

**Economic Growth in the Mid Atlantic Region  
Conjectural Estimates for 1720 to 1800**

Peter C. Mancall (University of Southern California)  
Joshua L. Rosenbloom (University of Kansas and NBER)  
Thomas Weiss (University of Kansas and NBER)

Paper prepared for presentation at the 2010 Summer Institute of the Development of the  
American Economy, National Bureau of Economic Research

This research was funded in part by the National Science Foundation Grant SES-0317265.

There is no doubt that the economy of the British North American mainland colonies was successful. Considerable evidence supports the view that residents of these colonies enjoyed a high standard of living, and this prosperity attracted continuing streams of immigrants, encouraged a high birth rate, and encouraged investment in slave and indentured labor, all of which combined to generate the highest rate of growth of population in the world at the time. Abundant land forestalled diminishing returns so that the high rate of population growth was also transformed into a high rate of growth of gross domestic product and its components, including exports. The levels of wealth achieved by some free colonists were high and had increased over the colonial period. The average stature of those born in the colonies, and thus able to benefit from the cornucopia of produce and the more favorable environment than that in Europe, increased noticeably. As John McCusker put it in his recent survey of colonial statistics, “On the eve of the American Revolution, real per capita gross domestic product in the Thirteen Continental Colonies was: ... higher than any other nation in the world at the time.”<sup>1</sup>

In contrast to the consensus that exists about the standard of living in the colonies and about the pace of aggregate growth, there is considerably less agreement about the rate of growth of living standards and per capita GDP. Despite McCusker’s assertions “that its economy grew at the fastest rate of all known contemporary economies,” scholars remain divided about the actual rate of economic growth as illustrated in the range of estimated growth rates reported in Table 1.<sup>2</sup> For the mainland Anglo-American colonies as a whole, scholars have placed the rate

---

<sup>1</sup> John McCusker, “Colonial Statistics,” in Susan Carter, et al, (2006). *Historical Statistics of the United States: Earliest Times to the Present* (Cambridge University Press), vol. 5, p. He also alleged that it was “higher by far than it had been a century or a century and a half earlier,” the result of his having assumed a “long-term rate of growth [that] exceeded, perhaps even doubled, the rate of growth of Great Britain.” *Ibid*, p.

<sup>2</sup> *Ibid*, p. 1. Not only does this assertion rest on his assumption about the rate of growth, but also on the estimated rates of growth in other nations at the time.

of growth of real GDP per capita anywhere between 0.05 to 1.0 percent per year.<sup>3</sup> The lower rate implies that however successful the economy might have appeared to have been, it was a stagnant prosperity. The higher rate means that the colonial economy performed *on average* - over a very long period of time - better than the U.S. economy performed in the first half of the nineteenth century, an age which witnessed the industrialization of the northeast, the expansion of railroads and canals, and more broadly the acceleration of economic growth to modern rates. The rates of growth for individual colonies and regions range even more widely from minus 0.8 percent per year for New England from 1700-09 to 1770-79 to 1.6 percent per year for Pennsylvania between 1730 and 1770.

A range of opinion on the speed of economic growth is to be expected given the divergent nature of the economies of the various colonial regions and the relative paucity of quantifiable data for the period. In the absence of comprehensive statistics, past efforts to measure colonial economic performance have relied on the behavior of what each individual researcher thought of as either the key economic variable or what they were able to measure. Alice Hanson Jones, for example, used changes in wealth and an assumption about the likely ratio of wealth to income to estimate GDP.<sup>4</sup> More commonly, scholars have focused on exports, which have stood either as a proxy to quantify growth or as having been the engine of growth.

---

<sup>3</sup> In "Estimating Early American Gross Domestic Product, *Historical Methods*, vol. 33, 2000, p. 156, Tables 1 and 2 and accompanying text, McCusker argued that the weight of opinion would narrow this range to between 0.3 and 0.6 percent per year. That range was taken from John McCusker and Russell Menard (*Economy of British North America*, 1985, pp. 52-57) where they argued that the lower rate of 0.3 percent which was that achieved by England, according to estimates current at the time they wrote, set the lower bound for the colonies, while the higher rate reflected their view that because the colonies had started out far behind they likely grew faster than the mother country. In "Measuring Colonial Gross Domestic Production: an Introduction," *William and Mary Quarterly*, vol. 56, Jan. 1999, p. 5, McCusker reaffirmed the view that "the long term rate of growth exceeded, perhaps even doubled, the rate of growth of Great Britain." Such an estimating principle, of course, requires that the colonial rate be revised each time the rate for Great Britain is revised.

<sup>4</sup> Alice Hanson Jones, 1980. *Wealth of a Nation to Be*. New York: Columbia University Press

Marc Egnal, for example, explains that to arrive at his estimates “initial approximates were derived from data on per capita imports. These estimates were then checked against data for long term changes in probate wealth and the value of exports.”<sup>5</sup>

Refining our understanding of the dynamics of economic growth in North America before 1800 requires moving beyond estimates based on a single variable or the impressionistic combination of several key indicators. A more systematic approach to integrating the available data is needed. The method of controlled conjectures offers what we believe is the most promising method for doing this. This method allows us to produce estimates of GDP per capita that are consistent with all of the available evidence, makes explicit the assumptions we use, and has the potential for assessing the relative importance of different sources of growth.

The initial application of the conjectural method to the colonies as a whole by Mancall and Weiss suggested that the rate of growth of per capita GDP was substantially slower than had been commonly accepted.<sup>6</sup> Such a result for all the colonies need not, however, reflect the performance in any specific region, especially given the extraordinary divergence in the economic systems of the mainland British colonies. Growth rates for New England, which had no large-scale staple exports, might have differed dramatically from the rates in plantation regions of the Chesapeake colonies or the Lower South, or even the grain-exporting sectors of the middle colonies. Moreover the evidence available varies from region to region. Thus, more precise estimates of growth rates during the colonial period need to come from analysis of specific regions.

---

<sup>5</sup> Marc Egnal, 1998. *New World Economies*. New York: Oxford University Press, p. 43.

<sup>6</sup> See Peter C. Mancall and Thomas Weiss, “Was Economic Growth Likely in British North America?” *Journal of Economic History* 59 (1999), 17-40. Their estimates were made for the colonies as a whole, but were based on bits and pieces of information from various individual colonies.

Here we employ the conjectural approach to develop estimates of the growth of GDP per capita for the colonies and states of the mid-Atlantic—modern-day New York, Pennsylvania, Delaware, and New Jersey. Our earlier conjectural analysis of the economy of the Lower South revealed that the region, despite its extensive rice and indigo exports, had a poor record of economic growth. Exports and output (i.e. real GDP) grew quite rapidly, but so too did population, with the result that *output per person* at the end of the colonial period, as well as at the end of the century, was virtually the same as it had been in 1720 – around \$59-60 (in 1840 prices). The region experienced some very modest growth between 1740 and 1770, but that could not offset periodic declines in GDP per capita before 1740 and after 1770.<sup>7</sup>

Until now, there has been no similar analysis of the middle colonies, though a number of previous histories have speculated about the region’s growth, arguing that it experienced sustained growth and emphasized the significance of trade as the driving factor for regional economic fortunes.<sup>8</sup> McCusker and Menard argued that “commencing in the 1720s, a long, powerful, sustained expansion characterized the remainder of the colonial period, with perhaps

---

<sup>7</sup> Peter C. Mancall, Joshua Rosenbloom, and Thomas Weiss “Conjectural Estimates of Economic Growth in the Lower South, 1720 to 1800,” in *History Matters: Economic Growth Technology, and Population*, ed. William Sundstrom and Tim Guinnane (Stanford: Stanford University Press, 2003), 389-424. The absence of growth in per capita output in the Lower South reflects to a large extent the changes in the composition of the population, namely a rise in the share of the female and child shares of the population, and after 1770 a decline in the slave share of the population, all of which served to reduce the labor force participation rate.

<sup>8</sup> In some sense, the field has not evolved substantially—at least not in terms of precise quantifiable estimates, for the past thirty years—since the time when Douglas Greenberg suggested that “economic growth and the social change and dislocation that often accompanied it occurred, in the main, more rapidly in New York, New Jersey and Pennsylvania than elsewhere in North America during the colonial period.” See Greenberg, “The Middle Colonies in Recent American Historiography,” *WMQ* 3<sup>rd</sup> Ser., 36 (1979), 410-11. For the central role of exports as the engine of growth in the middle colonies see McCusker and Menard, *Economy of British North America*, 190-191, 195-198, 204; Egnal, *New World Economies*, 5, 59; and cf. Daniel Vickers, “The Northern Colonies: Economy and Society, 1600-1775,” in Stanley L. Engerman and Robert E. Gallman, eds., *The Cambridge Economic History of the United States*, vol. 1, *The Colonial Era* (Cambridge, Eng: Cambridge University Press, 1996), 209-248.

some (but not much) tailing off after 1760.”<sup>9</sup> Marc Egnal, though differing in some details, also offered a sanguine assessment, noting that while the pace of development was uneven, “[s]olid long-term growth marked the northern colonies in the eighteenth century.”<sup>10</sup>

Presumably, results for this region would differ from the Lower South, at least in part because the Middle Atlantic’s exports of grains figured less prominently in the regional economy than did the Lower South’s staple exports of rice and indigo. Further, though there were slaves in the middle colonies, they constituted a far smaller and declining share of the overall population, most likely because farmers involved in cereal cultivation did not have year-round demand for labor.<sup>11</sup> Instead, the family or tenant farm dominated the regional production of wheat and corn. While the majority of these agricultural products were consumed locally, nonetheless the region exported a considerable quantity of these grains, primarily to the West Indies and Southern Europe. Despite the more limited role of exports in the Middle Atlantic we find that the regional economy nonetheless experienced modest growth of real GDP per capita. Although the rate of growth we find was modest in comparison to what would materialize in the late nineteenth century, it was nonetheless faster than that of the Lower South, and at times as fast as that for the U.S. in the first half of the nineteenth century. In its heyday of growth from 1740 to 1750—before the dislocations produced by the spread of the Seven Years’ War—real GDP per capita rose at 0.7 percent per year, driven by the growth output per worker in both agriculture and nonagriculture.

---

<sup>9</sup> See McCusker and Menard, *Economy of British North America*, 202. . In “Sources of Investment Capital in the Colonial Philadelphia Shipping Industry.” *Journal of Economic History* (1972) 32, no. 1 (Mar.), p. 155, fn 17, McCusker argued that economic growth in Pennsylvania proceeded at the astonishing rate of 1.6 percent per year between 1730 and 1770.

<sup>10</sup> Egnal, *New World Economies*, 46.

<sup>11</sup> See Ira Berlin, “Time, Space, and the Evolution of Afro-American Society on Mainland British North America,” *American Historical Review* 85 (1980), 44-78.

## Using Controlled Conjectures

Our estimates of per capita GDP growth for the states and colonies of the middle Atlantic region are based on a variant of the method of controlled conjectures pioneered by Simon Kuznets and popularized by Paul David.<sup>12</sup> As elaborated by David, the controlled conjectures approach begins with the identity that output per person (GDP/P) in any year equals the product of the labor force participation rate (LF/P) and average labor productivity (GDP/LF). Output per worker in turn can be written as a weighted average of output per worker in agriculture (a) and nonagriculture (n), where the weights are each sector's share of the labor force.

$$\text{GDP/P} = (\text{LF/P}) [S_a (\text{O/LF})_a + S_n (\text{O/LF})_n] \quad (1)$$

At any point in time  $(\text{O/LF})_n = k(\text{O/LF})_a$ , where  $k$  is the ratio of sectoral productivities in that year. With that modification and the fact that  $S_n = (1 - S_a)$ , the equation can be further simplified to:

$$\text{GDP/P} = (\text{LF/P}) [S_a (\text{O/LF})_a + (1 - S_a) k (\text{O/LF})_a]. \quad (2)$$

As equation (2) makes clear the growth of per capita GDP can be estimated with data (or conjectures) about the evolution of just four of economic variables: the labor force participation rate, average labor productivity in agriculture, the sectoral distribution of labor between agriculture and non-agriculture, and the relative level of productivity in the agricultural and non-agricultural sectors.

Starting from equation (2) we have introduced one important modification by treating the production of shelter services as an independent sector rather than subsume it in either

---

<sup>12</sup> Simon Kuznets pioneered the use of this technique in "Long Term Changes" and has since been used by Paul David, in "The Growth of Real Product," and Thomas Weiss in "U.S. Labor Force Estimates," to estimate output per capita for the U.S in the period 1800 to 1840.

agriculture or nonagriculture. We do this because we do not want the value of shelter output to influence the calculation of output per worker in either of the other sectors. Although shelter output arose in both agriculture and nonagriculture, in neither case was it produced directly by labor. Our revised estimating equation is:

$$\text{GDP/P} = (\text{LF/P}) [S_a (\text{O/LF})_a + (1 - S_a) k (\text{O/LF})_a] + (\text{O}_s) \quad (3)$$

With this modification the growth rate of per capita GDP now depends on estimation of five series rather than four.

Our estimation procedure proceeds backward in time, beginning with estimates of the level of each series in 1800 (1770 in some cases) then projecting them backwards on the basis of the available evidence and plausible conjectures. Although we proceed as if the baseline figures are known values they are not known with the precision or completeness of official statistics. Rather, they are estimated taken from existing work (and were not generated by our conjectures).<sup>13</sup> The base-year values of output per capita in the various components for the region are summarized in Table 2 and compared to values for the nation as a whole.

To obtain estimates of per capita GDP for years before 1800 we have had to reconstruct the rates of growth of each of the series that make up the conjectural estimating equation. The construction of each series is described in more detail in the notes to the tables and in an appendix to this paper. Because of its importance, the estimate of agricultural output is described in detail in the text below. In brief, the others were derived as follows. The series on total population, as well as free versus slave populations, were readily available, but the age and

---

<sup>13</sup> The GDP per capita figures in 1800 for the region were based on the national estimates by Weiss (1992, Table 1.4). David's (1967) estimates for 1800 are lower than Weiss's and would thus dictate less growth for the preceding century. In both cases, the figures were conjectured in ways that leave the 1800 figures unbiased by business-cycle influences that may have occurred.



sex composition of the population was estimated using evidence for one or more colonies.<sup>14</sup> Once the age-sex composition was established, the labor force figures could be constructed following procedures that have been used for the early nineteenth century.<sup>15</sup> The distribution of the labor force between agriculture and nonagriculture could also be derived following procedures used for estimation in the nineteenth century, and required time series on the urban-rural distribution of the population and labor force, and on agricultural participation rates in rural and urban areas. The value of shelter per capita for 1800 was calculated as 22 percent of the stock of dwellings to yield a value of \$14.30 in prices of 1840.<sup>16</sup> That value was extrapolated backward to 1720 based on an index of change in the stock of dwellings.<sup>17</sup>

### **Estimation of Agricultural Output**

---

<sup>14</sup> Carter, et al (2006) *Historical Statistics of the United States*; F. B. Hough, *Census of the State of New York, 1855*; Evarts B. Greene and Virginia D. Harrington, *American Population Before the Federal Census of 1790*, Columbia University Press, New York, 1932 (reprinted by Peter Smith, Gloucester, Mass., 1966); W. S. Rossiter, *A Century of Population Growth, From the First Census of the United States to the Twelfth: 1790-1900*, U.S. Bureau of the Census, 1909; New Jersey Archives, 1st Series, V; New Jersey Department of State: *Compendium of Censuses, 1726-1905*, Trenton, 1906

<sup>15</sup> See Lebergott (1966) and Weiss (1992) both of whom produced estimates for the nineteenth century. The total labor force is the sum of the estimates of the number of free male workers, free female workers, male and female slave workers, all aged 10 and over, where the labor force in each population category is the product of the estimated population in that category and an age-sex labor force participation rate obtained from nineteenth century data for the Mid Atlantic region.

<sup>16</sup> The annual flow of 22 percent is from (Weiss, 1992, Table 1.2). The base year value for the stock of dwellings was based on evidence for 1798 (Pitkin, 1967; Soltow, 1989; and Soltow and Land, 1980). The flow was revalued in prices of 1840 by using the deflator for the gross rental value of farm dwellings estimated by Towne and Rasmussen (1960)

<sup>17</sup> We based the index on Jones's estimate of the rate of growth of wealth per capita between 1700 and 1774, and Gallman's estimate of the rate of growth of the real value of structures between 1774 and 1805. Jones, *Wealth of a Nation to Be*, 78 and Gallman, "American Economic Growth," 95. In effect we have assumed that the dwelling share of wealth and of structures remained constant over the period before 1774, and the annual flow of shelter services remained a constant percentage of the value of the stock. Jones's evidence shows that in the Middle Colonies land (which includes) or 62% of total wealth.

Measuring agricultural output is essential to constructing plausible estimates of the rate of growth of per capita GDP before 1800 because agriculture was the dominant component of the economy. In our estimating equation agricultural output determines both output per worker in agriculture and (indirectly) in the nonagricultural sector. No time series of the region's agricultural output is available for the eighteenth century, but we were able to construct one in fairly direct fashion. The output of the agricultural sector is comprised of the production of food that was produced within the region for consumption within the region (f), firewood (w), and those agricultural products that were exported either abroad ( $x_a$ ) or to other colonies ( $x_c$ ).<sup>18</sup>

$$O_A = f + w + x_a + x_c$$

As described in detail elsewhere, we have compiled a new and more complete time series on agricultural exports from the region, both to foreign markets as well as to other North American colonies.<sup>19</sup> And in similar fashion we constructed a series on the import of food from both foreign and domestic sources in order to derive the amount of food produced domestically. The series on firewood was obtained from evidence in a USDA report.<sup>20</sup>

---

<sup>18</sup> We treat all this agricultural output as though it were marketed in order to place a value on it and to make our estimates comparable in scope to those for the early part of the nineteenth century. Nevertheless, we have not made explicit estimates of the value of home manufacturing and farm improvements. We have not excluded these items because they were unimportant, but rather because they were likely more important in 1720 than in 1770 or 1800. Their inclusion would raise the level of GDP in all years, but more so in 1720, and would thus bias downward the estimated rate of economic growth.

<sup>19</sup> See Mancall, Rosenbloom and Weiss, "Commodity Exports, Invisible Exports and Terms of Trade for the Middle Colonies, 1720 to 1775," NBER Working Paper No. 14334.

<sup>20</sup> United States Department of Agriculture, "Fuel Wood Used," table 2. Although the level of firewood consumption may not be precise, the trend in the series should be reasonable. The estimates were made on a regional basis and the underlying per capita consumption rates tried to "take into consideration the

The one series that is not based on the sort of readily available evidence underlying those just described is that for food produced for consumption within the region (f). Food produced for domestic consumption was the dominant component of agricultural output in the colonies, and regrettably there are no time-series data on this item for the eighteenth century. We can, however, estimate this quantity by noting that food produced and consumed within the region can be approximated by the value of food consumed minus the quantity of food imported into the region from abroad as well as from other North American colonies. In other words,

$$f = c - f_m$$

where  $c$  is the quantity of food consumed, and  $f_m$  is food imported into the region. Although there is no time-series evidence on consumption, we believe there is enough information about the diets of colonists and slaves to permit a reasonable approximation of the likely value of food consumed.

Previous work on the value of food consumption in this era has relied largely on poor house records documenting the quantity or value of provisions provided to the poor, and on colonial records of provision for troops at various dates.<sup>21</sup> A report for 1800-01 from Philadelphia implies an implausibly high figure of \$30.50 per person on relief.<sup>22</sup> Since we have estimated that per capita food consumption in 1800 in the region was valued at \$30.10 this figure appears

---

climate, the timber, the characteristics of the population, housing conditions, the shift from fireplaces to stoves, and the displacement of wood by mineral fuels."

<sup>21</sup> Gallman (1971, pp. 71-78) argued that the militia were ordinary members of society serving in the military for a temporary period of time, so military rations seem like a reasonable proxy for food consumption by the colonists.

<sup>22</sup> Philadelphia Guardians for the Relief and Employment of the Poor of the City of Philadelphia," The Accounts of the Guardians of the Poor, reprinted in *Poulson's American Advertiser*, May 19, 1802.

too high to be believed.<sup>23</sup> Moreover, we have been unable to find comparable budgets for the poor at other dates that would allow us to gauge the rate of change, if any, in the per capita figures.<sup>24</sup> Somewhat more information can be obtained from data on the provision of troops in New York and Pennsylvania. Figure 1 plots the time series of observations we have been able to assemble on expenditures for militia provisions in the two colonies. There is considerable variation in this series, but no clear evidence of an upward trend.

Although not specific to the Mid-Atlantic region, the so-called Rules for Georgia specify in some detail the provisions to be provided to persons on charity who were transported to that colony in the 1730s.<sup>25</sup> Although this information on the diet pertains explicitly to colonists in Georgia, it nevertheless provides a point of reference for free colonists elsewhere. The specified diet included beef or pork, rice, peas, flour, beer, molasses, cheese, butter, spice, sugar, vinegar, and salt. Moreover, quantities of each category of provisions were specified for adult males, adult females, children, and servants. In prices of 1840 we have calculated that the provisions

---

<sup>23</sup> With adjustments, it could be made more consistent with the latter. For one thing, the accounts show an inordinate amount spent on molasses and sugar – more than \$5.00 per person, amounting to 18% of the total expenditure. If we eliminated those items, the per capita value would be a more believable \$25.14. Moreover, these various food items were purchased at retail or wholesale prices while the 1800 figure we constructed was valued at farm prices because we are ultimately interested in the value of farm production.

<sup>24</sup> The one earlier account we found, Peter J. Parker, “Rich and Poor in Philadelphia,” *Pennsylvania Magazine of History and Biography*, 1975, p. 5 yields a figure of 10.7 Pounds Sterling per person per year in 1709, or \$55.50 in prices of 1840. Billy Smith, “The Material Lives of Laboring Philadelphians, 1750 to 1800,” *William and Mary Quarterly* 3<sup>rd</sup> ser., 38, no. 2 (Apr. 1981), p. 170, reported figures on a Philadelphia Laborer’s diet around 1772. He used quantities for 1772 and valued them in prices of 1762 to obtain a weekly amount of 10.5 Pounds Pennsylvania currency. We recalculated that diet in the prices of 1840 and obtained a value of \$18.

<sup>25</sup> Allen D. Candler, 1904-16. *The Colonial Records of the State of Georgia*. Compilations of transcripts of records in the Public Record Office begun by Allen D. Candler and completed by William J. Northen and Lucian Lamar Knight, 1904-16, vol. 3, 408-09.

for an adult male would have been valued at \$31.<sup>26</sup> Taking account of the lower amounts specified for women and children, a weighted average value of the diet of free colonists in the lower south works out to \$24. Since this figure reflects the value of food consumption for charity cases in a newly settled colony it can be interpreted reasonably as a lower bound on the value of per capita food consumption for the Mid-Atlantic region in the 1730s. Further evidence that this figure is a lower bound we can note that it is roughly equivalent to the value of the diet consumed by slaves in 1800. It is difficult to believe that the Mid-Atlantic region would have exerted such a strong attraction for settlers if the average colonist in the 1720s and 1730s consumed a diet no better than that consumed by slaves in 1800.

Although the foregoing observations are inadequate to construct a detailed history of food production we believe they are sufficient to place reasonable bounds on the rate of growth of agricultural production in the region. The diet surely had its ups and downs with the state of the harvest and with the booms and busts of the economy, but the underlying trend value is our interest, so being able to set bounds on any trend is useful for generating estimates of agricultural output and GDP.

The lower bound for the trend would seem to be no growth in the value of the diet, and there are three arguments in support of this. First, there is no evidence that the value of the diet declined over time, so no growth would seem to be the lower bound on the growth in the diet.<sup>27</sup> Second, as described above, data on military rations indicate that the value of provisions

---

<sup>26</sup> The diet for women and children aged 12 and over was calculated to be 83 percent that of a male; that for children aged seven to twelve was specified as half that for those aged 12 and over; and that for those aged two to seven was one-third. Apparently no provisions were provided for those under two years of age (Candler 1904-16, vol. 3, pp. 408-09).

<sup>27</sup> Of course, if one accepted the implausibly high estimate of the value of the diet for the poor in 1709, then one would think that the value of the diet declined over time.

provided to soldiers stayed roughly constant. Third, data on the wages of working class laborers in Philadelphia collected by Gary Nash and Billy Smith reveal that although there were short run fluctuations in earnings there was likely no long-term change in the standard of living for working class laborers in Philadelphia. According to Nash's evidence real wages of laborers rose sharply between 1727 and 1733, but fell thereafter and by 1750 the real wage equaled the average for 1727-28.<sup>28</sup> Smith's evidence shows that real wages of laborers fluctuated without trend in the 1750s and 1760s, fell to a low in the 1780s and then recovered.<sup>29</sup> So real wages may have fallen somewhat during the colonial period, but were roughly equal at the beginning and end of the period, 1727 and 1800.<sup>30</sup>

The upper bound on growth in the value of the diet can be calculated by starting with the value of the diet prescribed in the Rules for Georgia; that is a figure of \$24. Using this as a lower bound figure for the value of the diet in 1730 implies that the value of food consumption increased at a rate of 0.37 percent per year in order to reach the diet's actual value in 1800. As we argued above, however, such a low value of the diet seems implausible. Consequently we believe a realistic upper bound on the growth rate of the value of food consumed per capita is probably closer to 0.2 per cent per year on average. Using a 0.2 percent rate to extrapolate back from the 1800 value of the diet implies that in 1720 food consumption per capita would have been about \$26, still only about 11 percent above the value of the slave diet in 1800.

---

<sup>28</sup> Gary B. Nash, *The Urban Crucible: Social Change, Political Consciousness, and the Origins of the American Revolution*. Cambridge, MA: Harvard University Press, 1979, 392-94. We extended Billy G. Smith's cost of living index back to 1727 in order to deflate the nominal wages reported by Nash.

<sup>29</sup> Billy G. Smith, "The Material Lives of Laboring Philadelphians, 1750 to 1800." *William and Mary Quarterly*, 3<sup>rd</sup> ser., 38, no. 2 (April 1981), pp. 164-202. The wage data are on pages 184-85, the cost of living indices on p. 173.

<sup>30</sup> The 1800 figure was lower than that of 1727-28, but the average for 1798-1800 was about the same as that for 1727-28

Consequently we can be confident that the growth rate of the value of the diet between 1720 and 1800 lies somewhere between 0% and 0.2% percent per year, and our most likely estimate is the midpoint of this range—0.1% per year.<sup>31</sup> As we will show below, the plausibility of our assumption about the rate of growth in the value of the diet is further reinforced by the implied rate of growth of agricultural labor productivity that it generates. But before turning to this comparison it is necessary to adjust our regional consumption estimates for imports and exports of agricultural products and add estimates of firewood production.

The components of agricultural output are summarized in Table 4. Domestic consumption of agricultural products and the related production comprised the bulk of agricultural output. Domestic consumption was equal to roughly 72 percent of the sector's output, and domestic production of food supplied over 90 percent of domestic food consumption during the colonial period.<sup>32</sup> The remainder of the consumption was supplied by imports from abroad and from other North American colonies. The former supplied about 5 percent of consumption, while imports from other colonies accounted for 3 to 4 percent. The share of consumption supplied by imports from abroad was higher after 1790 than it had been during the colonial period, and that supplied by other states was noticeably higher in 1800, but still food

---

<sup>31</sup> We have also had to make an assumption about the change in the slave diet over time, but because slaves were relatively unimportant in the region, averaging less than 7 percent of the population for the entire period and dwindling in importance over time, this has little bearing on the growth of GDP per capita for the entire population.

<sup>32</sup> The rate of growth of food consumed per capita differs from the 0.1 percent growth rate we have assumed for the diet of free colonists because of shifts in the composition of the population. The relative level of consumption of free adults is higher than that of children, and that of free colonists is higher than that of slaves, and the rate of growth of the slave diet differs from that of the free colonist. Declines in the slave share of the population raise the weighted average and its rate of growth, while increases in the child share of the population lowers the weighted average and rate of growth. And, the rate of growth of the slave diet differs from that of the free colonist

imports in total amounted to only 10 percent of food consumption in the region. In other words, domestic production of food supplied the bulk of domestic consumption.

The production of firewood was the second largest component of agricultural output, amounting to 20 to 24 percent of the total, nearly three times as large as the value of agricultural exports abroad and more than five times the value of exports to other colonies. Indeed, the value of firewood production was roughly twice the size of the value of both of those exports combined. The value of firewood provided a boost to the growth of agricultural output before 1750, but was a drag thereafter, especially after 1770.

Agricultural exports abroad and to other colonies appears to have been a positive force for growth over both long term periods, having risen at 0.41 percent per year from 1720 to 1770 and 0.47 from 1720 to 1800. It is striking that it was the export of agricultural products to other North American colonies that was the more positive influence at times. Exports abroad on a per capita basis rose at 0.24 percent per year from 1720 to 1770, but declined from 1770 to 1800, while exports per capita to other colonies rose at 0.8 percent per year during the colonial period and 1.7 percent per year after 1770. The latter were a smaller share of exports for most of the period, but by 1800 exports to other colonies was about equal to shipments to foreign destinations. Although exports, both abroad and to other colonies, grew substantially, they comprised a much smaller share of the agricultural sector than did food production or firewood, amounting to around 11-13 percent, except in 1800 when they comprised about 17 percent. Their growth after 1740 offset the impact of the decline in firewood production, but was not large enough to propel the sector's output at a faster rate than that determined by the sluggish growth of food production.



Combining the various elements of agricultural production we find that agricultural output per capita rose during the colonial period at 0.13 percent per year, but declined after 1770 with the consequence that over the entire period 1720 to 1800 there was no growth in the per capita value. Output per worker fared slightly better because the agricultural labor force grew more slowly than population.<sup>33</sup> Over the colonial period, output per worker in agriculture rose at 0.145 percent per year, and then accelerated slightly after 1770. The rate of advance for the entire period 1720 to 1800 was 0.20.

Evidence on labor productivity growth for the nineteenth century and for Chester county Pennsylvania in the eighteenth century lends credence to the growth rate of agricultural labor productivity implied by our assumption of a 0.1% rate of growth of the value of the diet and provides further argument against any more rapid improvement in the diet. The performance of agriculture in the early nineteenth century sets upper bounds on the growth of output per worker over long periods in the eighteenth. According to Duane Ball and Gary Walton, “Because of slower rates of technological progress in eighteenth century agriculture,...it is reasonable to expect the eighteenth century experience to mirror more closely the lower 1800-1850 rate than the much higher rate for 1850-1900.”<sup>34</sup> There could be a decade now and then in which there was an upsurge in output per worker, but over an extended period of time the growth in output per worker in the eighteenth century could not have exceeded the average increase over long periods in the nineteenth century.

---

<sup>33</sup> The small decline in the agricultural share of the labor force reflects a very gradual decline in the rural agricultural participation rate of 0.07 percent per year, described further below.

<sup>34</sup> Ball and Walton (1976, p. 103) were talking about total factor productivity, but the argument would seem to apply as well to labor productivity. The nineteenth century would also seem to have benefited from the greater possibility of economies of scale, as well as improvements in seeds and animal husbandry.

The rates of growth of agricultural output per worker implied by our assumed rate of growth in the diet of 0.1 percent per year and several alternative rates are shown in Table 4. Comparable evidence for the nineteenth century can be used to suggest how plausible or implausible these rates are. Although output per worker would be expected to fluctuate and possibly grow rapidly for a decade every now and then, over longer time periods we do not expect that the rates for the eighteenth century would exceed those for the nineteenth. The nineteenth century's rates of growth pertinent for comparison are as follows:

Rates of Growth of Agricultural Output per Worker <sup>35</sup>

1800 to 1840	0.34
1800 to 1850	0.25
1800 to 1860	0.58

If the diet had increased at 0.3 percent per year, agricultural output per worker would have increased at 0.27 percent per year from 1720 to 1770 and 0.31 percent from 1720 to 1800, as fast or faster than the rate for the first half of the nineteenth century.<sup>36</sup> Even more striking is that between 1720 and 1740 output per worker in agriculture would have advanced on average at 0.4 percent per year, and growth of output per worker in 2 of the first 3 decades of our study would have exceeded the rates of advance over any of the long term periods of the nineteenth century. When the diet is assumed to have grown at only 0.2 percent per year, a less compelling argument can be made that the rates of growth of output per worker are implausible, but the rate for 1720 to 1800 is slightly faster than that for the first half of the nineteenth century. And, when

---

<sup>35</sup> Weiss, 1992, Table 6 and the underlying work sheets.

<sup>36</sup> If the value of the diet had increased at the maximum rate of 0.37 percent per year described in the text, the rates of growth in output per worker would have been even less plausible: 0.31 percent per year between 1720 and 1770 and 0.38 percent from 1720 to 1800.

this evidence is combined with that about the level of the free colonists diet being only marginally above that of a slave, growth in the diet of 0.2 percent per year seems too fast. The rates of growth of output per worker based on our assumption about the rate of growth in the diet - 0.15 between 1720 and 1770 and 0.2 percent between 1720 and 1800 - are both below any of the nineteenth century standards, and seem much more plausible than the alternatives.<sup>37</sup>

The rates of growth of output per worker can also be compared to those estimated by Ball and Walton for Chester county, Pennsylvania, the only other estimate of output per worker we have found. Ball and Walton used probate data to calculate indexes of inputs and outputs on farms in four periods across the 18<sup>th</sup> century.<sup>38</sup> They focused on the change in TFP, but their indexes show that output per labor input increased at an annual rate of 0.37 percent between 1714-31 and 1750-70. The increase was due largely to a decline in the labor index from a value of 100 in 1714-31 to 91.1 in 1750-70, whereas the output index rose from 100 to only 105. Russell Menard thought that their labor index declined too rapidly and offered an alternative series that rose from 100 to 109, and yielded a decline in productivity at a rate of minus 0.1 percent per year.<sup>39</sup> Our estimate that output per worker increased at 0.18 percent per year over the roughly comparable time period, 1720 to 1760, falls soundly in the range of rates set by Ball and Walton at the upper end and Menard at the lower end. The same holds for two twenty-year time periods for which we can make comparisons with our estimates, the rates of change in our series fall roughly in the middle of the range set by their alternative estimates. Our long term

---

<sup>37</sup> Of course, the rates based on no growth in the diet are even lower, and more plausible by this criterion.

<sup>38</sup> Duane Ball and Gary Walton, (1976, Table 3 p. 109-113). The time period covered by Ball and Walton (1714-31 to 1775-90) differs from ours (1720 to 1800), but we can construct shorter time periods in our series that are very similar to those in Ball and Walton, such as 1720-40 for comparison with their period of 1714-31 to 1734-45.

<sup>39</sup> Russell Menard, "Comment on Paper by Ball and Walton," *The Journal of Economic History* 36, 118-25.

period of 1720 to 1800 does not cover exactly the same time period as theirs, but nevertheless our estimated rate of change in output per worker of 0.2 is virtually identical to the rate of 0.19 found by Ball and Walton for the period running from 1714-31 to 1775-90.<sup>40</sup> Overall, we think these comparisons indicate that our implied rates of growth of output per worker are very reasonable and lend credence to our estimates of agricultural output, as well as to the estimates of GDP.

### **The Results: Economic Growth in the Mid Atlantic Region**

We can now turn to the results of interest, the growth of real GDP per capita. Recall that the conjectural estimation framework is structured to allow us to combine the available data with reasonable conjectures about the behavior of those elements of the equation that cannot be directly measured. In addition to our conjectures about the rate of growth of the value of the diet which are embedded in the resulting estimates of output per worker in agriculture, our estimates of GDP per capita depend on two other conjectures. The first of these concerns the agricultural share of the labor force, which rests on an assumption about the rate at which the agricultural share of the rural population changed over time. The second concerns nonagricultural productivity, which depends on our assumption about the change in the value of  $k$ , output per worker in nonagricultural industries relative to that in agriculture. As we discuss below, however, variations in the assumptions about these latter two quantities do not produce any substantial shifts in our estimates.

---

<sup>40</sup> The growth of agricultural output per worker in the region over this long term also compares favorably with our estimate for the Lower South. For that region we estimated that output per worker rose at 0.22 percent per year from 1720 to 1800. Mancall, Rosenbloom and Weiss, 2003, p. 403.

Our estimates of real GDP per capita at benchmark years from 1720 to 1800 are shown in Table 5.<sup>41</sup> In the figures reported in this table we have assumed that the rural agricultural participation rate declined at the slow rate of 0.07 percent per year, a rate based on the evidence for Chester county, Pennsylvania.<sup>42</sup> It is possible that the rate did not decline at all. Our reading of the extensive literature on the extent to which colonial farmers engaged in production for the market offers no suggestions that farm households were withdrawing their labor from agricultural activities. And, it is possible the decline was faster than 0.07 percent per year. In the nineteenth century, the rural agricultural participation rate declined more rapidly, but not by much. In the Mid Atlantic region, the rate for the labor force aged ten and over declined at 0.13 percent per year between 1800 and 1840. The rate we have calculated for Chester county and assumed in our conjectures is thus about half that of the rate for the early nineteenth century.<sup>43</sup>

For the most likely rate of change in the value of  $k$  we have assumed that non-agricultural productivity grew at 0.1% per year relatively to agricultural productivity. This figure is the mid-point of the range suggested for estimates from the early nineteenth century, and if anything is likely to introduce some upward bias into our estimates. The minimum rate of 0.0 percent per year is that assumed in earlier conjectural estimates of economic growth in the early nineteenth

---

<sup>41</sup> In an appendix table we show the results of changing each of the three key assumptions.

<sup>42</sup> Ball and Walton estimates (1976, Table 3 p. 109-113). Their indexes of labor inputs per farm for Chester county from 1714-31 to 1775-90 appear to have assumed there was no decline in the rural agricultural participation rates, except for children. The rate of 0.07 percent is a weighted average of the decline in the child participation rate and constancy in the rate for adults implicit in their estimates.

<sup>43</sup> As we discussed above, high rates of growth in the diet yield implausible rates of growth of output per worker in agriculture using the 0.07 percent decline in the agricultural share of the rural population. The same implausibility would arise if that rural rate declined faster. Any positive effect on the growth of output per worker due to the decline in the rural agricultural participation rate would have to be met by a reduction to the assumed growth in the value of the diet, and thus the growth of gdp per capita would be unaffected.

century.<sup>44</sup> For longer time periods in the pre-Civil War era the maximum rate was 0.21 percent per year from 1800 to 1840.<sup>45</sup> When we allow  $k$  to change at the maximum rate of 0.2 percent per year, the growth of GDP per capita is increased by only 0.07 percent per year over the rate implied when  $k$  was held constant.<sup>46</sup> The impact is nearly invariant with respect to differences in the rate of growth of the diet. Whether we set the growth of the diet at some maximum value or at a minimum, each additional 0.1 percent change in the rate of growth of  $k$  changes the growth of GDP per capita by roughly 0.035 percent per year.<sup>47</sup> In constructing the most likely estimates we have assumed that  $k$  changed at a rate of 0.1 percent per year, the mid point between the minimum and maximum values and virtually identical to the rate found for the period 1800 to 1860. Thus, our estimated rate of growth of GDP per capita can be specified as plus or minus 0.035 percent per year.

The results of our conjectures are that GDP per capita advanced at an average of 0.24 percent per year over the colonial period and 0.16 percent over the period 1720 to 1800. Growth after 1740 was faster than before, despite a downturn in the 1750s: almost all the growth that took place between 1740 and 1770 occurred in the 1740s. Most of the increase in GDP per capita that had occurred before 1770 was lost during the years of the Revolution and the Articles

---

<sup>44</sup> See David, 1968 and Weiss, 1992

<sup>45</sup> The rate of increase was only 0.06 percent per year for the entire period 1800 to 1860. The rate declined at 0.24 percent per year in the shorter interval from 1840 and 1860, but we think the values for longer time periods are more appropriate.

<sup>46</sup> Changes in the value of  $k$  have no effect on output per worker in agriculture so would not make those implied rates of growth any more or less implausible as discussed below.

<sup>47</sup> The rates of growth of nonagricultural output per worker, however, are more sensitive to changes in  $k$ ; each 0.1 percent increase in the rate of growth of  $k$  raises the rate of growth of nonagricultural productivity by about 0.1 percent per year. So higher values of  $k$  could generate implausibly high rates of growth of output per worker in nonagriculture.

of Confederation. The 1790s witnessed a strong recovery; GDP per capita rose at 0.72 percent per year and made up almost all the gains that had been lost in the preceding 20 years.

The rate of growth we estimate for the Middle colonies from 1720 to 1770 is well below the rate of 0.6 percent that Egnal estimated for the Northern colonies for the period 1713-75. It is possible that these two disparate rates are consistent with each other, but given the 0.24 rate of growth we estimate for the Middle colonies it requires that New England's rate of growth be exceptionally high – around 1.0 percent per year - in order to bring up the Northern region's weighted average to 0.6 percent.<sup>48</sup> And, our estimated rate of growth is very far below the 1.6 percent figure that McCusker estimated for Pennsylvania for the period 1720 to 1774. This would seem to indicate that the behavior of exports to England, which is the evidence on which he based his estimate, is not a good measure of economic growth more generally.

Our estimate is also below the lower rate of growth that McCusker assumed for the colonies as a whole, and well below the higher rate of 0.6 percent per year. Again, it may be possible that the other regions could have grown so rapidly that they would have pulled up the weighted rate of growth for all colonies to McCusker's estimated rates. But, the rate of growth we estimated for the Lower South (minus 0.03 percent) is lower than that for the Middle colonies, so it would require that New England and the Chesapeake performed extremely well. Given the population shares in the subregions, New England and the Chesapeake would had to have grown between 0.8 and 1.0 per cent per year.

If, however, there is merit to McCusker's estimating principle and not necessarily his specific numerical results, then new evidence on England's rate of growth may allow for consistency between our

---

<sup>48</sup> Each subregion had approximately one half the population in the Northern region in 1770. In earlier years, New England had a larger share and the rate of growth needed to bring the region up to 0.6 percent would had to have been in excess of one percent per year.

estimates for the Middle colonies and the Lower South and the implied rate of growth for the colonies as a whole. Greg Clark has constructed new estimates of national income and product from 1200 to 1860, and finds that real national product per person rose at 0.16 percent per year for the period 1720 to 1770, slightly slower than the rate we have estimated for the Middle Colonies.<sup>49</sup> Given that the poor performance of the Lower South would pull the weighted average down somewhat further, a colonial growth rate equal to that of the mother country could be achieved if New England and the Chesapeake had grown at the same rate as England. In order to have grown twice as fast as England, however, the Chesapeake and New England would have had to have grown around 0.4 percent per year. Although this seems high in comparison to our estimates for the Middle colonies and the Lower South, it may not be out of the question.<sup>50</sup>

We have also constructed a terms of trade index for the region, and used it to estimate adjusted values of gdp per capita. The terms of trade improved considerably for the region, having risen on average at an annual rate of 1.1 percent per year from 1720 to 1770 and at 0.96 percent from 1720 to 1800. As a consequence, the purchasing power of the real exports per capita rose at 1.4 percent per year from 1720-70 and 1.0 percent from 1720 to 1800, much faster in both instances than the growth of the real exports per capita. But, this adjustment had little impact on the growth of per capita because exports were such a relatively small portion of the economy. GDP per capita adjusted for changes in the terms of trade rose at 0.27 percent per year instead of 0.24 percent between 1720 and 1770, and at 0.2 percent instead of 0.16 percent

---

<sup>49</sup> Gregory Clark, "The Macroeconomics Aggregates for England, 1209 to 2008," *Research in Economic History*, 2010, Table 28. The rate for the period 1720 to 1800 was 0.22 percent.

<sup>50</sup> In Clark's time series, the value in 1720 was about the same as that for the preceding 40 years, and then jumped considerably by 1730. If we used the average values for 1710-30 and 1760-80 the rate of growth was 0.09 percent per year, which would make it that much more likely that the colonies could have grown at twice the rate of the mother country.



between 1720 and 1800. Because this adjustment has little impact on economic growth, the subsequent discussion is based on the unadjusted series.

## **Interpretation**

The estimates of economic growth reported in Table 5 allow us to say a number of things about the Mid-Atlantic region's economic performance. First, in contrast to the early nineteenth century, when the labor force to population ratio was rising, demographic trends in the colonial era were not a positive force for economic growth. In the colonial period, the LFPR held steady for the most part. It dipped in the decades immediately after 1720, but regained its starting value by 1770. It fell noticeably after 1770, and for the entire period 1720 to 1800 changes in the participation rate served to reduce the growth of GDP per capita. Likewise, shifts in the composition of the economy from agriculture to nonagriculture were of little importance. The agricultural share of the labor force rose slightly from 1720 to 1740 and then declined; the 70 percent share in 1800 was only slightly below the 72.5 percent of 1720, so there was no favorable impact on productivity arising from a shift into the more productive nonagricultural industries.<sup>51</sup>

Instead, our conjectures imply that increases in output per worker played an important role. Agricultural output per worker rose on average at 0.15 percent per year from 1720 to 1770 and 0.20 percent from 1720 to 1800. The increase in output per worker from \$176 in 1720 to \$207 in 1800 would have increased GDP per capita by about \$10 if the LFPR had remained constant. But the participation rate fell from .31 to .27, which offset a large portion of the effect

---

<sup>51</sup> The small decline in the share of agriculture reflects the decline in the rural agricultural participation rate, not an increase in urbanization. The urban share of the region's population declined from 14.4 percent in 1720 to 9.8 percent in 1800.

of improved productivity. During the colonial period, the increase in output per worker of \$13 accounted for about half the increase in GDP per capita.

The other major source of growth was capital formation. Although we have no specific measure of capital formation, the component of the economy that grew over the entire period was shelter output, which was determined entirely by growth in the capital stock. If nothing else had held the economy in check, the rise in the stock of housing would have pushed up GDP per capita by more than \$2 during the colonial period, and by another \$2 after 1770. That alone would have generated growth in GDP per capita of 0.07 percent per year.

Finally, these estimates allow us to put this region's performance in perspective. This is a better performance than was found for the colonies and states as a whole and for the Lower South.<sup>52</sup> For the colonies and states as a whole Mancall and Weiss estimated likely rates of growth of only 0.08 for the colonial period, 1700-1770, and 0.04 for the entire century. Our estimates indicate that the region grew 3 to 4 times as fast as that. For the Lower South, we estimated that real GDP per capita declined slightly – by 0.03 percent per year from 1720 to 1770 and 0.02 percent per year from 1720 to 1800.<sup>53</sup> There is little doubt that the Middle Colonies experienced noticeably faster economic growth than the Lower South.

---

<sup>52</sup> Mancall, Peter C., and Thomas Weiss. 1999. "Was Economic Growth Likely in Colonial British North America?" *Journal of Economic History* 59: 17-40

<sup>53</sup> Mancall, Peter C., Joshua Rosenbloom, and Thomas Weiss "Conjectural Estimates of Economic Growth in the Lower South, 1720 to 1800," in *History Matters: Economic Growth Technology, and Population*, Bill Sundstrom and Tim Guinnane, eds. Stanford University Press, 2003. The poor performance of the Lower South reflects in part the decline in exports per capita, which fell at 0.04 percent per year from 1720 to 1770 and 0.6 percent from 1720 to 1800. Another important source of the decline in GDP per capita was the changing composition of the region's population, namely a continual increase in the share of the population under the age of 10 and an increase in the free share of the population. These shifts kept the labor force participation rate from rising for most of the period and eventually pushing it down, especially after 1770. If nothing else had changed, this phenomenon alone would have reduced GDP per capita by 0.04 percent per year between 1720 and 1770 and by 0.27 percent per year between 1720 and 1800.

The relative performance of these two regions brings into question the importance of exports as an engine of growth in colonial America. In neither region did exports comprise a substantial portion of the economy, falling well short of the 25 to 30 percent share that John McCusker thought it accounted for.<sup>54</sup> In the Middle Colonies exports made up roughly 7 percent of GDP, and the per capita value grew at about the same rate as that for gdp per capita, around 0.24 during the colonial period.<sup>55</sup> In the Lower South, exports figured more prominently, but still did not exceed 14 percent of GDP in most years, and declined on a per capita basis at 0.04 percent per year, about the same rate as the decline in GDP per capita.<sup>56</sup>

Although the long term rates of growth of exports and GDP within each region are alike, this similarity is just coincidence, not evidence of causation. Elsewhere we showed in detail that the ups and downs of the economy of the Lower South were not correlated with the fluctuations in exports, and the same pattern appears in the Middle Colonies. That is, the decadal changes in exports per capita do not appear to be highly correlated with changes in GDP per capita.<sup>57</sup> Most telling perhaps is that the Lower South, the region in which exports were supposed to have driven economic growth, fared worse in terms of growth of GDP per capita than the Middle Colonies.

---

<sup>54</sup> John McCusker, "Measuring Colonial Gross Domestic Production: an Introduction," *William and Mary Quarterly*, vol. 56, Jan. 1999, p. 4.

<sup>55</sup> The 7 percent figure for the Middle Colonies includes both agricultural and nonagricultural commodities. Agricultural products alone amounted to about 5 percent of GDP.

<sup>56</sup> See Mancall, Rosenbloom and Weiss, 2003.

<sup>57</sup> Luckily so in some instances, such as the 1730s, when exports per capita abroad and to other colonies both declined while GDP per capita rose at 0.13 percent per year due to growth in food production and the value of shelter per capita.

Table 1				
<b>Estimates of Annual Rates of Economic Growth per Capita</b>				
Over Long Time Periods				
	Publication Date	Time Period	Geographic coverage	Rate of Growth
Mancall and Weiss	1999	1700-1770	all colonies	0.05%
Jones	1980	1700-1770	all colonies	0.4%
Egnal	1998	1713-1775	all colonies	0.5%
McCusker and Menard	1991	1690-1785	all colonies	0.3 - 0.6 %
McCusker	2000	1720-1774	all colonies	0.6%
Taylor	1964	1700-09 to 1770-79	all colonies	1.0 % +
<i>Individual Regions</i>				
Anderson	1979	1700-09 to 1770-79	New England	-0.80%
Mancall, Rosenbloom and Weiss	2003	1720-1770	Lower South	-0.03%
Egnal	1998	1713-1775	Lower South	0.10%
Main and Main	1988	1650-1770	So. New England	0.35%
Kulikoff	1979	1705-1776	Chesapeake	0.40%
Egnal	1998	1713-1775	Northern colonies	0.60%
Egnal	1998	1713-1775	Upper South	0.90%
McCusker	1972	1730-1770	Pennsylvania	1.60%

## Notes and Sources to Table 1

These authors did not all measure growth of real GDP per capita. Some specifically described it as such, some as Gross or Net National Product or National Income, while others implied that they were describing change in one of these measures of economic growth, but the specific evidence they used was some proxy measure, such as TFP or imports.

Peter Mancall and Thomas Weiss, 1999, "Was Economic Growth Likely in British North America?" *Journal of Economic History* 59 (1999), 17-40. They measured real GDP per capita.

Marc Egnal (1998) *New World Economies*, New York: Oxford University Press, p. 43. Measured per capita imports as a first approximation, "then checked against data for long term changes in probate wealth and value of exports."

Alice Hanson Jones, 1980. *Wealth of a Nation to Be*, New York: Columbia University Press, p. 78

George Rogers Taylor, 1964. "American Economic Growth before 1840: an Exploratory Essay," *Journal of Economic History*, 24, 437. He examined a variety of evidence and provided an informed opinion about the rate of growth of income per capita.

John McCusker and Russell Menard, 1985. *The Economy of British North America*, pp. 52-57. They estimated the rate of growth of GNP per capita based on estimates of the growth of GNP per capita current at the time that they wrote. The lower rate of 0.3 percent was that achieved by England, which they argue set the lower bound for the colonies; the higher rate of 0.6 percent reflected their view that because the colonies had started out far behind they likely grew faster than the mother country.

John McCusker, 2000. "Estimating Early American Gross Domestic Product," *Historical Methods*, vol. 33, 2000, p. 156, Table 2 and accompanying text. Here he revealed his preference for the higher rate of growth of 0.6 percent per year.

Terry Anderson, 1979. "Economic Growth in Colonial New England: 'Statistical Renaissance,'" *The Journal of Economic History*, 39, 253, Table 3 and 255. His estimate of minus 0.8 percent per year is based on his estimate of TFP. If one used output per worker the rate of decline is only minus 0.7 percent per year.

Peter Mancall, Joshua Rosenbloom and Thomas Weiss, 2003. "Conjectural Estimates of Economic Growth in the Lower South, 1720 to 1800," in *History Matters: Economic Growth Technology, and Population*, ed. William Sundstrom and Tim Guinnane (Stanford: Stanford University Press, 2003), 389-424. They measured real GDP per capita.

Gloria L. Main and Jackson T. Main, 1988. "Economic Growth and the Standard of Living in Southern New England," *The Journal of Economic History*, 48, 27-46. Real wealth per capita.

Alan Kulikoff, 1979. "The Economic Growth of the Eighteenth-Century Chesapeake Colonies," *The Journal of Economic History*, 39, 277. He measured real wealth per capita in Prince George's county, Maryland.

John McCusker, 1972. "Sources of Investment Capital in the Colonial Shipping Industry," *The Journal of Economic History*, 32, p. 155, fn 17. Used growth in exports to England as a measure of growth in NNP

Table 2  
 Estimates of GDP and Components in the Base Year of 1800: U.S. and Middle Atlantic Region  
 (U.S. dollars, prices of 1840)

	United States		Mid Atlantic		Mid Atlantic		Ratio  Mid Atlantic to the U.S
	Total Output \$000's	Per Capita for Total Population \$s	Total Output \$000's	Per Capita for Total Population \$s	Per Capita Values Free Pop.    Slaves		
<i>Agricultural Output</i>							
Food (consumption)	159,098	29.98	45,557	31.09	31.31	23.48	1.04
less interstate food imports	-	-	4,337	2.96			
less food imports from abroad	9,132	1.72	3,253	2.22			1.29
Food Production	149,966	28.26	37,967	25.91			0.92
Firewood	35,258	6.64	10,942	7.47	7.57	3.79	1.12
Agric Exports Abroad	17,806	3.36	5,070	3.46			1.03
Agr. Exports to Other Colonies	-	-	4,557	3.11			
<i>NonAgricultural Output</i>							
Shelter	44,921	8.46	20,456	13.96	14.30	1.17	1.65
Invisible Earnings			2,769	1.89			
NonAgr. Commodity Exports			2,740	1.87			
Residual NonAgr. Output	103,571	19.52	28,182	19.23			0.99
<b>GDP (Narrowly Defined)</b>	<b>351,522</b>	<b>66.24</b>	<b>112,685</b>	<b>76.90</b>	<b>78.28</b>	<b>28.44</b>	<b>1.16</b>
<b>Labor Force</b>							
	1713.2		402				0.23
Agricultural	1262.2		281				0.22
NonAgricultural	451.0		121				0.27
<b>Output per worker (Narrowly Defined)</b>							
Agricultural	161		208				1.30
NonAgricultural	230		278				1.21
Ratio NonAgr. To Agr.	1.43		1.34				0.94

## Notes and Sources to Table 2

Population figures for the U.S. and the Mid Atlantic region underlying the calculations are from Susan Carter, et al., *Historical Statistics of the United States*, 2006, Series Aa: 2769-71, 4779-81, 4943-45, and 5407-09. The labor force figures are from Weiss (1992)

The figures for GDP and its components for the U.S. in 1800 were taken from Weiss (1992). The GDP figures for the Mid Atlantic region in 1800 were derived by extrapolating backward an estimate of the region's per capita income for 1840. The extrapolating index for per capita income was constructed as the product of indexes measuring changes in the same variables that underlie the estimates of the national figures - changes in the agricultural share of the region's labor force, changes in the region's labor force participation rate, changes in agricultural productivity - and an assumption that the ratio of non-agricultural productivity to agricultural productivity remained constant over the period at the value established for 1840. It was further assumed that agricultural productivity in the region changed at the national rate between 1800 and 1840. The region's per capita income for 1840 is based on the estimates of Easterlin. (1960, pp. 97-98, Table A-1)

The per capita food consumed for free adults (those aged 10 and over) and free children (aged 0-9) in the Mid Atlantic in 1800 were assumed to equal the average of the national figures for those population groups in 1839, 1849, and 1859. The latter figures were calculated from data in Gallman, 1960, table, A-2 and U.S. Census Bureau 1975, series U-215 and 216. Food consumption per slave was assumed to equal 75 percent that of free whites. These per capita figures were then multiplied by the population in each group in 1800.

We estimated the 1800 values of agricultural imports from other states by extrapolating forward the 1768-72 benchmark figures (described in the notes to Table 3). An estimate of the region's exports to and imports from other states was derived for 1790-92 by multiplying the 1768-72 value of exports per ton cleared (for exports) and per ton entered (for imports) by reported figures for the coastal tonnage entering the ports of New York and Pennsylvania, and inflating these to obtain the value for the Middle Atlantic Region. The average per capita values of coastal exports and imports for 1790-92 were then extrapolated forward to 1802 in two parts, using figures on the stock of registered and licensed tonnage. The 1791 figure was first extrapolated to 1794 based on the gross tonnage engaged in coastal and internal trade. The 1794 figure was then extrapolated forward based on the enrolled tonnage and the tonnage of licensed vessels employed in the coasting trade in the states of the Middle Atlantic. In both cases the extrapolator was a three-year average of tonnage per capita. The tonnage data are from Susan Carter et al, *Historical Statistics of the United States*, Series Df591 and *New American State Papers, Commerce and Navigation*, vol.4 pp. 453-55

Food imports from abroad were estimated by calculating food imports per capita for the US., converting to 1840 prices, then multiplying by the 1768-72 ratio of the Mid Atlantic's per capita food imports to those for the US. We calculated food imports in 1800 as a share of total merchandise imports (*Historical Statistics*, Series Ee 368) less re-exports (Mancall, Rosenbloom and Weiss, 2008, Appendix Table 8). The 1768-72 ratio is from, Shepherd, 1970 "Commodity Imports" (mimeo) Purdue University Working Paper, Tables 1 and 2.

The value of firewood per person for the Mid Atlantic was taken from U.S. Department of Agriculture 1942, Table 2. We used the reported figures on firewood consumed for the Mid Atlantic region (Del., NJ, NY, Penn., DC and Md) for the periods 1790-99 and 1800-1809 to calculate a per capita figure for the entire population. We assumed that slaves consumed one-half the quantity consumed by free persons and solved for the per capita consumption of free persons and slaves. These per capita figures were then multiplied by the free and slave populations in the Mid Atlantic region as defined in this paper.

For agricultural exports, invisible earnings, and nonagricultural commodity exports see Mancall, Rosenbloom and Weiss, 2008 “Commodity Exports, Invisible Exports and Terms of Trade for the Middle Colonies, 1720 to 1775,” NBER Working Paper No. 14334 and the associated Appendix.

For the free population, the value of shelter services equals 22 percent of the value of the stock of dwellings in 1798 adjusted for omitted values (Weiss, 1992, Table 1.2; Pitkin, 1967; Soltow, 1989; and Soltow and Land, 1980). The flow was revalued in prices of 1840 by using the deflator for the gross rental value of farm dwellings estimated by Towne and Rasmussen (1960) to obtain a per capita figure for free persons of \$14.30. We assumed that the average value of a slave dwelling in each state equaled the value of those dwellings omitted from the housing survey. That value was calculated for each state as the product of the national ratio of the value of omitted dwellings to reported dwellings times the value of the reported dwellings in each state. This gave a dwelling value per slave of \$7.18 in 1840 prices. Using a service flow of 22 percent we obtain the annual value of shelter of \$1.58 per slave.

The residual nonagricultural output is the difference between the total GDP and the estimates of all the other components. This residual encompasses all nonagricultural output, except shelter. Thus it includes the output of manufacturing, mining, construction, final services flowing to consumers, the value of government services as well as investment spending.



Table 3											
Per Capita Values of Agricultural Output for the Colonies and States of the Mid Atlantic Region											
(US Dollars, prices of 1840)											
Year	Food Production			Firewood	Agricultural Exports			Agricultural Output	Agricultural LF share	Output per Worker	
	Food Consumed	Less Food Imported from			Food Produced	Abroad	to Other Colonies				Total
		abroad	other colonies								
1720	28.16	1.38	0.92	25.86	9.21	3.27	1.25	4.52	39.59	0.72	176.12
1730	28.66	1.69	1.01	25.96	9.86	3.57	1.35	4.91	40.74	0.74	184.61
1740	29.08	1.33	0.77	26.99	9.74	3.48	1.14	4.62	41.34	0.75	186.43
1750	29.65	1.35	0.39	27.91	10.15	3.78	1.89	5.66	43.73	0.73	198.27
1760	30.11	1.24	0.94	27.93	9.47	3.01	1.87	4.88	42.28	0.73	188.83
1770	30.79	1.54	1.49	27.76	8.96	3.68	1.86	5.54	42.26	0.72	189.37
1780											
1791	30.95	2.22	1.27	27.46	7.67	2.10	1.34	3.44	38.58	0.72	186.59
1800	30.85	2.22	2.96	25.67	7.47	3.46	3.11	6.57	39.72	0.70	207.15
	<b>Average Annual Rates of Change</b>										
1720-1740	0.16	-0.18	-0.91	0.21	0.28	0.31	-0.47	0.11	0.22	0.16	0.28
1740-1770	0.19	0.49	2.24	0.09	-0.28	0.19	1.65	0.61	0.07	-0.14	0.05
1770-1800	0.01	1.23	2.31	-0.26	-0.61	-0.20	1.73	0.57	-0.21	-0.08	0.30
1720-1770	0.18	0.22	0.97	0.14	-0.06	0.24	0.79	0.41	0.13	-0.02	0.15
1720-1800	0.11	0.60	1.47	-0.01	-0.26	0.07	1.14	0.47	0.00	-0.04	0.20
	<b>Average Shares of Agricultural Output</b>										
1720-1740	0.71	0.04	0.02	0.65	0.24	0.08	0.03	0.12	1.00		
1740-1770	0.71	0.03	0.02	0.65	0.23	0.08	0.04	0.12	1.00		
1770-1800	0.77	0.05	0.05	0.67	0.20	0.08	0.05	0.13	1.00		
1720-1770	0.71	0.03	0.02	0.65	0.23	0.08	0.04	0.12	1.00		
1720-1800	0.73	0.04	0.03	0.66	0.22	0.08	0.04	0.12	1.00		

### Notes and Sources to Table 3

The value of food consumed per capita is a weighted average of the value consumed by the colonists and that consumed by the slaves, and the average for the colonists is a weighted average of that consumed by an adult and that consumed by a child, where the weights are their respective shares of the population. Children are those under the age of 10.

We assumed that the per capita consumption figure for free adult colonists increased at an average annual rate of 0.1 percent per year between 1720 and 1800. The per capita figure for slaves was assumed to equal 75 percent that of a colonist in 1800. Based on Kahn's (1992) estimate of the least-cost diet for slaves, we set the 1700 figure at 75 percent of the 1800 figure and assumed that the value increased at a constant rate between 1700 and 1800.

The estimate of food imports from and agricultural exports to other colonies for 1768-72 comes from Shepherd and Williamson (1992, p. 798, Table 2). We calculated the implicit quantities of most food items, repriced them using dollar prices of 1840, then inflated their sum by dividing it by the share of these food items in the total value of food (in pound sterling) in the original data. We calculated average value per ton of agricultural exports to and imports from other colonies by dividing the base year values by the average tonnage clearing and entering in the years 1768-1772, and extrapolated these values to other years using statistics on tonnage entering and clearing.

Food imports into the Middle Colonies from Southern Europe, the Wine Islands, and the West Indies for 1768-72 are from Shepherd (1970, "Commodity Imports..." mimeo, Tables 1 and 2). Imports of food from Great Britain were calculated as 3 percent of all imports from that source. The total import figure was taken from Susan Carter, et al (2006, *Historical Statistics*, Series Eg452-455). We calculated average value per ton of agricultural imports for three points of origin (Europe, Britain and the West Indies) by dividing the base year values by the average tonnage entering from these other destinations in the years 1768-1772. We multiplied these values per ton by tonnage entering New York and Philadelphia from these three points to estimate the value of food imported from foreign countries. The tonnage data are from Carter, 2006, *Historical Statistics* and Lydon.

Agricultural exports abroad includes only those exports produced domestically. The benchmark figure for agricultural exports from the Middle Colonies to all countries in 1770 is from Shepherd and Walton (1972, 210-227) revalued in 1840 prices of each. We then extrapolated that benchmark figure forward to 1800 and extrapolated it backward to 1720 based on tonnage clearing Philadelphia and New York. See Mancall, Rosenbloom and Weiss, (2008) "Commodity Exports, Invisible Exports and Terms of Trade for the Middle Colonies, 1720 to 1775," NBER Working Paper No. 14334 for details.

The value of firewood per person for the Mid Atlantic was taken from U.S. Department of Agriculture 1942, Table 2. We used the reported figures on firewood consumed for the Mid Atlantic region (Del., NJ, NY, Penn., DC and Md) for the periods 1790-99 and 1800-1809 to calculate a per capita figure for the entire population in each year. We assumed that slaves consumed one-half the quantity consumed by free persons and solved for the per capita consumption of free persons and slaves. These per capita figures were then multiplied by the free and slave populations in the Mid Atlantic region as defined in this paper to get a weighted average value for each benchmark date.

Total agricultural output equals the sum of food produced, firewood and total agricultural exports.

The agricultural labor force is the sum of estimates for the white and black workers residing in rural areas, plus an estimate of the small numbers of the population in farming that were residing in cities. For each of the two rural population groups, the agricultural labor force is the product of the rural population in that group times a rural agricultural participation rate. The 1800 rural agricultural estimating ratios were taken from Weiss's earlier estimates of the U.S. labor force. We assumed those ratios declined over the period 1700 to 1800 at 0.07 percent per year, a rate derived from the labor force evidence for Chester county, Pennsylvania presented by Ball and Walton ((1976, Table 3 p. 109-113). Their indexes of labor inputs per farm for Chester county from 1714-31 to 1775-90 appear to have assumed there was no decline in the rural agricultural participation rates, except for children. The rate of 0.07 percent is a weighted average of the decline in the child participation rate and constancy in the rate for adults implicit in their estimates. That rate of decline is roughly half the rate at which the free labor force aged 10 and over declined in the period 1800 to 1840 (0.131 percent per year). The urban farm labor force was assumed to equal one percent of the urban population aged 10 and over, the percentage used by Weiss in his estimates for the nineteenth century. Evidence for Philadelphia in 1774 and 1780-83 (Jacob Price, ) provides some confirmation for this percentage.

Table 4					
Output per Worker in Agriculture					
with Different Rates of Growth in the Value of the Diet					
	Our Assumed Rate		Alternative Rates of Growth in the Diet		
	0.1		0.0	0.2	0.3
<b>Rate of Growth of Output per Worker</b>					
1720-1740	0.28		0.22	0.35	0.41
1740-1770	0.05		-0.01	0.12	0.18
1770-1800	0.30		0.23	0.37	0.44
1720-1770	0.15		0.08	0.21	0.27
1720-1800	0.20		0.14	0.27	0.33
<b><i>By Decade</i></b>					
1720-1730	0.47		0.41	0.53	0.59
1730-1740	0.10		0.03	0.16	0.22
1740-1750	0.62		0.54	0.69	0.77
1750-1760	-0.49		-0.54	-0.44	-0.39
1760-1770	0.03		-0.03	0.09	0.15
1791-1800	1.17		1.09	1.25	1.32

In all these cases we have assumed that the rural agricultural participation rate declined at 0.07 percent per year.

Table 5

Conjectural Estimation of GDP per Capita for the Mid Atlantic Region, 1720-1800

	LF Part. Rate	Agric. Output per worker	Intersectoral Shift Effect	Agric. Share of the LF	Estimated Value of K	Extrapolated Value of Non- shelter GDP per capita	Value of Shelter	GDP per Capita
1720	0.31	176.12	1.07	0.72	1.26	58.46	9.18	67.64
1730	0.30	184.61	1.07	0.74	1.27	58.75	9.70	68.45
1740	0.30	186.43	1.07	0.75	1.28	59.18	10.13	69.31
1750	0.30	198.27	1.08	0.73	1.29	64.41	10.56	74.97
1760	0.30	188.83	1.08	0.73	1.31	62.23	11.11	73.34
1770	0.31	189.37	1.09	0.72	1.32	64.36	11.74	76.10
1780								
1791	0.29	186.59	1.10	0.72	1.35	58.95	13.11	72.06
1800	0.27	207.15	1.11	0.70	1.36	62.94	13.96	76.90
<i>Average Annual Rates of Change</i>								
1720-1740	-0.23	0.28	0.00	0.16	0.10	0.06	0.49	0.12
1740-1770	0.17	0.05	0.06	-0.14	0.10	0.28	0.49	0.31
1770-1800	-0.43	0.30	0.05	-0.08	0.10	-0.07	0.58	0.03
1720-1770	0.01	0.15	0.04	-0.02	0.10	0.19	0.49	0.24
1720-1800	-0.15	0.20	0.04	-0.04	0.10	0.09	0.53	0.16
1720-30	-0.41	0.47	-0.01	0.23	0.10	0.05	0.56	0.12
1730-40	-0.04	0.10	0.01	0.09	0.10	0.07	0.43	0.12
1740-50	0.16	0.62	0.07	-0.21	0.10	0.85	0.42	0.79
1750-60	0.12	-0.49	0.03	0.03	0.10	-0.34	0.51	-0.22
1760-70	0.22	0.03	0.09	-0.25	0.10	0.34	0.55	0.37
1791-1800	-0.54	1.17	0.11	-0.30	0.11	0.73	0.70	0.72

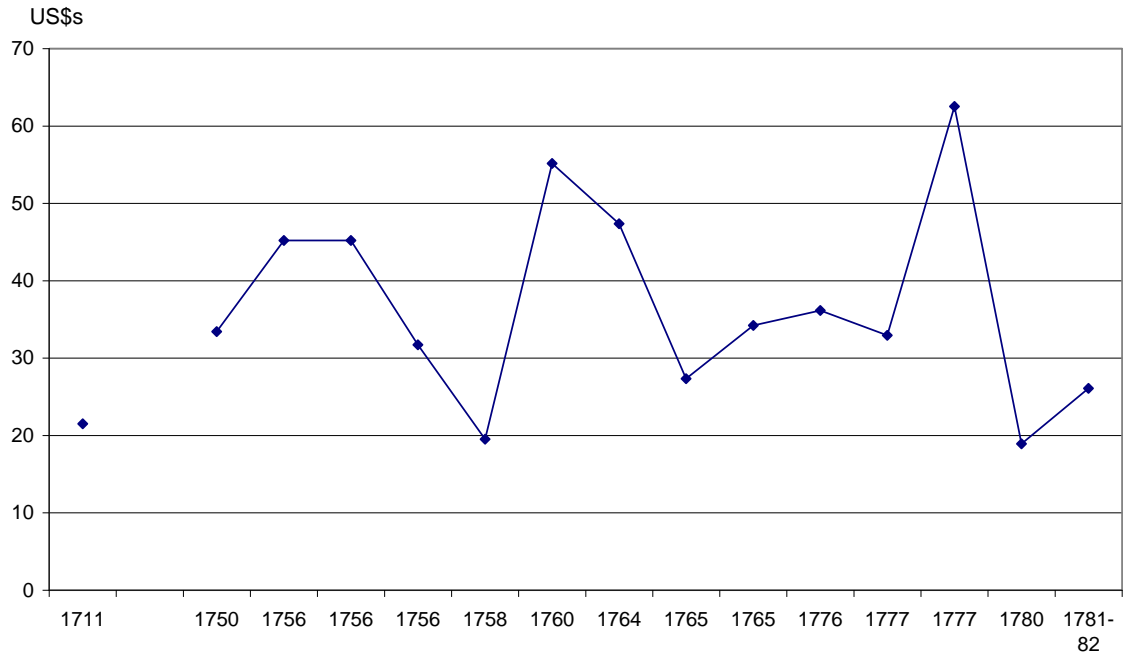
## Notes and Sources to Table 5

The Labor Force Participation Rate is a weighted average of that for the free males, free females, and slaves aged 10 and over. The participation rate for each of the population groups are those for 1800 (Weiss, 1992). Agricultural output per worker and the agricultural share of the labor force are from Table 3. The intersectoral shift effect measures the impact of changes in the distribution of the labor force between agriculture and nonagriculture and equals  $S_a + (1 - S_a) k$ . The value of  $k$ , the ratio of nonagricultural to agricultural output per worker, for 1800 is from Table 2. That ratio was assumed to have increased at 0.1 percent per year from 1720 to 1800.

The three input values (cols. 1-3 ) are multiplied to produce the extrapolated value of GDP per capita. The independent estimate of the value of shelter is then added to the extrapolated value to obtain the full measure of GDP, narrowly defined (i.e. excluding home manufactures and farm improvements).

The per capita value of shelter is a weighted average of that for free population and for slaves. The per capita values of shelter in 1800 of \$14.30 for free persons and \$1.58 for slaves are from Table 2. We used an index of change in the stock of dwellings to extrapolate the 1800 figures backward to 1700. We based the index on Jones's (1980, p.78) estimate of the rate of growth of wealth per capita between 1700-25, 1725-50, and 1750-74, and Gallman's (1992, p. 95) estimate of the rate of growth of the real value of structures between 1774 and 1799.

Figure 1  
Estimated Annual Amounts Spent on Provisions for Various Military Purposes  
(1840 prices)



## SOURCES

Anderson, Terry, 1979. "Economic Growth in Colonial New England: 'Statistical Renaissance,'" *The Journal of Economic History*, 39, 243-57.

Ball, Duane and Gary Walton, 1976. "Agricultural Productivity change in eighteenth century Pennsylvania," *The Journal of Economic History* 36, 102-17.

Berlin, Ira, 1980. "Time, Space, and the Evolution of Afro-American Society on Mainland British North America," *American Historical Review* 85 (1980), 44-78.

Candler, Allen D. 1904-16. *The Colonial Records of the State of Georgia*. Compilations of transcripts of records in the Public Record Office begun by Allen D. Candler and completed by William J. Northen and Lucian Lamar Knight.

Carter, Susan, et al., 2006. *Historical Statistics of the United States*, New York: Cambridge University Press.

Clark, Gregory, "The Macroeconomics Aggregates for England, 1209 to 2008," *Research in Economic History*, 2010,

David, Paul. 1967. "The Growth of Real Product in the United States before 1840: New Evidence, Controlled Conjectures." *Journal of Economic History* 27: 151->97

Egnal, Marc, 1998. *New World Economies*. New York: Oxford University Press,

Gallman, Robert, 1992. "American Economic Growth before the Civil War." In R. Gallman and J. Wallis, *American Economic Growth and Standards of Living before the Civil War*. Chicago: University of Chicago Press.

Greenberg, Douglas. 1979. "The Middle Colonies in Recent American Historiography," *WMQ* 3<sup>rd</sup> Ser., 36 (1979), 396-427.

Jones, Alice Hanson, 1980. *Wealth of a Nation to Be*. New York: Columbia University Press

Kahn, Charles. 1992. "A Linear Programming Solution to the Slave Diet." In Robert Fogel and Stanley Engerman, eds., *Without Consent or Contract*. *Technical papers*, vol. 3, pp. 522-35. New York: W. W. Norton.

Kulikoff, Alan. 1979. "The Economic Growth of the Eighteenth-Century Chesapeake Colonies," *The Journal of Economic History*, 39, 275-88.

Kuznets, Simon, 1952. "Long Term Changes in the National Income of the United States of America since 1870." In *Income and Wealth of the United States, Trends and Structure*. *International Association for Research in Income and Wealth, Income and Wealth Series II*. Baltimore, Md.: The Johns Hopkins University Press.

Lebergott, Stanley. 1966. "Labor Force and Employment, 1800-1960." In Dorothy Brady, ed., *Output, Employment and Productivity in the United States after 1800*. *Studies in Income and Wealth*, no. 30. New York: National Bureau of Economic Research.

Lydon, James, 1967. "Philadelphia's Commercial Expansion, 1720-1739," *Pennsylvania Magazine of History and Biography*, 91, 401-19.

Main, Gloria L. and Jackson T. Main, 1988. "Economic Growth and the Standard of Living in Southern New England," *The Journal of Economic History*, 48, 27-46.

Menard, Russell, 1976. "Comment on Paper by Ball and Walton," *The Journal of Economic History* 36, 118-25.



McCusker, John. 1972. "Sources of Investment Capital in the Colonial Shipping Industry," *The Journal of Economic History*, 32, p. 155.

McCusker, John, 1999. "Measuring Colonial Gross Domestic Production: an Introduction," *William and Mary Quarterly*, vol. 56, Jan. 1999, p. 3-8.

McCusker, John, 2000. "Estimating Early American Gross Domestic Product, *Historical Methods*, vol. 33, 2000, p. 156, Table 2 and accompanying text. Here he revealed his preference for the higher rate of growth of 0.6 percent per year.

McCusker, John, 2006. "Colonial Statistics," in Susan Carter, et al, (2006). *Historical Statistics of the United States: Earliest Times to the Present* (Cambridge University Press), vol. 5,

Mancall, Peter C. and Thomas Weiss, "Was Economic Growth Likely in British North America?" *Journal of Economic History* 59 (1999), 17-40.

Mancall, Peter, Joshua Rosenbloom and Thomas Weiss, 2003. "Conjectural Estimates of Economic Growth in the Lower South, 1720 to 1800," in *History Matters: Economic Growth Technology, and Population*, ed. William Sundstrom and Tim Guinnane (Stanford: Stanford University Press, 2003), 389-424.

Mancall, Peter, Joshua Rosenbloom and Thomas Weiss, 2008. "Commodity Exports, Invisible Exports and Terms of Trade for the Middle Colonies, 1720 to 1775," NBER Working Paper No. 14334.

Nash, Gary B., *The Urban Crucible: Social Change, Political Consciousness, and the Origins of the American Revolution*. Cambridge, MA: Harvard University Press, 1979.

*New American State Papers, Commerce and Navigation*, vol.4

Parker, Peter J., "Rich and Poor in Philadelphia," *Pennsylvania Magazine of History and Biography*, 1975,

Philadelphia Guardians for the Relief and Employment of the Poor of the City of Philadelphia," The Accounts of the Guardians of the Poor, reprinted in *Poulson's American Advertiser*, May 19, 1802

Pitkin, Timothy. [1816] 1967. *A Statistical View of the Commerce of the United States*. Reprint, New York: Augustus Kelley

Shepherd, James, 1970. "Commodity Imports" (mimeo) Purdue University Working Paper

Shepherd, James, and Samuel Williamson. 1972. "The Coastal Trade of the British North American Colonies, 1768-1772." *Journal of Economic History* 32: 783-810.

Smith, Billy G., "The Material Lives of Laboring Philadelphians, 1750 to 1800." *William and Mary Quarterly*, 3<sup>rd</sup> ser., 38, no. 2 (April 1981), pp. 164-202.

Soltow, Lee. 1989. *Distribution of Wealth and Income in the United States in 1798*. Pittsburgh, Penn.: University of Pittsburgh Press.

Soltow, Lee, and Aubrey Land. 1980. "Housing and Social Standing in Georgia, 1798." *The Georgia Historical Quarterly* 64: 448->58.

Taylor, George R. 1964. "American Economic Growth before 1840: An Exploratory Essay." *Journal of Economic History* 24: 427-44.

Towne, Marvin, and Wayne Rasmussen. 1960. "Farm Gross Product and Gross Investment in the Nineteenth Century." In William Parker, ed., *Trends in the American Economy*. Studies in Income and Wealth, vol. 24. Princeton, N.J.: Princeton University Press.

U.S. Department of Agriculture. 1942. "Fuel Wood Used in the United States, 1630-1930." Circular no. 641. Washington, D.C.: U.S. Government Printing Office.

Vickers, Daniel, 1996. "The Northern Colonies: Economy and Society, 1600-1775," in Stanley L. Engerman and Robert E. Gallman, eds., *The Cambridge Economic History of the United States*, vol. 1, *The Colonial Era* (Cambridge, Eng: Cambridge University Press, 1996), 209-248.

Weiss, Thomas. 1992. "U.S. Labor Force Estimates and Economic Growth, 1800 to 1860." In R. Gallman and J. Wallis, eds., American Economic Growth and Standards of Living before the Civil War. Chicago: University of Chicago Press.

Weiss, Thomas, 1993. "Long Term Changes in U.S. Agricultural Output per Worker, 1800-1900." *Economic History Review* 46: 324-41.

Weiss, Thomas, 1994. "Economic Growth before 1860: Revised Conjectures." In Thomas Weiss and Donald Schaefer, eds., *American Economic Development in Historical Perspective*. Stanford, Cal.: Stanford University Press.