**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 of this article at the *Journal’*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 contract.

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 Annual Subsistence (1-ER in parentheses)

 Rural Maryland 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