height data of progress in the early 19th century, this trend was reversed during the period of colonization. The first clear evidence of progress in welfare standards comes in the mid-20th century, with the emergence of anti-colonial social movements.

3.4. South Asia

Wallerstein argues the rise of capitalism began to influence human welfare on the Indian subcontinent from the 17th century. The proliferation of militarized European trading monopolies in the Indian Ocean led to rising demand for local produce, pushing up real prices and contributing to social instability (Wallerstein, 1989, pp. 177–188; Wallerstein, 1986, pp. 29–30; Ali, 1975). South Asia was then incorporated into the capitalist world-system from 1757, when the East India Company (EIC) assumed control of Bengal (Wallerstein, 1989, pp. 129–189; Wallerstein, 1986). The colonial regime used a system of one-sided tariffs to crush Indian manufacturing (Tharoor, 2017, pp. 1–35). By purchasing Indian exports with Indian tax revenues, the colonial regime created a drain of surplus to Britain (Patnaik, 2018). How did these social transformations impact poverty in India?

Table 2

Population collapse in colonial Central and East Africa, 1890–1920.

Country	Occupying power	Absolute decline (millions)	Relative decline
Congo, D. R.	Belgium	1.89	19%
Mozambique	Portugal	0.65	15%
Tanzania	Germany	0.61	11%
Kenya	Britain	0.61	14%
Angola	Portugal	0.53	16%
Cameroon	Germany	0.51	15%
Uganda	Britain	0.37	10%
Madagascar	France	0.36	12%
Malawi	Britain	0.32	15%
Chad	France	0.29	15%
Total		7.24	15%

Source: Frankema & Jerven (2014).

Allen (2007) has calculated real wages for the South, West, East, and North of the Indian subcontinent from the 1590s to 1910s. Figure 11 plots the average of these four series. More recently, De Zwart et al. (2014) have calculated real wages for five South Asian states from the 1830s to the 2000s. In the period when the two datasets overlap, de Zwart et al. use Allen's 'East India' wage for Bangladesh. However, they revised down his estimate for the Republic of India on the basis of new evidence. We have used this data to calculate a population-weighted average series. We also draw on De Zwart & Lucassen (2020), who have estimated the average wage in Northern India, including Bengal, for the period 1590 to 1870. It should be noted that while de Zwart et al. and Allen use the same subsistence basket, De Zwart & Lucassen include slightly more calories (2,000 vs 1,945), as well as a larger quantity of non-food items (see Appendix III).

Figure 11 shows that, prior to colonization, India's real wage was generally higher than the extreme poverty line. As with other regions, this data suggests extreme poverty only arose in times of extreme distress. De Zwart & Lucassen's series suggests wages fell below 1 in the 1610s and 1630s, coinciding with the Deccan famine of 1630–32, possibly the worst famine in Mughal India (Attwood, 2005; Winter, Hume, & Leenstra, 2017). In normal times, Indian labourers earned more than the extreme poverty line. This pattern changed, however, as India was forcibly incorporated into the capitalist world-system, with wages regularly falling below

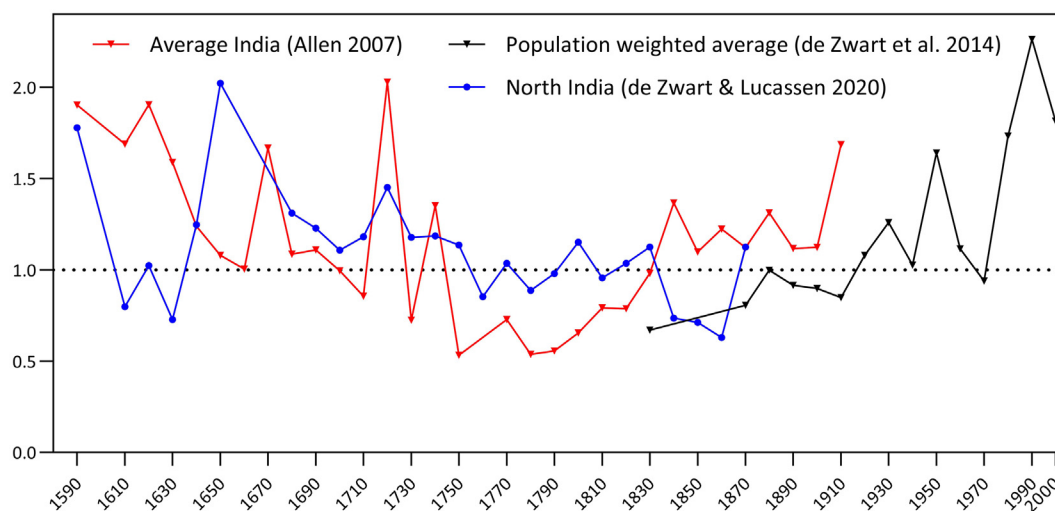


Figure 11. Daily income per person for a family of four, with one family member working 12 months a year as an unskilled urban labourer, decadal averages (1 = extreme poverty line). Source: De Zwart & Lucassen (2020); De Zwart et al. (2014); Allen (2007) see text and appendix III for discussion.

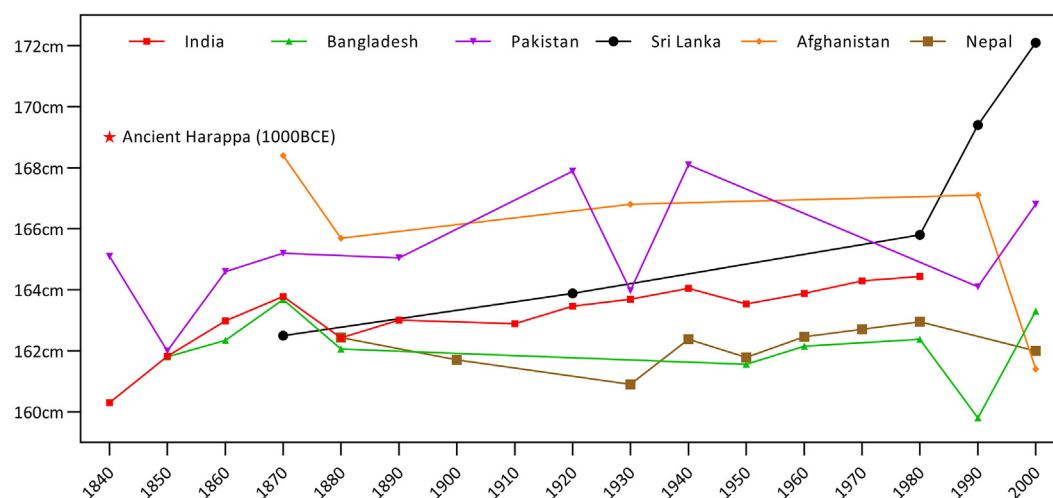


Figure 12. Average adult male height in South Asia (1840–2000). Source: Clark (2007); Baten & Blum (2013).

Table 3

Mortality and longevity in late 19th- and early 20th-century India (compared to early modern England).

	Life expectancy (years)	Crude death rate (per 1,000 people)	Excess deaths, millions (normal mortality = India 1880s)	Excess deaths, millions (normal mortality = England 16th– 17th century)
<u>England</u>				
16th–17th c	35.8	27.18	–	–
<u>India</u>				
1881–90	26.7	37.2	–	27
1891–00	22.8	44.6	21	49
1901–10	25.4	39.9	8	37
1911–20	21.9	44.2	21	52
Total	–	–	50	165

Source: Dyson (2018, pp. 126, 279–280); Wrigley & Schofield (1981, p. 528).

subsistence in the 18th and 19th centuries. There was some recovery following Indian independence in 1948. The 1950s saw higher wages than in any decade under British rule (the 1910s are a possible exception, although this is based on only two years of data from Allen's 'North India' series). Welfare standards collapsed again in the 1960s and 1970s, as the post-colonial state failed to pursue meaningful land reform or invest in the public distribution of food and necessities (see, Patnaik, 2007; Dreze & Sen, 1989, pp. 204–221). Despite a renewed upturn in the 1980s, India's real wage remained below its 16th and 17th century peaks as late as the 2000s.

Baten & Blum's (2013) height data begins in the 1840s for India, after the period of immiseration indicated by the wage data in Figure 11. This makes it difficult to assess the impact of capitalism over the colonial period. Gregory Clark (2007, p. 61) provides estimates of height in India's ancient Harappa civilization (2000–1000BCE), which may give us some indication of pre-colonial welfare. Both datasets can be seen on Figure 12. In the 1840s, all countries had lower heights than the ancient Harappan peoples. Heights recovered to the 1870s, but then collapsed as British policies led to a series of major famines (Davis, 2002). As of the 2000s, only the Democratic Socialist Republic of Sri Lanka has made significant progress, and returned to the ancient Harappan stature, an achievement which is attributable to public provisioning systems for food and health care (see, Sen, 1981, p. 301; Dreze & Sen, 1989, pp. 227–229).

It is widely recognized that famine became more regular and deadly under British colonialism than in the Mughal period (Davis, 2002; Tharoor, 2017). There is evidence of a particularly

severe mortality crisis in the late 19th century. Demographers have used India's censuses to reconstruct life expectancy and the crude death rate between 1881 and 1920 (Dyson, 2018, p. 126, p. 279–280). Table 3 reports this evidence. As Allen has suggested that India's welfare standards in the 16th century were similar to Western Europe's, for comparison we also include average figures for England in the 16th- and 17th-century (data from Wrigley & Schofield, 1981). Both the English and Indian figures are the results of modern demographic reconstructions, so changes in the mortality rate are not affected by changes in the rate of registration. We see that in the 1870s India's crude mortality rate had already risen considerably higher than early modern England. The situation deteriorated thereafter, with mortality rising by 19%, and life expectancy plummeting to 22 years. If we estimate excess mortality from 1891 to 1920, with the average death rate of the 1880s as normal mortality, we find some 50 million people lost their lives under the aegis of British capitalism (see Appendix V for a full discussion).¹⁶ But this estimate must be considered conservative. India's 1880s death rate was already very high by international standards. If we measure excess mortality over England's 16th- and 17th-century average death rate, we find 165 million excess deaths in India between 1880 and 1920 (Appendix V). This figure is larger than the combined number of deaths from both World Wars, including the Nazi holocaust.

¹⁶ There is also evidence of a mortality crisis in Sri Lanka at this time. Although government records may be subject to misreporting, it seems that up to 3.56 million excess deaths occurred under British colonialism between 1853 and 1946 (evidence reviewed in Appendix V).

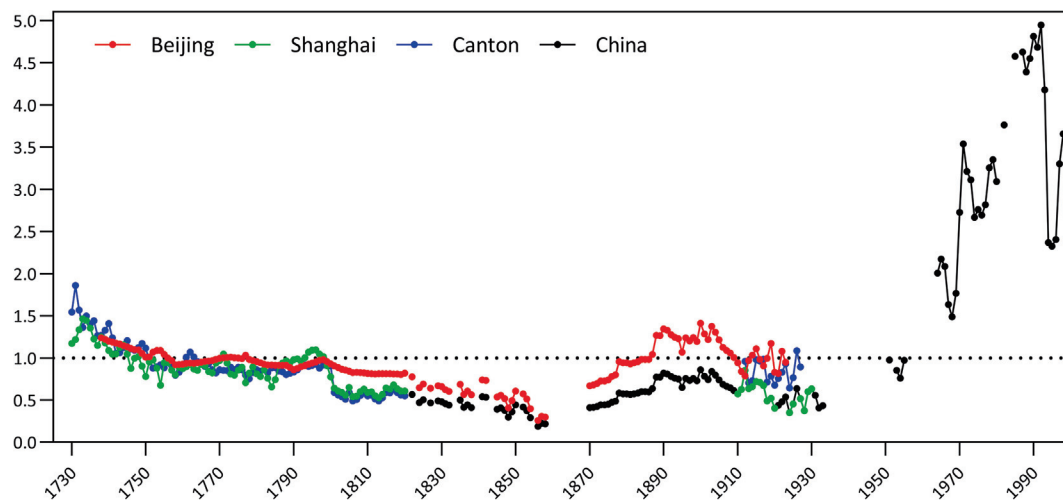


Figure 13. Daily income per person for a family of four, with one family member working 250 days a year as an unskilled urban labourer (1 = extreme poverty line). Source: Allen, et al. (2011); De Zwart et al., 2014; see text and appendix III for details.

Indian life expectancy did not reach the level of early modern England (35.8 years) until 1950, after decolonization.¹⁷ The post-independence government succeeded in halting the endemic mass mortality that had prevailed under British rule and delivered sustained improvements in life expectancy, climbing to almost 70 years today (although, as we will see below, India's progress has been much slower than in communist China). In light of the wage and height figures, these improvements probably reflect gains in health care, rather than improved access to food relative to the pre-colonial situation (see, Patnaik & Patnaik, 2017, p. 117).

Empirical evidence from South Asia does not support the standard public narrative about poverty. From the 16th to early 18th centuries, workers in this region generally had incomes higher than the extreme poverty line. The rise of capitalism and colonialism brought a decline in real wages and possibly also a decline in heights. Indeed, there is no substantial evidence of any progress in South Asian real wages or heights between the 1590s and the 2000s. This is consistent with Allen's estimates of India's extreme poverty rate, outlined in Figure 3.

3.5. China

The incorporation of India after 1757 brought the capitalist world-system to China's border. Control over Indian poppy fields allowed the British colonial regime to illegally traffic opium into the Qing empire, reversing the historical outflow of silver from Europe to China (Wallerstein, 1986, pp. 32–33; Basu, 1979). By the early 19th century, China suffered a deflationary trade deficit (So, 1984, pp. 94–98; Wong, 1998, pp. 369–374; Chang, 1964, pp. 39–46). Attempts by the Qing state to halt the outflow of silver were met with British aggression in the first Opium War (1839–1842), marking the beginning of China's incorporation into the capitalist world-system (Wallerstein, 1989, pp. 167–168; see also, So, 1984; So & Chiu, 1995; Li, 2016). Britain and France imposed 'unequal treaties' on the Qing state, forcing it to reduce all tariffs to 5%, even though English duties on Chinese tea were as high as 100% (So & Chiu, 1995, p. 43; Wong, 1998, p. 343). China's trade deficit soared. By 1850, 11% of China's money supply, and 13% of its silver stock had been drained from the country

(Davis, 2002, p. 295). In addition, British consuls established a "semi-slave trade" in Chinese indentured servants, relocating 150,000 people to export-oriented plantations around the world (So, 1984, p. 101).

Allen, et al. (2011) estimate welfare ratios for Beijing, Shanghai, and Canton from 1730 to 1930. De Zwart et al. (2014) estimate China's real wage from 1820 to 1998. In the period where the two series overlap, de Zwart et al's series is identical to Allen et al's data for Shanghai, although they interpolate missing years with the growth rate from Beijing. These datasets are plotted on Figure 13. In the early 18th century, Chinese labourers earned around 50% more than the extreme poverty line. Wages declined thereafter, particularly in the 19th century as opium imports increased. As one European writer commented in 1833, China was experiencing a "steady, non-ceasing impoverishment... by the abstraction of the circulating medium [silver]" (quoted in Wong, 1998, p. 374). This impoverishment escalated markedly following the Opium War and the resulting Taiping rebellion. Wages only began to recover following the Chinese communist revolution in 1949. By 1990, China's welfare ratio had risen to almost 5, one of the highest wages in the developing world (De Zwart, et al., 2014). This progress is attributable to the robust job security regime implemented by the communist party (the so-called 'iron rice bowl'), as well as Maoist provisioning programs that guaranteed food and other essentials at low prices (Dreze & Sen, 1989, pp. 204–225; Li, 2016; Navarro, 1993). During the capitalist reforms of the 1990s, when the state dismantled and privatized China's public provisioning systems, wages collapsed to a nadir of 2.3 (on the 1990s' reforms and poverty see, Li, 2016, ch. 2).

Figure 14 shows Baten & Blum's (2013) estimates of human stature in 19th- and 20th-century China. To put these figures in a broader historical perspective, we also show adult male height in Northern China during the neo-lithic (calculated as the average of data displayed in Pechenkina et al., 2007, p. 267). We see there was a deterioration in human welfare following the Opium Wars, with height dropping by 2.2 cm. The stature of the Chinese population recovered in the 1930s and 1940s, and then made substantial progress following the 1949 communist revolution.

The available evidence indicates there was a rise in mortality following China's incorporation into the world capitalist system. Lee (2014, p. 236) presents a time series of the number of 'great famines' per decade from the 1730s to the 1910s. In the 18th and early 19th centuries, there were about 1 or 2 major famines

¹⁷ According to Zijdemann (2014), life expectancy was 32.6 years in 1941, the final year of data during the colonial period. The United Nations Population Division puts the figure at 35.8 in 1950.

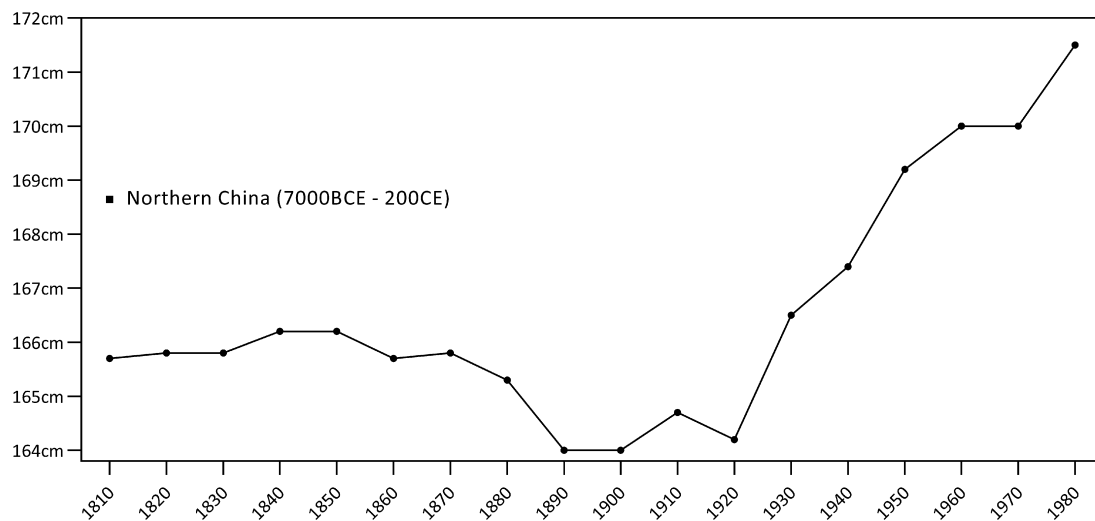


Figure 14. Average adult male height in China (1810–1980). Source: Baten & Blum (2013); Pechenkina et al. (2007).

per decade. Yet from the 1840s onward, each decade saw 6 or 7 famines. The 1910s saw 5 famines. There seems to have also been a rise in the number of epidemics from about 5 in the 1850s to 20 in the 1870s (*ibid*). Population data also points to a mortality crisis. From 1852 to 1870, China's population declined by 18.6%, the largest drop since the 14th century (Lee & Zhang, 2010, p. 243). In absolute terms, China lost 81.9 million people (*ibid*).

The health of the Chinese population improved markedly from 1950 to 1980. According to Babiarz et al. (2015, p. 39), Maoist China “experienced the most rapid sustained increase in life expectancy of any population in documented global history,” primarily because the government expanded public health care and education (see also, Dreze & Sen, 1989, pp. 204–225). There was, of course, a mortality crisis during the famine from 1958 to 1961, which was induced by a lack of democracy (Dreze & Sen, 1989, pp. 210–215). But outside of those dark years, China experienced exceptionally rapid gains against mortality, with the death rate dropping to 6 per 1,000 by 1978 (World Bank 2022). For perspective, India and many other low-income capitalist states did not approach this level until the 2010s. As Dreze & Sen (1989, pp. 214–215) point out: “despite the gigantic size of excess mortality in the Chinese famine, the extra mortality in India from regular deprivation in normal times vastly overshadows the former.... [E]very eight years or so more people die in India because of its higher regular death rate than died in China in the gigantic famine of 1958–61.”

China's rapid progress was reversed somewhat when Deng Xiaoping privatized the rural health system and began pursuing capitalist reforms. From 1978 to 1984, China's life expectancy declined by about 6 months, and the infant mortality rate rose from 37 to 50 per 1,000 (Dreze & Sen, 1989, p. 217). Substantial progress only resumed around 2004, when the government reintroduced social health insurance and other public programs (Dreze & Sen, 2013, p. 15, p. 67).

The historical evidence from China does not support the standard public narrative about global poverty. Extreme destitution was not natural, but emerged over time, as China was made to serve as an outlet for British opium exports. The expansion of the capitalist world-system did not improve human welfare in China, rather, it ushered in one of largest population declines in history. Progress began in the 1950s, as the communist government invested in public provisioning (Dreze & Sen, 1989, p. 204–225; Li, 2016).

4. Conclusions and discussion

Proponents of the standard public narrative about the history of human welfare hold that extreme destitution is a natural condition, which only began to decline with the rise of capitalism. Yet the national accounts data on which this narrative relies cannot legitimately be used to draw these conclusions, and extant data on wages, height, and mortality do not support them. In all of the regions reviewed here, fully-employed unskilled labourers in the early 18th century had incomes higher than the extreme poverty line. Far from a normal or natural condition, extreme destitution is a sign of severe social and economic distress, arising during periods of upheaval and dislocation such as war, famine, and state repression. As for the impact of capitalism on human welfare: data on wages, human height and mortality indicate that the rise and expansion of the capitalist world-system from circa 1500 caused a decline in nutritional standards and health outcomes. Recovery from this prolonged condition of crisis occurred only recently: the late 19th century in Northwest Europe and the mid-20th century in the periphery.

If one starts from the assumption that extreme poverty is the natural state of humanity, then it may appear as good news that only a fraction of the global population lives in extreme poverty today. However, if extreme poverty is a sign of severe social dislocation, relatively rare under normal conditions, then it should concern us that - despite many instances of progress since the middle of the 20th century - such dislocation remains so prevalent under contemporary capitalism. Depending on the subsistence basket one uses to measure poverty, as of 2008, between 200 million and 1.21 billion people live in extreme poverty (Moatsos 2017; 2021; see also our discussion in Appendix VI).¹⁸ While direct comparisons with the wage data are difficult because of the variety of baskets used, this suggests that under contemporary capitalism hundreds of millions of people currently live in conditions comparable to Europe during the Black Death (Figures 4 & 5), the catastrophes induced by the American genocides (Figure 7) and the slave trade

¹⁸ ILO data on food prices is not available after 2008. This makes Moatsos' more recent estimates of global poverty unreliable, and we do not report them here. Allen (2020) has used the price information in the International Comparisons Program to estimate the share of the population living below the BNPL in 145 countries in 2011. This data suggests there were at least 1.14 billion people in extreme poverty in that year.

(Figure 9), or famine-ravaged British India (Figure 11). To the extent there has been progress against extreme poverty in recent decades, it has generally been slow and shallow.

The evidence reviewed here suggests that, where poverty has declined, it was not capitalism but rather progressive social movements and public policies, arising in the mid-20th century, that freed people from deprivation. While more research is needed to confirm this point, it is worth noting that these findings are consistent with previous studies. Amartya Sen (1981) finds that between 1960 and 1977, the countries that made the strongest achievements in life expectancy and literacy were those that invested in public provisioning. Countries governed by communist parties (Cuba, Vietnam, China, etc.) performed exceptionally well, as did countries with state-led industrial policies (South Korea, Taiwan, etc.). Similarly, Cereseto and Waitzkin (1986) find that in 1980, socialist planned economies performed better on life expectancy, mean years of schooling, and other social indicators than their capitalist counterparts at a similar level of economic development. Navarro (1993) reached similar conclusions: when it comes to life expectancy and mortality, Cuba performed considerably better than the capitalist states of Latin America, and China performs better than India. Navarro also found that, amongst the developed capitalist countries, the social democracies with generous welfare states (i.e., Scandinavia) have superior health outcomes to neoliberal states like the US. Poverty alleviation and gains in human health have historically been linked to socialist political movements and public action, not to capitalism.

Contrary to claims about extreme poverty being a natural human condition, it is reasonable to assume that human communities are in fact innately capable of producing enough to meet their own basic needs (i.e., for food, clothing, and shelter), with their own labour and with the resources available to them in their environment or through exchange. Barring natural disasters, people will generally succeed in this objective. The main exception is under conditions where people are cut off from land and commons, or where their labour, resources and productive capacities are appropriated by a ruling class or an external imperial power. This explains the prevalence of extreme poverty under capitalism. Capitalism is a highly productive system, but it is also undemocratic: decisions about what to produce and how to use surplus are determined by the few who own and control the means of production (Chomsky, 2013; Albert, 2003; Wood, 1981). For capital, the purpose of production is not primarily to meet human needs, as we might expect in a more democratic system, but rather to extract and accumulate profit. Toward this end, capital seeks to cheapen inputs – labour and resources – wherever possible, including through enclosure and dispossession, especially in the periphery. The effect is that labour power and resources that could be used to meet local needs have often been appropriated instead for accumulation, and enclosures have left people vulnerable to market crises and other upheavals they might otherwise be able to weather. This only began to change when radical social movements pushed to organize production more around meeting human needs, including through public provisioning (establishing new commons and social securities) and a fairer distribution of purchasing power. This is a more interesting and nuanced conclusion than the standard public narrative allows.

Capitalism is not the only mode of social organization to have historically induced subsistence crises. Figure 5 suggests that European feudalism culminated in an episode of extreme poverty. Data on wages in 4th century Ancient Rome suggests labourers working 250 days a year lived in extreme poverty, with a welfare ratio of 0.83 or less (Allen, 2009; Scheidel, 2010). This is consistent with Koepke and Baten's finding that human height in the Roman

Empire was substantially lower than in other times and places, which they speculate may be due to high inequality, a lack of public services, and the commercialization of Roman agriculture (Koepke & Baten, 2005, pp. 86–87). Even in Maoist China – where pro-poor policies significantly reduced deprivation following the revolution – dictatorship and press-censorship caused millions to die in the famine of 1958–61 (Dreze & Sen, 1989, pp. 210–215). Capitalism is not unique in producing poverty; poverty may result from any system where an underclass lacks political and economic power. It is clear however that the expansion of the capitalist world-system caused a dramatic and prolonged process of impoverishment on a scale unparalleled in recorded history.

It is worth noting that many of the scholars we rely on for data attribute the trends outlined here not to the rise of capitalism, but to Malthusian population dynamics (e.g., Allen, 2001; Koepke & Baten, 2005; Alfani & Gráda, 2018; Abad, Davies, & van Zanden, 2012; Clark, 2007, 2013; Lee & Zhang, 2010). Some of these scholars use statistical models to demonstrate there is a correlation between welfare indicators and population pressure. Yet they ignore how these dynamics are themselves structured by the politico-economic system. From the 16th century, the European population grew while welfare deteriorated and food access declined. But this must be understood within the context of the emerging capitalist system. Productive capacities that could have been used to meet people's needs were instead diverted to service elite accumulation. Land that could have been used for food cultivation was enclosed and used for other commercial purposes (Moore, 2002; Wallerstein, 1974; Frank, 1978). Furthermore, capitalist elites seeking to increase the size of their labour force used pro-natalist state policies to prevent women from practicing family planning (Federici, 2004, pp. 88–91). Similar considerations pertain to Latin America. Mexican wages fell to subsistence levels in 1800, when the population hit 5 million people (Abad et al., 2012, p. 158). But pre-Hispanic Mexico had a population of up to 18 million people (ibid.). If in 1800 the land could only support 5 million at bare subsistence, it was because the colonial economy was geared towards elite accumulation rather than local food needs. We should not ignore the relationship between population growth and ecology, but we must not treat these as operating in a social and political vacuum (Davis, 2002, pp. 306–310; Kallis, 2019).

To explore this issue further, we can consider the famines that occurred during the rise of capitalism. Alfani and Gráda (2018) present a statistical model demonstrating the occurrence of famine in Europe was correlated with population size. They conclude that “distribution and entitlement issues were not the main cause of medieval and early modern famines” (ibid., p. 283). Lee and Zhang (2010; Lee, 2014) find a similar correlation in pre-revolutionary China and reach similar conclusions. However, these scholars do not actually demonstrate that these famines resulted from absolute food scarcities rather than distributional issues, which may have been exacerbated by population growth. Indeed, the evidence suggests that food output was generally sufficient for averting famine in the early modern period. Alfani and Gráda (2018, p. 285) note that in France and Italy, the famine-population correlation disappeared around 1710 and 1770, respectively, “before the onset of sustained [GDP] growth.” They also acknowledge that “the early disappearance of famine in certain areas” may be linked to “public and private charity” (ibid., p. 286). Clearly, if distributional policies rather than growth eliminated famine, the problem was not an absolute scarcity of food. Similarly, Lee's data indicates that during the major famines of the late 19th century, grain output per capita in China was between 190kg and 240kg (Lee, 2014, p. 235). Compare this to post-colonial India, where from 1951 to 2001 per capita food-

grain supply averaged only 189kg (Patnaik, 2004, pp. 20–21), and yet the country did not experience mass famine (Dreze & Sen 1989).¹⁹ This suggests that 19th-century China had sufficient food to avert mass famine. This did not occur because the British-imposed drain on China “accelerated the decline of the ‘ever-normal’ granaries that were the [Qing] empire’s first-line of defense against drought and flood” (Davis, 2002, p. 12). The Chinese population starved not because the landmass was too small for its needs, but because the landmass was called upon to service an expanding capitalist world-system.

A limitation of this study is that the consumer baskets upon which ‘welfare ratios’ are based include only a limited number of goods. In reality, the goods available have changed over time, and people now have access to vaccines, household durables, and other appliances that did not exist in the past. This is unlikely to be relevant prior to de-colonization. We have seen that during the colonial period mortality generally increased, indicating there was no improvement in access to health care. But it is plausible that after 1950 the subsistence basket fails to account for access to new goods among the poor. Post-colonial South Asia has experienced improvement in longevity, despite stagnant welfare ratios. Nevertheless, we maintain that the trend in access to food is important. If a modern wage can purchase no more food than wages from 400 years ago, something has clearly gone wrong, even if there have been gains in medical care or information technology. ‘Welfare ratios’ bring our attention to a worker’s ability to meet their most basic needs. If these basic capabilities deteriorated during the rise of capitalism, and if up to a billion people today have lower real incomes in terms of access to food than 16th-century labourers, it is reasonable to conclude that the world capitalist system as such has failed to deliver meaningful progress against extreme poverty.

CRedit authorship contribution statement

Dylan Sullivan: Conceptualization, Data curation, Visualization, Writing – original draft, Writing – review & editing. **Jason Hickel:** Conceptualization, Supervision, Visualization, Writing – original draft, Writing – review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.worlddev.2022.106026>.

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¹⁹ These figures represent total grain output plus net imports minus net additions to government stocks. Patnaik’s original figures were also net of seed, feed and wastage. Since the figures for 19th-century China do not appear to exclude these, we divided the Indian figures by (7/8), under the assumption that net grain availability is equal to seven eighths of gross availability (see, the note in Patnaik, 2004, p. 19).

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