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Relative costs of living, for richer and poorer, 1688–1914

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Abstract
The kinds of goods that richer and poorer households consumed differed more strongly in the past than today. Movements in the relative prices of luxury goods versus staples caused the real inequality to oscillate in ways missed by the usual historiography of (nominal) inequality. On both sides of the North Atlantic and in Australia, real inequality rose substantially less in 1800–1914 than the literature on nominal inequality has revealed. The reasons for this relate to the relative decline of food prices, rural–urban price gaps, and the delayed rise of luxury service prices, especially after 1850. Throughout these centuries, the North Americans enjoyed lower living costs than their counterparts in England.

1 Introduction

Recent writings now offer us a clearer view of trends in economic inequality within the now-industrialized countries since the early 1300s. A new consensus suspects that the intra-national inequalities of income and wealth never declined significantly across these centuries, except in the wake of the Black Death and during the turbulence of world wars and depression between 1910 and 1970. Throughout Europe, inequalities probably widened between 1400 and 1800.[1] Across the long nineteenth

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[1] Van Zanden (1995), Milanovic et al. (2011), Alfani (2017 2019), Alfani and Di Tullio (2019), and Di Matteo (2018). For a grand synthesis of the literature on inequality trends in Europe and all over the world for two millennia, see Scheidel (2016).

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century, by contrast, the literature sees mixed trends, apart from a clear widening of income and wealth gaps in France and the USA.[2] For the twentieth and twenty-first centuries, the greatest achievement has been the unlocking of the mystery of top nominal incomes in more than two dozen countries since 1900.[3]

This emerging consensus, like the estimates that produced it, has looked only at the inequality of <u>nominal</u> income or wealth.[4] This gives the correct inequality result if we seek to know how unequal are people's abilities to buy <u>any one bundle</u> of goods and services. Yet to compare an income class's real purchasing power across generations or across countries, it may help to consider the cost of the kind of consumption bundle that class finds relevant. As such, a measure of "real" inequality—one that would measure inequality based on more than a single basket—could act as an important complement to the existing literature. Indeed, it is quite probable that the adverse effects of inequality are linked through real income effects, where the contrasts that matter are contrasts in individuals' abilities to buy what they care to buy, or need to buy, and not the (nominal) inequality in their ability to buy the same common bundle as some other class could buy. For example, the literature showing that inequality can worsen aggregate health and life expectancy is based on mechanisms of nutritional status that relate to effects on income-class-specific real consumption, especially for those in the lower-income ranks.[5]

If one sought only to contrast the real purchasing powers of poor people across time and space, setting aside the gaps between rich and poor, then one could contrast the abilities of poor populations to buy either a "bare-bones" (subsistence) or a "respectability" bundle, as introduced by Robert Allen. An expanding literature has done so, contributing greatly to the debates over Eurasia's Great Divergence, Europe's Little Divergence, and the trans-Atlantic gaps in welfare ratios. For this purpose, real wages and incomes have been mapped and compared around the world (Allen 2001, Allen et al. 2011; Pomeranz 2000, 2011; Arroyo Abad et al. 2012,

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[2] On all data-supplying countries, see Roine and Waldenström (2014) and Moatsos et al. (2014), again with a summary by Scheidel (2016). On the nineteenth-century rise in French wealth inequality, see Piketty et al. (2006) and Piketty (2014, esp. p. 349). On the rise in American income and wealth inequality 1774–1860 or 1774–1914, see Lindert and Williamson (2016, Chapter 5). For England and Wales, Allen (2018, pp. 21–24) finds that inequality, after rising across the eighteenth century, had "moderated" in the mid-nineteenth century. The rise of nominal inequalities in the early modern period has been documented by Van Zanden (1995) and by Alfani and Di Tullio (2019).

[3] See Atkinson et al. (2011) and the WID database (https://wid.world).

[4] In the economic history literature, we note three exceptions that indeed pursued real differences in income inequality. One is Williamson's (1976) analysis of what different income classes' cost-of-living movements over time within the urban USA might imply for income inequality. Similarly, social biased price trends played an important part in Hanus's (2013) study of part of the Low Countries between 1500 and 1650. A broader historical perspective was the study of European cost-of-living movements by income class conducted by Hoffman et al. (2002, 2005). While their historical sweep was broad, covering several Western European countries over the centuries since 1500, their study shared a limitation with that of Williamson: lacking the right units of measurement to compare nations at a point in time, they could only sketch how price movements affected inequality within three European countries over time. We follow in their path, expanding the countries covered and comparing absolute differences in higher-income purchasing power across nations.

[5] For some recent evidence on the nutritional and other purchasing-power influences on health see Aizer and Janet (2014), Underwood (2014), Spagnoli (2014), and Brueckner and Lederman (2015).

Geloso 2016 and 2019a). Even the basic income estimates of Angus Maddison are now being reshaped by the Maddison Project (Bolt and Van Zanden 2014) and by new direct comparisons of countries' purchasing power in the past (Ward and Devereux 2003, 2004, 2006; Lindert and Williamson 2016; Lindert 2016; Panza and Williamson 2017a, b; and Geloso 2019b). Allen himself has continued to pioneer in subsistence comparisons, improving on international agencies' concepts of the poverty line (Allen 2017).

Knowing how real inequality differed between countries or continents, and how it moved over time, requires that we go beyond the emerging consensus about the real welfare of the poor alone, and try to map what the rich consumed, and what prices they paid for it. In so doing, it will be possible to enrich existing estimates of inequality based on nominal incomes. On this more daunting task we have made enough initial progress to support a new historical geography of real income inequality within countries, combining the expenditure patterns of rich and poor with prices from different continents over more than 200 years. More specifically, we focus on England, Canada, the USA, and Australia from 1688 to 1913.

We find that the relative costs of different lifestyles differed both over time and across continents. First, the movements over time showed pronounced, and reversing, trends. In the early modern setting, here meaning the period up to about 1815, the relative rise of staples prices, especially food grain prices, imposed a rising relative burden on those in the lower-income ranks, relative to those affluent enough to enjoy the declining relative cost of luxuries. In this early modern setting, the documented rises in nominal-income inequality were reinforced by the rise in the relative cost of buying bare necessities, which raised real inequality even more. Thus, up to about 1815, the recent literature's findings of rising inequality based on nominal estimates have been confirmed, although Hoffman et al. (2002, 2005) found that real inequalities widened even more in that early modern era.

Within the nineteenth century, however, this paper reveals new evidence of a major trend reversal. An egalitarian movement from 1815 to 1913 was shared by all four countries on which this paper concentrates, but with some differences in timing. In Canada, the ratio of the class costs of living remained trendless 1815–1850, followed by a pronounced egalitarian rise in the relative cost of living between 1880 and 1913. In England, the egalitarian drift was spread across the entire prewar century between Waterloo and the First World War. For the USA, the rise in the relative cost of higher living began even earlier, around 1790, i.e., immediately after Independence, and persisted to 1913. Australia showed the same egalitarian trend from 1870 onward.[6]

The two main reasons for this widespread nineteenth-century reversal toward a more egalitarian trend in the cost of living were (1) the decline in the relative prices of staple grains, and (2) the rise in the relative price of services and labor-intensive luxuries, which outweighed the continuing decline in the relative prices of many luxury goods. The strong effect of service prices is confirmed by relative-price movements not only in England and North America, but also in Australia.

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[6] By contrast, in France the trends in upper- and lower-class living costs did not differ in any clear way, as we shall note again later.

Second, across continents, the cost-of-living contrasts reveal that Canada, the USA, and Australia continued to be better lands for poorer households than for richer ones, relative to the corresponding lifestyle costs in France and Britain.

Our progress toward these tentative findings begins with the examination of different income ranks' preferred consumption bundles, in Part II. Part III assembles our comparisons of the price-driven relative costs of living well versus barely getting by, and Part IV shows which differences in commodity sub-group prices seem to account for these contrasts. Part V uses an accounting exercise to show how the new trends in real top-income shares differ from the now-well-known trends in nominal top-income shares.

2 Consumption bundles for rich and poor

Different income ranks consume different budget shares, even within a given price environment, so that the same prices or the same movement in prices may affect them differently.[7] Thus, there is a need for more disaggregated measures of the cost of living (Pollak 1980, 1981). That need is especially strong for the pre-1914 era. Prior to 1914, trade was limited to a few (luxury) items, the prices of many goods responded to local market conditions (Williamson 2011), and purchasing power parities differed importantly over space. We already know that the rich and poor consumed very different bundles before 1914, and that such differences were greater than they have been since. Therefore, differences in relative prices would clearly have differing effects on households at higher- and lower-income ranks.

The daunting task is to capture the expenditure patterns of the rich, and to find price series for the goods and services that took a much greater share of budgets for the well-off. Several such studies do exist, usually for an individual household. Unfortunately, their expenditure categories are too broad for easy attachment to price series, and they have large "other expenditure" shares representing heterogeneous luxuries. We find that their overall expenditure patterns contrast with those of poorer households in broadly the same ways for different countries and eras, as shown by comparing the 1688 English and early-nineteenth-century American budgets featured in this article.[8]

One might think that scholars have recently made good progress up the income ranks here. Yet those prototypical households consuming the "respectability" bundles pioneered by Allen (2001), and also used by other scholars, were not far above

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[7] For a recent study of income-class differences in the effects of inflation, see Hobijn and Lagakos (2005). Some studies have even found that the poor face different prices from the rich even within the same price environment (e.g., Rao 2000, Beatty 2010), due mainly to credit constraints. We cannot pursue this level of detail here, however, due to data limitations.

[8] That is, the inter-class differences in expenditure shares remain roughly similar, even though expenditure shares move over time and space for each income class. For household budgets offering detail on luxury items, see the wide array of consumer household budgets, including several middle- or upper-class budgets, in Williams and Zimmerman (1935), Hoffman et al. (2002, pp. 326–327), http://gpih.ucdavis.edu/global prices and incomes database/consumer bundles, and Brady (1972).

the bare-bones consumers in the income ranks, and not so different in the shares of expenditures devoted to staples.[9] While these baskets have been used heavily to compare living standards over space, they are largely geared toward capturing the realities at the bottom of the income distribution. For example, consider the households consuming the respectability versus bare-bones bundles hypothesized for "1801-03" in Broadberry et al. (2015, p. 339). If we equate their would-be expenditures with their would-be incomes, then even the households consuming the respectability budget would be in the bottom decile of the income distribution.[10] Nor do the bare-bones and respectability expenditure patterns differ enough to capture the stark contrasts that almost surely prevailed over the higher-income ranks. The share spent on staple grains, which was 61.5% of the bare-bones survival budget, was still as high as 50.8% of the "respectability" budget. One needs to find, and use, expenditure patterns that include household much further up the income ranks. Absent such information, an international appreciation of inequality in the cost of living will be elusive.

Fresh answers emerge from a new collection of consumer household budgets for different income ranks, plus new collections of price data, now including luxury expenditures and luxury prices, which were not covered by the historical literature comparing workers' bare-bones expenditures. To begin with those income-class household budgets, Table 1 introduces two new historical contrasts between richer and poorer households in the same economy and same era. One contrast is documented for the USA in the early nineteenth century, and one reports what Lindert and Williamson (1982) and Arkell (2006) has distilled from Gregory King's guesstimates of English consumer behavior in 1688.

The American and English richer classes whose budgets are portrayed in Table 1 were probably in the top deciles (top 10%) of the respective income ranks, and the lower-income budgets characterize poorer groups. For the English poor in 1688, Stone's grouping of King's estimates offers an aggregate sketch of the bottom 41% of the income ranks. In the American case, we can rank the two household positions more specifically. The richer-household expenditure pattern was recorded by a high-level federal clerk in Washington DC in 1816–1817 (Woodhouse 1929). Several years later Matthew Carey (1833) produced a credible expenditure budget for a Philadelphia canal worker in 1831. The ratio of their household expenditures was nearly 8:1. These are only two households, or course, but the detail offered by Woodhouse seems to be a fair representation of somebody much higher in the ranks. As best we can tell by comparing the Washington clerk and the Philadelphia canal worker with the income ranks estimated for 1850 (Lindert and Williamson 2016, esp. p. 115), the clerk's income would have ranked somewhere in the 90th–95th percentile of the nation's households, while the canal worker probably ranked down around the 15th

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[9] The decision to study only the limited gap between "bare-bones" and "respectability" is one shared by the present authors in other work [e.g., Geloso (2016) and Lindert and Williamson (2016, Appendix D, pp. 304–310).] The respectability budget, like the bare-bones one, is helpfully confined to basic goods for which comparative price data are more abundant. It is still considered a "poverty line basket" by many, such as Humphries (2013) and Hanus (2013).

[10] For the updated income distribution for 1801–03, now more plausibly attributed to the year 1798, see Allen (2018).

Table 1 Expenditure shares for richer and poorer families in two settings

Overall	20 price-data	Households in these income ranks:	
Categories	Commodities	Bottom 41%	91–95 Percentiles
(A.) English expenditure shares (%s), 1688			
Bread flour	Bread	8.7	2.3
	White flour	8.7	2.3
Other grains	Oats	8.7	2.3
	Potatoes	8.7	2.3
	Peas	6.1	4.0
Meat &c.	Beef	2.2	3.5
	Pork	2.2	3.5
	Eggs	3.5	4.4
Dairy	Butter	13.0	5.7
Drink & sugar	Sugar	1.1	2.2
	Coffee	2.1	3.1
	Tea	2.1	3.1
	Beer	1.9	6.3
Salt	Salt	0.6	0.6
Fuel & light	Firewood	4.7	7.7
	Candles	0.9	0.5
Clothing	Cloth	17.7	23.0
	Shoes	1.3	5.9
Housing	Housing	5.0	5.0
Services	Unsk. wage	1.2	12.2
		100.0	100.0

Overall Categories	23 price-data Commodities	Philadelphia 1831 canal laborer	US central govt clerk 1816–17	Ditto, breaking the residual "other non-food" into labor, cloth, and wood inputs
(B.) USA-based expenditure shares (%s), early nineteenth century				
Bread flour	Bread	15.2	0.5	0.5
	White flour	10.0	5.2	5.2
Other grains	Potatoes	2.1	1.7	1.7
	Corn	2.0	1.0	1.0
	Oats	2.0	0.0	0.0
Meat &c.	Beef & veal	4.1	9.3	9.3
	Pork	2.0	6.8	6.8
	Eggs	2.0	3.4	3.4
Dairy	Butter	6.5	7.1	7.1
Drink & sugar	Sugars (2)	2.0	4.0	4.0
	Coffee	1.0	1.2	1.2
	Tea	1.0	0.8	0.8
	Alcoholics (2)	1.8	4.9	4.9

Table 1 (continued)

Overall Categories	23 price-data Commodities	Philadelphia 1831 canal laborer	US central govt clerk 1816–17	Ditto, breaking the residual "other non-food" into labor, cloth, and wood inputs
Other food	Salt	1.0	0.2	0.2
Fuel & light	Firewood	4.6	4.1	9.7
	Candles	1.0	0.7	0.7
Clothing	Shoes, boots	8.0	5.0	5.0
	Cloth or sheets	16.1	6.4	12.0
Housing	Housing	15.6	9.6	9.6
Services	Unskilled wage 2.0	5.6	16.9	
Other non-food		0.0	22.6	
		100.0	100.0	100.0

For England 1688, we adapt expenditure shares for two income strata from Richard Stone's (1688, Appendix Table A1 and A4) reworking of Gregory King's notebook estimates. The poorer group, Stone's Group 1, represented the bottom 41% of all "families" excluding servant households, and the richer group represented his Group 6, represented the 91st–95th percentiles (more narrowly, those from the 91.8% to the 95.5% ranks). Gregory King and Richard Stone did not offer details within the residual luxury category, nor did they separate out housing costs. Following a frequent practice by Robert Allen, we assumed that housing costs accounted for 5% of total expenditures. For the richer group, we also broke out 5.74% of expenditures as having been spent on domestic servants, using Allen's estimates for 1688 (Allen 2018, Appendix Table A1). For the USA in the early nineteenth century, the expenditure shares for the laborer's household in 1831 are from Carey (1833) and those for the federal government clerk in Washington DC in 1816–1817 are from Woodhouse (1929). Carey's laborer budget gave only the overall categories, whereas Woodhouse gave the full 20-commodity detail shown here (and more) for the government clerk's household. We used some arbitrary assumptions to break Carey's expenditure categories into the finer products for which we have price data—most importantly, the division of the breads into bread and flour. For the sugars, we retained his overall sugars category, attaching an 0.5% weight to molasses and 1.5% to white sugar. For both settings, the large residual shares spent on other luxuries will lack any corresponding time series on prices (although some luxuries mentioned explicitly in the American case were home furnishings, extra clothing, and children's toys). We therefore had to make assumptions about the composition of the residual. We have divided the residual non-food expenditure share into a composite of inputs with the following shares applied to available (log-)prices: 50% labor, 25% wood, and 25% cloth, as illustrated in the final column of the American panel. This same adjustment is applied to the residual luxury category for both income groups

percentile. Their expenditure patterns contrasted strongly, as shown in Table 1. The canal laborer's household spent 31.3% of its budget on staple grain products, versus only 10.4 for the clerk's family.

The expenditure patterns in Table 1 naturally conform to Engel's Law, with the better-off spending lower shares of their overall budgets on foods of all types. Similarly, within the food and beverage category, staple grains feature prominently in the baskets of the poor, while meat, alcohol, and luxuries take bigger monetary shares in the baskets of the rich. Among the non-food categories, our sources offer only hints about the luxury status of different commodities. Fuel appears to have been

a luxury good in both the USA and Canada.[11] Potentially the ultimate luxuries are the entries shown at the bottom of the US expenditure list (Table 1, Panel (B.)). Personal services, home furnishings, and retail clothing are likely to offer the greatest luxury category. By their nature, these heterogeneous products are hard to capture in consistent price data. For now, the last column of Panel (B.) has decomposed such products into input shares representing labor, wood, and cloth components, so that the next section can convey how the missing prices of such retail products might have behaved.[12]

3 How relative costs of living shaped real inequality over time and space

Combining the consumer expenditure shares of Table 1 with time series on prices reveals how the cost of each consumer bundle, or each lifestyle, moved over the decades and centuries in four settings—southern England, eastern Canada, eastern America, and urban Australia. For each setting, we have spliced long-run price series for twenty or more goods and services. The number of goods and services must be trimmed slightly for international comparisons, since a few goods are available only for some countries and not for others.

Table 2 provides the evolution of such index-number time series for the different countries using English 1688 weights, and Table 3 does the same using American 1816–1831 weights. The price series for Canada through 1850 are taken from Geloso (2019b), with an extension to 1913 assembled from a variety of well-known sources in Canadian economic history and described in the appendix to this paper (see Appendixes 1 and 2 in the supplementary materials).[13] For the USA, the prices are mostly urban, except where the main series is from T.M. Adams's (1944) monumental price history based on Vermont farm record books. The data for Australia comes from the work of McLean and Woodland (1992), while the data for Britain comes from the work of Clark (2005). In Fig. 1, the weights used are those for England and Wales in 1688, which can also be called the King-Stone expenditures shares. In Fig. 2, the same can be seen but with the American expenditure shares instead.

Shared patterns can be perceived. Both Canada and the thirteen American colonies experienced important shocks during the eighteenth century. For Canada, the most prominent shock was a relative grain scarcity during the Seven Years' War

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[11] By contrast, Broadberry et al. (2015, pp. 333–339) postulate lower fuel shares of total expenditures for Great Britain's "respectability" budget than for their "bare-bones" budget.

[12] Note that using input prices to proxy the prices of luxury and capital-good outputs requires the assumption that total factor productivity in these luxury and capital-good sectors did not change across countries or over time. Over time, our necessary assumption is likely to bias the trend in luxury and capital-good prices upward.

[13] As the post-1850 data for Canada blends new data (for wages) and old data (for prices), a long discussion is required. This discussion hampers the flow of the article. Thus, we thought it preferable to relegate this to an appendix. .

Table 2 Cost-of-living movements for richer and poorer income groups, 1690–1912, using consumption bundles from England 1688 Five-year averages ("1850" (i.e., 1848/52) = 1.000)

	In England		In Canada		In America		In Australia	
	Richer	Poorer	Richer	Poorer	Richer	Poorer	Richer	Poorer
1690	1.076	1.078	0.738	0.745				
1700	1.170	1.151	0.828	0.796				
1710	1.324	1.176	0.764	0.678				
1720	1.051	1.098	1.211	1.077	0.578	0.513		
1730	1.083	1.128	0.602	0.549	0.658	0.545		
1740	1.163	1.109	0.585	0.530	0.739	0.617		
1750	0.805	0.789	0.829	0.762	0.836	0.750		
1760	1.086	1.104	1.328	1.537	0.686	0.744		
1770	1.092	1.159	0.721	0.705	0.816	0.826		
1775	1.139	1.222	0.847	0.814				
1780	1.232	1.276	1.457	1.539				
1785	1.179	1.235	1.144	1.151	1.027	1.099		
1790	1.154	1.225	0.910	0.913	0.924	0.925		
1795	1.298	1.316	1.112	1.134	1.187	1.217		
1800	1.591	1.547	1.344	1.375	1.346	1.331		
1805	1.504	1.506	1.401	1.462	1.396	1.397		
1810	1.716	1.644	1.635	1.755	1.539	1.445		
1815	1.782	1.760	1.831	2.075	1.784	1.742		
1820	1.512	1.501	1.320	1.364	1.381	1.314		
1825	1.370	1.353	1.174	1.215	1.149	1.060		
1830	1.274	1.243	1.153	1.210	1.072	1.019		
1835	1.195	1.211	1.224	1.246	1.121	1.141		
1840	1.225	1.181	1.131	1.202	1.098	1.095		
1845	1.119	1.074	1.107	1.135	0.969	0.943		
1850	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
1860	1.118	1.125	0.983	1.002	1.166	1.137	1.143	1.159
1867	1.193	1.220	1.163	1.164	2.131	2.072	1.023	1.008
1870	1.168	1.193	1.218	1.180	1.898	1.796	0.971	0.893
1880	1.056	1.096	1.116	1.107	1.361	1.253	0.942	0.822
1890	0.920	1.001	1.092	1.035	1.226	1.129	0.901	0.802
1900	0.869	0.988	0.996	0.923	1.132	0.997	0.798	0.679
1910	0.971	1.075	1.190	1.092	1.460	1.291	0.942	0.811
1912	0.986	1.105	1.219	1.119	1.478	1.282	0.974	0.834

See Table 3 footer

(1756–1763), which especially hurt lower-income workers more than the better-off because of the British invasion of the colony. However, war shocks in Canada did not always strike in the direction of hurting the poor. During the War for the Spanish Succession (1701–1714), the British caused an important disruption of foreign shipping into Quebec which affected the supply of imported luxuries (whose prices rose

Table 3 Cost-of-living movements for richer and poorer income groups, 1690–1912, using consumption bundles from USA 1815–1831 Five-year averages (same country's "1850" (i.e., 1848/52) = 1.000)

	In England		In Canada		In America		In Australia	
	Richer	Poorer	Richer	Poorer	Richer	Poorer	Richer	Poorer
1690	0.790	0.957	0.662	0.846				
1700	0.881	1.040	0.735	0.854				
1710	0.903	1.148	0.718	0.850				
1720	0.838	0.969	1.102	1.295	0.476	0.562		
1730	0.839	0.969	0.585	0.679	0.550	0.584		
1740	0.861	1.030	0.588	0.673	0.607	0.666		
1750	0.687	0.747	0.844	0.936	0.680	0.779		
1760	0.874	1.002	1.403	1.756	0.496	0.710		
1770	0.940	1.061	0.727	0.829	0.671	0.840		
1775	0.986	1.160	0.908	0.980				
1780	0.993	1.185	1.339	1.559				
1785	0.984	1.156	1.054	1.218	0.888	1.121		
1790	1.000	1.185	0.883	0.978	0.797	0.990		
1795	1.113	1.325	1.063	1.230	1.082	1.355		
1800	1.307	1.627	1.267	1.450	1.219	1.472		
1805	1.320	1.549	1.315	1.509	1.263	1.502		
1810	1.491	1.790	1.578	1.710	1.371	1.623		
1815	1.565	1.797	1.757	1.988	1.618	1.856		
1820	1.351	1.527	1.284	1.324	1.241	1.423		
1825	1.260	1.381	1.143	1.204	1.069	1.160		
1830	1.191	1.321	1.134	1.200	1.006	1.102		
1835	1.150	1.217	1.184	1.214	1.077	1.188		
1840	1.167	1.231	1.099	1.221	1.063	1.140		
1845	1.075	1.109	1.089	1.099	0.928	0.983		
1850	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
1860	1.155	1.142	1.039	0.956	1.161	1.127	1.148	1.129
1867	1.235	1.240	1.220	1.209	2.004	1.983	0.968	1.010
1870	1.251	1.211	1.229	1.338	1.799	1.733	0.939	0.919
1880	1.212	1.082	1.268	1.222	1.329	1.220	0.957	0.875
1890	1.104	0.971	1.077	1.073	1.196	1.090	0.942	0.814
1900	1.123	0.935	1.072	0.974	1.132	0.946	0.827	0.662
1910	1.194	1.037	1.249	1.137	1.459	1.169	0.991	0.797
1912	1.229	1.056	1.286	1.170	1.490	1.180	1.031	0.826

The "richer" and "poorer" income groups are those whose expenditure patterns are reported in Table 1 above. Five-year averages, except for Canada in 1900, 1910, and 1912. For similar earlier calculations covering England, France, and the Netherlands, see Hoffman et al. (2002). *On splicing time series* The scarcity of price series for certain dates in the seventeenth and eighteenth centuries has led to our splicing early series based on fewer commodities to the fuller later series. The numbers of commodities whose time series we used are:

Table 3 (continued)

	Using price time-series from								
	England	Canada				America			Australia
Using	1688–	1688–	1703–	1781–	1850–	1720–	1762–	1784–	1850–
expenditure	1914	1702	1781	1850	1913	1762	1784	1914	1914
Weights from									
England	20	17	18	19	20	11	20	22	19
USA	20	19	20	20	20	11	19	23	18

Each earlier period's price levels were spliced to those of the next later period
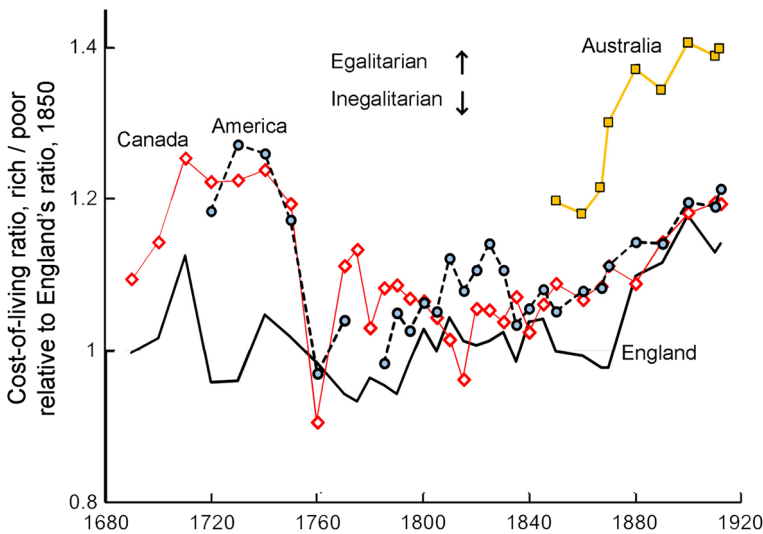
Fig. 1 Cost-of-living movements for richer versus poorer income groups, 1690–1912, using consumption bundles from England in 1688. *Expenditure shares* See Table 1. *Price series* The main price sources for 1850 are available and documented at gpih.ucdavis.edu. We used Gregory Clark's series for England. The Canadian series are from Geloso (2016, 2019a, b). The main American series are those supplied by Bezanson et al. (1936) for Philadelphia, Carroll Wright for Massachusetts (1885), and T. M. Adams (1944) for Vermont. Those for Australia are from data underlying McLean and Woodland (1992), helpfully supplied by Ian McLean. In all four countries, most of the prices used were recorded in cities, rather than on farms. The exceptions were some of Clark's English price series, a few price series from farm households in Vermont, and the data for Canada relating to rural areas that are in close proximity to urban centers in the province of Quebec. *The 1850 benchmark* All countries' ratios of (COLrich/COL-poor) are related to the same ratio for the single year 1850 in England, to assure comparability. These differ from the country-specific ratios in Tables 2 and 3, because the latter are all standardized separately so using the base the five-year period 1848–1852 for the same country

faster than that of necessities). For the thirteen American colonies, the main shock of the eighteenth century also came during the Seven Years' War, as in Canada.

Beyond those North American shocks, what emerges from Figs. 1 and 2 for the eighteenth century, and indeed up to the end of the French Wars in 1815, is the lack
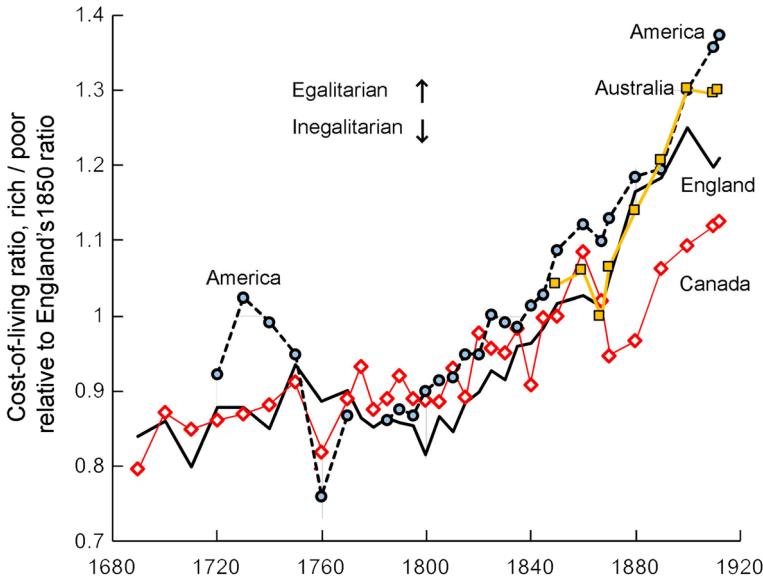
Fig. 2 Cost-of-living movements for richer versus poorer income groups, 1690–1912, using consumption bundles from USA 1816–1831. Sources and notes: see Fig. 1

of any egalitarian shift in the relative costs of living for Britain, for Canada, or for America. The poor got no relief from the trend toward dearer necessities relative to luxuries, the trend that their ancestral counterparts in the sixteenth and seventeenth centuries had suffered.[14]

Then, the "nineteenth-century" period 1815–1914 brought a clearly egalitarian shift in the price structure for all four countries—England, Canada, the USA, and post-1850 Australia. The net change over these 100 years is unmistakable in Figs. 1 and 2, supported by Tables 2 and 3. That is, something brought relief in the price of necessities relative to staples over those 100 years. This relative improvement for the poor did not advance evenly, however. In all four countries, there was a brief inegalitarian retreat somewhere between 1850 and 1867, though the timing of this retreat depends on which set of weights one uses. Such reversions aside, the relative costs of living in all four countries shifted unmistakably in favor of lower-income groups from the end of the French Wars to the eve of the First World War.

The new numbers unveil not only the great break in trend from the eighteenth century to the nineteenth, but also how the relative cost of living for the different income ranks differed across the oceans. Recent data improvements, particularly the accumulation of information on how to convert old local units into metric measures and in hard currency, open up such comparisons. Recall that such international

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[14] Starting from back in 1500, for England, and also for France and Holland, the trend was more strongly inegalitarian, as emphasized by Hoffman et al. (2002, Figs. 1, 2, 3). Their cost-of-living indices of the relative costs of living had still not shifted in favor of workers as late as 1815, and behave like the ones reported here, even though they used different expenditure weights.

comparisons have already been introduced for the lower-income ranks, particularly by Robert Allen's work on "bare-bones" costs (Allen 2009, 2001) and by the publicly available online databases on global prices and incomes.[15] What we can now add are expenditure shares and luxury prices more appropriate to the higher-income groups. The ability to compare the cost of living of the poor relative that of the rich over space helps us to see which was the "best poor man's country" (Lemon 1972).

Using 1850 as a benchmark year, this contrast is generated by using the double ratios of expenditures at different prices and expenditures shares

$$\text{Cost-of-living (COL) double ratio for 1850}$$
$$= \frac{\text{(COL, rich in this country/COL, poor in this country)}}{\text{(COL, rich in England/COL, poor in England)}} \quad (1)$$

Applying separate national price levels to Table 1's two consumer bundles for richer and poorer households in the early nineteenth century yields the results in Table 4. Table 4 shows that both the richer and the poor strata could have found their consumer lifestyle to be cheaper in eastern Canada or in the eastern USA than in southern England, whereas the same was not true in Sydney, at least not in 1850.

On the other hand, this cost-of-living advantage varied between the two income strata, and is sensitive to the choice of household budget weights. The contrast between American and English price structures makes the American prices look more egalitarian using either set of weights. Not so, however, for the other two countries. To be sure, sticking with English weights would suggest that all three newly settled countries were blessed with more egalitarian prices structures. Yet using the weights from early nineteenth-century America yields nearly a tie game, in which the rich and poor look similarly disadvantaged by higher Australian prices. In Canada using American weights makes the price structure in 1850 look inegalitarian relative to Britain. Thus, Table 4 finds a more egalitarian prices structure in four or five of the six intercontinental contrasts.

Thus far, our results offer new perspectives on both history and geography. Over the decades between the late seventeenth century and the early twentieth, the new cost-of-living history seems to be suggesting a reversal. In the eighteenth century and the start of the nineteenth, we see no improvement in cost pressure on the common-labor subsistence lifestyle relative to the living style of those better off—yet such an improvement arrived unmistakably in each country in the nineteenth century, with the common folk now getting the better break from cost-of-living trends. As for geography, our transoceanic contrasts for 1850 tend to find that price structures in the countries of new settlement tended to favor both income groups, but especially the common folk toward the bottom of the income ranks. Why?

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[15] For historical conversions to metric, and some commodity weight/volume ratios, again see the Global Price and Income History site (http://gpih.ucdavis.edu), the International Institute for Social History's history of prices and wages (http://iisg.nl/hpw), Robert Allen's homepage, and the further metrological links provided by these sites.

Table 4 Relative prices and costs of living in 1850

Commodity	British pence per—	Southern England	Eastern Canada	(Mostly Eastern PA) USA	(Mostly Sydney) Australia
Panel (A.) International price ratios for 1850					
Bread	kg	3.56	2.81	2.68	3.86
White flour	kg	1.54	0.59	0.59	0.34
Potatoes	kg	1.34	1.29	3.54	8.82
Rice	kg	12.86	5.29	4.81	3.86
Pork	kg	12.59	6.89	10.98	15.43
Eggs	dozen	6.45	0.46	8.43	16.00
Butter	kg	20.00	13.18	24.75	33.07
Cheese	kg	12.10	5.67	10.65	15.43
Sugar	kg	11.36	6.16	9.26	7.72
Coffee	kg	43.94	14.25	45.30	30.86
Tea	kg	9.22	29.88	24.00	48.50
Beer	liter	4.64	2.86	4.19	8.72
Salt	kg	0.69	0.28	0.29	3.85
Firewood	cubic meters	29.62	82.48	24.60	29.52
Candles	kg	12.17	13.79	10.10	9.92
Shoes	pair	63.78	90.88	47.54	77.00
Cloth	meter	3.33	6.97	3.67	7.00
Housing	month	245.00	126.00	100.16	118.40
Unskil. wage	day	28.69	25.20	44.38	83.16

Table 4 (continued)

Commodity	British pence per—	Southern England	Eastern Canada	(Mostly Eastern PA) USA	(Mostly Sydney) Australia
Panel (B.) The resulting international contrasts in living costs for 1850, relative to England					
The international cost-of-living ratio, covering about 20 commodities,					
Using shares for poorer English in 1688			Using shares for richer English in 1688		
Canada 0.83	USA 0.91	Australia 1.28	Canada 0.95	USA 1.00	Australia 1.55
Using USA laborer's budget shares			Using USA clerk's budget shares		
Canada 0.89	USA 0.82	Australia 1.20	Canada 0.82	USA 0.88	Australia 1.23

The 20 commodities from Panel (A.) were aggregated into an overall cost of living using a unit-elastic Cobb–Douglas functional form. The unit elasticity implies that an $x\%$ rise in any price brings an $x\%$ decline in the quantity of that commodity consumed. The 1850 prices for the England and the USA are five-year centered averages. Those for Australia are averages for 1850–1854, since the McLean-Woodland data series start with 1850. Those for Eastern Canada are for 1850 itself, since the prices for later years were not available during this calculation. The sources are Clark (via gpih.usdavis.edu) for England; Geloso (2019a, b) for Eastern Canada; McLean and Woodland (1994, via gpih.ucdavis.edu) for Australia; and a blend of data series mainly drawn from by T.M. Adams (1944) for Vermont farms, Anne Bezanson et al. (via gpih.ucdavis.edu) for southeastern Pennsylvania, and Carroll Wright (via gpih.ucdavis.edu) for Massachusetts. The two income groups for England in 1688 were estimated by Richard Stone (1988, Appendices), working with Gregory King's notebooks. The "poorer English" are his Group 1, covering the 0–41 percentiles in the income ranks among households not headed by domestic servants. The "richer English" are his Group 6, ranking between the 91.8th percentile and the 95.5th percentile

4 Which component price movements shifted the relative costs of living?

What price movements explain the nineteenth-century egalitarian movements, and the present section "accounts for" the observed movements and international contrasts, by breaking down each contrast in the cost of living into its component parts. Starting with this step helps direct our search for deeper, more exogenous, causal forces by providing more detailed results that any causal idea must also explain.

Four explicit accounting exercises are presented in Table 5. The first and third use a price-index identity to "account for" a movement in income classes' costs of living over more than a century, and the other two use the same identity to account for an international difference in the middle of the nineteenth century. Each panel of Table 5 uses one of the two different sets of expenditure shares from Table 1.

For each of the four countries, and using either set of expenditure weights, the time-series challenge is the same: To account for those sizeable egalitarian gains, the advance in the relative cost of living a richer lifestyle, unveiled for the nineteenth century back in Figs. 1 and 2 and in Tables 2 and 3. Two positive historical forces combine to account for most of this egalitarian shift in price stricture in all eight cases.

The relatively cheaper cost of grain-based food items accounts for a sizable share of the evolution, regardless of the basket used. The opening of the Canadian west especially with the "wheat boom" of the 1890s (Russell 2012) and a previous agricultural expansion in the province of Ontario (McCallum 1980) meant that the land-rich frontier was being harnessed to increase food production. The same was true for the USA and Australia (Federico 2005: 31–40; McLean 2013: 58–63). This combination of a land-rich frontier, which could be utilized to increase food production, and a growing access to international markets, especially after 1850, thanks to reductions in the costs of transport and communications,[16] would have magnified the contribution of these food items to the changes in real inequality. For as long as grains were key staples, with income elasticities below one, a relative decline in grain prices was egalitarian. Its contribution assumes great weight here because Engel effects were so powerful in the less prosperous world before 1914, as we reaffirmed back in Table 1.

The other strong influence on changing costs over this century appears to have been the rise in the relative price of services, here proxied by the rise in the wage rate for common labor, given that the rich consumed services more than the poor—especially when the American weights are used. One would expect services, which account for a sizeable share of expenditures by rich households, to depend heavily on unit labor costs, or the wage rate times average labor productivity in the service sector.

We know from the international trade literature that the wage rate tends to be driven by productivity in the whole economy, while non-tradable services tended to have more stagnant productivity before the revolutions in finance, communications,

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[16] This would include overseas shipping as well as overland shipping which became cheaper as railroads made the frontier parts of Canada, Australia, and the USA more accessible (and thus inciting increases in the supply of food staples) (see notably Hobson 1895: 85; Norrie 1975).

Table 5 Accounting for some differences in the relative cost of living (COL), rich versus poor

Log-trend or log-differential	Share (%) contributed by log-differences in:			
In the rich/poor COL ratio to be explained	Grain prices	Other food and bev. prices	Services (wage rates)	Other non-food prices
The long nineteenth century, using English 1688 expenditure patterns				
England, 1800 to 1912＝0.155 (up 17%)	117	− 45	87	− 59
Canada, 1800 to 1912＝0.147 (up 16%)	57	25	85	− 66
USA, 1800 to 1912＝0.052 (up 5%)	41	− 60	84	35
Australia, 1850 to 1912＝0.181 (up 20%)	89	− 0.6	38	− 26
The long nineteenth century, using American 1816–1831 expenditure patterns				
England, 1800 to 1912＝0.161 (up 17%)	34	1	33	32
Canada, 1800 to 1912＝0.188 (up 21%)	22	− 75	64	89
USA, 1800 to 1912＝0.164 (up 18%)	41	− 60	84	35
Australia, 1850 to 1912＝0.215 (up 24%)	62	1	43	− 6
The 1850 intercontinental snapshots, using English 1688 expenditure patterns				
Canada versus England in 1850＝0.127				
(Canada > England by 14%)	78	− 34	− 11	67
USA versus England in 1850＝0.097				
(USA > England by 10%)	90	− 25	49	− 14
Australia versus England in 1850	＝0.193			
(Aus > England by 21%)	16	− 2	61	25
The 1850 intercontinental snapshots, using American 1816-1831 expenditure patterns				
Canada versus England in 1850＝− 0.075				
(England > Canada by 7%)	− 51	183	26	− 57
USA versus England in 1850＝0.069				
(USA > England by 7%)	25	− 80	94	61
Australia versus England in 1850＝0.025				
(Aus > England by 3%)	− 335	− 179	623	− 9

The shares spent on each category of commodities by the two income classes, and the list of prices within each expenditure, are as defined in Table 1. Beverages are included in the "other foods" category. Each level of a cost-of-living ratio is a centered five-year average of that ratio. Thus, 1800 is 1798–1802, 1850 is 1848–1852, and 1912 is 1910–1914 (except that for Canada, 1912 is 1909–1913). The overall costs of living for the high-income and low-income classes are defined, in natural logs, as $C_{high} = \sum b_i p_i$ and $C_{low} = \sum a_i p_i$. Where b and a are expenditure shares summing to one, the p's are log-prices, and the i's are the commodity categories, here grains, other foods, services, and other non-foods. Define two historical contexts x and y. In the first panel, x is USA 1800 and y is USA 1912. In the second panel, x is England 1850 and y is USA 1850. The accounting equation quantified in this table is Δ_{y-x} $(C_{high} - C_{low}) = \sum (b_i - a_i)(p_{iy} - p_{ix})$. Where again the C's and p's are defined as natural logarithms

and retailing accelerated after the 1970 s. This means that middle- and upper-class consumers of non-tradable services may suffer more upward price pressure when labor productivity is advancing rapidly economy wide. It is therefore easy to understand the contrast in the role of service prices, tied to the unskilled wage rate, in Table 5's first and third panels. By contrast, the relative prices of non-grain foods and of the residual category (non-foods other than services) have no consistent

impact on the relative costs of living. Not all staple goods were traded internationally, even if some like wheat were. As such, goods like meats, dairy products, and potatoes were not traded internationally (at least until the late decades of the nineteenth century) and they remained noticeably cheaper in the New World. For example, beef in 1850 was 41% as expensive in Canada as it was in England, while that proportion for potatoes stood at 38%. In the USA and Australia, the proportions for meat stood at 37% and 30%, while those for potatoes stood at 38% and 22%. Differences like these made the New World an attractive place for the poor, even in the case of Canada (Geloso 2016, 2019a, b).

It turns out that these two positive forces—cheaper staple grains and more expensive labor-intensive luxury services—also help to explain those intercontinental contrasts in living costs in 1850, introduced in Table 4. As the spatial contrasts for 1850 in Table 5 show, both the grain effect and the services effect stand out as features making the price structure more egalitarian in the three countries of recent settlement than in England.[17] Here again, the roles of non-grain foods and of non-service luxuries are less consistent.

5 Revising the trends in top income shares

How and when did the trends in the relative cost of a richer lifestyle affect the magnitude of the now-famous rise of inequality before 1914? Mild egalitarian trends in the cost of living, such as those we find for the four countries we consider, attenuate increases in income inequality. In other words, adjusting for those trends in the cost of living allows us to capture "real" inequality. For two of our four countries, we can use the measures developed in Part III to convert the conventional measures of nominal income inequality into corresponding real-inequality measures. For Britain between 1688 and 1911, we can apply our cost-of-living adjustments to the latest estimates of nominal top-income shares, and we can do the same for America between 1774 and 1914. The top-income shares most conveniently available for these full-time spans are the top-one-percent share and the top-ten-percent share.[18]

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[17] It is also worth pointing out that—in all four countries we considered—prices for manufactured goods such as clothing fell rapidly relative to the price of grains. In the basket using American weights, where clothing constitutes a larger share of expenditures for the poor than the rich, this is particularly important as this contributed to the egalitarian price. However, consistent and comparable series on other (more heterogeneous) manufactured goods are not available.

[18] Unfortunately, for Canada, the first series of income inequality start only around 1920 (Saez and Veall 2005). There are series covering earlier wealth inequality (Di Matteo 2016, 2018) that can be used, but there are none that speak to Canada as a whole, but only regional estimates for different top income shares (1% or 10%) for disparate time periods. However, thanks to recent work by Di Matteo (2018: Appendix 2) which compiles all available estimates of wealth inequality in Canada, we can see that two areas (the province of Manitoba and Wentworth county in the province of Ontario) offer estimates from the early 1870s to the eve of the Great War for the top 1% of wealth holders. In the case of Wentworth county, the increase in real wealth inequality is between 6 and 32% inferior to the increase in nominal wheat inequality between 1872 and 1912. In Manitoba, the changes in real wealth inequality between 1875 and 1912 are 6% to 20% below the changes suggested by nominal figures.

To attach our cost-of-living measures to movements in nominal income shares requires a simple transformation of movements in nominal income shares into movements in ratios of average real incomes. We offer two such transformations in Table 6. First, to follow the literature's frequent focus on the relative income of the top 1 percent, we contrast the real income movements of the top 1% with those of the bottom 99%. Second, to remain truer to the income ranks of our government clerk versus laborer, we contrast the real income movements of the top 10% with those of the bottom 40%.

The resulting movements are sketched for benchmark years in Table 6 and in the two-part Fig. 3a, b. Our derived real inequalities confirm some qualitative impressions from the current literature on nominal inequalities in Britain and America, yet seem to affect the long-run trends in, and the timing of historical peaks in, income inequality. For Britain, Fig. 3a, b starts with nominal rich/poor income ratios from Robert Allen (2018). The richest 1% had their peak advantage in nominal income in the 1867 benchmark (Fig. 3a), whereas the whole top 10% had their peak advantage in nominal incomes come earlier, at the 1798 benchmark (Fig. 3b). Then, both top groups lost ground between 1867 and 1911. Adding the social differences in the cost of living does not change the directions of movement, but it magnifies the leveling of incomes after 1867.[19] Whichever estimates one prefers, Britain's real inequality between the top 1% and the rest came sometime back in the nineteenth century, and not as late as the early twentieth.

For America, the real inequality movements from 1774 to 1914 departed more visibly from the nominal movements. In nominal terms, the rich kept steadily pulling ahead of the poor, aside from a pause during the Civil War decade (Lindert and Williamson 2016). By the eve of the First World War, in nominal terms, the Americans were as unequal in their incomes as the British. In real terms, however, relative price movements eliminated either half (Fig. 3a) or all (Fig. 3b) of the rise in inequality over those 140 years.

6 Remaining caveats and new frontiers

Our results offer important insights into the study of inequality. The first is that it reinforces the contention that more attention must be given to price structures in order to reflect "real" inequality differences between rich and poor. There are many factors related to prices that can render incomplete any nominal-income based portrait of inequality. This is true over time (as the relative price of certain goods changes over time) and over space (as certain goods tend to be cheaper in certain areas—especially when these goods are not internationally traded).

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[19] For the Bowley-Stamp-Routh 1911 estimates, see Lindert and Williamson (1983) and gpih/ucdavis.edu/distribution. This finding is drawn from estimates of the distribution of household incomes. For a different presentation of the 1911 distribution among taxpayers, rather than among households, see Scott and Walker (2018).

Table 6 What the cost-of-living ratios imply about real household-income inequality trends in Britain and America, 1688–1914

Panel (A.) The top 1% versus the bottom 99%

		Top 1% share of income (%)	Nominal income ratio, top 1%/bottom 99%	Cost-of-living ratio, rich/poor		Ratios of real average incomes	
				English weights	American weights	English weights	American weights
1688	England–Wales	14.7	17.1	0.998	0.839	17.1	17.1
1759	England–Wales	18.0	21.7	0.984	0.886	22.0	20.5
1798	England–Wales	17.8	21.5	1.014	0.815	21.2	22.2
1867	England–Wales	28.6	39.6	0.978	0.978	40.4	34.0
1867	UK	28.5	39.5	0.978	0.978	40.3	33.9
1911	UK	21.8	27.6	1.134	1.183	24.3	19.6
1774	13 colonies	8.5	9.2	0.931	0.798	9.2	9.2
1850	USA	10.4	11.5	1.000	1.000	10.7	9.2
1860	USA	10.0	11.1	1.025	1.030	10.0	8.6
1870	USA	9.8	10.8	1.057	1.038	9.5	8.3
1913	USA	18.8	22.9	1.153	1.263	18.5	14.5
1914	USA	19.4	23.8	1.151	1.263	19.3	15.1

Panel (B.) The top 10% versus the bottom 40%

		Top 10% share of income (%)	Bottom 40% share of income (%)	Cost-of-living ratio, rich/poor,		Ratios of real average incomes	
				English weights	American weights	English weights	American weights
1688	England–Wales	43.2	11.4	0.998	0.839	15.1	15.1
1759	England–Wales	43.2	11.6	0.984	0.886	15.1	14.1
1798	England–Wales	52.0	9.4	1.014	0.815	21.7	22.8
1867	England–Wales	49.8	17.3	0.978	0.978	11.8	9.9

Table 6 (continued)

		Top 10% share of income (%)	Bottom 40% share of income (%)	Cost-of-living ratio, rich/poor,		Ratios of real average incomes	
				English weights	American weights	English weights	American weights
1867	UK	48.5	15.7	0.978	0.978	12.6	10.6
1911	UK	45.7	16.1	1.134	1.183	10.0	8.1
1774	13 colonies	32.2	12.6	0.931	0.798	10.2	10.2
1850	USA	36.5	11.7	1.000	1.000	11.6	10.0
1860	USA	38.0	10.7	1.025	1.030	12.9	11.0
1870	USA	39.3	11.1	1.057	1.038	12.5	10.9
1913	USA	42.3	11.3	1.153	1.263	12.1	9.4
1914	USA	42.9	11.5	1.151	1.263	12.1	9.4

The England–Wales nominal income shares for 1688 through 1798 are calculated from Allen (2018, Appendix), using the shares of family income net of servants' pay and counting servants as separate "families." Both the England–Wales and the UK 1867 top-share estimates, and the distribution among households in 1911, are from gpih. ucdavis.edu/distribution. The cost-of-living ratios were calculated as in Tables 2 and 3. The real-income ratios are derived by setting the cost of living at 1.000 for 1688 in the English case, and for 1774 in the American case. For America, we use the top-percent shares estimated by Lindert and Williamson (2016) and, for 1914, by Piketty et al. (2018), using the population 20–64 rather than households. The nominal income shares for the American bottom 40% in 1914 are based on this crude extrapolation. Bottom 40% in 1914= bottom 40% in 1929 times (bottom 90% share in 1914)/(bottom 90% share in 1929). The bottom 40% in 1929 received 12.5% of money income (the OBE-Goldsmith series cited in *Historical Statistics* Series Be21–Be26). The bottom 90% received 42.9% in 1914 and 46.7% in 1929 (Piketty et al. 2018)
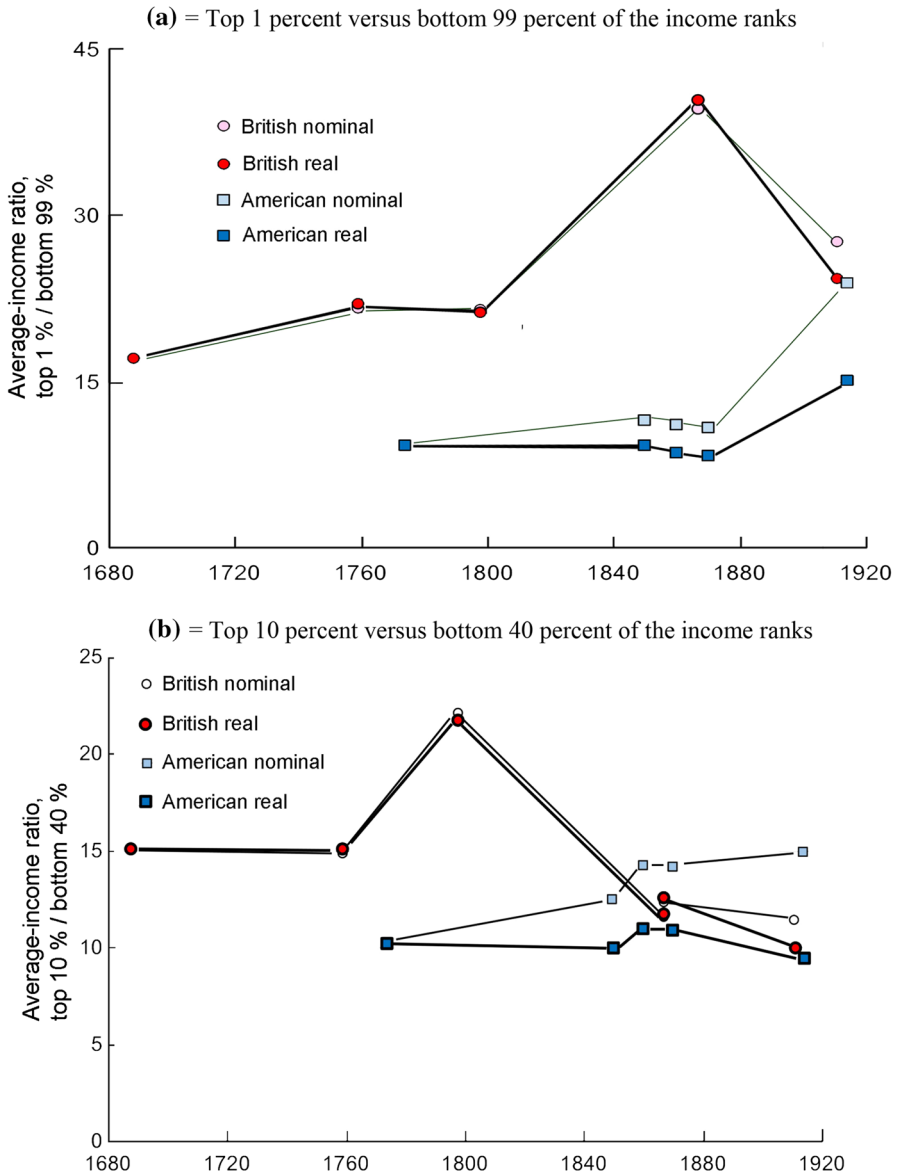
(a) = Top 1 percent versus bottom 99 percent of the income ranks

(b) = Top 10 percent versus bottom 40 percent of the income ranks

Fig. 3 What the cost-of-living ratios imply about real income inequality in Britain And America, 1688–1914 (See Table 6)

However, there are caveats to be underlined in order to properly expand this research frontier. We have already mentioned some of them. Ideally, as we have noted, one should complement the constant elasticity measures used in this paper with fixed quantities of goods (like poverty baskets and respectable-living baskets), to see whether the elasticity assumptions make any great difference. This would call

for the design of baskets, along the methodological lines drawn by Allen (2001), but for the very richest in each society, as we do have well-established baskets for those near the poverty line.

Another caveat relates to urban-tenant bias in real income measures, including ours. Regions and classes differed in their tendency to supply themselves with goods and services, especially food and housing. Missing this point would mean misreading the history of real incomes. In the real-wage literature, for example, workers are supposedly non-owning tenants who pay for all their food and rent for occupying housing they do not own, an assumption that fits low-skill laborers in England. Yet if a large share of them (as in the case of Canada, the USA, and Australia in this paper) do own their own food-growing resources or own their homes, either as outright freehold or as long-term tenants paying less rent that the current market value, these implicit values of income should be included in any measure of nominal income. In the real wage literature, it has not been included. Contrary to an inference invited by that literature, when food prices rose by 30% relative to farm wages, ordinary peasants did not experience anything like a 30% drop in real purchasing power. As net sellers, many peasants actually gained from that rise in food prices.

The degree of home production also constrains Engel's Law. For example, consider the shares of purchased food in total purchases for different classes in the USA in the 1830s, as sketched by Dorothy Brady (1972, pp. 76–83). For a farm family with annual expenditures of only $200–500, the food share of total expenditures was 34 percent, which was no higher than the mid-range share, again 34 percent, for urban families having total expenditures of $1000–3000. What Engel had in mind in his classic studies of the food share of total expenditures was its share of total consumption expenditures for families who bought all that they consumed. To restore his Law, one must compare richer and poorer with similar shares of home production. In this same case of the USA in the 1830s, Engel's Law re-emerges when we compare the shares of all expenditures devoted to food within the cities—as high as 61% in that poorer $200–500 group versus the 34% for the $1000–3000 group. Yet if we carelessly compare farm with city, the importance of home production of one's own food (and housing and unskilled services) was historically so great as to confound the usual assumption that food is the ultimate staple in terms of purchases (as opposed to total consumption).

Our calculations have side-stepped the home-consumption issue. Even in our frontier economies, the relevant price series are mainly non-farm, and even urban. For Canada, the prices relate to the main cities plus the proximate countryside around those cities. Some of them should be categorized as urban prices, but some are rural prices (but not hinterland prices, which would be quite problematic). For America, the series are largely from Philadelphia, except that we have (courageously) spliced Vermont farm figures onto the more urban series, to extend the indices past 1896 to 1914. For Australia, too, the series are urban, coming mainly from Sydney. One obvious solution would be to find benchmark year estimates of prices in both rural and urban areas in order to properly assess differences.

The fact that data are more available for urban markets than for the countryside means that our findings should be read as applying especially to urban households, or more broadly to those who buy all of their consumption in the marketplace, rather

than producing much of it themselves. The few cases where we can observe both urban and farm-gate prices underline how the urban–rural price ratios drifted across the nineteenth century, with major implications for the study of inequality. We find that the prices of staple grains dropped much more in the cities (data from Philadelphia, New York, and Boston) than on farms (in Vermont). This movement was presumably aided by improvements in transporting grains from farms to urban markets. On the other hand, the prices of two relative luxuries, sugar and cotton sheeting, rose in the cities relative to those farms. Again, we presume that improved transport played a role, easing the shipment and sales of these largely imported goods from the cities into the hinterland. The upshot for relative living costs is clear. In relying on urban price data we, like other scholars, have quantified movements that were particularly egalitarian in the cities. We would have found much less egalitarian drift in the cost of living in the countryside—where, in any case, the staple goods in question were often home-produced. The cost-of-living story, in other words, carries particular weight in the urban part of the economy.

Each of these caveats has its positive side, in the form of a further research frontier to be conquered as historical data continue to become more available.

For the present, we have at least opened a new historical geography, suggesting when and where the cost of living moved quite differently for different income ranks. Relative to the emerging history of nominal income (or wealth) inequality, we find that not only in Western Europe but also in other continents, cost-of-living movements failed to move in favor of the poor in the eighteenth century, but did so across the nineteenth century. We have also suggested two main explanatory factors: the real prices of staple grains and of luxury services. Given the roles played by these two forces, one could tell a new story of how a delayed rise in (decline of) the real grain wage translates into an egalitarian (inegalitarian) movement in relative lifestyle costs.

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