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Poverty and the Labor Market: Today and Yesterday

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Abstract

World Bank estimates put absolute poverty in Asia and Africa at 50–60% of
the population in 1980 and at negligible levels in the developed world. This
review investigates whether Asia was always so poor, as well as the history
of poverty in today's rich countries. Poverty measurement methodologies
are reviewed, and it is argued that a basic needs approach is the best way to
tackle poverty measurement in the past. This approach is related to recent
advances in the measurement of historical real wages. Estimates of poverty
rates in England between 1290 and 1867 are presented, as are estimates for
preindustrial India. About one-quarter of the English population was in ex-
treme poverty in the late Middle Ages, and the proportion had fallen below
10% by 1688. About one-quarter of the people in northern India lived in ex-
treme poverty in the early nineteenth century, and the proportion was likely
lower in 1600. The very high poverty rates in India in 1980 were a develop-
ment of the colonial era.

INTRODUCTION

We have made great strides in measuring the scale—and decline—in world poverty in recent decades. The World Bank poverty line (WBPL) has been an invaluable tool in that endeavor. It shows that 50–60% of the population of Asia and Africa lived in extreme poverty in ca. 1980 (**https://ourworldindata.org/extreme-poverty**).[1] Indeed, the percentage may have been higher in Asia because the WBPL understates poverty there, for reasons discussed below. In contrast, only a few percent of the people of Europe and North America were similarly impoverished. Since then, poverty has declined spectacularly in Asia as the economies there have boomed. Extreme poverty is becoming more and more confined to Africa.

In this article, however, we are concerned with what happened before 1980. If we went back far enough in time, presumably we would find many poor people in Europe, but was the continent ever as poor as Asia or Africa in 1980? And were Asians and Africans always so poor? One reason to doubt that is the recent claim by Ken Pomeranz (2000) and other members of the California School that incomes in Asia in the eighteenth century were on a par with those of Europe (Parthasarathi 1998, Sivramkrishna 2009, Wong 1997). Is that true, and if so, does it mean that a 60% poverty rate is a recent development in world history?

Bourguignon & Morrisson (2002) took an important step in answering these questions. They estimated poverty rates for the world's regions back to 1820. Ravallion (2014) used their data to compute poverty rates for some important countries. The backbone of these estimates is Maddison's (1995) reconstructions of historical GDP in 1990 in US dollars. His GDP estimates were broken down into incomes by decile from independently worked out estimates of the distribution of household income. The 1990 global poverty line of $1.08 per day was shifted from a household to a GDP basis—which raised it to $2.38 (Ravallion 2014)—by finding the value that gave the same number of poor people in the world in 1990 as the World Bank had estimated from its household surveys. Bourguigon & Morrisson (2002) found that 84% of the world population lived below the poverty line in 1820. Even in today's rich countries, the poverty rate ranged from 40% to 80% (Ravallion 2014), so Asia and Africa appear to have had higher poverty rates than in 1980.

This is impressive research. It relies, however, on Maddison's (1995) backward extrapolations of 1990 GDP, and they have been called into question by Prados de la Escosura (2000) and Ward & Devereux (2020). Certainly the range of goods available in 1820 was limited compared to 1990, and one must question how well the new goods problem was tackled by the statisticians whom Maddison relied on. Combining household survey–type data with GDP data requires a substantial revaluation of the poverty line, which is unsettling. How reliable is this combination of data, extrapolations, and adjustments? Discrepancies appear, for instance, in the case of the United States. Using the Bourguignon–Morrisson data, Ravallion (2014) calculated that more than 40% of the population lived below the poverty line in 1820, declining to about 30% in 1850. The US income distribution data underlying the Bourguignon–Morrisson conclusion are referenced to Lindert's (2000) survey of the American literature, although Lindert only presents data on the distribution of wealth in the United States. Recently, however, Lindert & Williamson (2013, 2016) have assembled very large data sets to measure changes in US inequality from 1774 to the present. If we compute a basic needs poverty line (BNPL), as outlined in this review, for 1850 and compare it to their detailed income data, no group in the United States is found to live in poverty. This includes, in particular, enslaved persons who turn out to have had material consumption levels just above the poverty line.

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[1]Moatsos (2016) has argued that poverty rates in these regions were much lower then.

This anomaly suggests that we would be better off not translating the historical evidence into 1990 dollars—a calculation that throws up formidable index number problems—but instead measuring poverty directly from the historical data using a poverty line defined in terms of prices of the day. In this review, I do that using the BNPL as my metric.

Historical poverty measurement faces some major challenges. In particular, we lack the representative household income and consumption surveys that allow us to count how many people lived below the poverty line. We do, however, have, or can construct, social tables that divide a country's population into social and occupational groups and show the typical income of each group (Milanovic et al. 2011). These tables can provide a rough indication of poverty rates, although they do not show the effects of variation in income within a group. The group incomes in the social tables are based implicitly or explicitly on specifications of household income and expenditure. These are the kind of data alluded to above for the United States. A comprehensive social table such as those discussed in this review includes the income and expenditures of all family members and so provides further insight into poverty and living standards generally.

In addition to these indicators, there is a very large and still growing literature estimating real wages for many places extending far into the past. The real wage literature has many points in common with the poverty measurement literature, and one aim of this review is to bring out those similarities and indicate how each can benefit from the other. The study of real wages can help us gauge poverty in the past.

The estimates herein of poverty in the past are tentative and limited explorations of a large topic that deserves much future research, which this review aims to promote. Even a first look with limited evidence, however, highlights important milestones in long-run economic development. None of the historical cases discussed here show poverty levels as high as those found in Asia and sub-Saharan Africa in the early World Bank data. Our estimates for England before the Black Death and India in the early nineteenth century are both on the order of 25% of the population. Development in England that led to the Industrial Revolution began early—well before the Glorious Revolution—for the head count poverty rate had dropped to 5–10% by 1688. The real wage evidence suggests that India may have had less poverty and higher incomes at the time of Akbar than in the early years of British rule. Perhaps ca. 1600, India was on a par with the developing parts of Western Europe, as the California School suggests. India suffered badly under the Raj, however, for the poverty rate looks to have doubled during the colonial period. In view of the fragility of the evidence, these observations should be read as provocations for further research rather than definitive conclusions.

EARLY POVERTY LINES

The scientific analysis of poverty began in the 1790s. Malthus's *An Essay on the Principle of Population* (1798) made fundamental theoretical contributions. A few years previously, Davies (1795) and Eden (1797) conducted the first ever surveys to record the incomes and consumption patterns of the laboring poor. To interpret his data, Davies defined a line of tolerable comfort—arguably the world's first poverty line (Gazeley & Verdon 2014). **Table 1** shows the budget of a typical family (man, woman, three children) plus the additions of small beer and school fees added by Davies to define his line of comfort. In addition, the family had a small garden in which they grew "beans, pease, cabbages, onions, and some potatoes too" (Davies 1795, p. 36). The veg aside, Davies' diet gives only 2,021 calories per person per day and is deficient in fat and all major vitamins and minerals, although it does meet minimum protein requirements. The presence of bacon, cheese, sugar, and beer in the budget, however, means that Davies' standard of comfort is considerably above the WBPL and BNPL discussed here. This rich diet is testimony to the economic development

Table 1 Davies' line of tolerable comfort for a typical laborer

	Quantity per year (kg/person)	Annual cost
Typical laborer's budget		
Flour	162.86	£13.00
Yeast	NA	£0.22
Salt	NA	£0.33
Bacon	7.08	£1.27
Cheese	1.18	£0.24
Butter	2.36	£0.87
Sugar	2.36	£0.87
Tea	0.30	£0.49
Soap	1.63	£0.68
Candles	1.57	£0.65
Thread	NA	£0.43
Clothing	NA	£3.50
Fuel	NA	£0.50
Rent	NA	£2.00
Childbirth	NA	£0.50
Davies' additions for tolerable comfort		
Lost time	NA	£0.50
Small beer	324.40	£3.75
Schooling	NA	£0.50
TOTAL	**NA**	**£30.28**

Abbreviation: NA, not applicable.

that occurred in England prior to the Industrial Revolution, as is clear from comparisons with medieval diets (see below).

Social surveys to investigate the budgets of poor people continued sporadically in the nineteenth century. The Elementary Education Act of 1870 mandated school attendance in England and Wales and allowed school boards to waive fees for students whose parents were judged to be poor. This required them to adopt a financial definition of poverty, but there was no uniformity in these protopoverty lines (Gillie 1996). A landmark in poverty research was Charles Booth's (1892–1897) massive surveys in London in the 1880s and 1890s. He set a line of poverty at 21 shillings per week. The first use of the term poverty line *tout court*, however, was in an article in *The Century Magazine* in 1890 summarizing Booth's 1888 paper to the Royal Statistical Society (Oxford English Dictionary 2020). The author, Albert Shaw (1890, p. 173), was an American social reformer and journalist who had written a PhD dissertation under Richard Ely and was a founding member of the American Economic Association.

Booth's (1888) specification of his line of poverty was impressionistic, and it fell to Seebohm Rowntree (1902) to define the poverty line precisely when he replicated Booth's study in York. Rowntree invented what has become known as the basic needs or reference budget approach. He set his poverty line equal to the 'minimum necessary expenditure for the maintenance of merely physical health" (Rowntree 1902, p. 87). This expenditure included food, footwear, clothing, fuel, light, soap, and rent of housing. Minimum food expenditure was based on the age structure of the family, likely activity levels, and a close reading of the nutrition literature. His diets are notable for excluding fresh meat on that grounds that it was too expensive a source of nutrients. Expenditures

on other goods were based on interviews into minimum requirements. "The minimum standard allows nothing for trade union or society subscriptions, tram fares, amusement, beer, tobacco, newspapers or betting" (Bowley & Hogg 1925, p. 16). Rowntree's method addresses many of the questions a basic needs approach must consider: the adequacy of the diet, the requisite requirement of clothing, and the relationship of fuel and lighting to climatic conditions.

The basic needs approach to defining the poverty line has been followed by many investigators since Rowntree. Bowley, the noted statistician, used it in measuring poverty in English towns before and after the First World War (Bowley & Burnett-Hurst 1915, Bowley & Hogg 1925). Bowley revised Rowntree's line to allow two pounds of fresh meat per week. Bowley & Hogg (1925, p. 14) characterized the line as "arbitrary but intelligible." The basic needs approach has been used in much recent policy making, where it is known as reference budgeting (Carlson et al. 2007, Goedemé et al. 2015).

THE WORLD BANK AND THE MEASUREMENT OF POVERTY

When Ahluwalia et al. (1979) worked at the World Bank in the 1970s, they developed a novel statistical approach to poverty measurement. They required that the poverty line deliver 2,250 calories per person—the only nod to basic needs—and set the value at the income level in India at which food consumption supplied that many calories. The requirements for other nutrients, clothing, fuel, housing, and so forth were not explicitly budgeted but instead defaulted to the spending pattern of Indians consuming 2,250 calories per day. The line was converted to other currencies at purchasing power parity (PPP) exchange rates and equaled $0.55 per day in 1970 dollars. Ahluwalia et al. (1979, pp. 3–4) found that 38% of the population lived below their poverty line in the 36 low-income countries they applied it to. This percentage rose to 51% in the ten poorest countries.

In the 1980s, Ravallion et al. (1991) compiled independently produced poverty lines for 35 countries and converted them to US dollars at PPP. In general, the poverty line increased with consumption per head; however, there was no rising trend among the six poorest countries, and this was taken to mean that their poverty lines were so low that they could not be depressed further and, therefore, indicated absolute poverty. Or, to begin at the rich end of the spectrum and move down the income scale, a decrease in per capita income was associated with a lower national poverty line until very low incomes were reached, at which point the poverty line stayed the same even as per capita income continued to fall. Ravallion et al. (1991) claimed this was so because the line hit an absolute minimum standard and could not be reduced further. The average of the lines in the poorest countries was $1.00 per day, and this became the World Bank standard. The line was updated to the 2005 value of $1.25 by Ravallion et al. (2009), who compiled a new sample of 74 countries of which the 15 poorest were deemed to be in absolute poverty, since their poverty lines exhibited no rising trend with income. The poverty lines of these 15 countries were updated to reflect local inflation and changes in PPP, and the average of those values ($1.90) became the 2011 value of the WBPL (Ferreira et al. 2016).[2]

Ravallion (1998, 2016) has offered several arguments in favor of the WBPL. First, he claims the line represents the same level of welfare[3] in all countries, since people in each country with the local currency equivalent of $1.90 at PPP have the same purchasing power in the United States.

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[2]Jolliffe & Prydz (2016), Kakwani & Son (2016), and Sillers (2015) arrived at similar values using different methods, and this "strange alignment of the stars" has reinforced the line's credibility (Atkinson 2017, pp. 19–20).

[3]Welfare is an elusive concept. Ravallion (1998, p. 3) defined welfare as a level of utility: "The poverty line can be interpreted as a point on the consumer's expenditure function, giving the minimum cost to a household of
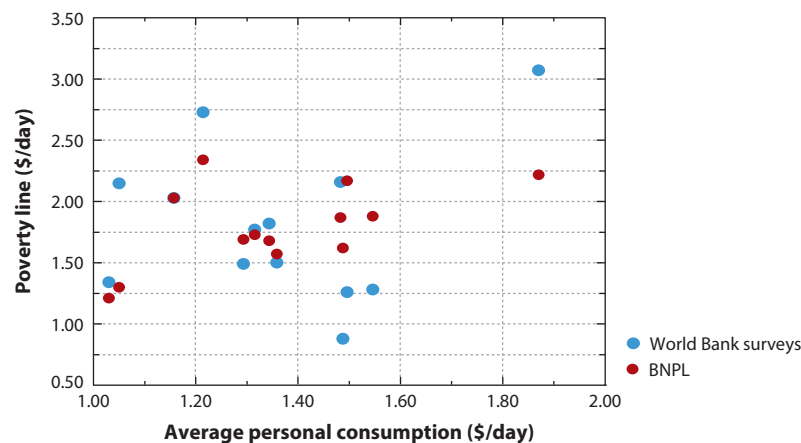
Figure 1

Poverty lines versus average personal consumption for poor countries in Africa in 2011 (US dollars per day). Abbreviation: BNPL, basic needs poverty line. Data from the 2011 round of the International Comparison Project and Ferreira et al. (2016, p. 162).

In view of the great differences between countries in climate, the ability to buy the same bundle of clothes in the United States may not correspond to the same level of well-being—a point to which I return. Second, he claims that a basic needs line is arbitrary, while the WBPL respects the preferences of the poor, since the national poverty lines on which it is based reflect local views on poverty. In fact, most of the 15 national poverty lines underpinning the WBPL were constructed under the tutelage of the World Bank along the lines of Ahluwalia et al.'s (1978) investigation in which a calorie standard was set for the country and the income with that level of consumption became that country's line. One difficulty is that the calorie standards were not the same for all countries, which raises a question about their comparability (Atkinson 2017, p. 128). Furthermore, even if we accept Ravallion's first argument, the local currency values of the 15 national lines do not imply a common utility standard, since they do not convert into the same dollar value (as shown in **Figure 1**, where the dollar values of the 13 African poverty lines are plotted).

Aside from these issues, the WBPL has generated great controversy on several levels. First, which countries should be used to define the line? The original $1.00 a day was based on 6 countries, while the $1.25 set for 2005 was based on 15 countries. India was in the first 6 but had grown so much by 2005 that it was not in the later 15. However, India's line had been very low, so its economic success perversely raised the global poverty line (Deaton 2010, pp. 15–16). The $1.90 line set for 2011 was derived by inflating the 2005 lines in local currencies with their national inflation

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attaining a given level of utility at the prevailing prices and for given household characteristics." The World Bank's *Handbook on Inequality and Poverty* interprets Ravallion in this way (Haughton & Khandker 2009, p. 41). Sen's (1985, 1987) capabilities are treated as additional information that is helpful in choosing the level of utility that defines the poverty line. "In deciding on what utility level is needed to escape poverty it can help greatly to consider what normative capabilities must be met to do so." However, "The idea of 'capabilities' does not substitute for utility (or some money metric of utility) as the individual welfare indicator but complements it" (Ravallion 1998, pp. 8–9). In his review in the present volume, however, Ravallion (2020) reduces welfare to capabilities and, thence, to the basic needs of nutrition and enough income for social inclusion. Ravallion (2016, pp. 137–39) takes an intermediate position. In practice, the poverty line is set at the income level of a society where per capita calorie consumption is 2,100 per day and total family consumption at that level is assumed to be adequate to meet all basic needs.

rates and then converting them to US dollars at PPP. Should the list of poor countries have been updated to reflect different rates of economic growth in the intervening six years?

Second, all the usual index number problems bedevil conversions of the WBPL between dollars and local currencies. If superlative indices are used, for instance, spending shares in the poor country are averaged with those in the United States. Shares of spending on housing and air travel are very different in the two cases, so the use of average shares means that things such as air travel, which have no bearing on the standard of living of poor Africans, play an important role in the calculation, while the cost of housing, which matters greatly in the United States, is given too little weight (Deaton 2010, pp. 22–24). Were we to try to apply this procedure historically, it would explode, for there was (obviously) no air travel before recent years. We cannot avail ourselves of the usual expedient of introducing new goods through chain linking the indices, for we lack early expenditure surveys from which to forge the chains.

THE BASIC NEEDS POVERTY LINE

Although the basic needs approach has been widely used for over a century, it has only recently been applied to global poverty measurement by Moatsos (2016) and Allen (2017). I focus on the latter. Like Rowntree's line, it specifies consumption levels for food, clothing, fuel, light, and housing. The consumption levels are dependent on local prices and climate.

Food typically amounts to about two-thirds of the cost of the BNPL and is specified as the solution to a linear programming (LP) diet problem. The problem is to choose a diet from a list of possible foods such that the diet minimizes the cost of meeting a set of nutritional requirements. The problem requires the prices of all the foods, their nutritional compositions, and the nutritional requirements. LP diets do not describe the behavior of people in rich countries (Stigler 1945), but they do capture key features of the diets of poor people in poor countries.[4]

A major practical issue in applying the LP model is the choice of nutritional requirements. Allen (2017) considered a range of possibilities that ran from a single nutrient (calories) to one consisting of calories, protein, fat, and 12 vitamins and minerals. Comparing the predictions of the models to behavior indicated that the basic model with the requirements for calories, protein, fat, and the vitamins and minerals needed to prevent anemia, pellagra, beri-beri, and scurvy best described what poor people in poor countries eat. Those vitamins and minerals are iron, vitamin B12, folate, vitamin B1 (thiamine), niacin, and vitamin C. The last turns out to pose the biggest challenges for the specification of LP diets in the past.

The basic diet is defensible on health grounds, and it describes the main features of diets of poor people in poor countries in recent years. In particular, the basic diets are mainly vegetarian (the animal protein is typically milk or a few kilograms per year of fish or cheese, rarely meat), with some oil, a legume if the grain is rice, and a vegetable or cassava. The composition and weight of the diet approximates the food consumption of the average person in the same countries in 1961, the earliest year the Food and Agriculture Organization of the United Nations collected the data. The basic diets err in two ways: They rarely include sugar, which is consumed in small quantities by almost everyone, and they do not capture the variety of vegetables people eat, although they do better at predicting the total weight of vegetables. I use the basic version of the LP diet to extend the BNPL into the past.

Nonfood goods made up about one-quarter of spending. These included clothing, footwear, bedding, fuel for cooking and heating, and energy for lighting. More clothing and fuel are required in cold climates than in hot ones, and the poverty line needs to incorporate that feature.

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[4]Moatsos (2016) has also used LP in setting the food component of a poverty line.
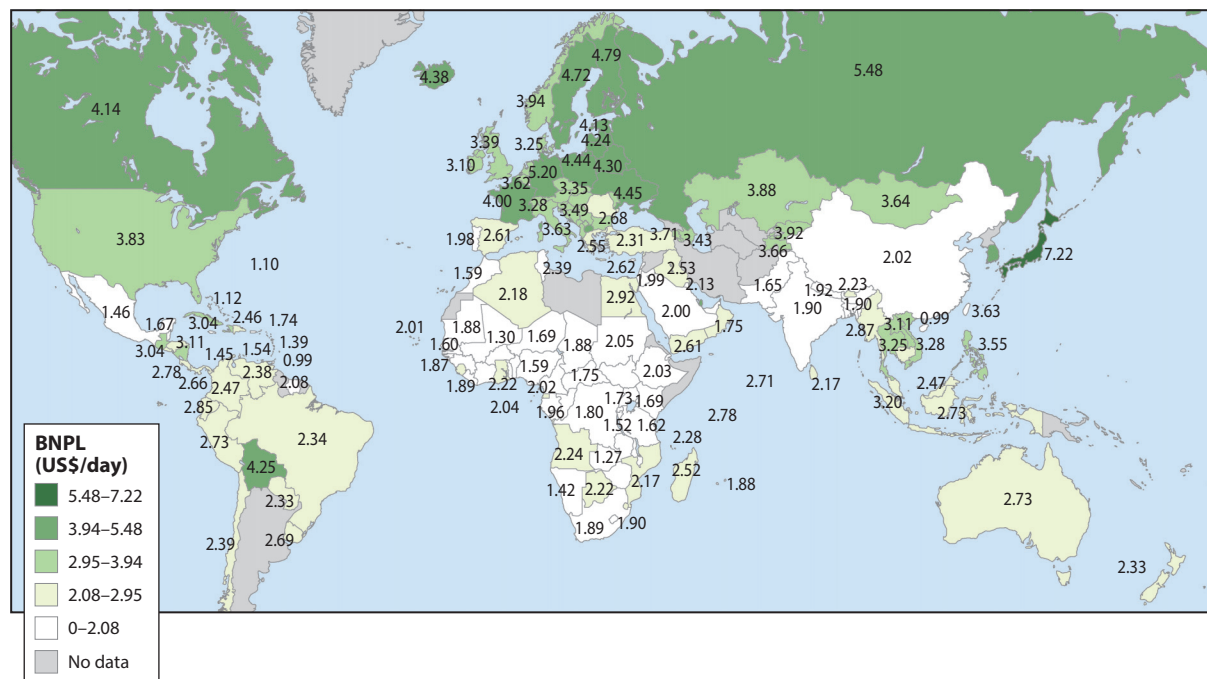
Figure 2

Basic needs poverty line (BNPL) in 2011 (US dollars per day). Data from the 2011 round of the International Comparison Project.
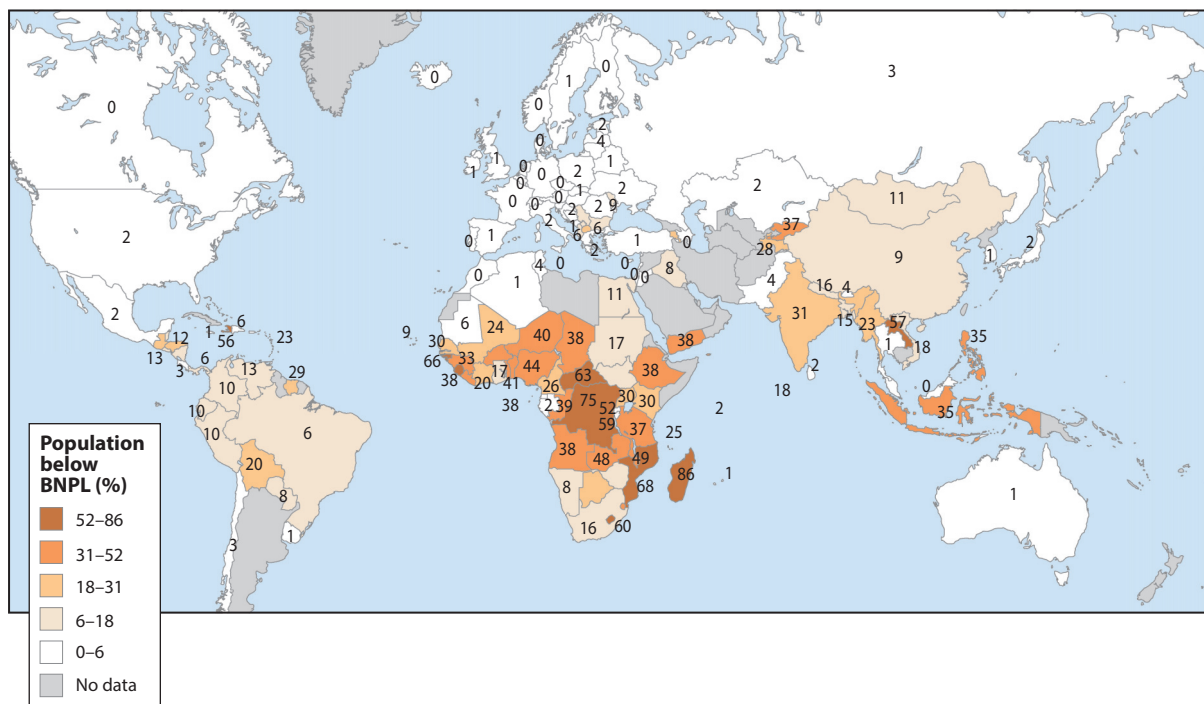
The requirements for nonfood goods were based on household budget surveys of industrial workers in Saint Petersburg in 1907–1908 and Bombay in 1921–1922 (Prokopovich 1909, Shirras 1923). These workers were indubitably poor and lived at opposite ends of the world's climate spectrum. The assumption is that differences in consumption reflected differences in climate rather than differences in income or relative prices. In the event, Saint Petersburg workers consumed many more times the clothing, footwear, bedding, and fuel than their counterparts in India. Consumption of nonfood goods for people in other parts of the world was interpolated between the Bombay and Saint Petersburg values in accord with heating degree days in each locality. The procedure that yields the WBPL has no counterpart to this comparison, for the WBPL is based almost exclusively on surveys from sub-Saharan Africa, and so, by construction, the WBPL cannot address the implications of differences in climate.

Housing, the remaining item in the BNPL, was set at 3 m^2 per person. This is a typical value for slums in poor countries in the twentieth century. Families in many places often consisted of four people, in which case, the housing requirement means a family occupied a room 3 × 4 m^2.

In Allen (2017), this model was applied to 20 countries ranging from the poorest to the richest using data from the 2011 round of the International Comparison Project (ICP). Since then, the BNPL has been calculated for all countries represented in ICP 2011.[5] **Figure 2** shows the global distribution. The range is large—from \$1.21 in Malawi to \$7.22 in Japan. The lowest poverty lines

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[5]The ICP lists prices for many goods that have only very limited availability in the country concerned. Constraints were introduced in the linear programs to limit consumption in the least-cost diet to four times per capita consumption for Asia and twice per capita consumption for Africa. These values were chosen on the assumptions that about one-quarter of the Asian population was poor and half of the African population was poor.

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still occur before final publication.)

Figure 3

Percentage of the population below the basic needs poverty line (BNPL) in 2011. Data from the 2011 round of the International Comparison Project.

are in sub-Saharan Africa, where they look to approximate the World Bank's value of $1.90. Lines are higher in rich countries (because housing is expensive and underweighted in the PPPs) and cold countries (owing to higher requirements for heating and clothing). The BNPL also exceeds the WBPL in many parts of Latin America and in southeast Asia. The higher values in the latter region do not reflect climate or real estate differences. Rather, they reflect a higher degree of food processing. In sub-Saharan Africa, many poor households consume unprocessed farm products such as maize kernels or sorghum groats, while in Asia, rice is the predominant crop. It is generally purchased by processors, husked and polished in commercial mills, and then sold to consumers in shops, whose prices are surveyed for the ICP.

The BNPL indicates higher levels of poverty than the WBPL outside Africa (**Figure 3**). In rich countries, the increases are small, since the number of people below either line is at most 1.5% of the population. Increases are perceptible in Latin America and substantial in southeast Asia. The head count poverty increased by 18% in Asia when measured with the BNPL.

THE AFRICAN ROOTS OF THE WORLD BANK POVERTY LINE

Figure 2 suggests that the WBPL corresponds—on average—to the BNPL in sub-Saharan Africa, if nowhere else. This is not a fluke. The WBPL is based on the national poverty lines of 15 countries—13 of which are in sub-Saharan Africa. That is unavoidable given the Bank's statistical approach, since Africa is where most of the poor countries are located. **Figure 1** plots the 2011 dollar values of the national poverty lines of the 13 African countries defining the WBPL

and the corresponding BNPLs for the same countries. The means are virtually identical—$1.81 for the WBPL and $1.79 for the BNPL. (Both are less than $1.90 because they exclude Tajikistan, one of two non-African countries in the 15. Tajikistan's national line is exceptionally high and pulls up the average by almost 10¢. It is also of questionable validity.) The variance is smaller for the BNPL. The WBPL is a basic needs line for the part of the world that defined it—but not for anywhere else. And, as noted, the WBPL does not meet basic needs in most other places.

Should the World Bank redefine its poverty line in terms of basic needs? The question has become more urgent with the adoption of the UN's Millennium Development Goals, which require the Bank to monitor poverty everywhere (rather than only in poor countries, which was previous practice), since the problems of climate and real estate markets loom larger when a global approach is taken to measurement. The question, however, is difficult. The basic needs approach is attractive on scientific grounds, but it runs into the administrative objection that we should not shift the goal posts in the middle of the match by updating it (as argued by Atkinson 2017, pp. 22, 30, and Ferreira et al. 2016). Although it is disconcerting that the WBPL represents different standards of well-being in different parts of the world, there is a mitigating, if perverse, consideration. As Asia continues to grow economically, poverty becomes more and more concentrated in sub-Saharan Africa. Consequently, the WBPL becomes an increasingly appropriate measure of extreme poverty, since that is the part of the world on which it is calibrated.

POVERTY IN THE PAST

One of the startling trends revealed by the WBPL is the decline in absolute poverty in poor countries since about 1980. While the levels are understated outside sub-Saharan Africa, for reasons just given, the downward trend is undoubtedly sound. In 1980, half or more of the population of Asia and Africa lived below the WBPL. Was it always so, or did poverty in poor countries have a more complicated history? Aside from its intrinsic importance, this question is relevant to the great divergence debate concerning when and how the West pulled ahead of the rest in terms of economic development. We can try to measure this with national income estimates and real wages. Can we map out the great divergence in terms of changing poverty levels?

To do this, we must establish the poverty line in the past. The BNPL can do this more easily than the WBPL, for the index number problems that beset international comparison in the present are even more daunting for comparisons spanning millennia. The earliest expenditure surveys are those of Eden and Davies in the 1790s, discussed above, and they record information only for England. Otherwise, there are no sources for spending weights. Provided a sufficiently broad range of food prices are to hand, LP diets can be computed and provide weights for food. If the prices of only a few widely consumed foods are available, subsistence baskets of 2,100 calories (to be defined) can be used instead, since their cost is usually not far from that of the LP least-cost diet. Fuel consumption for cooking and light in hot climates is set by engineering studies (Allen 2017); for colder countries, the early twentieth-century values seem to apply in earlier centuries.[6] The housing requirement is set at a minimum.

The principal difficulty regarding weights for the BNPL in the past concerns clothing and footwear.[7] People in the past consumed smaller quantities than in the early twentieth century. Adam Smith [1937 (1776), pp. 821–22) famously considered the role of custom in defining

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[6]This conclusion rests on a study of household expenditures on fuel and retail prices of coal using data collected by Young (1771a,b), Davies (1795), and Eden (1797) covering up to 190 villages in England.

[7]The consumption of fuel for lighting presents similar problems but is not nearly of such import in poverty calculations, since lighting expenditures were always small. The quantity of energy consumed for lighting in the twentieth century was unaffordable in the Middle Ages. This situation was due to the advent of cheap
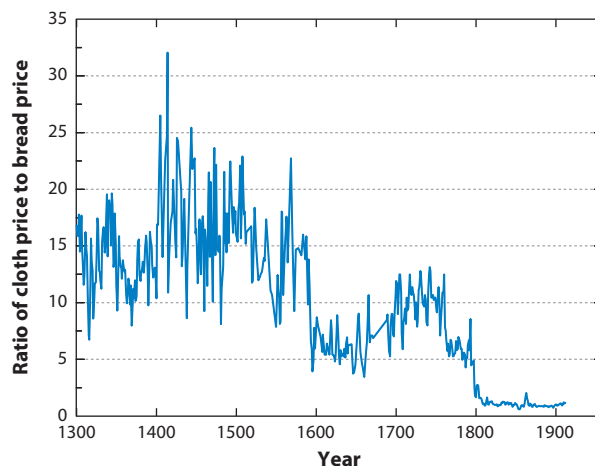
Figure 4

Price of linen (then cotton) cloth relative to the price of bread in England over time. Full data available on
the author's research page at **https://www.nuffield.ox.ac.uk/media/2139/london.xls**.

subsistence, and his discussion focused on the English laborer's need of a linen shirt and leather
shoes—for reasons of social respectability rather than survival (MacDonald 2019):

> By necessaries I understand not only the commodities which are indispensably necessary for the support
> of life, but whatever the custom of the country renders it indecent for creditable people, even of the
> lowest order, to be without. A linen shirt, for example, is, strictly speaking, not a necessary of life. . .But
> in the present times, through the greater part of Europe, a creditable day-labourer would be ashamed
> to appear in public without a linen shirt. . . Custom, in the same manner, has rendered leather shoes a
> necessary of life in England. The poorest creditable person of either sex would be ashamed to appear
> in public without them. . . .Under necessaries, therefore, I comprehend not only those things which
> nature, but those things which the established rules of decency have rendered necessary to the lowest
> rank of people.

These examples are very much to the point, since the consumption of clothing and shoes among
the poor was much lower in the past. *Pace* Smith, tastes were probably not the original driver
here. Instead, it was falling prices. The consumption norms implied by the Saint Petersburg and
Bombay expenditure surveys in the early twentieth century were far beyond the means of people
in earlier eras who perforce made do with less clothing. **Figure 4** shows the price of linen, and then
cotton, cloth relative to bread since the thirteenth century, when it was 30 times more expensive
than today. The price dropped in two steps—the first due to the adoption of the spinning wheel
and the putting-out system, the second due to the rise of factories. **Table 2** shows estimates of
the requirements at different dates for Russia, England, and India. As clothing and shoes became
cheaper, social norms of minimally acceptable dress rose, and the BNPL must be revalued to reflect
this change in custom. After ca. 1840, the early twentieth-century standards can be used, but before
factory spinning and the power loom drove down the price of cotton cloth, the twentieth-century
norms were unaffordable and preindustrial standards must be adopted.

Prices are required to compute the poverty line, and they are available owing to the research on
wage and price history undertaken since the middle of the nineteenth century. Rogers (1866–1902)

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kerosene at the end of the nineteenth century. Earlier calculations of basic needs budgets should use the
quantity of lighting materials in the subsistence basket—1.3 kg each of candles and lamp oil, or equivalent.
The increase in consumption with kerosene probably led to a change in lighting norms, as was the case with
clothing.

Table 2 Requirements of clothing, footwear, and bedding in different countries and years[a]

	Ca. 1910[b]	Ca. 1800[c]	Ca. 1300[d]
Russia	63	20	NA
England	36	15	6
India	19	5	NA

Abbreviation: NA, not available.

[a]Requirements are specified as meters of cotton or linen cloth per person per year.

[b]See Allen (2017, pp. 3709–13).

[c]See Davies (1795, p. 15) and Beveridge (1965, p. 458) for the price of fustian, Korchmina (2019, pp. 212–13), and Buchanan (1838, Vol. I, app. p. 40 and Vol. II, app. pp. 27–28).

[d]See Dyer (1989, pp. 175–76) and price of linen from Rogers (1866–1902, Vol. I, pp. 573, 587–89).

wrote the first price history and set the pattern for later studies. Rogers abstracted transactions from the financial records of Oxford and Cambridge colleges to produce tables of the prices of goods they bought and the wages of the people they employed. In the 1930s, research was accelerated when the Rockefeller Foundation financed the International Scientific Committee on Price History to support data collection projects in seven countries (Beveridge 1965, pp. viii, xlix–xlii). The volumes accumulated, and, while they clearly had great value, they were hard to work with, since prices were expressed in local units of account and local weights and measures. With the computer revolution, it became possible to enter all these data into spreadsheets, standardize the metrology and money, and begin comparative research in earnest. Research has since proliferated to encompass much of the globe and extend further back in time.[8] Much of the data has been posted online, and the availability of that information provided an incentive to researchers to collect yet more data to make more comparisons.[9]

The income side presents several difficulties. There are no household expenditure surveys before the nineteenth century like those used to determine poverty rates by the World Bank. Estimation must be rougher and is based on three kinds of information. First, contemporary observers and historians have reconstructed household income and expenditure for particular groups in the past. Second, this information underpins social tables, which have been constructed for many places. A social table breaks a population down into occupation and status groups and provides estimates of each groups' average income. Inequality indices and poverty rates can be computed, although within-group variation is ignored. Third, real wages throw light on the incomes of the working classes over long stretches of time.

There is now a large literature on real wages. Most previous research on real wages was limited to trends in individual countries, often over short time spans.[10] The computerized price histories allow comparisons of income across space as well as over time. The first comparative study of real wages was by van Zanden (1999) and was followed by Allen (2001), which established the template

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[8]A nonexhaustive list would include work by Allen (1994, 2001, 2007, 2009b), Allen & Khaustova (2019), Allen et al. (2011, 2012), Arroyo Abad et al. (2012), Bassino & Ma (2006), Broadberry & Gupta (2006), Broadberry et al. (2015), Clark (2005, 2007), de Zwart (2016), de Zwart & van Zanden (2015), Du Plessis & Du Plessis (2012), Frankema & van Waijenburg (2012), Grytten (2009), Khaustova & Sharp (2015), Korchmina (2019), Malanima (2013), Malinowski (2016), Mijatović & Milanović (2019), Özmucur & Pamuk (2002), Pamuk & Shatzmiller (2014), Rönnbäck (2014), Scheidel (2010), Schneider (2013), Sivramkrishna (2009), and van Zanden (1999).

[9]Online postings include **https://www.nuffield.ox.ac.uk/people/sites/allen-research-pages/**, **http://www.iisg.nl/hpw/**, **https://gpih.ucdavis.edu/**, and **https://nyuad.nyu.edu/en/research/centers-labs-and-projects/re-counting-the-past.html**.

[10]A classic over a long time span is Phelps Brown & Hopkins (1956), while Feinstein (1998) is over a shorter time span.

Table 3 Respectability and subsistence baskets in England[a]

|	Respectability	Subsistence
Food		
Bread	242 kg	NA
Cheap grain (oatmeal)	NA	170 kg
Beans (dried)	20 L or 39.52 kg	20 kg
Meat	26 kg	5 kg
Butter	5.2 kg	3 kg
Cheese	5.2 kg	NA
Eggs	52 eggs	NA
Beer	182 L	NA
Nonfood		
Candles	2.6 kg	1.3 kg
Lamp oil	2.6 kg	1.3 kg
Soap	2.6 kg	1.3 kg
Linen/cotton	5 m	3 m
Fuel	5 million Btu	2 million Btu
Rent	5% of food and nonfood cost	5% of food and nonfood cost

Abbreviation: NA, not available.

[a]These baskets are rated at 2,100 calories each. The original versions were rated at 1,940 calories. They were identical to these except that the respectability basket had 182 kg of bread and the subsistence basket had 155 kg of oatmeal. In other parts of the world, the subsistence basket is defined in terms of the cheapest local grain, and the quantities vary slightly from those shown here for oats.

for most subsequent research. The real wage was measured by the welfare ratio (Blackorby & Donaldson 1987). This equaled annual income divided by the cost of maintaining a family at the poverty line. Values >1 or <1 indicate whether the worker and his family were above or below the poverty line, respectively. Much research has focused on laborers and craftsman in the building industry, since their wages were widely recorded. Generally, they were employed by the day, in which case annual income was calculated by multiplying the daily wage by an estimate of the days worked per year (often 250 days). The poverty line was defined by basic needs. In the original formulation, the poverty line was the respectability basket (**Table 3**) based on the spending of the English agricultural laborers described by Eden (1797) and Davies (1795). It contained white bread, beef, cheese, eggs, and beer, and its calorie content was set at 1,940 per day. Allowance was also made for cloth, soap, candles, lamp oil, fuel, and rent (Allen 2001). While fully employed English laborers could afford this diet, it was beyond the means of laborers in eastern and southern Europe, India, and China. So the subsistence basket was defined (Allen et al. 2011). It consisted of the cheapest available grain (on the order of 170 kg per year), 20 kg dried legumes, 5 kg meat, and 3 kg butter, ghee, or vegetable oil. The grain quantity was set so the diet yielded 1,940 calories per day. Allowances for nonfood items were reduced from the levels of the respectability basket (**Table 3**). These baskets were affordable by laborers in most of the world.[11]

This approach is subject to some criticisms. On the income side, the work year may have been other than 250 days.[12] Also, the income of women and children is ignored. This is not a great

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[11]de Zwart et al. (2014) and Moatsos (2016) have used subsistence baskets in constructing modern poverty lines for measuring global poverty.

[12]Humphries & Weisdorf (2018) have tried to circumvent this problem by estimating the income of servants hired on one-year contracts. However, this approach brings its own problem, namely that the income of
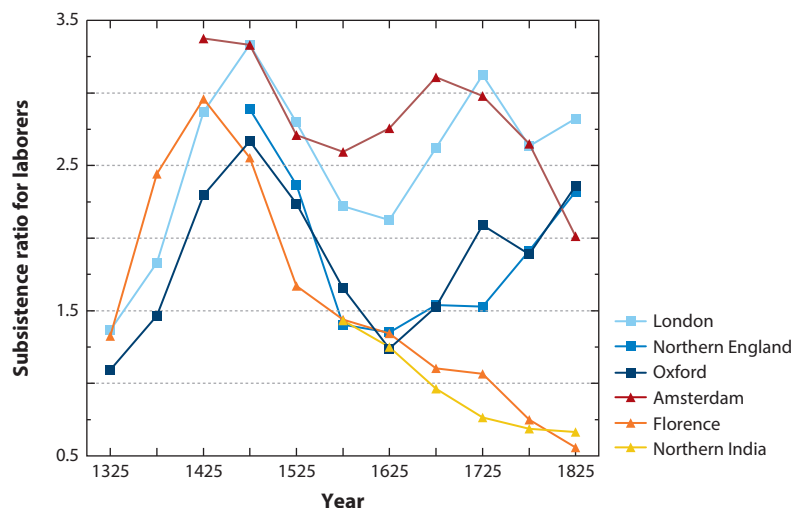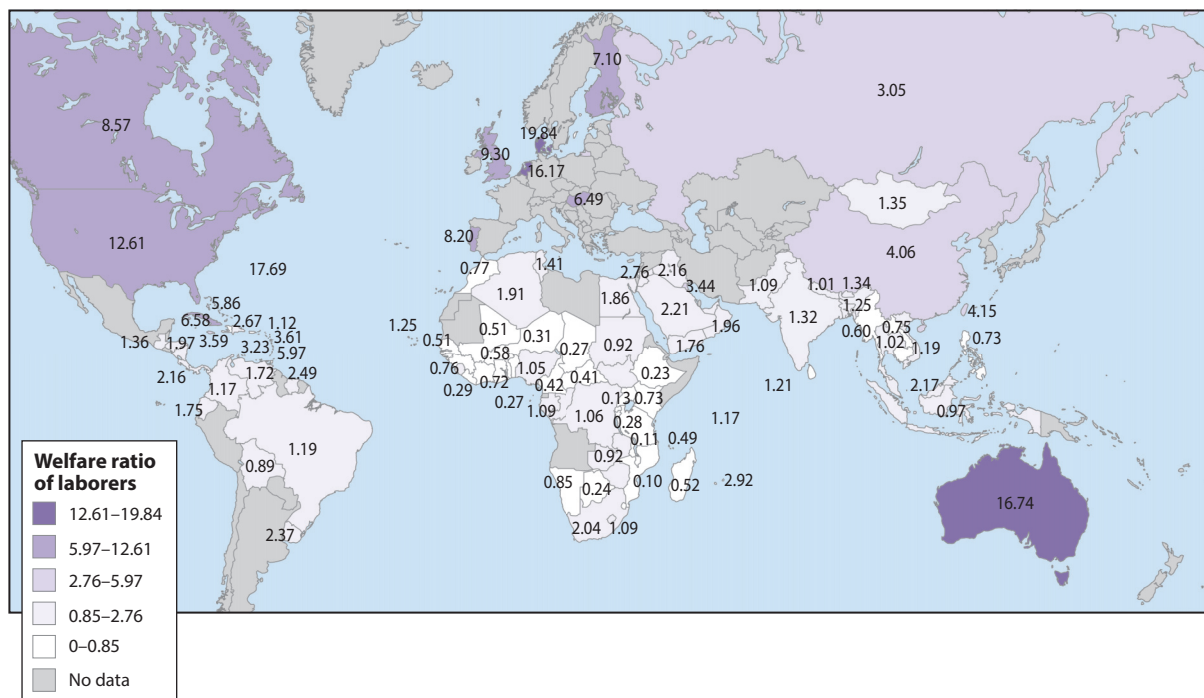
Figure 5

The great divergence in laborer's living standards (welfare ratios) as Northwest Europe pulls ahead of Asia and the rest of Europe. Data from sources in Allen et al. (2011). The cost of the subsistence basket in Florence has been recomputed using the price series of oats and maize in Malanima (2013) to create a deflator conceptually comparable to those used for other cities.

distortion in the late eighteenth century but is a serious omission in many other times. On the cost side, the assumptions of 1,940 calories per day and three adult equivalents (i.e., four people) per family imply an average daily calorie consumption of 1,455, which is manifestly too low (Humphries 2013). These assumptions have been relaxed to four people and 2,100 calories per person in later studies. The unfortunate result is that the findings of different studies are not directly comparable.

Welfare ratios have been computed for many places in Europe back into the Middle Ages, in the Americas back to the sixteenth century, in Asia for the past several centuries, and in sub-Saharan Africa in the nineteenth century. These series typical exhibit four characteristics: (*a*) no upward or downward trend until the onset of modern long run growth, (*b*) preindustrial stasis at about subsistence (although exactly what level depends on the deflator used), (*c*) very low frequency cycles, and (*d*) short-run increases after demographic collapses such as the Black Death in 1348 or 1349. **Figure 5** shows six series that illustrate these generalizations. **Figure 5** also brings out another important regularity of the real wage series–the great divergence in living standards between northwest Europe and the rest of the world in the early modern period. After the Black Death, real wages across Europe were at a high level and were remarkably similar across Europe. Over the next 500 years, wages declined on most of the continent and in Asia as population expanded on a constant resource base in the absence of much economic development. In the great

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servants consisted of a cash payment, based on much evidence, plus room and board. The latter amounted to as much as four-fifths of the total compensation. Humphries & Weisdorf (2018) estimated the cost of the room and board as the cost of a respectability basket each year from 1260 to 1850. While southern English farm laborers (and farm laborers are the largest occupational group in their sample) did eat wheat bread in the eighteenth century, they did not do so in the Middle Ages. Instead, they were paid in coarse grain—oats, barley, and rye, as detailed in this review and Dyer (1988). Northern English farm laborers continued to eat a nonwheat diet into the nineteenth century (Collins 1975). The nonwheat diets are akin to the subsistence basket and much cheaper than the respectability basket and contradict their assumption that the in-kind income was the same throughout. The same problem occurs in Humphries & Weisdorf (2015).

Figure 6

Welfare ratios of laborers computed from the 2011 round of the International Comparison Project.

maritime centers of the Low Countries and England, however, the expansion of global trade led to tight labor markets and persistently high wages even as the population expanded.[13] A rich north and a poor south preceded, rather than followed, the Industrial Revolution and, indeed, caused it by providing the incentive to substitute capital for labor (Allen 2009a). Also, as northwestern Europe developed, Asian wages slide ever further downwards.

WELFARE RATIOS IN THE INTERNATIONAL COMPARISON PROJECT

While the ICP is best known for its prices, it contains wages and salaries for many types of labor. These are collected to compute PPP exchange rates for construction, education, health, and other categories. Before considering the historical poverty estimates, it is useful to calculate welfare ratios from the ICP data to establish the present world pattern. These have been constructed using the BNPL to measure the poverty line. To allow for differences in family size, it has been set at two plus the total fertility rate of each country—that is, one man, one women, and the average number of children. The ICP reports hourly rates for laborers and carpenters, and it has been assumed, rather arbitrarily, that their work year was 2,000 h everywhere. The resulting welfare ratios are mapped in **Figure 6**.

While the data are spotty, broad patterns stand out. Welfare ratios in rich countries were substantial—often 10–20 times subsistence. In poor countries, however, they were low. The labor

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[13]Stephenson (2018) has claimed that the English building wages series overstate the take-home pay of building workers, which is doubtful, and, even if true, the overstatement is not large enough to change the comparative conclusions (Allen 2019).
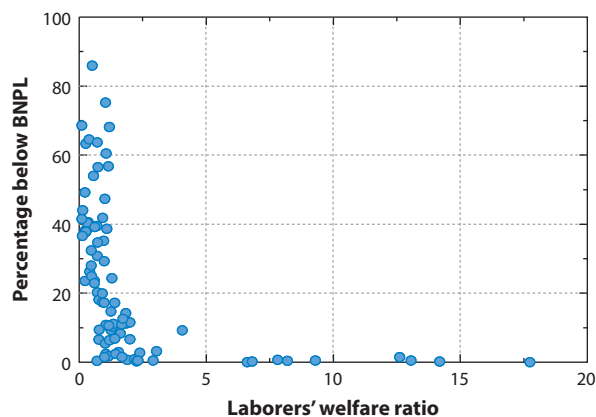
Figure 7

Poverty rates versus laborers' welfare ratios from the 2011 round of the International Comparison Project.
Abbreviation: BNPL, basic needs poverty line.

market was dire in sub-Saharan Africa, where in many cases, the welfare ratio was usually between
0.25 and 0.75, with a nadir of 0.1 in Mozambique. In these countries, laborers were either single
men (a welfare ratio of about 0.5 would provide enough calories to sustain a single man) or there
were multiple earners in a family. In South Asia and Latin America, however, welfare ratios were
1–2.

Welfare ratios for carpenters were invariably higher, for they were better paid. In most (but
not all) sub-Saharan African countries, they were near one or greater. In Asia and Latin America,
carpenters usually earn several times subsistence. Having some skill is a requisite for a man to
support a family.

There is a strong relationship between real wages and poverty rates. When the laborer's wel-
fare ratio exceeds 2, there is very little measured poverty. Lowering real wages is associated with
increasing rates of poverty. This pattern stands out clearly in **Figure 7**, which plots head count
poverty rates against welfare ratios for Eurasia and Africa. If this relationship is stable, the real
wage of unskilled workers provides some indication of the severity of poverty in the past. When
low skilled men had welfare ratios below two, family incomes were likely low, and there was con-
siderable poverty. If the welfare ratio was below one and if the laborers had families, it is likely
that many members were working and the family income could still easily be below subsistence.
The lower the male welfare ratio, the stronger these expectations.

POVERTY IN ENGLAND, 1290–1867

England entered the era of modern economic growth between 1290 and 1867—indeed, long be-
fore the Industrial Revolution. Recent estimates of national income point to a long-run rising
trend in real output per person beginning after the Black Death and accelerating in the seven-
teenth century (Broadberry et al. 2015). The seventeenth century upturn also shows up in real
wage series (**Figure 8**). Beginning in the early seventeenth century, wages in southern English
towns such as Oxford and in Northern England began to rise toward the higher London level.
Export-oriented handicraft manufacturing was expanding in many parts of rural England to supply
Britain's colonies, and labor markets tightened in consequence.

We get a similar picture if we focus on the bottom of the income distribution. We do not have
household expenditure surveys for this period; however, contemporaries constructed social tables
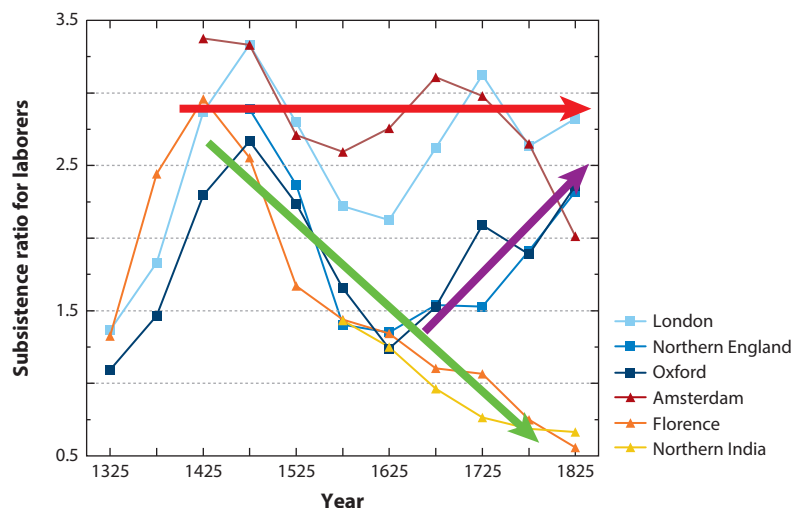
Figure 8

The great divergence showing welfare ratios in English regions rising above those in Asia and much of
Europe and converging to London levels. The green arrow shows falling real wages in Asia and most of
Europe, including, initially, England outside of London. The red arrow shows high living standards in
London and Dutch cities. The purple arrow shows upward convergence of real wages toward London levels
in English cities other than London. Data from sources in Allen et al. (2011).

for 1688, 1759, 1798, 1846, and 1867, and they have been corrected and extended by later histori-
ans who also added 1290 to the list (Allen 2019; Broadberry et al. 2015; Lindert and Williamson
1982, 1983). These tables divide the population into occupational and status groups with estimates
of the average household size and income of each group.

An important feature of the social tables is that they include the incomes of women and children
as well as men.[14] The tables for 1846 and 1867 were explicit in this regard and were based on
occupational counts of women, boys, and girls in the preceding censuses. The incomes for the
poorer groups in the 1290 table have been validated against estimates of the household production
of woolen cloth and the agricultural employment of men and women based on an independent
model of English agriculture at the time (Allen 2005). My estimates confirm those in the 1290
table and explicitly include income attributable to women. An analysis of the incomes for most of
the laboring groups in 1688, 1759, and 1798 shows that the family incomes included the earnings
of women and children, and their numbers were estimated accordingly in Allen (2019).

To account for price changes, we must project the BNPL into the past. Least-cost diets in the
preindustrial period differed markedly from those of 2011 (**Table 4**). Instead of wheat flour, milk,
vegetable oil, and cabbage, eighteenth-century LP diets featured oatmeal, barley, beef, lard, and
potatoes (in the winter) or cabbage (in the summer). Many of these changes were the result of
globalization in the nineteenth century. Wheat flour was twice the price of oatmeal in the eigh-
teenth century but is far cheaper today due to the shift of wheat production to North America and
Australia. [That Davies' (1795) surveys show farm laborers in southern England eating a wheat-
based diet in the 1790s testifies to the economic development that had already taken place.] Today,
oil is cheaper than butter due to the spread of palm oil cultivation to southeast Asia, and the shift
from beef to milk shows the impact of railways in creating national markets for fresh milk.

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[14]Allen (2015) and Horrell et al. (2019) have attempted to measure changes in family income by combining
wage data for men and women.

Table 4   LP diets for England (kg/person/year)

	Medieval times[a]	1780	1905	2011
Wheat flour	NA	NA	49	177
Oats or oatmeal	106	116	131	NA
Rye	97	NA	NA	NA
Barley	NA	65	NA	NA
Beans	NA	1	NA	NA
Potatoes	NA	76	76	NA
Beef	NA	6	6	NA
Herring	3	NA	NA	NA
Lard	4	2	2	NA
Milk	NA	NA	NA	70
Oil	NA	NA	NA	8
Cabbage	NA	NA	NA	31

Abbreviations: LP, linear programming; NA, not available.
[a]The medieval diet is calculated without a vitamin C requirement.

Medieval LP diets were similar to eighteenth-century LP diets. Two things should be noted, however. First, peasants before the Black Death actually subsisted on the rye, barley, and oats of the LP diet and ate little meat, unlike their counterparts in the eighteenth century (Dyer 1988). Second, medieval diets did not include potatoes, since they were a New World crop and were not available in Europe in 1300. A practical problem is that medieval records contain very few vegetable prices, probably because cottage gardens were ubiquitous.[15] For the years before 1760, when our potato price series begins, we have increased the cost of the LP diet computed without a vitamin C requirement by 4% as an allowance for the missing vegetables.[16] Removing the vitamin C requirement has little effect on the rest of the diet, since vegetables were the main source of vitamin C and did not supply many other nutrients. With this adjustment for diet and including the costs of the nonfood goods and rent, the BNPL comes to £0.49 per person per year.

Table 5 shows the incomes of the various social strata in the English social table for 1290 and the corresponding welfare ratios in order to gauge poverty. The average cottager lived in poverty.

Table 5   English social table ca. 1290[a]

	Number of households	People/household	Total number of people	Income/household (£/year)	Welfare ratio[b]
Landowners	21,000	8.5	178,500	28	6.72
Big tenants	12,500	7	87,500	12	3.50
Yardlanders	180,000	5.5	990,000	6.25	2.32
Smallholders	300,000	4	1,200,000	3.13	1.60
Cottagers	240,000	3.5	840,000	1.5	0.87
Nonagriculture	160,000	3.5	560,000	1.8	1.05

[a]Table Broadberry et al. (2015, p. 317) and author's calculations.
[b]Welfare ratio computed as household income divided by the basic needs poverty line of £0.49 per year multiplied by the number of people per household.

[15]Whether cottagers could pasture a cow on a common depended on local custom and varied over time. Kosminsky (1956, pp. 298–99) thought that cottagers ca. 1300 did not in general enjoy this right.
[16]This adjustment is a weighted average of the change in the cost of the diet (with and without a vitamin C requirement) in the summer, when vegetables were cheap and cabbage appears in the solution, and in the winter, when vegetables were expensive and potatoes replace cabbage.

Table 6   The annual income in kind of farm servants ca. 1290[a]

	Quantity per year	Price (pence per unit)	Cost (pence per year)	Kilograms per household per year	Kilograms per person per year
Oats	2.33 quarters	28	65.24	339	96.86
Barley	1 quarter	48	48	182	52.00
Rye	1 quarter	50	50	218	62.29
Peas	1.5 bushels	6.63	9.94	41	11.71
Meat	6.04 lbs	1.66	10.00	2.74	0.78
Total	NA	NA	183.18	NA	NA

Abbreviation: NA, not applicable.

[a]Table derived from Claridge & Langdon (2015).

His family took in £1.50 per year from farming their two-acre holding (£0.33),[17] the woolen cloth they wove (£.13), but mainly from wages (£1.05).[18] With 3.5 members, the family's BNPL was £1.72, so their welfare ratio was only 0.87. The average welfare ratio of the nonagricultural population was slightly higher at 1.05, but this group included rich merchants as well as laborers, so much of the nonfarm population must have also lived in poverty. Together, these groups amounted to 36% of the population, so the head count poverty rate was on the order of 20–30%.

How did people live below the poverty line? We can gain more insight into their circumstances from Claridge & Langdon's (2015) recent investigation into the employment and pay of farm servants employed on demesnes—an important class of laborers who would have been tallied as cottagers in **Table 5**. Their income included some cash but consisted overwhelmingly of periodic deliveries of cheap grain (e.g., rye, barley, oats). In addition, they were fed a serving of oat and pea pottage each day they worked and enjoyed several lavish feasts at which they probably gorged themselves on meat. This income in kind is detailed in **Table 6** and was worth 231 pence (£0.96) per year. Together with the produce of their farm land (£0.33) and the homespun clothing (£0.13), the family realized an income of £1.42, which implies a welfare ratio of 0.83—just below the poverty line. This regime provided an almost adequate diet in nutritional terms and was augmented when the peasants raised garden vegetables, picked wild berries, and snared the odd rabbit.

A comparison of the social table for 1290 with Gregory King's 1688 table (as amended) shows a substantial decline in poverty (**Table 7**). He assigned an income of £2 per head to his poorest group of vagrants and cottagers, and they amounted to 9.2% of the population. With the BNPL at £2.08, the average income was below the poverty line, and the welfare ratio was 0.96. In contrast, workers on average had a welfare ratio over 3 and farm laborers (not shown) were at 1.75. This marks an important advance, since the counterpart to the farm laborer in 1688 was the ploughman in 1290, whose wages left him below the poverty line. Perhaps 5–10% of the English population lived below the poverty line in 1688—a big improvement from 1290.

The situation was little different in 1759. Between then and 1798, the population grew considerably, and expenditures on poor relief rose substantially, which was one of the developments prompting Malthus (1798) to write *An Essay on the Principle of Population*. The share of the population who were cottagers or vagrants rose, but their average income also increased to 14% above the BNPL. There was no reduction in poverty in this period. By 1846, cottagers and paupers

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[17]This value is based on the assumption that the cottager's holding achieves the same revenue per acre as the English average.

[18]This figure is derived by comparing labor demand with labor supply for each social class and apportioning jobs across classes to clear the market. Women's labor as well as men's is included in the balance.

Table 7 Welfare ratios by social class in England and Wales, 1688–1867[a]

	1688	1759	1798	1846	1867
Welfare ratio					
Landed	29.04	43.87	52.52	40.57	43.31
Bourgeoisie	19.33	14.23	36.43	26.33	43.66
Lower middle class	4.94	5.01	8.23	10.34	6.16
Farmers	3.57	4.35	6.76	8.86	10.16
Workers	3.07	3.16	4.30	3.55	5.27
Cottagers and paupers	0.96	0.99	1.14	1.61	2.07
Poverty line					
BNPL	2.08	2.29	3.21	3.31	3.48
Percent of families					
Landed	1.8%	1.5%	1.3%	1.3%	0.9%
Capitalists	3.4%	4.2%	3.2%	8.6%	7.8%
Lower middle class	6.5%	9.4%	8.6%	15.4%	15.8%
Farmers	23.0%	18.9%	10.8%	5.7%	4.0%
Workers	56.0%	56.4%	61.1%	61.4%	65.7%
Cottagers and paupers	9.2%	9.6%	14.9%	7.6%	5.7%

Abbreviation: BNPL, basic needs poverty line.

[a]Table derived from Allen (2019, pp. 18–19). BNPL poverty lines shown here were used to compute the welfare ratios.

amounted to 7.6% of the population, and the average welfare ratio was 1.6. Poverty in early Victorian Britain was much less than the roughly 30% implied by the Bourguignon & Morrisson (2002) data, as analyzed by Ravallion (2014). This is surprising in view of the reforms to the Poor Law in 1832, which are usually portrayed as a draconian attack on the well-being of the poor. Nonetheless, absolute poverty largely ended in this period.

The long-run decline in absolute poverty is due to the growth of the economy and rises in real wages. While the real wage of laborers in London dipped in the sixteenth century, it recovered quickly and was at a high level through the Industrial Revolution. Real wages elsewhere in England dropped substantially in the sixteenth century but began to rise in the early to mid-seventeenth century and converged to the London level. Not everyone gained, however, due to technological unemployment—first among women who lost work as hand spinners with the advent of factory spinning in the eighteenth century, and later among the men and women in a succession of hand trades that were mechanized during the first half of the nineteenth century. Declines balanced advances, and the average wage remained flat from 1798 to 1846. It was only when the hand trades were eliminated by factory production that wages rose generally—as shown by the rise in workers' income between 1846 and 1867.

INDIA CA. 1810

The English East India Company began its conquest of India with the seizure of Bengal after its victory at Plassey in 1757. Territorial expansion continued in the next half century, culminating in the defeat and annexation of the Kingdom of Mysore in 1799. The Scottish physician Francis Buchanan (later Hamilton) was commissioned to do an economic survey of the East India Company's new possessions. He traveled extensively and recorded half a dozen volumes with detailed economic information, which can be used to estimate poverty (Buchanan 1807, 1838). His

Table 8   Poverty budgets in Bihar ca. 1810

	BNPL units	BNPL rupees/unit	BNPL expense (rupees/head/year)	Buchanan's budget per head[a]
Maize	137.30 kg	0.01	1.84	2.57
Pigeon peas	63.09 kg	0.02	1.13	0.34
Milk	70.01 kg	0.02	1.69	NA
Oil	2.75 kg	0.10	0.27	0.38
Bitter gourd	13.12 kg	0.01	0.16	NA
Salt	0 kg	0.11	0.00	0.38
Fuel	1.60 million Btu	0.29	0.46	NA
Cloth	5.00 m	0.13	0.66	0.69
Soap	1.30 kg	0.15	0.20	NA
Light	0.40 million Btu	0.29	0.12	NA
Implements	NA	NA	NA	0.14
Ornaments	NA	NA	NA	0.03
Tobacco/betel	NA	NA	NA	0.38
Temple	NA	NA	NA	0.50
Barber	NA	NA	NA	0.13
Total nonfood	NA	NA	1.43	1.85
Total food	286.27	NA	5.09	3.65
Rent	3.00 m^2	0.13	0.38	0.11
Total cost	NA	NA	6.91	5.61

Abbreviations: BNPL, basic needs poverty line; NA, not applicable.
[a]From Buchanan (1838).

statements of earnings included cash payments as well as any food, clothing, or shelter—all reduced to money. I concentrate on his very complete data for the Patna region in Bihar.

To assess poverty, we need a poverty line—easily computed as a BNPL. Buchanan (1838, Vol. I, app. pp. 17–25) reported the prices of 23 foods that imply the least-cost diet shown in **Table 8**. Unlike the preindustrial English diets, the early Indian diets are similar to those computed from the ICP 2011. According to Buchanan (1838, Vol. I, pp. 278–79), many poor Indians subsisted on coarse grains such as maize or millet in Bihar and ragi in Mysore (Sivramkrishna 2009). The nonfood goods were computed as in **Table 2**. Buchanan indicated that a poor family lived in a clay-walled house with one room. "The common size of the hut was 11 to 13 cubits by 5 to 6 [13.8 square meters]." There was seldom a wooden door, and Buchanan added that "a hurdle even to shut it [was] considered as too expensive." This led his editor to remark, "What an idea this simple fact affords of the poverty of the mass of people!" (Buchanan 1838, Vol. I, pp. 474–75). The poverty line works out at 7.32 rupees per person per year or 0.61 rupees per month (**Table 8**).

How does this compare to incomes? As in medieval England, a ploughman was a common occupation at the bottom of the earnings distribution. If the man worked full time (347 days), he received 16.8125 rupees in cash and food. Allowing for sickness, however, implied annual earnings of about 14 rupees. Women could command almost as high a wage but worked fewer days, and Buchanan (1838) put their annual earnings at 8 rupees for a total of 22 rupees. In his calculations, he assumed a family consisted of a man, a woman, and two children. In reality, families were often larger, but he maintained that the additional family members (either older children or old people) could earn their keep tending cattle, so they were not explicitly included in the family financial balance. A family of four had an annual income that was 20% below the poverty line.
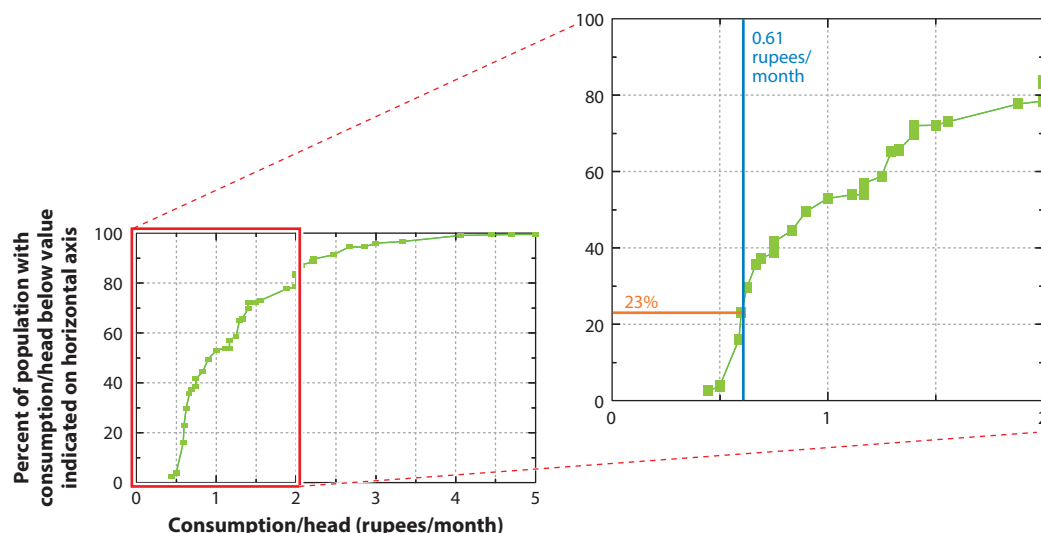
Figure 9

Distribution of consumption and the poverty rate in Bihar ca. 1810. Data from Buchannan (1838, Vol. I, app. pp. 6–7).

How did people live below the poverty line? We can compare our BNPL budget to a poor family's budget drawn up by Buchanan (1838, Vol. II, app. pp. 27–28). The total expense for four people was almost 22.5 rupees per year. This is a half rupee too much, but economies could have been made on drugs or piety. Buchanan's family spent slightly more for nonfoods than the BNPL, but the distribution of spending was much different: Nothing was spent on fuel (which was gathered), lighting, or soap, and much less was spent on clothing. Small amounts were spent on implements and ornaments. Most of the extra was spent on tobacco, betel, temple contributions, and the barber. The capital costs of housing were ignored. The biggest difference, however, lay in food, which cost much less than the BNPL diet. Buchanan's statistics show that over half of the population only consumed fish that they caught themselves, seldom had cultivated vegetables, and had milk only on holidays. The only meat they had was for sacrifices at "great occasions" (Buchanan 1838, Vol. I, app. pp. 10–11). Buchanan's families "use no fuel, fish nor vegetables but what they collect" (Buchanan 1838, Vol. II, app. p. 28) "A few very poor people, who cannot every day procure pulse, collect wild leaves, or superfluous plant of some common crop, such as mustard, which costs them nothing, but the trouble of gathering" (Buchanan 1838, Vol. I, p. 121). They consumed only about 175 kg per year of grain and pulse compared to 200 kg in the BNPL. As a result, the calorie intake of Buchanan's family averaged only 1,747 per day rather than the 2,100 in the BNPL. The Indian ploughman was like poor families in India today (Deaton & Drèze 2009, p. 47) and somewhat worse off than his English counterpart before the Black Death.

One reason for focusing on Bihar is that Buchanan (1838) drew up a table breaking the households down into 49 categories according to size and monthly consumption expenditure. The latter appear to be anchored in his estimates of individual earnings and family income for many occupations. This table is unusual as a historical source in that the categories are not overlapping. **Figure 9** shows the cumulative income distribution for Bihar implied by Buchanan's data. With the BNPL of 0.61 rupees per month, 23% of the population lived below the line.

Our data for poverty in India are weaker than for England, so we can only take them as suggesting possibilities rather than establishing certainties. We have no survey before Buchanan's (1838)

to compare with his. However, the history of real wages suggests a hypothesis. The ploughman's budget indicates that the man's wage was well below BNPL. This is in accord with the welfare ratio for laborers in **Figure 6**, which is considerably below one in the late eighteenth and early nineteenth centuries. The real wage series shows much higher values in the days of the Emperor Akbar at the beginning of the seventeenth century. In 1595, laborers in northern India earned more than the BNPL (**Figure 5**). There is, thus, a strong possibility that poverty rates were much lower then. Why incomes were so high in 1595 is unclear. Was there still no population recovery from the Black Death? However, if population growth responded positively to high real incomes, we would expect an increase in population that would have pushed incomes to subsistence. If both men and women worked and contributed substantially to family income, as they did in India, then both the male and female wage would have been below subsistence, which was the case by the mid-eighteenth century.

Between 1810 and the 1980s, the poverty rate in India increased substantially. "It is possible that the deprivation in childhood of Indians born around mid [twentieth] century was as severe as that of any large group in history, all the way back to the Neolithic revolution and the hunter-gatherers that preceded them. Life expectancy in India in 1931 was 27, also reflecting extreme deprivation" (Deaton 2013, p. 163). Why? Many factors may have been involved, but imperialism and globalization must have played leading roles. The nineteenth century was marked by Britain's dominance of the world market for cotton textiles. British exports of yarn and (to a lesser degree) cloth eliminated handicraft production throughout Asia and Africa. India had been a leading cotton textile producer, and the fall in rural, manufacturing incomes contributed to the growth in poverty.

CONCLUSION

Analyzing the WBPL from the perspective of basic needs highlights some of its limitations and throws light on its strengths. Since the WBPL is an average of national poverty lines from countries mainly in sub-Saharan Africa, it incorporates the consumption choices made in that region in response to its climate, housing market, food supplies, and culinary traditions. These stamp the WBPL as an African poverty line. Since many people in that region are very poor and have trouble meeting their basic needs, it is perhaps not surprising that the direct calculation of the cost of meeting basic needs yields values that match the national poverty lines computed for the countries themselves. The basic needs approach improves our understanding of Africa by making explicit the consumption possibilities open to those in extreme poverty. This was not always clear with the WBPL in view of how it was set.

Difficulties arise when we move out of Africa, for in most other parts of the world, including tropical regions such as southeast Asia, the cost of meeting basic needs is higher, since the circumstances are different. These differences are picked up in the basic needs approach but not by the WBPL in view of its design: Basing the poverty line on the national poverty lines of countries mainly in sub-Saharan Africa means that the line reflects the climate and culinary norms of that region rather than of the whole world. The use of superlative index numbers in calculating PPP does not eliminate this problem or effectively deal with the massive differences in real estate prices across the globe. Poverty outside sub-Saharan Africa is, therefore, often undercounted when the WBPL is the measuring rod. These regions are precisely those that have been growing most rapidly and eliminating poverty in the process. The upshot is that extreme poverty has become ever more concentrated in sub-Saharan Africa, with the result that the geographical limitations of the WBPL are becoming increasingly less important.

Another advantage of the basic needs approach is that it can be extended into the past. The BNPL faces one challenge when this is attempted, however: The consumption of clothing and

footwear derived from early twentieth century consumption surveys is far too expensive for people in the Middle Ages, who made do with less clothing. This is not a question, in the first instance, of changing tastes but rather of the huge falls in the cost of these goods due to technological improvements such as the spinning wheel, the putting-out system, and the factory. Modern culture has adapted to cheap clothing by raising the social standard of minimally acceptable dress (as Adam Smith noticed), but the changes were originally driven by technology, not preferences. Minimum clothing requirements must be updated over time in recognition of this change when the BNPL is calculated.

Pressing poverty measurement into the past with the BNPL does have its rewards, for it helps map long-run changes in well-being. The 50–60% poverty rates in Asia in the post–World War II period were not always the norm. In England ca. 1300, one-quarter of the population looks to have lived at or below the BNPL, and a similar percentage may have been poor in Northern India in the early nineteenth century. English poverty rates dropped in the early modern period as the economy began a growth trajectory long before the Glorious Revolution of 1688. In India, poverty may have been less in the reign of Akbar in about 1600 and increased substantially during the colonial period. By using the BNPL to study poverty in the past, we can see more clearly the implications of economic growth, colonialism, and globalization for the daily life of the least-well-off people than is possible with national income statistics.

DISCLOSURE STATEMENT

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