AMERICAN INCOMES BEFORE AND AFTER THE REVOLUTION

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NBER Working Paper No. 17211
July 2011, Revised February 2013
JEL No. N11,N91,O47,O51

ABSTRACT

Building social tables in the tradition of Gregory King, we develop new estimates suggesting that between 1774 and 1800 American incomes fell in real per capita terms. The colonial South was richer than the North at the start, but was already beginning to lose its income lead by 1800. We also find that free American colonists had much more equal incomes than did households in England and Wales. The colonists also had greater purchasing power than their English counterparts over all of the income ranks except in the top few percent.

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I. Early American Growth and Inequality Debates

      American economic historians need fresh information on the income levels that prevailed at the end of the colonial era and the dawn of independence in order to understand this country's growth process and its evolving social structure. This need keeps arising whenever we try to cast back from today to the late colonial period, or to project ahead from early colonial years, or to view American incomes in trans-Atlantic perspective.

      The debate that tries to back-cast American growth from 1840 has centered around Paul David's classic 1967 article on "New Estimates, Controlled Conjectures", a descriptive label that should apply to this paper as well. David, Robert Gallman, Thomas Weiss, and others centered their plausible conjectures on the division of the economy into large sectors, each with its own labor force and labor productivity growth. All of these competing estimates have been built up from the output side in the spirit of Simon Kuznets. This paper offers something quite different, building up estimates from the income side in the form of what have been called social tables. Until recently, our alternative approach has been hampered by the paucity of data on the occupations and the sector mix of the labor force before 1840. The early censuses did not help much with these, except to give indicators that should have affected labor force participation, such as sex, race, age, region, and urban/rural. Accordingly, we have long thought that a new attack on the issue of early American growth must feature new information on American occupations. Even though many household heads were simply called artisans, merchants, farmers, planters, farm hands, or slaves, it helps considerably to know what labor force shares they represented, where they lived, their average incomes, and how those incomes changed over time.[1]

      Economic growth across the colonial era defines more contested territory. Some have seen only extensive growth: that is, stagnant productivity, with only population growth and land settlement, and without gains in average living standards. Others have seen evidence of intensive growth: that is, considerable productivity growth, some emphasizing seventeenth-century emergence from initial hardship and mortality, and others emphasizing gains across the middle of the eighteenth century. This debate has also been hampered by lack of knowledge about labor inputs and occupational structure, and by the roughness of any estimates of productivity growth within such sectors as agriculture or shipping.[2]

Our interest in American incomes around the time of the Revolution is enhanced by viewing them from across the Atlantic. Angus Maddison (2007) estimated that it was not until after the 1870s that the United States caught up with the United Kingdom in real GDP per capita, though active debate has ensued about the uncertainties of his and others' estimates. Maddison's beliefs need to be reconciled with the fact that North America attracted a significant net emigration from the Mother Country and that colonial and republican population growth was much faster here. In the light of current research on the Great Divergence, on the history of European incomes, and on the continued use of the Maddison world income estimates, we think the time is ripe to add data from the American side to compare with the new estimates for Europe.

We can now offer new estimates based on more archival data than were available to earlier researchers. The harvest is offered as an "open-source" presentation of our detailed data and procedures on the internet, for both negative and positive reasons. The negative reason is that many scholars might resist accepting some new estimates based on vulnerable primary data, wishing to offer their own estimates. The positive reason for open sourcing is the dynamism of the database itself. The information explosion that has offered us new data will continue to offer additional data to all scholars in the future. Maximizing the disclosure of our data and procedures accelerates the opportunities for improving the reliability of the estimates. Hence, our work is tied to a set of appendices and two downloadable sets of spreadsheet and text files. One is this *Journal*'s archived file set, and another is an expanding data set relating to our larger project on American incomes 1774-1870.[3]

Our findings confirm some common beliefs about growth and inequality in early America, yet contradict others, and also introduce some brand new issues. This paper offers a clearer view of colonial American inequality and how the incomes of different classes compared with those of their counterparts in the Mother Country. American inequality was much lower in 1774 and 1800 than in England or Wales, especially among free whites. Inequality was also lower in the Northern colonies than in the United States today. We find higher colonial incomes in 1774 than did previous scholars, especially higher in the Southern colonies. In 1774, average colonial incomes seem to have been higher than those in England and Wales, using either exchange rates or purchasing power parity hints, though American incomes were almost

certainly lower in 1800. Our estimates raise new questions about what happened between 1774 and 1800, during the Revolutionary War era and then at the dawn of the Republic.

II. How the Estimates Are Derived[4]

A. The 1774 Colonial Evidence

Our approach starts by counting people by occupations or social classes, and mustering evidence about their average incomes. That is, we build national income and product accounts (NIPA) from the income side. This departs from all recent scholarship on early American growth, which has built its real income series from the production side, and then used price indexes to estimate nominal incomes. Historians will recognize our approach as that of building *social tables*,[5] in the "political arithmetick" tradition spawned by such Englishmen as Sir William Petty and Gregory King in the seventeenth century. That is indeed our approach here, as it has been in other publications of ours.[6] We are preceded by at least two early American writers who imitated Petty with their own calculations of what their region was worth – presumably to guess at its ability to pay taxes and fight wars.[7]

Fortunately, the archives continue to accumulate early local returns that recorded people's occupations, including such social labels as "Esquire" or "widow" in the English tradition. Reconstructing society from these sources is no easy task, however, and will continue to be challenging even as the primary data accumulate in the future.

Any social profile of Americans on the eve of the Revolution must start from local censuses, tax lists, occupational directories, and probates, all supported by the earliest national population censuses of 1790 and 1800. Fortunately, the recent electronic revolution has made local enumerations from the late eighteenth century much more accessible. While all records before 1790 were local, aggregate regional counts can be developed by assuming that proportions from one documented locality represents those of other localities in the same region, with the same population density, urbanization level, and qualitative attributes.

Our path to counting early Americans by work status, location, and living arrangement starts from basic population totals themselves, and then adds early US labor force estimates

(themselves constructed from labor participation rates by age-sex-slave/free cells), before dividing up that labor force by occupation and by household headship status.

Population census counts. The few local censuses from the colonial period are now collated and referenced in the colonial section of *Historical Statistics of the United States*, both in the Bicentennial Edition (1976) and in the *Millennial Edition* (2006). These offer detail by sex, race, free/slave status, and rough age distributions for seven colonies; we clone the demography of the other six missing colonies from these seven.

Labor force participation rates. Next we derive persons in the labor force for each demographic group defined by place, sex, race, free/slave, and age. Following convention, the labor force consists of all persons generating products and services sold in significant part (or, for slaves, demanded in significant part) outside the household.

To convert population into labor force, we use the detailed labor participation rates for 1800 supplied by Thomas Weiss. It seems reasonable to assume there were no behavioral changes over these twenty-six years in the rates defined in the detailed cell-specific Weiss estimates, which give separate rates for such cell categories as urban Pennsylvania's free white females age 10-15, or rural South Carolina's male slaves over the age of 10, or small town Connecticut's free white males aged 16 and older. However, since these categories changed in relative importance over time, the regional and national labor participation rates could and did change between 1774 and 1800.

Recorded occupations. Sketching the social make-up of the labor force requires detailed occupation counts for different localities. We draw on newly accessible counts for years near 1774, though only for a few places, only for parts of the labor force, and only with the help of some comparison of occupational mixes over time and space.

Our fresh start on the social structure of America on the eve of the Revolution uses local tax assessment lists and occupational directories, as reported in Table 1. Such lists allow us to create the following occupational groups for the free population:

Group 1 = Officials, titled, professionals

Group 2 = Merchants and shopkeepers

Group 3 = Skilled artisans in manufacturing

Group 4 = Skilled in the building trades

Group 5 = Farm operators (renters, sharecroppers, planters, owner-operators)

Group 6A = Male menial laborers

Group 6B = Female menial laborers

The new data re-shape the occupational structure of the colonies. For example, relative to Alice Hanson Jones (1977), our estimates shift a lot of the Middle Colonies' labor force from middling farmers to less wealthy craftsmen and laborers, and to males with no stated occupation.

In the urban South, the 1790 directory for Charleston seems usable, when scaled back to the estimated Charleston 1774 population. One gets the same occupational patterns by starting with Alice Hanson Jones's *w* weights for a sample drawn from four Southern states. In either case, one must adjust for the over-representation of absentee landowners and, especially, of slaveholders. We adjust the Jones weights, guided by some very useful local censuses from three North Carolina counties in 1779-1782. These enumerate the whole population of free household heads according to whether they held slaves or real estate or both or neither. We assume that the same adjustment of weights is required in Charleston as in the rest of the South.

For the rural South, we carried out the same adjustment away from slaveholders and landowners, giving instead more weight to ordinary farmers. One could wish, of course, for a broader sampling of the rural South than just the Alice Hanson Jones sampling from four states, plus our new sampling from the three North Carolina counties. There are other rural Southern county assessment documents on the internet, but only very few are for dates earlier than 1798, and none of the lists we have seen record the occupations of the household head.

Unrecorded occupations. Persons with occupations recorded by tax assessment lists or urban occupational directories fall short of the persons in the labor force. In most cases they even fail to capture all household heads, the exception being those three counties of rural North Carolina between 1779 and 1782, for which the listings seemed to have captured all free household heads.

Not all unlabeled labor force members are equal. Some lack an occupational label despite a positive amount of assessed wealth. Some lack an occupational label, and are listed as tax-exempt because they had zero or near-zero wealth. Thus, we distinguish between the following groups of household heads in the social tables:

Group 7 = free males with positive wealth but no recorded occupation,

Group 8 = free females with positive wealth but no recorded occupation, and

Group 9 = free persons recorded as having zero or near-zero wealth and no stated occupation, and others who are in the labor force but unlisted in local records.

Counting Households. One could avoid measuring household headship if we were interested only in measuring aggregate national product, since it depends only on who is in the labor force and their average income. Yet we need the headship rates by occupation to measure inequality.

Households are the income recipient units used here to measure income inequality, for both practical and theoretical reasons. Previous investigators have been forced to confront the simple fact that taxable property, such as real estate, is used by all household members, even if only one is the owner and taxpayer. The prevailing practice is to measure income inequality among households, not among individual income earners. In order to compare apples with apples, we do the same. That's the practical reason. The theory comes from Simon Kuznets (1976), who warned against measuring inequality among individual earners and emphasized the superiority of the household focus. Caring about economic inequality means caring about how unequally people consume resources over their lifetimes. Even if data constraints force us to study annual inequality rather than life-cycle inequality, Kuznets pleaded for the measurement of annual income per household member. The numerator should capture the incomes of all economically active household members, and the denominator should capture all adult-equivalent consumers in the household.

Since the early population censuses usually did not count households, some assumptions must be invoked to decide who were in fact household heads. Fortunately, historians of early America have already grappled with this issue. Following the leads of Billy Gordon Smith (1981, 1984, 1990) and the late Lucy Simler (1990, 2007) in particular, we estimate the number of household heads from population data from c1774 and c1800 invoking the following assumptions:

(1) All free white males, 21-up, were household heads, subject to (4) below;

(2) All free white widows with any indication of property ownership or of occupations were household heads;

(3) One-sixth of the free black population consisted of household heads;[8]

(4) The number of free white males, 21-up, who were *not* household heads is matched by the number of free white females, 18-up, who *were* household heads, despite not

being included in (2) above. That is, we assume that two errors offset each other when using the white males 21-up as household heads. Hopefully, later studies can make more headway on the headship rates by gender.

These assumptions have generated the total numbers of households by place – that is, by region and by urban versus rural.

By subtraction, we derive the number of household heads that are missed by the listed-occupation counts. The shares of heads omitted are often large when the occupational data come from the tax lists and the urban directories. As estimated in detail elsewhere, the colonial business directories and the tax lists may have missed more than 30 percent of all households.[9] Left uncorrected, such counts would underestimate total income and its inequality, since many of the unregistered were poor. In contrast, the tax lists from around 1800 are more likely to have captured something like the full population, or so it appears in our samplings from New York State property tax rolls that began around 1799, where the number of assessments approximated the estimated number of households. The same should have been true of the federal direct tax of 1798, which required a household enumeration subject to external audit.

Still, we have found significant omissions in some tax lists and business directories from the colonial era. Which groups were most frequently omitted? The literature has advanced the plausible intuition that the omitted consisted mainly of the tax-excused poor. Yet, there is also some evidence that many in the middling and rich groups may also have been omitted, or at least that their wealth was under-assessed. We have used clues from the tax assessments to divide the household heads of no recorded occupation into Groups 7-9.

Three tough questions need to be answered about those who were in the labor force (LF), according to the censuses and the Weiss estimates of labor force participation rates, yet who were not reported as household heads (HHs): First, how many of them were there for each place defined by region and by urban/rural? Second, what kinds of occupations and earnings rates did they have? Third, whose households did they live in, and share resources with? Guided by the censuses, we identify the following groups in the labor force who were not household heads:

Groups 10 and 11 = Free white males and females, respectively, ages 10-15;
Groups 12 and 13 = Free white males and females, respectively, ages 16-up, but not household heads;

Groups 14 and 15 = Free black males and females, ages 10-15;

Group 16 = Free black males ages 16-up, minus free black household heads;

Group 17 = Free black females ages 16-up;

Group 18 = White indentured servants in Maryland, the only colony that labeled them separately in a census near 1774; and

Group 19 = Slaves ages 10-up (65 percent of whom were assumed not to be household heads).

Some of these groups contained laborers who were almost surely paid only unskilled wage rates, while others could have been spread over occupations of higher earnings. Our income estimations make the following assumptions within each location:

Groups 10, 11, 14, and 15 (free non-HH heads ages 10-15) are allocated to Groups 6A and 6B, menial or unskilled, by sex;

Groups 12, 13, 16, and 17 (free non-HH heads 16-up) are allocated location-specifically across Groups 2-6 in the same proportion as are Groups 2-6;

Group 18 Maryland servants are allocated across occupations following Galenson (1981) and Grubb (1985), occupations that were relatively urban and skilled.[10]

Group 19, slaves ages 10-up, uses other scholars' estimates of the amount of their earnings they were allowed to retain for consumption, specific to region and occupation. In the South, the rate varied between 41.4 percent for field hands to 52.7 percent for Charleston labor. Following Claudia Goldin (1976), Richard Wade (1964), Richard Sutch (1975) and others, we assume that slaves doing non-farm work were artisans, construction workers, or unskilled (including servants). The non-farm share unskilled is based on the Charleston 1848 census, while the residual is divided equally between artisans and construction workers.[11]

So far, these calculations affect our estimations of both aggregate national income and income inequality. For inequality purposes, and following Kuznets, we must further decide in whose households these non-HH head members of the labor force lived. The data are almost non-existent on this issue. We make the following assumptions about the non-head earners "imported" into the households of others:

(1) For each region and urban/rural place (e.g. New England big cities or rural South), the non-heads and their individual earnings are absorbed into the same region and place.

(2) For the free population, within each group defined by region and urban/rural, we assume that the average earning power of each non-HH head imported into free families is the same for all free persons of that occupation in that place.

(3) Slave non-heads are taken into slave households only, leaving household income the same as the retained earnings of all slaves.

(4) This same assumption holds for the separately recorded group of Maryland servants, though the assumption is redundant here because these are one-person households.

These assumptions and the resulting allocations can certainly be challenged. We emphasize one point about data sources: For each place defined by region and by urban/rural, the aggregate imports of non-HH heads are driven by the census, the labor participation rates, and by the household headship rates. The allocation of non-HH heads to households by place is not yet derived from micro-studies about how households shared earnings, because there are too few such studies. Nor are the allocations simply assumed, except for the key middle-of-the-road assumption (2) above.

Labor earnings by occupation, circa 1774. We are able to assign annual incomes to the most ubiquitous occupations in each location, thanks to the enormous archival gleanings of Carroll Wright, T.M. Adams, Stanley Lebergott, Jackson Turner Main, Donald Adams, Winnifred Rothenberg, and a few others.[12] Their time-consuming collection of newspaper quotes and account book entries must be used with care. Some are in the depreciated local colonial currency, whereas others are in (British) pounds sterling. Fortunately, most sources, and Main in particular, were careful to say which was which. Some of the earnings are annual, as for white collar professionals and farmers, but others are monthly, weekly, or daily rates of pay, requiring assumptions about how many days or months they spent in gainful employment each year. We believe that for those days or months in which a person did not hold his or her main stated job, he or she nonetheless filled in with other productive work, like weaving and farming at home, and some of this output was traded on the market. Thus, our "full-time" estimates assume that daily or monthly full-time equivalent (FTE) workers performed productive work of some kind for 313 days a year (excluding only Sundays). This assumption implies, of course, that we include more non-market work in our income estimates than do other scholars that include only or mainly market work in their output estimates. However, to imitate the labor force behavior that other scholars may have assumed in estimating early American

GDP, and as sensitivity analysis, we also calculate "part-time" estimates that use fewer labor days per year.[13]

We enlarged the concept of labor earnings to include farm operators' profits, estimated by Main, plus slaves' and indentured servants' retained share of what they earned. As noted previously, we have called this labor income amalgam "own-labor incomes".[14]

Property income in 1774.[15] Our property income estimates benefit from Alice Hanson Jones's exhaustive and masterly study of America's wealth in 1774, based on her 919 probate inventories and supporting documents.[16] A key advantage of her data is that they identify the occupation or social status of most of the people in her colonial sample. We have examined her data and procedures in great detail, and find no flaws.[17] Jones realized that a probate-based sample ran the risk of overstating average wealth, and understating wealth inequality, because probate was more likely for the deceased rich than poor. She went to enormous lengths to adjust for this, ending with what she called $w*B$ estimates that were meant to capture more of the poor. We have moved in the same direction, using a different procedure. Our greater weighting of the poorer households was achieved by introducing the new data on occupational structure described earlier in this section. As it turns out, our estimates imply an even greater probate-wealth markdown than did her $w*B$ estimates.

Wealth is not property income or total income. Jones confined her income-measurement efforts to brief conjectures about wealth-income ratios, using twentieth-century aggregate capital-output ratios borrowed from the macroeconomics literature of the 1970s.[18] We have followed a different route, in order to exploit the wage data just described. Our reading of the limited evidence on colonial rates of return suggests that, on average, assets probably earned a net rate of return of 6 percent per annum.[19] Later we will quantify the sensitivity of our income estimates for 1800 to this 6 percent rate of return.

The gross rate of return, which is more appropriate to the calculation of gross national product for comparison with other studies, equals this net 6 percent plus rates of depreciation that differed by asset. Following NIPA accounting standards, we have assumed zero depreciation on financial assets and real estate (positive depreciation offset by rapid capital gains), 5 percent for servants and slaves, 10 percent for livestock and business equipment, and zero for net changes in producers' perishables and crops.[20]

Combining own-labor income and property incomes for 1774. Here we gain from having invested so much effort in gathering occupation data. Since own-labor incomes and property incomes are both arranged by occupation, we can combine the two to get their total incomes. For farmers, the largest occupational group, we can even exploit some of the regional size distribution of property income data, dividing it into the top 2 percent of farmers, the next 18 percent of farmers, a middling 40 percent, and a bottom 40 percent. This disaggregation helps us judge the degree of income inequality within each region.[21]

Households were practically the whole economy. Our calculations offer what NIPA accountants call total private income of the household sector. The colonial government sector's contribution consisted only of the wages and salaries of government employees and military personnel (already included in our occupations and own-labor earnings). There were no government corporations in 1774. Nor do we need to worry about the retained earnings of private corporations, since they amounted to little by the end of the century. The same assumptions will be made for 1800. When a future paper compares 1774 and 1800 with similar accounts for 1860-1870, the non-household sector will take a larger share of national income for the later dates.

B. The 1798-1800 Post-Revolutionary Evidence

Our next benchmark for appraising national income is the census year 1800. On the labor-income side, our procedures for 1800 are roughly the same as those we applied to 1774, though the data sources are more copious and of higher quality. Table 2 sketches the mixes of sources and methods for the 1800 estimates. What is distinctive about the estimates for 1798-1800 relates not to labor incomes but to property incomes. To fund a possible conflict with France, Congress passed the first direct tax, a one-off tax levied on real estate wealth and on the numbers of slaves.[22]

The 1798 direct tax returns remain the most useful source available for the property income side of 1800 national income estimation. True, one might view these returns with some suspicion: Can we trust the quality of the data extracted by tax collectors from a new nation that had just shed its royal government partly over tax issues? Such suspicion is indeed warranted, especially given some evidence that properties had already been under-assessed in tax returns of the previous two decades.[23] Before using the 1798 returns, we must identify, and adjust for, their likely biases.

In New England and the Middle Colonies, the 1798 direct tax probably under-assessed market values by something like 15.5 percent, a figure based on a contemporary study of marketed real estate in Connecticut in that same year.[24] We have raised our 1800 property income estimates by this 15.5 percent underassessment in New England and the Middle colonies, and also by the 7 percent rise in average asset values from 1798 to 1800 suggested by the contemporary Samuel Blodget (1806).

The South might have under-assessed rich households' realty, and slaves, by even more than that 15.5 percent underassessment in the North. Appendix 3, in the supplementary materials, lays out the peculiarities of southern assessment for the 1798 tax, and presents our preferred estimates for the extent of underassessment. The adjustment for the extra Southern underassessment raises real estate plus slave wealth values by 30.1 percent for the South Atlantic. This combined with the nationwide underassessment of real estate by 15.5 percent raises real estate plus slave wealth values by 40.4 percent for the South Atlantic, or 27.7 percent for the whole Eastern seaboard.

Since the 1798 returns covered only real estate and slaves, we had to use the same ratios of total property/(realty plus slave values) obtained from the 1774 evidence to inflate them to total property. We apply region-specific ratios to each of the three colonial regions.

There is one other important difference between the data sources on the property side between 1774 and 1798-1800. The 1798 tax returns are very handy in that they were aggregated for us at the time. But a serious drawback of the 1798 return is that it reports no data on occupation. This means that we cannot document the occupational distribution of *total* income for 1800, although we can document the distribution of own-labor incomes and property incomes separately, as well as the aggregate value of total income. To survey the resulting estimates, we turn first to the levels and growth of aggregate income over the quarter-century 1774-1800, and then to the income inequality of 1774 alone.

III. Provisional Conclusions about Income Levels and Growth, 1774-1800

Our estimates of labor and property incomes shed new light on average income in 1774 and 1800, and the growth of income per capita over a quarter century of war, postwar, and national emergence. The levels and composition of total personal income are shown in Tables 3-6, for the three regions used by Alice Hanson Jones and for a geographically fixed "nation", defined as the 13 colonies in 1774 and the easternmost 15 states plus the District of Columbia in 1800. Table 3 can be used to calculate any of several important ratios, using the denominators in the lower half of the table

and the price deflators in the notes to the table. Here we stress two key results. First, in 1774 the colonial South had about twice the income per free person as that in the Northern colonies, and was richer on the average even when one rightly counts slaves as persons. Second, these new estimates imply that real income per capita dropped seriously over that quarter century. The 1774-1800 decline of about 20 percent looks almost as serious in per capita terms as the 1929-1933 drop into the Great Depression. If other authors are correct in reporting brisk income gains across the 1790s, then the Revolutionary disaster and Confederation turmoil could have been America's greatest income slump ever, in percentage terms. Let us first scrutinize the levels of income at each date, before searching for explanations of the implied net decline.

A. The Income Level Estimates for 1774 [25]

Our estimates suggest that the 13 colonies were richer and more productive in 1774 than other estimates have implied. The left half of Table 4 underlines the contrast, focusing on the more recent and more prominent set of competing estimates. Our thirteen-colony current-price (full-time) estimate of 173.2 million dollars is 26 percent greater than the average of the Jones and McCusker estimates (136.9 million). Yet our colonial income estimates differ greatly from those of Jones for only one region. There is little difference for New England or for the Middle Colonies. The main source of the big difference with Jones arises in the South, for which our income estimate ($98.8 million) is almost twice that of Jones ($59.2 million).

There are two gaps to confront here: The gap in estimates for the 13 colonies as a whole, and the gap for the South alone. While there must be error components in any measures of early incomes, including our own estimates, we offer reasons for believing that the 13-colony gap and the Southern colonial surprise are not due to errors we have introduced.

For the 13 colonies as a whole, the large gap is not driven by any higher estimate of wealth per household, since we rely on Alice Hanson Jones' own work. Supplementing her data with our new occupation weights, we get a slightly *lower* net worth per wealth holder than she did. Furthermore, because we find many fewer households with wealth than her estimated number of "potential wealth holders", our aggregate wealth estimate is only about 70 percent of her implied total wealth.[26]

Our conversion of wealth into property income, as described earlier, involved multiplying different asset holdings by net and gross rates of return. A reader feeling that our income estimates seem too large might want to challenge both our net and our gross rates of return as being somewhat

high. It seems very unlikely that our 6 percent figure overstates the net rate of return, the opportunity cost of not having lent at interest. The colonies and the early republic had a legal usury limit of 6 percent that was vigorously supported by law and custom.[27] That is, the usury constraint seems to have checked a strong demand for capital, so that the 6 percent ceiling might very well have been *below* market. Could the (illegal, market) rate of interest foregone by holders of directly productive assets have been higher, say 8 percent? This is a distinct possibility, especially for 1800, for which the literature suggests even greater capital scarcity than for 1774.[28] Table 5 shows the impact of assuming 8 rather than 6 percent. Shifting to the higher rate of return would raise our total income estimates further above those conjectured by other scholars.

One might also challenge our depreciation assumptions in deriving gross property incomes. Indeed, some might argue that depreciation should not have been included in the income estimate at all. If the reader prefers net property income estimates, ones that only include that 6 percent rate of return on wealth, then she can refer to the 1774 net household income estimate of $162 million shown in Table 5.[29] This net household income estimate would eliminate about half the gap between our gross income estimate of $173.2 million and the $136.9 million average estimate offered by Jones and McCusker. That partial convergence might seem comforting, but it should not. The debate over early American economic growth has consistently used *gross* national (or domestic) product, not net national product. We should conform to the same convention for purposes of comparing apples with apples. Thus our favored 1774 aggregate income estimate remains the gross income figure of $173.2 million shown in Tables 3 through 5.

So much for possible biases in property income. What about our own-labor income estimates for 1774, supported as they are by new occupation weights, full-time employment assumptions, and occupation-specific wage rates? Could these have exaggerated labor income for the 13 colonies as a whole, thus raising our aggregate income estimates above that of previous scholars? The source of the difference cannot lie with our new occupation shares, which give greater weight to poorer and less probated whites in the North, since this would serve, once again, to make our estimates *lower* than Jones's, not higher. We also do not think the full-time employment assumption of 313 working days per year for those hiring out is inappropriate, given the widespread prevalence of home production and direct non-market consumption in the eighteenth and early nineteenth century. And as we have already noted, a more conventional set of assumptions about different occupations' annual work days would cut our estimated national income by only 4.8 percent.[30]

What did Jones assume about rates of pay for labor, including the earnings retained by slaves? In fact, she did not make any assumption at all, but took a single leap of faith that we have already noted: By picking up some capital/output ratios quoted in the aggregate growth literature from the 1970s, she jumped from her impressive and reliable wealth estimates to less reliable total income guesswork which stands or falls on her assumed aggregate wealth/income ratio (not necessarily the same as a capital/output ratio). The macro literature offered Jones capital/output ratios ranging from 2.5 to 10 for the nineteenth and twentieth centuries. Within this wide range, she said, "I hazard that ratios of three or three and a half to one may be reasonable". Yet we find that the 1774 ratio of net worth (wealth) to national income was only 1.89.[31]

The strikingly wide gap between Southern and Northern incomes in 1774 has a simpler explanation. In 1774, unlike 1860 and later, the South had a very different mix of free men's occupations, with a much higher propertied share and fewer poor. On the eve of the Revolution, the South was still a frontier with rich productivity in producing exportable tobacco, rice, indigo, and cotton. We find this contrast between the regional occupation mixes among free household heads in 1774:

	among free household heads (%)		
	New England	Middle colonies	Southern colonies
Farm operators	43.9	25.8	72.7
Professions, commerce, crafts	11.0	32.5	14.3
No occupation given, some wealth	16.7	28.7	11.0
Menial laborers + those with zero wealth	28.4	13.0	1.9

Southern farm operators not only had higher average incomes than other farmers, but they constituted a larger share of households, while low-paying occupations took a lower share among free Southerners. The advantage of the colonial South should not seem surprising, even without any gap in wage rates for given occupations. What drove the income gap between regions was not pay differentials mysteriously unexploited by potential migrants, but rather a mix of Southern occupations featuring those for which entry required prior accumulation of wealth in a world of imperfect capital markets.[32]

Other clues support the belief in a richer colonial South. Alice Hanson Jones's wealth estimates had already shown that Southern wealth per wealth holder was 56 percent higher in the

South than the average for other colonies. That again stemmed largely from her estimates of the occupational mix, even before our revisions magnified the contrast. Both her occupational mix and ours show a remarkable lack of poor Southern whites, defined as those of menial trades or those having zero assessable wealth. While our occupational calculations for the South have used only Jones's estimates plus the finding that there may have been no household heads with zero wealth in three North Carolina counties, two archival data sets from Virginia in the 1780s again suggest that there were few demonstrably poor white household heads. Tax returns from 1787 for rural Loudoun County at the north end of Virginia appear to have covered all white households, yet with very little evidence of white masses with zero net assets. Similarly, while a special census of the rural town of Richmond, Virginia in 1782 did reveal some white household heads with menial occupations or the possibility of zero wealth, their share of white household heads was no higher than in the rural towns of Chester County Pennsylvania, and lower than the share in rural Massachusetts. More important than these comparisons within regional hinterlands, or between their respective small towns, was the inter-regional difference in rural and urban shares. The South was overwhelmingly countryside, where the poverty share among the free population was lowest. While the percentage of true white paupers was not zero in the South, it was not as high as in the North.[33]

B. The Income Level Estimates for 1800

Unlike those for 1774, our 1800 total income estimates are not above those offered by other scholars. In fact, our estimates, shown on the right-hand side of Table 3, are in the lower half of several competing estimates for the nation as a whole. Our 1800 totals for the Lower South match those of Mancall, Rosenbloom, and Weiss (2003), even though we used the income approach and they used the production approach. It might seem comforting that our 1800 estimates are so close to others. However, ours would have been a bit higher than most if we had been able to make all the adjustments that we feel are warranted. We are especially concerned about two such adjustments. One of these can be quantified but one cannot.

The first potential adjustment is one already mentioned in connection with Table 5: using the interest rate on public debt as a measure of the opportunity cost of assets, it appears that the net rate of return on property was higher in 1800 than in 1774, presumably in response to Revolutionary War and Confederation inflation, financial disruption, and perhaps even productivity advance.[34] As we have noted, if the interest rate tended to be 8 percent in 1800 versus 6 percent in 1774, then the 1774-1800

decline in real per capita income would be a bit less, 14 percent, using the "alternative" estimates for 1800 shown in Tables 5 and 6, rather than the bigger decline of 20 percent implied by the baseline estimates.

The second adjustment relates to an omission from the baseline 1800 estimates. We have no 1800 data, or even guesses, about farm operators' pure residual profits, as distinct from their asset returns or the implicit value of their own physical labor. For 1774, we were able to use a few testimonies unearthed by Main (1965) to guesstimate that the farm profit residual was 18.9 percent of all farm operators' income in New England, 21.1 percent in the Middle Atlantic, 34 percent in the South, and 28.8 percent for the 13 colonies as a whole. We cannot apply these ratios to 1800, however, since we lack any delineation between farm operators and free farm laborers in the census or in the Weiss labor force estimates on which we rely.[35] Until evidence on this issue emerges, we can only propose our alternative estimates in Table 6, and repeat that accordingly the nation still experienced a per capita income decline of maybe 20 percent over the quarter century, though the decline might have turned out to be a little less than our estimates show had we been able to add estimates of 1800 farmers' pure profits in the future.

C. Long-Run Growth Implications

Our estimates imply that between 1774 and 1800 America suffered a serious net decline in per capita income. We need to conduct some reality checks on these results, both in terms of their longer-run growth implications and in terms of their implications about the turbulence within that quarter century itself.

How do the estimates fit into accepted narratives about the longer run development of early America and its regions? Our new higher income estimates for 1774 will, of course, re-open the debate over growth during the long colonial period. It seems wisest to refrain from commenting on this part of the debate until our social tables technique has been applied to some benchmark date earlier in the eighteenth century. However, we note that our higher income per capita estimates for 1774 are consistent with recently documented steep rises in real wages in New England and the Middle Colonies from the mid-seventeenth century to the Revolution (Allen *et al.* 2012: Figure 5).

We are more prepared to use our income estimates to assess America's growth performance up to 1840. Table 6 supplies our real per capita income growth estimates for each of the three regions, and for the three combined (the "nation" consisting of the thirteen original colonies), and it does so for

1774-1800, 1800-1840, and 1774-1840. For the entire period 1774-1840 real per capita incomes in the three-region "nation" grew modestly, at 0.6 percent per annum. At such a pre-modern growth rate, it would have taken 116 years to double income.[36] Over those seven decades, the South Atlantic fell behind the per capita income of the east coast "nation", while New England and the Middle Atlantic regions pulled ahead.

Between 1800 and 1840, however, per capita income in the North grew very fast, 2.3-2.4 percent per annum in New England, and 1.6-1.8 percent per annum in the Middle Atlantic, rates that are consistent with the 5 percent per annum industrial output growth centered in the Northeast (Davis 2004). These rates exceeded those in Western Europe in the late eighteenth century and early nineteenth. In contrast with fast growth in the Northeast, the figure for the South Atlantic was only 0.5-0.7 percent per annum, which pulls down the "national" average to a still impressive 1.4-1.6 percent per annum.

How do the new per capita income growth rates for 1800-1840 compare with those of other scholars? Our growth rate for the South Atlantic is 0.51-0.69 per annum, while Mancall, Rosenbloom, and Weiss estimate something similar for the Lower South, 0.53-0.79 percent. For the US as a whole, Weiss offered three estimates, ranging between 0.56 and 0.80, far below David's estimate of 1.12-1.28 percent. Our estimates of 1.39-1.56 are even higher than David's,[37] though including farmers' residual profits in 1800 would have lowered our 1800-1840 rates a bit.

Table 6 suggests that this modest pre-modern growth performance was driven by two special events: Southern decline, and the economic disaster associated with the Revolutionary War and Confederation turmoil.

The absolute decline of the South Atlantic over the last quarter of the eighteenth century and its relative decline over the next four decades stand out as a classic example of what has come to be called *reversal of fortune*.[38] The South Atlantic was already well behind the Northeast and the national average by 1840, having been well ahead of all other regions in 1774. Supporting reversal of fortunes in the South is the absence of evidence that the colonial South had any large army of poor whites in 1774. We note again that the few local colonial censuses and tax records suggest that nearly all white households around 1774 had positive wealth. Why the reversal of fortune for the South? We do not yet know what weights to attach to the decline of frontier super-returns, institutional failure, or exceptionally severe damage incurred in the Revolutionary War.[39]

D. Revolutionary Shocks: Diverted Trade and the Crisis at the Top

What stands out in the longer run perspective is the economic turbulence between our two benchmark years 1774 and 1800, first with the war years themselves and then with the troubled Confederation in the 1780s. The last quarter of the eighteenth century found the economy on a rickety swinging bridge, a metaphor that also describes scholarly attempts to span that gap with numbers from what has been called a statistical dark age. Like late eighteenth century France, early nineteenth century Latin America, early twentieth century Russia, and late twentieth century Africa, scholars of the early United States have had great difficulty bridging the data gap across their revolutionary upheaval and early nation-building. On the one hand, Thomas Berry (1968, 1988), Louis Johnston and Samuel Williamson (2010), Richard Sylla (2011) and others have emphasized the strong growth experienced across the 1790s, perhaps due to the wisdom of Alexander Hamilton and other founding fathers and/or due to the recovery of foreign markets. Yet, the more we come to accept their sanguine view of the 1790s, the more we must infer a true economic disaster between 1774 and 1790.

Any study attempting to measure incomes for 1774 and 1800 alone cannot quantify the depth of any economic depression in between. Yet, we can help guide the search for the magnitude of the Revolutionary war and post-war depression by posing a question: How deep would the per-capita income loss have been from 1774 to 1790 if the scholars cited above are right about the growth from 1790 to 1800, and our estimates of the net decline from 1774 to 1800 are also right? This question has eight numerical conjectures, based on our two estimates for 1800 ("baseline" and "alternative") times the four leading series documenting real income per capita growth from 1790 to 1800. The four series are those by Richard Sutch, Louis Johnston and Samuel Williamson, Thomas Berry, and John McCusker.[40] All eight conjectures imply significant drops in income per capita between 1774 and 1790. Between these two years GDP per capita might have dropped 18 percent, based on Sutch and our alternative estimate for 1800. The largest estimated drop is 30 percent, based on Berry's series and our baseline estimate. The estimates seem to agree with John McCusker and Russell Menard that the "Colonists paid a high cost for their freedom", and with Allan Kulikoff that the drop in incomes was "equal to the early years of the Great Depression", and with their consensus that recovery was painfully slow.[41]

What could have caused such sustained income losses? There is good *prima facie* evidence that three related negative shocks could have been large enough to cause the deep depression between 1774 and 1790. The first was the economic destruction of the war itself, as well as the impact of nearly two

decades of hyperinflation and a dysfunctional financial system. The second negative shock consisted of the disruptions of overseas trade during the Revolution and, after 1793, the Napoleonic Wars.[42] Available price and trade data show that the colonies, especially in the Lower South, suffered heavy volume and value losses in trade and shipping as the war deepened, and that they recovered only slowly and partially across the 1780s. In real per capita terms, New England's commodity exports rose by a trivial 1.2 percent between 1768/72 and 1791/92, rose by a modest 9.9 percent in the Middle Atlantic, but fell by a spectacular 39.1 percent in the Upper South, and by an even bigger 49.7 percent in the Lower South (Mancall *et al.* estimate an even larger 67 percent), yielding a decline of 24.4 percent for the thirteen colonies as a whole.[43] The most painful of these shocks was the loss of well over half of all trade with England between 1771 and 1791. In addition, America lost Imperial bounties like those on the South's indigo and naval stores, as well as New England's reversal from colonial bounties to prohibitive duties on its whale oil exports.

While these negative demand shocks to American commodity exports were very large, especially for the Lower South, the initial share of exports in regional income was only about 6-7 percent in the early 1770s, according to the Shepherd-Walton export values per capita in 1768-1772 and our 1774 income estimates for the three main regions combined. Thus, it is hard to imagine that the huge depression of 1774-1790 was entirely "export-led": A 24-percent trade fall times a 6-7 percent share of income equals no more than a 2 percent fall in income colony-wide. The numbers are bigger for the South, where exports fell by perhaps 45 percent and the trade share was 7.1 percent, implying an income loss of more than 3 percent. These calculations only deal with foreign trade losses; the trade losses would be considerably higher if they included the decline in inter-colonial and subsequent inter-state trade between 1774 and 1790. Finally, these negative trade shocks created a move back to subsistence farming, and presumably lower agricultural productivity.

The third major negative shock involved what we call a *crisis at the top*, and it was felt primarily in the coastal cities and smaller river towns. This shock was related to the trade losses, but transcended them and could have caused much greater income losses. America's urban centers were severely damaged by British naval attacks, blockades, occupation, and by the eventual departure of skilled and well-connected loyalists, especially from New York, Charleston, and Savanna. In Richard Hildreth's summary, "one large portion of the wealthy men of colonial times had been expatriated, and another part impoverished".[44]

The damage to urban economic activity was considerable, and potentially enough to bring great declines to per capita incomes, even though population kept growing. To identify the extent of the urban damage, one could start by noting that the combined share of Boston, New York City, Philadelphia, and Charleston in a growing national population shrank from 5.1 percent in 1774 to 2.7 percent in 1790, recovering only partially to 3.4 percent in 1800. To the extent that urbanization is a close correlate of levels of economic development, this big fall in the American city population share certainly confirms what our income estimates document. There is even stronger evidence confirming an urban crisis: the share of white collar employment was 12.7 percent in 1774, but it fell to 8 percent in 1800; the ratio of earnings per free worker in urban jobs relative to that of total free workers dropped from 3.4 to 1.5; and the ratio of white collar earnings per worker to that of total free workers fell even more, from 5.2 to 1.7. This evidence offers strong support for an urban crisis, and it also supports the view that America had not yet recovered from the Revolutionary economic disaster even by 1800.

IV. An Egalitarian Colonial America

Incomes were more equally distributed in colonial America than in other places. Among all American households, slaves included, Table 7 reports that the richest 1 percent had only 7.1 percent of total income, and the Gini coefficient was 0.437. Without the slaves, the top 1 percent of free households had only 6.1 percent of total incomes, and the Gini was 0.400. Compare colonial American inequality with that of the United States today, where almost 20 percent of total income accrues to the top 1 percent, and where the Gini coefficient is about 0.5 (Atkinson *et al.* 2011: Table 5, p. 31). That colonial America was a more egalitarian place is even more apparent when we compare modern America with colonial New England (Gini 0.35), the Middle Atlantic (Gini 0.38), and, surprisingly, the free South (Gini 0.33).[45] Within any American colonial region, free citizens clearly had much more equal incomes than do today's Americans.

Free American colonists also had much more equal incomes than did West Europeans at that time. The average Gini for the four northwest European observations reported in Table 7 is 0.57, or 0.14 higher than the American colonies. Indeed, there was no documented place on the planet that had a more egalitarian distribution in the late 18th century.[46]

If people had more equal incomes in America than elsewhere, which kinds of colonists were better off than their counterparts in Europe? Figure 1 offers an Anglo-American comparison. On the

horizontal axis each society is ranked from its poorest to its richest, and on the vertical axis their average group incomes are displayed in logarithms. It appears that an American colonist of any rank had a higher income than his or her English counterpart of the same rank until we reach the top percentile. Indeed, it turns out that even American slaves were above the bottom of the Anglo-American income ladder, although such comparisons fail to account for loss of freedom, longer hours worked, and harsher working conditions. As one might sense from Figure 1, colonial households as a whole had higher incomes than households in England and Wales. If one simply converted from dollars directly into sterling at the exchange rate of $4.44/£, colonial households averaged £78 each, versus about £50 per family in England and Wales, converting either the revised version of Massie's 1759 social table or that of Colquhoun's 1801-1803. At a first rough comparison, the American colonists had much higher incomes in 1774, as one might have guessed from the fact that so many English continued to risk the migration across the Atlantic. Yet the colonists may have temporarily lost their income lead by 1790. Their wartime depression combined with the slow growth of British GDP per capita in the last quarter of the eighteenth century, suggests as much.[47]

Future research needs to pursue the impact of relative purchasing power on such income comparisons. As is widely recognized, simple exchange rate conversion does not adequately account for cost of living differences between classes and places. This familiar point has a number of important applications in the colonial American context, and they deserve emphasis and further investigation. One is that the cost of a standard consumption bundle probably was lower in New England than it was either in the Southern colonies or in England and Wales. So say some recent calculations for this era. If true, then these nominal income contrasts might be somewhat misleading. Perhaps New England -- with its cheap fish, corn, beans, rum and molasses -- was not so much poorer than the Southern colonies as the nominal figures in Table 7 imply. This might also have been true of the Middle Colonies with its cheap grains (exported to England where they were expensive: Mancall *et al.* 2008b). In any case, such adjustments should also deal with the relative cost and quality of housing (Shammas 2007). Perhaps New England wasn't so much worse off relative to Southerners as our figures suggest, and perhaps workers in the Middle Atlantic were even better off compared with English workers than our figures suggest. On the other hand, an upper-class cost of living bundle, including the cost of music, theater, and servants, must have been lower in London than in the Northern colonies. These "real inequality" dimensions need to be explored further,[48] but we do not expect them to overturn the inequality contrasts shown here.

V. Summary and Agenda

The only way to push back the quantitative frontiers of inequality and living standard history is to adapt to the data environments of the deep past. In the archeological extreme, that means accepting skeletal remains and DNA as our main forms of evidence. Even a journey back to the late eighteenth century must accept an eclectic array of incomplete evidence. One of the most underexploited frontiers for the early modern era is occupation counting, an approach which allows us to assemble aggregate incomes and their distribution among social classes. Working on that frontier, we have emerged with a rich harvest dealing with early American growth and inequality. It appears that the colonists had higher incomes in 1774 than previously thought. Between 1774 and 1800 American incomes declined in real per capita terms, so that any rapid growth after 1790 failed to make up for a very steep decline during wartime and early independence. In addition, we find that free American colonists had more equal incomes than did households in England and Wales. The colonists also had greater purchasing power than their English counterparts over all of the income ranks except at the top one percent, although this income advantage was lost in the fight for Independence.

Regional inequality was also an important feature of the American colonies. Our results suggest that Southern per capita income was far above the averages for other colonies in 1774, and that poor whites were much less common than in other colonies. It appears that the colonial South lacked the large numbers of poor whites that could be counted in Boston, Philadelphia, New York and lesser coastal towns. In short, our results suggest that mass poverty did not spread among the Southern white population until the nineteenth century. Surely the late colonial income distribution in the South needs further research of the sort already done for the Chesapeake.[49] In addition, it appears that the South Atlantic underwent a reversal of fortune between 1774 and 1840, dropping from being the richest American region to being the poorest. Why?

The research agenda for the future seems clear enough: more data, better ways of using the data, and new interpretations. We hope to have persuaded the reader just how powerful the *social tables* approach can be when data are scarce. Fortunately, they are getting a little less scarce as archives and the internet keep adding to the supply of usable information on occupations, earnings, and property income. We hope to have blazed the trail for additional work on early American incomes and by leaving behind an open-source data description and some provocative initial results.

Table 1. Main Data Inputs for 1774 Income Estimates

	Data sources and adjustments for occupational shares
(A.) Population, labor force	Local censuses, labor force participation rates for 1800 supplied by Thomas Weiss, expanding on his estimates in Weiss (1992).

(B.) Occupations of household heads and of the labor force
New England (CT, MA, ME, NH, RI, VT)

• Big city = Boston	• Boston 1780 shares from Main (1965), backed by Boston 1790 shares from Price (1974) and the downloaded Boston 1800 occupational directory
• 19 lesser cities & rural	• Use the 1771 Massachusetts-Maine tax returns to estimate the shares of land-owning farmers, non-land-owning farmers, and others with positive vs. zero realty. Then for the towns, apply the non-farm, non-big city occupation mix from Lancaster PA 1800 to lesser cities in 1774, and the Chester County PA rural occupation mix of non-farmers in 1800 to the rest of New England 1774.

Middle Colonies (NY, NJ, PA, DE)

• Big-city = Phila., NYC	• Philadelphia 1772 occupations from assessment lists supplied by Billie Gordon Smith*
• 3 NJ lesser cities	• Lancaster Borough PA 1773
• Rural	• Chester County PA 1800, 9 rural townships

South (GA, MD, NC, SC, VA)

• Big City = Charleston**	• Charleston 1790 directory, downloaded. Re-weighted away from slave holders and land owners, based on assessments for 3 North Carolina counties, 1779-1782
• Rural	• Start with Alice Hanson Jones's rural $\underline{w}$ weights from 4 colonies (MD, VA, NC, SC), and apply the same adjustment as for Charleston based on 3 NC counties

(C.) Free labor earnings and farm profits	Secondary literature: J.T. Main, Stanley Lebergott, Carroll Wright, Bureau of Labor Statistics, T. M. Adams, Donald Adams, Winnifred Rothenberg, and others.
(D.) Slave retained earnings	Slave retained earnings by age and sex could be derived from any two of these three parameters: free wage rate for same occupations, expropriation rate, and the slave hire rate (Fogel-Engerman, for Queen Anne's County MD 1796-1804). We used the latter two, cross-checked against the literature on slave consumption (e.g. Mancall *et al*. 2001).***
(E.) Property income	Applying a 6% rate of net return plus asset-specific depreciation to Alice Hanson Jones's wealth, re-weighted using new occupational data.

Notes to Table 1:

For further details on the derivation of these occupational shares, see the worksheets on LW

occupational weighting in the three regional "Property 1774" Excel files.

* See Smith (1984, 1990), supported by Price (1974) on Philadelphia 1780-1783.

** The earliest Baltimore occupational directory available is for 1799, and the earliest for

Norfolk VA is for 1801. Both are posted on the http://gpih.ucdavis.edu site.

*** See the Excel file "slave earnings retention 1774, 1800".

Table 2. Main Data Inputs for 1800 Income Estimates

Data sources and adjustments for occupational shares

(A.) Population, labor force

U.S. census, labor force participation rates for 1800 supplied by Thomas Weiss, expanding on his estimates in Weiss (1992).

(B.) Occupations of household heads and of the labor force
• City directories and tax lists for Baltimore 1799, Boston 1800, Charleston 1800, Hartford 1799, New York City 1799, Norfolk 1801, Philadelphia 1800;
• Town directories and tax lists for Lancaster PA 1800, Lexington KY 1806, Pittsburgh 1815; and
• Rural tax lists from Burke County GA 1799, Chester County PA 1799-1802.

C.) Free labor earnings and farm profits
Same sources and methods as in Table 1, but we can offer no estimate of farm profits.

(D.) Slave retained earnings
Same sources and methods as in Table 1.

(E.) Property income
The 1798 direct tax on real estates and slaves, via Pitkin (1817) and the Connecticut State History Museum. See also Soltow (1989), Einhorn (2006). We assumed similar local ratios of real estate and slave valuations to total property as in 1774.

Note to Table 2: See the details of these data sources and their use in http://gpih.ucdavis.edu

Table 3. Estimated American Personal Incomes, 1774 and 1800

	New England	Middle Atlantic	South Atlantic	All 13 Colonies (15 states + DC)
Gross income, millions of current dollars ($4.44/£ sterling)				
Circa 1774				
FTE free own-labor income	31.09	28.85	62.81	122.75
Ditto, part-time (see text)	28.16	27.26	58.27	113.70
Slave retained earnings	0.13	1.06	12.18	13.37
Gross property income	4.84	8.37	23.83	37.04
Gross total income	36.06	38.28	98.81	173.16
Ditto, with part-time	33.13	36.69	94.28	164.11
Circa 1800				
FTE free own-labor income	73.65	84.20	87.77	245.62
Ditto, with part-time	66.57	76.91	80.88	224.36
Slave retained earnings	0.07	2.10	37.34	39.51
Gross property income	21.39	47.83	89.77	158.99
Gross total income	95.11	134.13	214.88	444.12
Ditto, with part-time	88.03	126.83	208.00	422.86
Relevant denominators				
Free labor force 1774	185,999	156,875	195,938	538,812
Total labor force 1774	188,230	175,655	436,136	800,021
Free population 1774	657,567	582,134	719,875	1,959,577
Total population 1774	661,563	613,685	1,101,151	2,376,399
Free labor force 1800	334,685	380,162	402,504	1,117,351
Total labor force 1800	335,500	404,900	835,590	1,575,990
Free population 1800	1,231,671	1,423,924	1,428,695	4,084,290
Total population 1800	1,233,011	1,464,548	2,222,221	4,919,780

Notes to Table 3:

The estimates exclude Native Americans.

The 1800 estimates currently lack any estimate of farm operators' residual incomes beyond the implicit value of their farm labor and their property incomes (see text).

The gross property incomes for 1800 are based on middling assumptions about Southern underassessment in 1798 (see text).

The baseline estimates use the full-time assumptions of 313 days per labor year, in occupations where the primary earnings data are sub-annual (e.g. daily or monthly wage rates). The part-time assumptions retain the explicitly annual income estimates for titled and professionals, for commercial proprietors, for manufacturing trades, servants, slaves, and household heads of unstated occupations having positive wealth. Part-time work years for explicit pay are assumed to have been only 280 days for construction workers, farm operators, and the rural unskilled. For urban unskilled and for household heads with zero wealth and unstated occupations, we assumed a work year of only 222 days.

Delaware is here included with the Middle Colonies for both years, following Alice Hanson Jones's sample design.

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Table 4. Alternative Estimates of National Income 1774 and 1800, in current $ and 1840 $ (millions)

	1774 current $m	1774 1840 $m	1800 current $m	1800 1840 $m	Source
US (orig 13)	142.2	152.5			GDP: McCusker (2000)
	131.7	141.6			Gross inc: Jones (1980)
	173.2	185.7	444.1	305.9	Gross income: LW (2012)
	164.1	176.3	422.8	291.3	" , part-time: LW (2012)
US (all)			508.7	350.3	GDP: McCusker (2000)
	150.3	161.6	515.5	355.5	GDP: Mancall &Weiss (1999)
	135-157	145-169			GDP: Gallman (1972)
	134.8	145.0	500.1	344.9	GDP: Goldin & Lewis (1980)
	132.6	142.6			Narrow GDP: Weiss (1992)
			430.9	297.2	Berry (1988)
			446.3	307.8	David (1996)
			510.4	351.5	GDP: Mancall *et al*. (2003)
			470.7	324.2	Gross income: LW (2012)
			448.1	308.7	" , part-time: LW (2012)
New Eng.	35.5	38.2			Income: Jones (1980)
	34.6	37.1	95.1	65.5	Gross income: LW (2012)
Middle Atl.	36.5	39.3			Income: Jones (1980)
	39.7	42.6	134.1	92.4	Gross income: LW (2012)
South Atl.	59.2	63.6			Income: Jones (1980)
	98.9	106.0	214.9	148.0	Gross income: LW (2012))
Lower	22.0	23.7	93.5	64.4	GDP: Mancall *et al*. (2003)
South Atl.			94.1	64.8	Gross income: LW (2012)

Notes to Table 4: (1) Gross income, Net income = our baseline estimates of personal income, gross and net of depreciation. For the "part-time" variant, see text.
(2) This culled set omits very old estimates, and if a modern source offers more than one estimate, this set selects the most recent. It also selects the highest in the Jones range, as recommended by Gallman and Weiss.
(3) John McCusker's (2001) price deflators = 97 for 1774, 151 for 1800 if 1860 = 100, or 93.3 for 1774 and 145.2 for 1800 if 1840 = 100.
(4) The western states included in the LW "US (all)" estimates are KY and TN, plus MS for labor incomes only.

Table 5.   Alternative Property Incomes and Total Incomes, 1774 and 1800

1774	$ millions in 1774 (at $4.44/£)			
	New England	**Middle Colonies**	**South**	**All 13 Colonies**
Estimated using 6% net rate of return on all NIPA-type assets and slaves				
Gross personal property incomes	4.840	8.372	23.830	37.042
Net personal property incomes	3.662	6.534	15.736	25.932
Total gross personal incomes	36.064	38.281	98.814	173.159
Total net personal incomes	34.886	36.444	90.719	162.049
Estimated using 8% net rate of return on all NIPA-type assets and slaves				
Gross personal property incomes	6.061	10.550	29.075	45.685
Net personal property incomes	4.883	8.712	20.981	34.575
Total gross personal incomes	37.285	40.459	104.058	181.802
Total net personal incomes	36.106	38.622	95.964	170.692

1800	$ millions in 1800			
	New England	**Middle Atlantic**	**South**	**All 15 states and DC**
Baseline estimate, using 6% net rate of return on all NIPA-type assets and slaves				
Gross personal property incomes	21.391	47.829	89.772	158.993
Net personal property incomes	16.787	29.346	46.490	92.624
Total gross personal incomes	95.112	134.128	214.880	444.119
Total net personal incomes	90.508	115.645	171.598	377.750
Alternative estimate, using 8% net rate of return on all NIPA-type assets and slaves				
Gross personal property incomes	26.987	57.611	105.269	189.867
Net personal property incomes	22.383	39.129	61.987	123.498
Total gross personal incomes	100.707	143.910	230.376	474.994
Total net personal incomes	96.103	125.427	187.094	408.625

Source: The three "Property 1774" Excel files, and the "Property totals 1798-1800" and "own labor incomes 1800" files.

Note: These Table 5 estimates use the full-time estimates of personal income. Corresponding estimates for part-time national income can be derived by applying the part-time personal gross estimates for both dates here, and deriving the other rows using the ratios and differences implicit here.

Table 7.   Inequality in the American Colonies 1774

Region:	All 13 colonies	All 13 colonies	New England	Middle Colonies	South	South
Households:	All	Free only	All	All	All	Free only
Gini coefficient:	0.437	0.400	0.354	0.381	0.464	0.328
Income shares in % of total income						
Top 1% of HHs:	7.1	6.1	3.8	6.4	7.9	6.3
Top 5%:	22.2	21.6	11.4	19.3	25.6	21.3
Top 10%:	30.8	29.6	20.1	28.3	34.3	30.8
Top 20%:	47.3	43.8	35.7	43.8	49.1	42.3
Next 40%:	40.3	41.6	52.5	40.1	39.4	35.7
Bottom 40%:	12.3	14.6	11.8	16.1	11.4	21.9
Household income levels in $ (at $4.44/£ sterling)						
Mean:	345	406	278	289	411	620
Median:	282	377	371	274	322	585
Top 1% of HHs:	2379	2471	1059	1862	3243	3910
Top 5%:	1272	1754	631	1118	2105	2635
Top 10%:	859	1202	559	818	1410	1910
Top 20%:	776	890	496	634	1011	1312
Next 40%:	369	339	365	290	406	694
Bottom 40%:	104	230	82	117	118	199

Western Europe, as a comparison group

Region: (All households)	England & Wales	England & Wales		Holland	Netherlands
Year:	1759	1802		1732	1808
Gini coefficient:	0.522	0.593		0.610	0.563
Income shares in % of total income					
Top 1% of HHs:	17.5	14.6		13.7	17.0
Top 5%:	35.4	39.2		37.0	39.5
Top 10%:	45.1	48.8		50.9	51.3
Top 20%:	57.5	63.2		65.8	64.7
Next 40%:	30.0	27.8		25.6	22.8
Bottom 40%:	12.5	9.0		8.5	12.5
Household income levels					
Mean:	£	43.4	90.6*	fl.	67.8	319.3
Median:	£	25.0	55.0	fl.	35.0	150.0

* £106.8 if we count government revenue, the King, and certain
pensioners, listed separately by Colquhoun.

Notes to Table 7 and Figure 1:

See the Excel file "American incomes 1774", where the Lorenz curves and inequality parameters are derived and compared on the last five worksheets.

The inequality results in Table 7 are based on the full-time (FTE) measures of incomes at 313 days per year. Inequality would have been raised only slightly by using the part-time work year assumptions described above. For example, using the part-time work years would yield a 13-colony gini coefficient of 0.440 for all households, or 0.408 for free households. Figure 1 is based on the part-time work years, for better comparability with English and Dutch inequality.

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Figure 1. Comparing American and English Income Ranks in the Late 18th Century
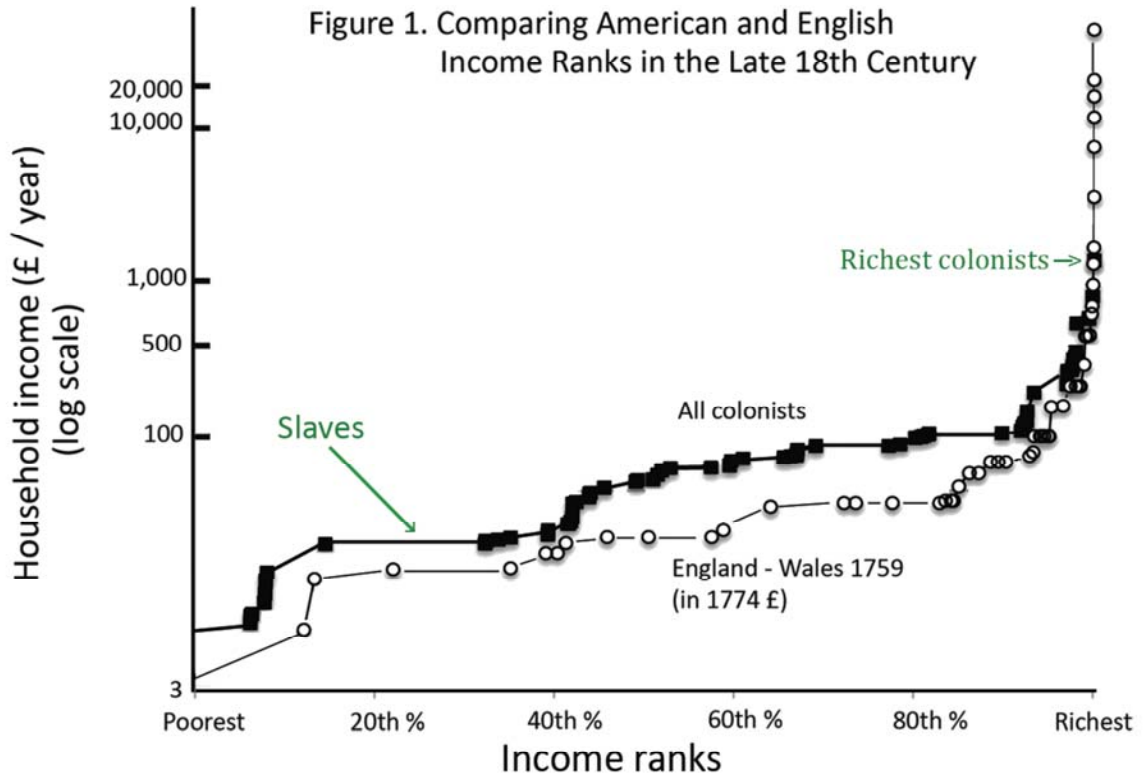
ENDNOTES TO MAIN TEXT

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[1] The debate over growth rates from 1790 or 1800 to 1840 is well represented by David (1967, 1996), Gallman (1992, 1999), and Weiss (1992, 1993, 1994).

[2] See, for example, Egnal (1975), Kulikoff (1986), McCusker and Menard (1985), Carr *et al.* (1991), Mancall and Weiss (1999), and McCusker (2000), and the sources cited there.

[3] See the four Appendices included with this revision, and the "Excel files" in the folder "American incomes 1774-1870" at http://gpih.ucdavis.edu.

[4] Underpinning this section are the supplementary materials, both Appendices and "Excel files", cited in the preceding footnote.

[5] Economists will recognize some similarity between our social tables and social accounting matrices.

[6] See Lindert and Williamson (1982, 1983), and Milanovic, Lindert, and Williamson (2011).

[7] One of these imaginative efforts was constructed by colonial Governor James Glen of South Carolina in 1751 (cited in McCusker 2006) and one by Samuel Blodget (1806: p. 99). They appear to have been readers of the English political arithmeticians, whose writings accelerated with the growing needs to finance wars. On the rise of the quantification culture in late-eighteenth-century England, see Hoppit (1996).

[8] The one-sixth assumption is supported by the somewhat distant 1820 census, the earliest census to give an age distribution for free blacks. As of 1820, 24.3 percent of free blacks consisted of likely household heads, using the same assumptions as for free whites. We believe that the headship rate was probably lower in 1774, both because children were a higher population share of whites and slaves and because fewer free black adults would have been able to establish separate households then. Hence, we choose 16.7 percent, or 1/6, as the headship rate for 1774. For an elaboration, see the file "Estimated mix of occupations 1774 by region" at http://gpih.ucdavis.edu, within the folder "American incomes 1774-1870".

[9] See Excel file "Occs 1774 by region", worksheet (2), and the worksheets on LW weighting in the three regional "Property 1774" files.

[10] See Excel file "own-labor incomes 1774", worksheet (3).

[11] See Excel file "own-labor incomes 1774", worksheet (4), and the file "Slave LF 1800".

[12] See the Excel file "Wage data c1774" in the supplementary materials. The main sources are: Jackson T. Main, *Social Structure* (1965); Stanley Lebergott *Manpower* (1964); Carroll Wright (1885); the many articles of Donald Adams (1968, 1970, 1982, 1986, 1992); T. M. Adams (1944); BLS (1929); and Winnifred Rothenberg (1985).

[13] The shares of the 313-day full year that seem most plausible as a conventional "part time" measure of work for pay outside the home are:

> 1.00 (100% of 313 days) for those households with the head employed in the professions, commerce, and skilled manufacturing artisanal jobs, and for slave households;
>
> 0.89 (280 days) for households with the head employed in construction trades, rural unskilled workers, and (to understate total annual days a bit) farm-operator households; and
>
> 0.71 (222 days) for households headed by free urban unskilled laborers and zero-wealth household heads of unknown occupation.

This "sensitivity analysis" range is certainly wide enough to cover such estimates for England: 1760 and 1771 averaged 278 days; and 1800 280 days (Broadberry *et al.* 2012, Table 12). For 1774, these part-time assumptions yield the following ratios of part-time to full-time total incomes (labor plus property):

	New England	4 Middle Colonies	South	Thirteen Colonies
Free households	0.918	0.957	0.948	0.943
All households	0.919	0.958	0.954	0.948

These ratios imply that the difference between "full-time" and "part-time" estimates would not come close to explaining the gap between our income estimates and those of others for 1774 (Tables 3 and 4 below). On the length of the work year, see the Excel file "Wage data 1774," worksheet (7) on "1774 FTE work".

[14] See the Excel file "Own-labor incomes 1774".

[15] Appendix 3 describes our estimation of property incomes from Alice Hanson Jones's wealth estimates for 1774 and, for 1800, the Direct Tax of 1798.

[16] See Jones (1977, 1980) and her ISPCR data file 7329 at the Inter-University Consortium for Political and Social Research at the University of Michigan.

[17] In a set of side experiments, we tried to replicate Jones's A*-weighted estimates using her own data and her own procedures. In no case did we achieve exact replication, and for one regional wealth total, we were off by 4 percent. We could not find the source of this discrepancy, but suspect that she had to take some shortcuts in the pre-spreadsheet era that we have not understood. Despite the discrepancy, we feel confident of both her estimates and ours. See the Excel files "Property 1774" for each region.

[18] See in particular Jones (1980, pp. 61ff).

[19] There are only meager data on interest rates, i.e. the net opportunity cost of holding real capital. For estimates near the 1774 benchmark, see Homer and Sylla (1991, pp. 276-279). Near the 1800 benchmark, federal government bonds had a market yield of 6.94 percent per annum, while New England municipals yielded 6.13 percent (Homer and Sylla 1991, p. 286). Winifred Rothenberg (1985, p. 790) notes that 6 percent was the "Lawful Interest" stipulated by colonial law, but that "beginning in 1785, interest rates began to climb to 7, 8, and 9 percent". In personal communication, Farley Grubb notes late colonial evidence that could argue for either a 5 percent or a 6 percent rate on government borrowing.

[20] The use of a zero rate on changes in producer perishables and crops adheres to one reader's objection to our initial assumption that all probated stocks of such perishables were used up in a year, thus adding a 94 percent depreciation rate to the 6 percent interest forgone. Our initial assumption added slightly to the gross national income estimates for 1774, though of course it added nothing to the net national income.

[21] How we combined different kinds of incomes, both for household heads and their dependents, and for the derivation of the final inequality estimates for 1774, see the Excel file "American incomes 1774" in the supplementary materials online.

[22] The best introduction to the quantitative dimensions of the 1798 direct tax returns is still that of Lee Soltow (1989). For the underlying political history, see Einhorn (2009).

[23] Warned in advance by Gerard Warden's (1976) investigation of the Massachusetts 1771 tax rolls, we found implausibly low assessments not only on those rolls but also in the Philadelphia 1772 returns supplied to us by Billy Gordon Smith and in the 1786 New York City returns supplied to us by Herbert Klein. We found those tax rolls useful for identifying occupational coverage, including occupations revealed by the presence or absence of each asset type, but not for the assessed values themselves.

[24] Lee Soltow (1989, pp. 37, 256-257) cites correspondence he found in the Oliver Wolcott papers showing that for 518 Connecticut properties sold in 1798, the average ratio of US-assessed value to market value was 0.845.

[25] This section draws on additional evidence reported in Appendix 4.

[26] In this passage, "wealth" means household net worth. See the three Excel files on regional property incomes for 1774.

[27] See Homer and Sylla (1991) p. 271 and *passim*.

[28] See the interest rate literature cited in endnote 19 above.

[29] The markdown from gross to net personal income is not so different in these estimates from the comparable markdowns in the US economy today. There are various accounting ratios available for comparison with the 85% share of net personal income in gross personal income in 1774 (Table 5). As of 2009, that same concept would be 78.3% of gross personal income if one omitted personal transfer receipts, or 87.3% if the net transfers were included in the numerator (US Census Bureau 2011: Table 672), for an average of about 83%.

[30] That is, using the part-time work years defined in endnote 13 above would reduce our 1774 national income from $173.23 million to $164.11 million, still 20.4 percent above the McCusker-Jones average.

[31] Jones's conjectural range was given in her *Wealth of a Nation to Be* (1980), p. 62. Robert Gallman and Thomas Weiss have preferred her top wealth-income ratio, 3.5 to one, and that is used in Table 3's display of her estimates. Decomposing our aggregate 13-colony wealth-income ratio of 1.89 into regional wealth/income ratios for 1774, we estimated the ratio at 0.96 for New England, 1.80 for the Middle Colonies, and 2.25 for the South.

[32] Table A4.1 of Appendix 4 supports this point with an exercise in accounting for income differences between regions. Of the 107 percent gap between average free household

income in the South ($705) and the Middle Colonies ($340), most would be accounted for by giving the South the occupational mix of the Middle Colonies, and only a small share would be due to differences in average rates of pay for given occupations.

[33] See Appendix 4 for evidence from Virginia in the 1780s, and for commentary on the inequality literature for the Chesapeake.

[34] See Homer and Sylla (1991, pp. 274-296).

[35] Lucy Simler's detailed study of Chester County, Pennsylvania found that farm operators' families supplied 60 percent of farm labor in 1799, with the rest being variations on hired farm labor. For 1774, she implied 67 percent. See Simler (1990, p. 197, Table 3). Yet we cannot extrapolate from Chester County to the whole nation, and doing so would still leave this paragraph's other reasons for not trying to estimate farmers' pure profit share for 1800.

[36] As Douglas Irwin and Richard Sylla remind us in the introduction to their *Founding Choices*, growth is considered modern if per capita income growth reaches 1 percent per annum or more for long stretches of time (2011: p. 4).

Labor productivity grew a bit faster, perhaps 0.58 percent per annum. Demography explains the difference between this and the per capita rate of 0.38. The "relevant denominators" panel of Table 2 confirms that the labor (free and slave combined) participation rate fell from 0.337 in 1774 to 0.320 in 1800. The change was caused by a slight decline in the share of free males over 16 years of age in the North, and a slight decline in the population share of slaves, who were compelled to have much higher labor force participation rates.

[37] Mancall, Rosenbloom, and Weiss (2003), Weiss (1992: Table 1.2, p. 27), and David (1967, Table 8). See the excellent survey on growth estimates for early America by Sylla (2011: pp. 81-83).

[38] The recent empirical growth literature has come to call this a *reversal of fortune*, as in Acemoglu *et al.* (2002).

[39] Our estimates exaggerate the extent to which the relative Southern decline had already occurred by 1800. The exaggeration arises from data limitations forcing us to use some identical occupation-specific pay rates for all regions. This was true of town-and-rural white-collar occupations, urban manufacturing artisans, and the unskilled. Better data would reveal that more of the Southern decline came later than the 1800 benchmark.

[40] See Series Ca11, Series Ca16, and Series Ca17 in the *Historical Statistics of the United States* 2006, and McCusker (2000).

[41] See McCusker and Menard (1985, p. 374) and Kulikoff (2005, p. 27). For more detail on the many forms of wartime economic destruction and disruption, with emphasis on the countryside, see Mancall (1991, pp. 130-159) and Kulikoff (2000, pp. 256-280).

[42] As Shepherd and Walton (1976) have noted, the loss of trade in the 1780s was domestic as well as overseas, because the loose Confederation that preceded federal union briefly allowed the new states to tax interstate trade. We concentrate here, however, on the larger and longer shocks to trade with Britain and its possessions.

[43] Shepherd and Walton (1976: especially Table 5 and the surrounding text). The Mancall *et al.* (2008, Table 1) estimate for the Lower South refers to the twenty years 1770-1790.

[44] Hildreth's summary (1849, vol. III, pp. 465-466) is cited by McCusker and Menard (1985, p. 365).

An estimated 60,000 free persons (3.1 percent of the free population) and 15,000 slaves (3.6 percent of the slave population) had left as of the early 1790s (Jasanoff 2011, pp. 351-358). The losses to the American economy were presumably much greater than the losses that the departing loyalists experienced themselves. A high estimate of loyalist claims presented to His Majesty for losses in American rebellion came to $1,053,024 at the $4.44 exchange rate, or about 0.6% of the 1774 income of the 13 colonies (Eardley-Wilmot 1815, reprinted 1972, Appendix VIII). Of course, this ignores the human capital that the new republic lost.

[45] It might seem impossible that the free populations in each region could have a Gini less than that for the total (e.g. 0.33, 0.35, and 0.38, all less than 0.40), but recall that there was also great regional inequality between all three.

[46] C.f. the estimates in Milanovic *et al.* (2011).

[47] For revisions of the social tables of Massie and Colquhoun, see Lindert and Williamson "Revising" (1982) and "Reinterpreting" (1983). On British growth, see Broadberry *et al.* (2012, especially Table 10).

[48] For the specific contrast of consumer prices between New England and other regions, see the file "Massachusetts vs. England and WV" at http:// gpih.ucdavis.edu, and also Allen, Murphy, and Schneider (2012, Table 3). Unfortunately, these two sources do not offer the price evidence

we need for the more export-oriented South. On the more general subtlety about class- and place-specific costs of living, see Williamson (1977) and Hoffman *et al.* (2002). England's lower interest rates may also have implied a lower user cost of capital than in the colonies. [49] See, for example, Stiverson (1977), Kulikoff (1986), Carr *et al.* (1991), and Walsh (2010). See also Robert Gallman's (1982) study of Perquimans County, North Carolina.

Appendix 1

Population, labor force, and occupations

<u>**Excel and Word file sources:**</u> All Excel files and data referenced in this Appendix can be found in two internet archives. The unchanging set underlying the estimates in the text are downloadable from the "supplementary materials" folder at the *Journal of Economic History*'s internet site. A growing set of files for our larger project on *America's First Century: Growth and Inequality 1774-1870* are available in http://gpih.ucdavis.edu (click on the folder "American incomes 1774-1870"). The references to Excel files in this Appendix are to the versions archived by the *Journal of Economic History.*

<u>**Background**</u>

To construct the social tables, we estimate population by age, gender, slave/free status, rural/urban residence, and region. Indigenous native populations are excluded throughout. The three regions for the 1774 "original 13" include: New England = New Hampshire, Massachusetts, Connecticut, and Rhode Island; Middle Atlantic = Middle Colonies = New York, New Jersey, Pennsylvania, and Delaware; and South = South Atlantic = Maryland, Virginia, North Carolina, South Carolina, and Georgia. The 1800 "original 13" consists of the same regions, but with Maine, Vermont, and the District of Columbia identified separately in the original data. Second, we estimate the distribution of that population between urban (big city = Boston, New York, Philadelphia, and Charleston; lesser towns = other places with populations over 2,500; and a rural residual. Third, the urban and rural populations are assigned occupations by gender and slave/free status.

<u>**1774 and 1800 population by age, gender, slave/free, region, and urban/rural**</u>:

<u>1774 Source</u>: The colonial censuses in *Historical Statistics, Millennial Edition* (Carter *et al*. 2006). Some colonies have less evidence on the age/gender breakdown than others, in which case for missing evidence we "clone" by assuming that the age/gender distribution of the most similar contiguous colony applies. Excel file "Labor force 1774 by colony", worksheet (1)".

<u>1800 Source</u>: The US censuses of 1800 in Michael R. Haines (the Inter-university Consortium for Political and Social Research), *Historical, Demographic, Economic, and Social Data: The United States, 1790-2000* [Computer file]. ICPSR02896-v2. Hamilton, NY: Colgate University/Ann Arbor: MI: ICPSR [producers], 2004. Ann Arbor, MI: ICPSR [distributor], 2005-04-29. We divided the populations into over- and under-16 age groups by sex, race, and region in Excel files "LF 1800 free & slave (Weiss)" and "Slave LF 1800.xlsx".

The urban/rural decomposition for 1800 by state (and big city from the rest) is taken from the census as reported in ICPSR 2896 by Michael Haines (Computer File Compilation of the 1800 Census Compendium). The 1800 data are reported in Excel file "Urban data". For 1774, the urban/rural decomposition is based on Price (1974: Appendix B, pp. 176-7). The 1774 data are reported in Excel file "LF 1774-1790 regions and sectors". These sources allowed us to separate out the 1774 big city

populations (Boston, New York, Philadelphia, and Charleston) from the rest of the 1774 urban population by colony.

1774 and 1800 labor force participation:

Labor participation rates by category are not published in official sources until well into the nineteenth century. For 1774, we use estimated rates for 1800 supplied by Thomas Weiss by personal correspondence. How they were constructed can be found in his "U.S. Labor Force Estimates and Economic Growth, 1800-1860" (1992). See Excel file "Labor force 1774 by colony", worksheet (2). We applied these to the population breakdowns to generate labor force numbers by age, sex, slave/free status, rural/urban residence, and region. See the Excel file "LF 1774-1790 regions and sectors". For the labor force in 1800, see our presentation of estimates made available by Tom Weiss in "LF 1800 free & slave (Weiss)", and regional rearrangement of the slave labor force in the file "Slave LF 1800".

Household headship rates 1774 and 1800:

Following the leads of Billy Gordon Smith (1981, 1984, 1990), and the late Lucy Simler (1990, 2007) in particular, we estimate the number of household heads from population data for c1774 invoking the following assumptions:

For free whites, we use the number of free white males 21 and older as a proxy for the number of free white household heads. This implicitly assumes a net cancelation of two opposing errors: the failure to include female household heads other than the few (usually widows) identified in the data, versus the inclusion of free adult white males who were non-heads in somebody else's household.

For free non-whites in the North, we assume that 1/6 of that total free non-white population were household heads. It appears unlikely that many free non-whites in the slave South were household heads of the sort that would be considered such by the recorders of population censuses or tax assessments. The assumption made in this case is that 1/10 of them were heads of households defined as separate economic units. Thus we use a headship rate of 1/10 for free non-whites in Maryland, Delaware, and colonies/states further South.

For 1800, we pursued aggregate labor incomes and aggregate property incomes separately, for each state. Since the property returns are aggregate data not allowing a breakdown by occupation, we had to abandon the hope of calculating inequality of total incomes from occupational social tables for 1800. This meant there was no need to try to extract numbers of households. Rather, the labor income estimates use members of the labor force, and the property tax totals rest on returns from residences, rather than households.

For 1774, see Excel file "Labor force 1774 by colony", worksheet (2). The corresponding estimates for 1800 can be found in Excel file "LF 1800 free & slave (Weiss)".

Occupational Distribution of the Labor Force in 1774:

There are 99 occupational codes in our 1774 database (see Excel file "Occ codes, Lindert-Williamson"), but lack of data detail forced us to aggregate the occupational categories into the broader occupational groups described in Section II.A of the article's text.

Our occupational allocations vary from region to region, and by residential sector (big city, lesser city, and rural). For a region-by-region explanation of the LW occupational weights, see Appendix 3, which contrasts our weights to those of Alice Hanson Jones in the context of estimating the distribution of property income. We continue here with the occupational source materials by residential sector within each region.

The big city occupational allocations are based on the following: "Big cities c1774 by occ" and "Big cities 1800 by occ". These draw on our demographically adjusted counts in business directories, tax lists and probates for Baltimore 1790, Boston 1771, several places around 1780 (using Main 1965), Charleston 1774 (Jones 1977) and 1790, New York City 1786 and 1799, Philadelphia 1772 (data underlying Smith 1984, 1990), and Philadelphia 1774 and 1780-83 (data reported in Price 1974). As noted in the text, the Charleston 1774 occupational mix from Alice Hanson Jones was adjusted based on tax assessments for three rural North Carolina counties 1779-1782 (see Excel file "NC 3 counties 1779-82"). See the corresponding files at the gpih.ucdavis.edu site.

For lesser cities and small towns, the occupational distributions for New England are based on the following: 1765-1788 "frontier towns and subsistence communities", "more commercial towns with access to markets", and "lesser urban centers" (Main 1965); and small towns in Lancaster County (PA) 1800 plus the Chester County (PA) c1774 rural non-farm mix (Simler 1990, 2007; Marietta 1995). For towns in the Middle Colonies, the occupational mix is based on that in Lancaster Borough 1773. Since the town population numbers in the South are very small, we use the rural non-farm mix (see below) for the region's few lesser cities and small towns. See the Excel file "Small town occ dists 1774, c1800".

The rural non-farm labor force shares are for 1790 and they are given for that date by region in the Excel file "LF 1774-1790 regions sectors.xls". The New England rural non-farm occupation mix was assumed to be the same as in lesser cities (above). For the Middle Colonies rural non-farm occupation mix, we used eight rural townships in Chester County (PA) 1800 (Simler 1990, 2007; Marietta 1995). See the Excel file "Rural Chester Co 8 towns 1799-1802". For the South, we use Alice Hanson Jones' (1977) rural w weights from four colonies (MD, VA, NC, SC), applying the same adjustment already applied to Charleston (above) by using three NC rural counties.

Occupational Distribution of the Labor Force in 1800:

We grouped the labor force data according to the same 99 occupational codes as for 1774 (again see Excel file "Occ codes, Lindert-Williamson"). However, a scarcity of data detail forced us to aggregate the urban and rural non-farm categories into the same ones described for 1774, for each urban/rural group: the free non-farm big city group, the free non-farm lesser cities and small town group, and the free rural non-farm group. Farms have only farm laborers, some of whom are family members of the heads' household, some of whom are operators, and some of whom are owner-operators.

The lesser city and small town occupational distributions for 1800 are based on the following: directories and tax lists from Hartford (CT) 1799, Lancaster Borough (PA) 1800, and Lexington (KY) 1806. See Excel file "Small town occ dists 1774, c1800" for a more detailed discussion and the data.

The rural non-farm labor force share for 1800 is based on Weiss (1992: Tables 1A.1, 1A.7, 1A.9) (see Excel file "LF 1800 free & slave (Weiss)"). Its occupational distribution, like that for 1774, is based on tax lists from eight Chester County (PA) rural townships, reported in Marietta (1995) and supported by Simler (1990, 2007). Again see Excel file "Rural Chester Co 8 towns 1799-1802.xls").

Appendix 2

Labor Earnings

Excel and Word file sources: As introduced in Appendix 1, the relevant Excel and Word files can be found in two places: The main unchanging ("frozen") set underlying the estimates in this article are downloadable from the "supplementary materials" folder at the *Journal Economic History*'s internet site and others appear in http://gpih.ucdavis.edu.

Background:

To construct the social tables, Appendix 1 documented how we estimated the 1774 and 1800 labor force by gender, slave/free, location, and, most importantly, occupation. This Appendix reports the estimation of average annual (labor) incomes for the work force within these cells. For those receiving annual salaries, the only adjustment is to add in-kind payments where relevant (e.g. ministers with rent free housing). For those receiving monthly and weekly salaries, there are two adjustments to be made: first, the addition of the value of home or market work done during off season (e.g. female teachers working as domestics or manufacturing operatives when school was out; farm laborers working their own plots or spinning and weaving when not hired for wage work); and second, their in-kind income while working at their main job (e.g. female teachers living with families of students when school is in session; farm laborers living with farm families when hired as farm laborers). For those receiving daily wages, the adjustments involve estimates of days worked per year and perhaps more modest in-kind payment, such as the noon meal and some grog.

Nominal wages and annual salaries by occupation, c1774 and c1800:

The next major task is to combine the occupational information described in the text and Appendix 1 and rates of labor earnings. Using the procedures and sources described in the rest of this appendix, we have gathered the pay rates into the multi-worksheet Excel files "Wage data 1774" and "Wage data 1800". These are then combined with the number of persons engaged in each occupation in the files "Own-labor incomes 1774" and "Own-labor incomes 1800".

Big-city wage and salary rates: The observations for big cities c1774 draw on occupation-specific data from Boston, New York City, Baltimore, Philadelphia, and Charleston, and our sources are Adams (1968), Blodget (1806), Bureau of Labor Statistics (1929), Main (1965), Wright (1885), and others. The occupations covered include: unskilled = male common labor, female common labor, female domestic, mariner; building trades = bricklayer, carpenter, caulker, house wright, joiner, painter, ship carpenter, rigger, sawyer, and helpers; artisan = general artisan, glass shearer, tailor, weaver, wool comber, female spinner; annual salaried white collar = academy usher, minister, attorney, clerk for merchant, clerk for court, doctor, foreman, government official, head master, lawyer, professor, small manufacturer, school master, surgeon, treasurer and others. The income of those hired monthly was augmented by in-kind board. (See below for magnitudes and discussion). For more detail, again see "Own-labor incomes 1774".

For 1800 the pay-rate observations come from the same cities plus Norfolk and Washington D.C. Our main sources are Adams (1968, 1970, 1986), Blodget (1806), Bureau of Labor Statistics (1929), Lebergott (1964), and Wright (1885). The data are much richer for 1800 than 1774. Female unskilled = female common labor, female domestic, housemaid, laundress, and cleaning woman. Male unskilled = male common labor, boatman, seaman, able-bodied seaman, ship's cook, ship's boy and shoe factory operative. Building trades = bricklayer, carpenter, caulker, house wright, joiner, mason, painter, plasterer, ship builder, ship carpenter, ship joiner, rigger, sawyer, whitewasher and helpers. Artisan = general

artisan, baker, tailor, weaver, and shoe factory worker. Annual salaried white collar = academy usher, minister, attorney, clerk for merchant, clerk for court, doctor, female nurse, foreman, government official, head master, lawyer, professor, small manufacturer, school master, millwright, surgeon, ship captain (Asian, European, and coastal trades), mate (Asian, European, and coastal trades), male teacher, female teacher, treasurer and others. For those hired monthly, their nominal income was augmented by in-kind payments. (See below for magnitudes and discussion). For more detail, see the Excel file "Wage data 1800".

Small-town wage and salary rates: For 1774, we collected the small town wage observations by colony, although data gaps often require that we "clone" estimates from contiguous colonies. For example, there are no small town artisan observations for New England, so we used the small town unskilled observation times the big city (artisan/unskilled) ratio = 1.536 x 122.59 = 188.30, a figure that seems consistent with Main's statement that 188.70 was average for artisans in cities and towns. Similarly, there are no lawyer observations for NH, so we used CT; there are no common labor observations for RI, so we use MA; there are no school master observations for PA, so we use MD; there are no lawyer observations for NY, so we use PA; there are no common labor observations for GA, so we use NC; there are no school master observations for VA, so we use MD; there are no minister observations for SC, so we use GA; and so on. The main sources are Bureau of Labor Statistics (1929), Main (1965), and Wright (1885).

For 1800, the small-town occupational wage data are better than for 1774. Relying mainly on Lebergott (1964), we can document wages for common labor, female domestics, male teachers, female teachers, and ministers. To estimate the rest (especially the building trades and artisans), we apply Carey's Rule. Henry Carey (cited in Adams 1970: p. 505), writing in the early 1830s about the 1820s, observed that monthly contract wages in principal cities were 10-11 dollars (to which must be added in-kind value of boarding, also high), but farther away and in small towns, they dropped to 8, or 76% of the big cities. This is consistent with the common labor data above: female earnings were 75% of big cities, while male earnings were 77% (if boatmen and woodcutters -- not small town activities -- are excluded).

Rural non-farm: While guided by Main (1965) and what we know about small towns (see above), the evidence for rural non-farm occupations is the thinnest for our 1774 wage sources. See the rural non-farm worksheet in "Wage data 1774". For 1800, relying mainly on Lebergott (1964), we can document rural non-farm wages for gardeners, wood cutters, boatmen, bargemen, canal laborers, common labor, miners, doctors, female domestics, maids, male teachers, female teachers, female spinners, and ministers. To estimate the rest (especially the building trades), we apply Carey's Rule (see above) by assuming that rural non-farm wages were 60% of the big cities. See Worksheet (4) on rural non-farm in the Excel file "Wage data 1800."

Farm laborers' wage rates: Monthly nominal wages for the three regions are taken mainly from Donald Adams (1968, 1982, 1986), T.M. Adams (1944), Main (1965), and Wright (1885). For more detail, see the farm labor worksheets of "Wage data 1774" and "Wage data 1800".

1774 and 1800 In-Kind payments:

For detail on what follows, see the "in-kind" worksheets of the same two wage files just cited: "Wage data 1774" and "Wage data 1800."

Both for farm labor and for non-farm low-skilled labor, a large share of total income was paid in kind, especially with lodging and/or food or drink. According to Lebergott (1964: p. 257) "the most common method of wage payment in agriculture was monthly, with board included." More explicitly, it appears that the $/month quotes refer to cash payments. While board (and sometimes lodging and whiskey) was included, it was not typically assessed by value, or quoted in the value of the total payment. Furthermore, the monthly quotes were an average for the year across all seasons (Lebergott 1964: p. 258). Rothenberg

(1992: p. 122) agrees: "Since as a rule contract workers lived with the farm family, it was understood that they received part of their (total = cash + in-kind) wages in room, board, washing, mending" and other items while day farm workers "found" themselves. The problem with aggregating the in-kind (or "found") evidence is that we are rarely told what was included in the contract. Adams (1968: p. 409; 1982: p. 907) lists board, lodging, washing, mending, clothing, fuel, candles, borrowing the employer's horse and so on. Yet, the contracts typically refer only to "board" or to that and "lodging". How to make the limited board definition (food) comparable to the broad definition (food, lodging etc)? First, since domestics, farm workers and seamen all lived with their employers or on ship, they were clearly receiving "board" which also covered rent (and grog for seamen), at a minimum. We therefore augment nominal wages of those occupations by board + rent accordingly. Where necessary to split "board" into food and rent, we use two working class budget studies from the period: Matthew Carey in 1833 (Adams 1968: p. 412) reported food, fuel, clothing and rent shares of total budget, and the distribution between rent and food was .182 and .818, respectively; the figures for Brandywine manufacturing operatives (Adams 1982: p. 915) was similar, .211 and .799 respectively. Finally, Lebergott's (1964) survey of canal workers' day wages includes one meal and whiskey (for such "hard" work), as did Washington, D.C. construction contracts.

Our survey of in-kind/cash payment ratio magnitudes used to augment our 1774 and 1800 cash income payments for farm labor is based on Adams (1982, 1992), Henry Carey (1835), Matthew Carey (1833), Earle and Hoffman (1980), and Larkin (1988). The average was 0.493, applied to both 1774 and 1800.

Data are also available on in-kind payments for other (i.e., non-farm) contract labor: Our sources report the in-kind share of nominal cash payments for female domestics (0.618), ship captains and mates (0.300), seamen (0.516), miners (0.250), navy surgeons (0.300), Methodist preachers (3.250), manufacturing operatives (0.474), and many others.

Days worked per year, 1774 and 1800

No earnings issue is more poorly documented, and more hotly debated, than the days worked per year estimate. Lucy Simler (1990) has this to say about Chester County (PA) farm and rural non-farm labor in the early 19th century: "[A]s the demand for labor increased, employers frequently set wages by the month or by the year at monthly rates reflecting seasonal demand. It was assumed that the individual hired would work daily, sun up to sun down (Sundays excepted). At settlement, wages for days lost due to weather or for personal reasons were deducted at the rate set for the particular month of the absence" (p, 178). In addition, she says: "Except during periods of recession, workers were probably able to find as much work as they wanted. Year-round work did not necessarily mean working at one job or for one employer. Artisans and workers moved with considerable freedom from one job to another, and over the working year they made personal decisions as to the allocation of their time and income. Hosea Rigg, for example, was free to weave for others as long as he gave priority to Richard Barnard's work. Many gave up a day's wages to visit their friends or relatives. They planted their gardens, hoed their corn, brought in hay for their cows ..." (p. 180).

Thus, full time work for farm and common labor was 365 days minus 52 Sundays = 313, or 26 days per month. But time off due to poor weather was no small matter, at least for farm laborers, miners, boatmen, seamen, lumbermen, canal laborers, dock workers, workers in the building trades, and other outdoor work. Main (1965) suggested that workdays of New England farm labor should be scaled down from 313 to 227. But Main was referring to days hired out, and thus his figure would ignore unpaid labor on their small plot or spinning, weaving and other manufactures work at home, some of which was sold (Tryon 1917). In the text, we have explored the impact of various assumptions on our income estimates, using the mixture of 222, 280, or 313 annual work days, depending on the occupational group.

Slave maintenance and retained earnings, c1774 and c1800

Another large component of total labor earnings was the part of their marginal product that slaves were able to retain. Here our estimates must work back toward the eighteenth century from the eve of the Civil War.

The 1849-1859 slave maintenance estimates. In their *Time on the Cross*, Robert Fogel and Stanley Engerman (1974 I: 5-6) claimed slaves retained 90% of what they produced. That figure, and its subsequent revision, applied to 1859, six decades after 1800, and almost a century after 1774. This fact is important for any 1774 or 1800 estimate. Further research reduced the Fogel and Engerman 90% estimate to about 50%: "Current estimates suggest that the typical slave received only about fifty percent of the extra output that he or she produced" (Wahl 2008). In addition to that by Richard Sutch (1975), the best critical assessment, confirming the 50% figure, seems to be that of Richard Vedder (1975). Vedder first defined the expropriation rate (ER, following Fogel and Engerman) as the value of the marginal product of the slave (or earnings, w) less his or her actual payment or subsistence maintenance (s) divided by the value of the marginal product of the slave, or $[w - s]/w = ER$. Vedder (1975: p. 455) estimates ER to have ranged between 43.2% and 72.2%, for an average of 57.7% (implying a slave retention rate of 42.3%), well above the more benign Fogel and Engerman 10% ER rate (implying a 90% retention rate). In another study, Vedder reports a 1859 ER figure of 66.7% and a 1849 ER figure of 48%, concluding that the "observed rising rate of slave exploitation over time … reflects rising marginal productivity [of slaves] and a constant [subsistence]" (Vedder 1975: p. 456). This implies that the slave value marginal product rose across the decade 1849-1859 at 4.6% per annum. As we shall see, this huge rate was much lower earlier in the century, but the rate was already impressive in the first half of the century.
The best recent work on slave productivity growth is by Alan Olmstead and Paul Rhode (2010: Table 1, p. 37) who estimate that cotton bales per slave worker in the Old South grew at 1.57% per annum 1800-1860. Old South is defined as Georgia, North Carolina, South Carolina, and Virginia (ibid.: p. 4), the relevant region for our 1774 and 1800 estimates. This may overstate average slave productivity growth, since the plantations became more specialization in cotton over time (ibid.: p. 5). Still, even as late as 1880, cotton made up only 16 % of improved acres in the South (with corn 31%: other crops being barley, buckwheat, oats, rye, wheat, hay, tobacco, Irish potatoes, sweet potatoes, rice, and hops). Thus, what about a broader crop-based index? Paul Rhode offers such an index (communication August 22, 2010) based on cotton, tobacco, sugar, molasses, and rice 1800-1860, and it grows at 2.3% per annum for All South (Old plus New South). Applying the same discount to the slower-growing Old South that Olmstead and Rhode report for cotton productivity growth (2010: Table 1, p. 37: 2.44% per annum All South and 1.57% per annum for Old South, or 0.643 discount) implies 1.48% per annum over the six decades. Thus, 1.5% seems like a fair estimate. Cruder but confirming evidence of fast slave productivity growth can be found in earlier work by Conrad and Meyer (1958), Whartenby (1977) and Lebergott (1984).

Assuming an 1859 ER of 57.7%, constant subsistence, and slave productivity growth of 1.5% per annum, then the 1800 ER would have to have been negative! Since we know it was not, subsistence must have grown considerably over the six decades from much lower levels in 1800. A recent survey (Mancall, Rosenbloom, and Weiss 2010: hereafter MRW) offers confirming evidence on these slave consumption growth rates: slave subsistence per capita grew at 0.65% per annum over the 18th century. Perhaps much the same was true 1800-1860.

Estimating 1800 slave consumption directly. Alternatively, we can try to estimate slave consumption in 1800 directly. For this exercise, we lean heavily on MRW. Their findings can be summarized by these quotes: "In the nineteenth century, the value of a slave's diet equaled about 75 percent that of a free person. The information we have found for the colonial period would put the relative value anywhere between 20 percent and 75 percent." (MRW p. 399) "In estimating the diet of a slave, we assume that its value increased from around 50 percent of a colonist's diet in 1700 to 75 percent in 1800." (MRW p. 399.

See also fn 37, p. 417) Note that the latter statement interpolates to a share of 67 percent in 1774. Note also that MRW are referring to the value of food (diet or subsistence), and not to non-food consumption like shelter, fuel, clothes and extras which would have loomed much larger in the free laborer's budget.

When all is said and done, it appears that the slave retention rate in 1800 ranged between 23 and 31%, well below the 50% that the literature has estimated for 1849-1859. Some of the difference can be attributed to the fact that our 1800 estimate tries to cover all consumption, not just diet, but even so the 1800 estimates are well below those of the late antebellum era. They are also below the 1796-1804 slave rental data explored next, estimates based on better evidence and thus which we prefer.

The percent of slave earnings retained 1796-1804 for those hired out. A lessee renting a slave should theoretically pay a rental charge (hire rate per year) such that it plus the upkeep of the slave (the responsibility of the lessee) should be the marginal cost of using the slave. This marginal cost should, in turn, add up to the slave's marginal product. If so, there is a definitional relationship between the rental price (R) and the exploitation rate (ER). Let the value of the slave's marginal product be w, let s be the slave's consumption, and define ER = [w-s]/w. Logically, R = [w-s], so given an estimate of the slave's product and consumption, we can infer both the exploitation rate R/[R+s], and the retention rate 1 – (R/[R+s]). We assume that, given skills and occupations, slaves and free labor were close if not perfect substitutes, such that these African-Americans would have received the earnings of free labor had they been free, an assumption supported by qualitative evidence reported by Goldin (1976: pp. 28-30). An ICPSR file (constructed by Fogel and Engerman) reports the following average annual hire rates in Queen Anne's County (Maryland) 1796-1804 for 207 slaves, and we combine these with the consumption per slave estimates reported above. These hires were for farm work ($):

	Annual Hire Rental Rural Maryland	Annual Subsistence (1-ER in parentheses)	
		Lower South: farm	Middle Colonies: farm
All slaves hired	28.44	45.18(61.4)	43.64(60.5)
All male slaves hired	29.62	45.18(60.4)	43.64(59.6)
All male "fellows"	39.42	45.18(54.3)	43.64(52.5)

These slave retention rates (52.5% to 61.4%) are a bit higher than those the post-*TOC* literature has estimated for 1849-1859 (around 50%), with averages of 58.7% for the Lower South and 57.5% for the Middle Colonies (or Mid Atlantic).

Bottom line: Assumed slave retention rates for 1774 and 1800. We take the farm retention rate averages from above, and an estimated rural-urban cost-of-living gradient (see "Slave earnings retention 1774, 1800.doc"), to get the eight estimated slave retained earnings shares for 1800 (farm, rural non-farm, small town, and big city within both the Lower South and the North). We assume the same shares for 1774:

	Lower South	**North**
Average: farm	41.4	40.1
Rural non-farm	44.3	43.9
Small town	47.5	47.1
Big city	52.7	52.3

Appendix 3

Property Income Estimation for 1774 and 1798-1800

The incomes from property can be estimated for any historical period for which the archives yield information on stocks of wealth and the rates of annual return from that wealth. To measure the kinds of property incomes that would enter in the definition used in national income and product accounts (NIPA). Rates of return should be applied only to NIPA-type assets, and these typically exclude consumer durables and cash.

Estimates discussed in this appendix, and in the corresponding parts of the main text, come from calculations reported in Excel and Word files in the same locations described for Appendices 1 and 2. Its three regional files for 1774 are large, and its worksheets on occupational mix contain material supporting the occupational estimates already described in Appendix 1.

The 1774 property estimates

Fortunately, we have the landmark published study by Alice Hanson Jones (1977, 1980) and the ICPSR file of the individuals in her sample. Far from just presenting a set of 919 probated individuals, Jones used them to describe a carefully weighted slice of society. She fashioned the set of weights from her reading of the literature on occupations and from census-based shares for different groups defined by age range, sex, race, and place.

The only dimensions on which we have reason to revise her weights relate to occupations, poverty status, and asset ownership. Since 1980, the internet and spreadsheet technology have given us data she could not incorporate into her own work. We can now draw on additional local tax lists, censuses, and city directories, to get a clearer picture of the occupational mix and of the shares of household heads that lacked occupational labels and/or were too poor to be taxable. Table 1 in the article describes some of the sources we have added to the Jones mix.[1]

The new Lindert-Williamson (LW) counts of occupations and household headship depart from Jones's estimates in all three regions. Our mapping of New England occupations began with data on Boston's occupational directories, helped by Jacob Price (1974). These omitted many Boston household heads. We then turned to the giant 1771 tax return

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[1] The work on occupational and household mixes was developed simultaneously for the task of estimating property incomes and the task of estimating labor earnings. Scholars particularly interested in the occupational mix should therefore study the detail in occupational mix worksheets of the three regional files on "Property 1774", and should also consult Appendix 1.

for Massachusetts, including Maine (ICPSR 07734). Warned by Gerard Warden's (1976) article, we distrusted the assessed valuations given in this return. Rather we extracted only two occupational clues: Whether this person was assessed for any wealth at all, and whether this person was a farm operator. Farm operator status was revealed by the union of several asset clues: at least 25 bushels of grain produced, or at least 11 cows or swine, or at least 11 acres of hay land or meadow. Then, for non-Boston New England, we applied the non-farm, non-big city occupation mix from Lancaster PA 1800 to lesser New England towns in 1774, and the Chester County PA rural occupation mix of non-farmers in 1800 to the rest of New England 1774. Next, we noted the share of households that the 1771 returns implied had zero wealth. Finally, we added the estimated number of households missed by the 1771 tax lists altogether. (The numbers with zero wealth might be a bit too large, understating the property income of the poorer New England groups.) See the Excel file "Property 1774, New Eng".

For the Middle Colonies, we used the mix of sources described in Appendix 1, i.e. census materials, Billy Gordon Smith's detailed coverage of Philadelphia, Lancaster for small towns, and rural Chester County for the countryside. Our resulting mix differs from that of Alice Hanson Jones in ways that have raised inequality and lowered aggregate income. Given information that became conveniently available only after 1980, we derive a non-city mix of occupations that shifts households away from middling farmers to less wealthy craftsmen, laborers, and males with no given occupation. See the Excel file "Property 1774, MidCols", worksheets (5) and (6).

Aggregating occupations and property is particularly complicated for the Middle Colonies because of sampling constraints imposed on Alice Jones's probate research. She could collect only 23 probates for New York. This forced her to synthesize New York by giving only 1/10 weight to these 23 cases, and borrowing the rest of the wealth distribution from patterns revealed in her other three Middle Colonies (NJ, PA, DE) and the wealth distribution from New England. We inherit her difficulties here, and our combining New York with the other three Middle Colonies was a laborious task. See "Property 1774, MidCols", worksheets (5) – (10).

A further complication for comparisons of 1774 with nineteenth-century benchmarks was Jones's decision to put Delaware into the Middle Colonies instead of putting it in the South Atlantic, where it belongs in all later census aggregations by region. Our files present alternative regional results for 1800, with Delaware first in one region and then in another.

In the South in 1774, we again find that today's information set allows us to make several adjustments to Jones's weighting scheme. First, the available census clues suggest that she gave Charleston too much weight as a share of the South: her 4.9% Charleston share

should have been only 2.6%. Second, her probate sample gave greater weight to the wealthier classes, even after she tried to adjust for this with her w*B weights. From tax rolls in three North Carolina counties, we find lower shares of those owning land and/or slaves than in her probates. We have adjusted her weights accordingly, causing a reduction in average property income for the South. See the Excel file "Property 1774 South", worksheet (3).

Rates of return for 1774:

Deriving estimates of property incomes from data on property asset values requires knowing the rate of return defined as = current income/asset value. While the net rate of return might be inferred from the historical rates on alternate assets, such as bonds, a more difficult task is to choose depreciation rates (alias capital consumption allowance) on different assets, for the purpose of deriving gross incomes and gross domestic product. Here "income" is restricted to that which would appear in the National Income and Product Accounts. We have very little historical information on depreciation rates. Table A3.1, which immediately follows, presents out best guesses for 1774.

Table A3.1. Assumed rates of annual income, as % of wealth value, by asset type

	Interest +	Depreciation	= Gross rate
Financial Assets	6	0	6
Servants and Slaves	6	5	11
Producers' Durables	6	10	16
Producers' Perishables	6	0	6
Business Inventory	6	0	6
Liabilities	0	0	0
Real Estate (assume capital gains = depreciation cost)	6	0	6
Livestock	6	10	16
Equipment, Business	6	10	16
Crops	6	0	6

The 1800 property estimates:

Some features of the 1800 estimation process correspond to the 1774 procedures. The net rate of return is the same – a baseline 6%, with an alternative 8% rate considered in the article's text. The procedures for estimating occupational shares remain the same, as already described in Appendix 1.

The 1800 property structure must, however, be estimated from a wholly different database. Gone is the support of Alice Jones's careful probate study. In its place are aggregate figures on real estate and slaveholding wealth from that unique Direct Tax of

1798. The main archival source is a microfilm of "Statements of the 1st Direct Tax of the United States from Valuations by the Commissions of States (1798) prepared by Daniel Sheldon, Esq. for Oliver Wolcott,"[2] supplemented by summary returns in Pitkin (1817) and analyzed in detail in Soltow (1989) and Einhorn (2006, pp. 189-195).

We have re-scaled the 1798 assessments in several ways (as shown in Excel file "Property totals 1798-1800", worksheets (3) – (5)). We converted to 1800 values of real estate by using Blodgett's seven-percent realty markup between those dates. Then we adjusted for the 8.45% underassessment of realty revealed by a 1799 study.

The most important adjustment in the 1798-1800 property estimates is one for dealing with the extent to which Southern slaveholders and owners of highly valuable real estate were able to understate their wealth, evading a higher rate of taxation.

We have three clues about the degree of Southern underassessment. Two of these relate to slaves and do not affect our income estimates. The third relates to real estate, and it does affect our income estimates.

The first clue arises from slave counts. The tax return of 1798 reported only 86,840 slaves of taxable age 12-50 and 323,905 slaves overall. These numbers are much too low and also imply an implausibly low working-age share for the slave population (0.268). Indeed, only two years later the 1800 census reported 513,905 slaves aged 10-up and 835,490 slaves overall. Even the 1790 census reported far more slaves than were revealed in the 1798 tax returns. Fortunately, we were able to reject the 1798 tax-return slave counts in favor of the 1800 census, combined with the Fogel-Engerman (1976, updated 2006) sample values for the rental incomes derived by slaveholders.[3]

A second clue supporting underassessment in the South lies with the overall tax valuation of slaves, rather than just their numbers. According to Timothy Pitkin's (1817) summary of the 1798 returns, slave taxes were only 21 percent of all reported realty plus slave taxes in the South Atlantic, while in 1774 slave values were 58.1 percent of all slave plus realty value in that region. Either the market value of slaves relative to the value of real estate dropped spectacularly, or slaveholders gained a considerable tax break relative to other owners of real estate. It seems clear to us that the fifty-cent tax per slave reported to be 12-50 years old was based on an undercount of those slaves.[4] To repeat, our estimates of slaveholder incomes are not

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[2] We obtained our copy from Diana McCain of the library of the Connecticut Historical Society Museum (CHSM). The original microfilm on file with the CHSM was apparently assembled by E. James Ferguson of Queens College, Flushing, New York on October 3, 1969.

[3] See the Excel file "Property totals 1798-1800".

[4] The *ad valorem* tax rate as a share of the Fogel-Engerman slave values (1976, updated 2006) resembles the share of slaves that were reported. This again suggests that the undercount of slaves was the main mechanism for understatement of Southern taxable wealth. The slave undercount was common to all states in 1798, though over 60% of the

influenced by the undercount since ours are based on the market value of slaves rather than on the tax assessor's value for slaves. We have raised the slave undercount issue only to add credibility to the wealth adjustment discussed next.

In contrast with the first two clues, the third underassessment clue does have implications for our southern property income estimates. The South Atlantic (here excluding Delaware) paid 38.1 percent of the eastern US realty tax in 1798. This share was tied by law to the South Atlantic share of the free population of the eastern states in 1800 (35 percent). But note the comparison of this 38.1 percent with the region's 57.7 percent share of the thirteen colonies' real estate wealth in the probate valuations for 1774.

There are two possible explanations for the discrepancy. The first possibility is that the South could have under-assessed its 57.7 percent share of the market-based value of all realty in the 13 colonies, reporting only 38.1 percent. This heavy-evasion assumption would imply that we should mark up greatly South Atlantic real estate values in 1798-1800, from a South/North assessment ratio of $38.1/61.9 = 0.62$ to a market ratio of $57.7/42.3 = 1.36$.[5] The opposite possibility is that Southern realty was truly worth only 38.1 percent of total market value, implying that its relative real estate values must have crashed in the Revolutionary war and postwar years.

Neither extreme seems persuasive. The second, or no-underassessment, assumption would have to disregard the three clues implying that the South differentially under-assessed realty and slaves. The heavy-evasion assumption strains belief by implying that the South Atlantic suffered such enormous relative war and postwar losses. The true underassessment differential probably lies between these two extremes. We therefore settle on a middle-evasion assumption. That is, we assume that the North had the 15.5 percent underassessment of real estate demonstrated in the 1799 Connecticut market study, and that the South had the same 15.5 percent underassessment plus half of the possible extra underassessment.

1800-census slaves were reported in Connecticut, New York, and Pennsylvania, whereas less than 40% were reported in New Jersey, Kentucky, and Tennessee.

[5] The algebra of adjustment to reported South Atlantic realty is as follows. We observe the ratio of total assessed values, South to North $(As/An) = 0.381/0.619$. Under the high-evasion assumption, the regional ratio of true market values $(Rs/Rn) = 0.577/0.423$. Within the regions, the relationships of assessed to market value are $As = (1-Us) Rs$, or $An = (1-Un) Rn$, where the U's are the shares of underassessment. The 1799 market value study suggested that $Un = 0.155$ in the North. These values imply that the market value of Southern real estate $Rs = 2.6226$ times As, so that the underassessment rate $Us = 0.619$. (Just by coincidence, this matches the Northern share of assessments, given above.)

When Tables 3 and 4 introduce estimates of nominal income based on our middle-evasion assumption, one can add $9.547 million to get the result obtainable from the high-evasion assumption for 1800, or subtract the same amount for the no-extra-evasion result.

Finally, as noted in the main text, the absence of data on property other than real estate and slaves forced us to use the same ratios of total property/(realty plus slave values) obtained from the 1774 evidence to inflate them to total property. We have applied region-specific ratios to each of the three colonial regions (Property totals 1798-1800", worksheet (5)).

The 1774 total-income estimates, and the summary social table

The property incomes for 1774 were then merged with the own-labor incomes, both those of the free and the retained incomes of slaves. The greatest single complication in this income-merging process was the assignment of the labor income of free non-household heads to the households headed by other persons, as explained in the text and in Appendices 1 and 2. For the details of the final merger, see the file "American incomes detail 1774" in the supplementary materials. Its results are condensed and summarized in the file "American social table 1774".

Again, the same merging of labor and property incomes could not be done for 1798-1800, since the 1798 property returns did not offer any breakdown by occupational classes.

Appendix 4

The Richer Colonial South: More Evidence

This appendix adds two kinds of exhibits. The first amplifies the main text's point that the income advantage of the colonial South took the form of a different occupational mix, rather than a pay advantage for given occupations. The second adds two new data displays for the Upper South.

Accounting for income gaps between regions

The text says that the striking income gaps in favor of the South in 1774 were not due to income differences for given occupations. Rather they were due to differences in property per household and occupational mix, the latter due to differences that related to the capital cost of getting established in the rural south. Appendix Table A4.1 below quantifies this point, accounting for the differences in average incomes for the households of the South versus the four Middle Colonies (NY, NJ, PA, and DE). The inter-regional gap to be "explained" in accounting terms was wide: $705 per free Southern household versus $340 per free household the Middle Colonies, or $461 versus $329, respectively, if slave households were included.

Comparing the populations of free households alone, as in the upper panel of Table A4.1 confirms that hypothetically giving the Middle Colonies the pay rates of the South would raise free incomes only by 13 percent (from $340 to $385), far short of the 107 percent gaps we observe. The rest (the implicit 87%) would be explained by the remaining differences in occupational mix. If instead the Middle Colonists had kept their incomes for each occupation but had adopted the Southern occupational mix, Middle Colonies' average free incomes would have jumped to $578, a gain of 70 percent, crediting pay differences with only 30 percent of the observed gap. (The 13 percent and the 70 percent do not add to 100 percent, because they come from different hypothetical experiments.)

A similar result obtains from projecting the changes in free occupations or pay onto the whole population of households, including slaves. As shown in the lower half of Appendix Table A4.1, the importance of occupational mix looks more extreme. Letting the South keep its occupational income rates, but converting Southern planters into Middle Colony craftsmen and the like, would yield a hypothetical income average that is even lower than in the actual Middle Colonies, because these transformed free Southerners would still be keeping their slaves.

Further evidence on the Upper South

As noted in the text, our estimates of the income structure for the South are based on an occupational structure that adjusts Alice Hanson Jones's structure only by

using data from three rural North Carolina counties 1779-1782. This raises the possibility that we have under-represented the upper South (MD plus VA, including the future DC and WV), or roughly the Chesapeake. We therefore need to add what we can about this region. As it turns out, doing so does not overturn the point that poor whites were a much smaller share of the colonial Southern free population than they were to become in the antebellum nineteenth century.

Scholars have offered abundant evidence of inequality in the rural colonial Chesapeake. This might seem to contradict our article's emphasis on the lack of poverty among white households. We find little contradiction, however, because their "poverty" threshold appears to have been higher in that literature than in the literature on poverty in Philadelphia, New York City, Boston and the Northern countryside. For example, the title of Gregory Stiverson's *Poverty in a Land of Plenty: Tenancy in Eighteenth-Century Maryland* (1977) reveals a half-empty, half-full glass. As the title implies, his poverty population consisted of tenant farm operators rather than hired hands or the unemployed. One symptom of their poverty was "the inability of tenants to acquire extrafamilial laborers" (p. 138). While that might bespeak poverty among tenant farmers, it could also reflect a scarcity of free or indentured white labor for hire. Indeed, of the completely landless tenants, 26 percent paid enough to own at least one slave (pp. 146-147). Their poverty appears to have been less deep than that of the paupers in Philadelphia or Boston. Similarly, in Allan Kulikoff's (1986, Chapter 4) careful treatment of inequality in the colonial Chesapeake the featured bottom group consisted of tenant farm operators with modest, but positive, wealth.

Loudoun County Virginia 1787. We can set boundaries on the poverty share among free whites in the colonial Upper South by drawing on a special tax return for Loudoun County Virginia in 1787 (Schreiner-Yantis and Love 1987, pp. 23-69). In that year, the number of free households might have been 2,718 if we use our consistent demographic estimate of the household population – 2,702 free white males 21 and older, plus one-tenth of the free nonwhite population = 16 -- and assume that the county grew as fast between 1787 and 1790 as all Virginia grew between 1780 and 1790. It turns out that the number of households listed in the assessments, 2,879, roughly matches the total number of free households, as was the case in those three North Carolina counties used in our estimates. Note that this near-equality is unlike the greater shares of un-assessed persons in the urban North and rural Massachusetts.

Of those listed in the tax assessments, what share could have been poor enough to avoid being taxed, or "tithed" in the source records? We begin with the easiest part of the evidence: fully 82.1 percent of free household heads were deemed taxable, and were tithed. Most of the remaining 18 percent of free household heads resident in the county probably also had significant assets. To judge how many of them did, and how many were truly too poor to have assessable assets, we have to wade a bit into the details of the 1787 Loudoun County return. Aside from that 82 percent clearly taxed, here are the other groups to consider:

Group 1: Female heads of free households, or 3.8 percent of all free household heads. The law excused them from the tax, and most of them were explicitly listed as "not tithable". Yet virtually all (96 %) of those explicitly listed as "not tithable" were listed as having slaves and/or livestock, and thus probably not poor.

Group 2: Tenant household heads not having the same surname as the property owner listed just above them. These were the remaining 14.3 percent of the estimated number of free households. No property detail is listed for them. This 14.3 percent is our main suspect as a group of households of whom some could have been truly poor.

Beyond those we judge from the archival record to have been local household, here are two other groups that one might wish to consider as possibly local and poor, even though we have not considered them local households:

Group 3: white male household heads 21 and older who were explicitly listed as "not tithable". These amounted to 2.1 percent of our count of free households. Yet for two reasons they may not have been poor locals. First, many were excused from the tax either because they were residents of other counties owning property in Loudoun County, and thus not local household heads. Others were excused because they held a special profession, such as "clergyman, constable, governor, or professor." Such sub-groups were presumably not poor. Second, again, as noted for female household heads, virtually all of these were listed as having slaves and/or livestock.

Group 4: Persons of the same family name listed right under the assessed person, with no asset detail for these family members. We consider these not to be household heads, and thus do not consider them as separate households to be labeled poor or not.

From the Loudoun tax return, we conclude that only a small share could have been poor. It would have consisted of some unknown part of Group 2's 14.3 percent of all households. Even if all these were poor, the poverty share would be lower among free Loudoun County whites than among residents of Northern colonies.

The Richmond census of 1782. Another glimpse into the chances of being free and poor in the colonial South comes from that special census of the rural town of Richmond Virginia in 1782, as mentioned in the article's text. In that year of its becoming the new state capital, the town had a population of only 972, of which 409 were slaves. Fortunately, the census included occupations and information on ownership of land, slaves, and other assets, helping us decide which households could have been poor.

Appendix Table A4.2 shows that the maximum share of free household heads that could have been poor was 21.3 percent, or just 9.8 percent among white males.

Not all of the 21.3 percent would have been poor, and the true poverty share in Richmond would probably not have exceed that in the eight towns of rural Chester County, Pennsylvania in 1799-1802, as shown in the lower panel of Table A4.2. Of the nearly half of Chester County household heads without a recorded occupation, 41 percent, or 19.4 percent of the total households, were what Lucy Simler called "freemen and inmates", whom she considered "landless wage earners." Though we don't know what share of these 19.4 percent were poor or had zero wealth, either in Richmond or in Chester County, the poverty share among free residents of small towns would not have been higher in the upper south than in the Middle Colonies. And given the near absence of poor free whites in the Lower South, versus the widespread poverty in New England, the additional evidence supports the view that poverty was less prevalent in the South than in the North, as of 1774.

Table A4.1. Accounting for the higher colonial Southern incomes in 1774
Result:
In 1774, unlike 1860 and later, the South had a very different mix of free men's
occupations, with a much higher propertied share and fewer unskilled.
Differences in occupation-specific incomes explain very little of the South's
high average incomes.

	Average $ incomes from		
Free households	Own labor	Property	All sources
"Actual" Middle Colonies	231	109	340
"Actual" South	449	256	705
Synthetic free South, using the			
free Middle Colonists' --			
mix of occupations	288	97	385
mix of average incomes	321	257	578
All households, including slaves and servants			
"Actual" Middle Colonies	226	103	329
"Actual" South	312	149	461
Synthetic South, using the			
free Middle Colonists' --			
mix of occupations	218	56	275
mix of average incomes	237	150	387

Notes:
Calculations based on the file "American Incomes 1774" at http://gpih.ucdavis.edu
"Mix of occupations" combines the Middle Colonies' counts of free household heads
    with the South's occupation-specific average incomes.
"Mix of average incomes" combines Middle Colonies' occupation-specific average
    incomes with the South's counts of the occupations of free household heads.
No synthetic changes were made in the numbers of the retained earnings
    of slaves and servants.

Table A4.2.   Household Heads, Richmond Virginia in 1782

(A.) By sex and race

	All household heads	Heads that could have been low-status and/or zero wealth	Percentages
White males	122	12	9.8
White females	14	13	92.9
Free mulatto males	3	3	100.0
Free mulatto females	2	2	100.0
Sum	141	30	21.3

(B.) occupational shares (percentages)	Richmond Virginia, 1782	Chester Co., PA 1799-1802
Group 1 = Official & professional	12.1	1.0
Group 2 = Merchant & shopkeepers	31.9	4.3
Group 3 = Manufacturing and mining	20.6	15.9
Group 4 = Construction trades	8.5	4.6
Group 5 = Agric, forestry, fisheries	0.7	19.9
Group 6 = Laborers & menial	5.7	5.5
Group 7 = Males, no stated occ'n	12.1	47.3
Group 8 = Women with no occ'n	8.5	1.5
	100.0	100.0

Source: U.S Census Office … Virginia (1976), pp. 111-119.

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