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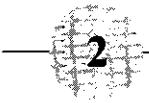

The Growth of Wages in Antebellum America
A Review

This chapter reviews the economic history literature on the growth of wages before the Civil War. Although various studies point to increases in real wages over the period 1820–60, virtually all the evidence pertains to the Northeast, and it is limited in other ways (e.g., in detail about occupation). The chapter concludes with a discussion of the two new sources of wage evidence developed for this book.

2.1 Real Wages

This section surveys the literature on trends and fluctuations in nominal and real wages during the antebellum period.[1] By *real wage,* I mean the money wage (or its equivalent in money) per some unit of time (typically, a day or a month) divided by an index of prices. The end result is an index of real wages; that is, the value of the real wage is set to 100 in some base year, and the value of the real wage in other years is expressed relative to the value in the base year. There are numerous practical difficulties constructing such indices, and there are equally numerous difficulties interpreting such indices once constructed. I leave a fuller discussion of some of these difficulties to later chapters, where I present and interpret my own set of indices. For the moment, I simply assume that real wage indices provide useful information about movements in living standards for antebellum (free) labor.[2]

History has not been particularly kind to economic historians interested in the course of wages before the Civil War. The federal government attempted to collect some comprehensive, internally consistent wage information for scattered years. The earliest such documents are the 1820 manuscript Census of Manufactures and the McLane Report (McLane

1833). The purpose of both surveys was to provide information on early antebellum manufacturing enterprises, and both are sufficiently detailed to analyze, for example, the gender composition of the industrial labor force, labor productivity, and average monthly wages in manufacturing (Goldin and Sokoloff 1982; Sokoloff 1986a; Sokoloff and Villaflor 1992). The McLane Report also provided some information, albeit widely scattered geographically, on the wages of mechanics and a few other occupations. Agricultural wages at the state level were first collected by the Treasury Department in 1848 as part of its attempt to monitor crop production (Lebergott 1964).

The first serious attempts to collect national wage data occurred in 1850 and 1860 as part of the federal census. Enumerators collected "social statistics" on real and personal wealth, crop yields, churches, schools, poor relief, and crime and information on the wages of farm laborers, common laborers, carpenters, and domestics and on the cost of board. State-level averages of wages and the cost of board were published in the 1850 and 1860 censuses (DeBow 1854, 164; Secretary of the Interior 1866, 512). Manuscript schedules of the social statistics have survived for various states. Later in the chapter, I describe a sample drawn from this rich and greatly neglected source.

Both the published and the sample 1850 and 1860 census data are extremely useful in constructing benchmarks (Lebergott 1964; and chap. 3 below). Elsewhere, I use them to study the relation between wage movements and the incidence of poor relief (Kiesling and Margo 1997) and the efficiency of labor markets (chaps. 5 and 6 below). However, the census data are obviously of little use for charting long-run trends (except between 1850 and 1860) and none at all regarding cyclic fluctuations.[3] To gauge trends more accurately, and even to measure cycles, annual information on real wages is needed. Two types of annual information have been examined—retrospective surveys and archival records.

The primary sources of retrospective information are two federal government documents: the Weeks Report, published as part of the 1880 census (Weeks 1886), and the Aldrich Report, published in conjunction with a Senate investigation of tariffs in the early 1890s (Aldrich 1893). The two reports differ in detail, but their basic designs are similar. Both contain wage information culled from payroll records, and both are retrospective—the data are time series derived from the records of firms that were in existence at the time of the survey. Firms that existed prior to either survey but went out of business before the surveys were taken were not included. However, because many of the firms in both surveys had been in business for many years, either survey can be—and has been—used to estimate wage indices well back into the nineteenth century. The two reports both disaggregate average wages by firm (and hence industry), occupation, and frequency of payment (daily and hourly), but the Weeks

Report does not give the number of observations underlying the firm averages.[4]

The Weeks and Aldrich Reports are not the only retrospective surveys that cover the antebellum period. Similar retrospective data were compiled for Massachusetts by Carroll Wright when he was commissioner of labor for that state, and the entire data set was published in an annual report of the Massachusetts Bureau of Labor Statistics (Wright 1885). As in the case of the Weeks and Aldrich reports, the data were culled from the payroll records of firms. A large array of occupations—skilled laborers, common laborers, farm laborers, and manufacturing workers—is represented in the Wright survey; however, none of the occupations contain wage quotations for every year. As a result, economic historians have primarily used the Wright data to study long-term movements in skill differentials—the ratio of skilled to unskilled wages (see Grosse 1982; Lindert and Williamson 1982).

Although a case can be made that either the Weeks or the Aldrich Report can be used to study post–Civil War wage movements, their usefulness in studying antebellum patterns is another matter, especially before 1850.[5] The number of observations per year declines very sharply before 1840.[6] Whether the retrospective nature of the reports introduces any bias for the antebellum period is unclear, but selectivity is clearly a concern because the number of firms with antebellum data is small. Perhaps most important, the antebellum data in either report pertain almost solely to the Northeast before 1850; little can be gleaned about the behavior of wages in the Midwest or the South (Coelho and Shepherd 1976). By definition, the Wright survey pertains solely to Massachusetts; like the Weeks Report, it lacks information on the number of workers in the firms that were surveyed; and, worse, no information was reported on the location of the firms in the state.

These deficiencies aside, all three reports are fundamental sources of economic data for the nineteenth century. The Aldrich and Weeks Reports, in particular, have been extensively mined, starting with Abbott (1905), Mitchell (1908), and Hansen (1925). Examples of modern studies based totally or in part on either source are Coelho and Shepherd (1976), David and Solar (1977), and Williamson and Lindert (1980). The David-Solar and Williamson-Lindert wage indices are hybrids, making use of archival evidence in conjunction with the Weeks Report, so I discuss the Coelho-Shepherd study and various archival sources before reviewing the David-Solar and Williamson-Lindert indices.

Coelho and Shepherd (1976) used the Weeks Report to chart regional differences in trends and levels of nominal and real wages from 1851 to 1880. Over three-fourths of the firms canvased by Weeks and his associates were located in the Northeast or East North Central states. Because the undersampling was especially severe for the West South Central, Moun-

tain, and Pacific regions, Coelho and Shepherd present limited estimates for these areas. For the 1850s, the sample was deemed unreliable for all but the Northeast and East North Central regions (Coelho and Shepherd 1976, 207).

After a careful discussion of biases, Coelho and Shepherd focus on six occupations—engineer, blacksmith, machinist, painter, carpenter, and common laborer. They also use the Weeks Report data to construct national and regional price deflators (their construction was described in an earlier paper, Coelho and Shepherd [1974]). Two types of regional wage series were presented. The first type combined all observations, either within a region, unweighted across occupations, or within an occupation, unweighted across regions. The second type was by region for engineers and common laborers.[7] Because my interest is in the pre–Civil War period, I focus on their estimates for the Northeast and the East North Central states as these are the series they believe to be most reliable.

The unweighted series suggest that real wages fell during the first half of the 1850s, regardless of whether the national or the regional price indices are used as the deflator.[8] Real wages then increased but were no higher in 1860 than in 1851 in any region. Thus, the Weeks Report data suggest that the 1850s was a decade of little or no overall real wage growth. The same conclusions about the 1850s hold for common laborers; for engineers, however, real wages were higher in 1860 than in 1851 in the Mid-Atlantic and East North Central states.[9]

Real wages were higher in the East North Central region than in the Northeast in the 1850s for the unweighted series and for engineers and common laborers.[10] Within the Northeast, real wages were generally higher in New England than in the Mid-Atlantic states, although the regional differences within the Northeast were generally smaller than those between the East North Central states and the Northeast.[11] The real wage advantage enjoyed by the East North Central states was a consequence of lower prices because money wages were higher in the Northeast.

Archival records have also been used to study wage movements before the Civil War. Perhaps the most famous such study is Walter B. Smith's (1963) well-known compilation of wages paid to workers on the Erie Canal. The data pertain to maintenance work performed on the canal. The bulk of the wage quotations (about 90 percent) are for common laborers. Smith also produced series for carpenters, masons, and "teamwork" (teamsters plus horses). The series for masons, however, has several gaps in it, owing to the fact that the hiring of masons was less frequent than that of the other types of workers.[12]

Although the state government in Albany appears to have been concerned with employment on the canal, it generally seemed to have left the remuneration of canal workers to local supervisors. For this reason, according to Smith (1963, 298), the "Erie Canal Papers have made it

possible to compile series which are trustworthy indicators of wage levels, wage trends, and fluctuations," series that "approximate the prevailing wages in the areas adjoining the canal."

Maintenance work on the canal was organized in gangs of varying size and specialization. Two sources of wage rate statistics are available: the "checkrolls" of the gangs and workmen's receipts of pay. These were sufficient in quantity to yield about thirty thousand observations—clearly a larger sample size than that boasted by any other antebellum source, except for the data analyzed in this book.[13]

Interpretation of the Erie Canal series is complicated by the fact that Smith chose the mode as an indicator of central tendency. The mode might impart a spurious stability to nominal wages, although Smith (1963, 301) argued that the modal wage and the mean wage generally differed little from one another. Comparisons between the Erie Canal series and other sources suggest a few differences in levels, but Smith claimed that these were readily explained; he also noted that the Erie Canal series generally match "trends and turning points" in other series.

Cyclic movements in canal wages seemed dampened relative to the general course of economic activity. For example, wages did not fall until 1843, "after the worst of the depression of the 1840s was about to be over" (Smith 1963, 307). Public works spending on the canal continued unabated in the early 1840s, so it is possible that demand-side pressures kept wages up in areas surrounding the canal. Money wages did not respond much to the inflationary pressures of the 1850s after an initial increase in 1852.

To convert nominal into real wages for carpenters and common laborers, Smith used two deflators: Hoover's (1958) price index and the Federal Reserve Bank's cost-of-living index, neither of which pertained to upstate New York per se. Considerable fluctuations in real wages were evident around the upward trend. For both common laborers and carpenters, the late 1840s was a period of substantial increases in real wages. Little growth in real wages occurred, however, from 1830 to 1845 and in the 1850s.[14] Real wage growth was slightly greater for carpenters than for common laborers; the ratio of carpenters' pay to common laborers' pay rose from 1.53 in the 1830s to 1.64 in the 1850s.

In addition to Smith's work, important archival contributions have been made by Layer (1955), Lebergott (1964), Adams (1968, 1970, 1982, 1986, 1992), Zabler (1972), and Rothenberg (1988). Layer (1955) used firm payrolls to construct a long time series of wages for textile manufacturing workers beginning in the late 1830s. Lebergott's (1964) classic study of "wages in the long term" is difficult to summarize because of the wide array of sources employed. In brief, Lebergott pulled together wage estimates for various occupations. He produced fundamental annual series covering the period from 1860 to 1900, as well as benchmark estimates for

various years before the Civil War, but he stopped short of constructing an annual index for the antebellum period.[15]

Zabler's (1972) paper is chiefly of interest in that Williamson and Lindert (1980) used his estimates of skilled wages in their reconstruction of skill differentials before the Civil War (see below). All Zabler's data come from payrolls of iron firms located in rural eastern Pennsylvania. Zabler constructed estimates of average monthly wages for six "skilled occupations" (clerk, keeper, carpenter, smith, miller, collier), five unskilled occupations (filler, laborer, teamster, woodcutter, banksman), and farm labor for the period 1800–1830. Since my interest is in the period after 1820, I focus on Zabler's estimates for the 1820s.

Zabler's series generally show a decline in money wages in the early 1820s, with little further change thereafter during the decade. The most important implication of Zabler's series, however, concerns levels, not trends; in particular, his series imply much lower skill differentials than do other sources for the 1820s. For example, the ratio of carpenters' to laborers' pay (using Zabler's "laborer series") averages 1.22 in the 1820s, considerably below the skilled-unskilled gap in Philadelphia as estimated by Adams (1968, 411). Zabler argues that wage differentials in the iron industry support Habakkuk's (1962) assertion that the skilled-unskilled wage gap was lower in the United States than in Great Britain in the 1820s.

In a comment on Zabler's paper, Adams (1973) argued that Zabler's estimates of skill differentials were too low. While unskilled wages in the iron industry do not appear to have been low (if anything, the opposite was true), skilled wages were. For example, on a daily basis, carpenters in the iron industry earned about $0.58 per day, compared with $1.25 for house carpenters in Philadelphia at the time.[16] Although the iron industry may have offered more secure employment, artisanal unemployment would have had to approach very high levels to equalize annual earnings between the two locations.[17] Adams (1973, 92) speculates that skilled workers may have received some form of nonwage compensation, a possibility denied by Zabler (1972, 110), except for clerks.

Without question, some of the most important archival work on antebellum wages has been done by Donald Adams. Adams (1968, 1970) used archival records for Philadelphia to chart wage trends from 1785 to 1830. The principal source was the Stephan Girard Collection, held at the American Philosophical Society library in Philadelphia. Girard, a Philadelphia financier and philanthropist, maintained meticulous records of business dealings, and his records have yielded an abundant collection of wage quotations. Since my interest in this book is the period from 1820 to 1860, I focus primarily on Adams's estimates for the 1820s. With the exception of agricultural labor, all estimates are of daily wages.

Adams constructed annual estimates of nominal and real wages for several occupations found in the Girard records. The occupations were in

either shipbuilding (e.g., caulkers, ship carpenters), construction (house carpenters, bricklayers, masons), or agriculture (daily and monthly laborers, female domestics). In his appendix tables, Adams reported a single number if all wage quotations in a given occupation were the same in a given year; otherwise, a range was given. In the text of the article, however, Adams produced an average wage for "artisans"; this is simply the unweighted average of wages in the different skilled occupations. The artisanal average fluctuated a great deal from year to year because Adams did not hold constant the composition of the artisanal sample when constructing the average (i.e., he computed an unweighted average across occupations).

A feature common to almost all the occupations was a decline in the nominal wage from 1820 to 1821.[18] Nominal wages then generally rose from 1822 to 1824, remaining more or less at the 1824 level for the rest of the decade. Stability in money wage rates was not, apparently, a characteristic of just the 1820s. After reviewing patterns for the entire period, Adams (1968, 408) concluded that money wages were strikingly stable, changing only "in response to major declines or advances in the level of economic activity. . . . This 'stickiness' of wage rates is all the more surprising when we consider the lack of effective labor organizations during the period under question." Little evidence was found of a secular trend in the ratio of skilled to unskilled wages, but there was some indication of a decline in skill differentials during booms and a rise during downturns.

To estimate real wages, Adams relied on wholesale prices from Bezanson, Gray, and Hussey (1936), in conjunction with a working-class budget prepared by one Matthew Carey in 1833. Like virtually all other studies of real wages before the Civil War, Adams's ignored changes in the rental cost of housing. Since the expenditure share for housing in Carey's budget was 0.133 (13.3 percent), Adams (1968, 413) argued that excluding housing would not alter his basic findings.[19]

In brief, Adams found substantial increases in real wages during the 1820s for common laborers. Using 1821 as the base year, the growth rate of real wages for common laborers was 4.3 percent per year. About 28 percent of this growth rate reflected a decline in prices in the early 1820s; the remainder was a jump in the money wage (from $0.75 to $1.00 per day). Virtually all the increase in real wages occurred before 1824, which suggests a delayed response to the economic downturn that followed the War of 1812. Consistent with Adams's inferences about movements in skill differentials during booms and recessions, growth rates of real wages were somewhat lower over the 1820s for artisans than for common laborers (the 1820s were boom years). Again, the choice of a base year was crucial. Real wage growth was more substantial choosing 1821 as the base year than it was choosing 1820.[20]

On the basis of his estimates, Adams drew three conclusions. First, real

wage growth was considerable before 1830, which is consistent with the view that per capita income growth was also substantial. Second, money wages were rigid, and this rigidity was found in all occupations, skilled and unskilled. Third, there was little evidence of a sustained trend, upward or downward, in skill differentials before 1830.

Adams (1982) examined payroll and other records of manufacturing establishments in the Brandywine region of southeastern Pennsylvania, near Philadelphia and Baltimore. Manufacturing took hold relative early in the Brandywine (the area has many sites that can provide waterpower), and thus wage trends in the region should shed useful light on early industrialization. Most of the data were drawn from the records of two companies: DuPont and a textile firm, Bancroft, Simpson, and Eddystone.

Converting Adams's annual estimates to decadal averages, the monthly wages of male manufacturing employees increased at an average rate of 0.3 percent per year from the 1820s to the 1850s. Adams found, however, that growth in money wages understated growth in annual earnings; the latter increased at an average pace of 1.3 percent per year from the 1820s to the 1850s. The explanation for this (very) large difference, according to Adams, was a decline in seasonality (firms were open on a more regular basis at the end of the period) and an increase in hours of work in the 1850s. Some fluctuations in money wages were evident in Adams's series, but these were relatively modest compared to the fluctuations in real wages. To compute real wages, he deflated by the David-Solar (1977) price index (see below). Because this index shows very steep price declines over time, the modest growth in money wages translated into substantial gains in real earnings.

Adams also investigated wage differentials between agriculture and industry, an issue that I consider in chapter 4. The computation of farm-nonfarm wage gaps was complicated by the fact that farm labor received perquisites, like board, but Adams's data were sufficient to place a value on board. Again computing decadal averages, Adams found that the ratio of monthly wages of agricultural and manufacturing labor was about 91 percent in the 1820s and 1830s. The ratio fell to 84 percent in the 1840s, before returning to about 92 percent in the 1860s. Similar evidence of integration was apparent for female labor: the wages of female domestics and female manufacturing operatives were quite similar throughout the period. Given the difficulties of valuing farm perquisites, this evidence suggests that the farm and nonfarm labor markets in the Brandywine region were closely integrated—any deviations from equilibrium (as in the 1840s) were swiftly followed by a return to equilibrium (the 1850s). Because the markets appear to have been well integrated, a substantial shift in labor out of agriculture was accommodated. Efficiency also implies that productivity gains in one sector (in this case, manufacturing) were quickly diffused (in the form of higher wages) throughout the labor force.

Sufficient information was available on the sectoral composition of the Brandywine labor force to compute estimates of aggregate "full-time-equivalent" earnings (assuming a twelve-month workyear). Because there was a slight gap in favor of manufacturing wages over farm wages, intersectoral reallocation of the labor force raised average earnings. About 26 percent of the growth in average annual earnings between the 1820s and the 1850s was due to the shift of labor out of agriculture, the remainder to within-sector growth in earnings. Although it is difficult to make comparisons because there are no per capita income estimates for the Brandywine region, the import of Adams's calculation is that intersectoral reallocation was less important in raising wages than in raising per capita income before the Civil War.

The DuPont (and other) firm records also yield insights into working-class budgets before the Civil War. Using the estimates of the monthly cost of board provided by Adams, I computed the ratio of board to monthly wages of manufacturing workers (male only); this ratio is an estimate of the budget share for food of an adult male. For the 1820s and 1830s, the budget share remained constant at 0.39 (39 percent); it declined slightly in the 1840s (to 38 percent) and then rose in the 1850s (to 42 percent). In fact, combining Adams's estimates of room and board for the 1840s and 1850s, "real" monthly wages (the money wage deflated by the combined cost of room and board) of manufacturing workers fell from the 1840s to the 1850s. But, as Adams (1982, 915) notes, real annual wages in manufacturing rose from the 1840s to the 1850s. As a result, Adams concludes that workers were better off in the 1850s than in the 1840s.

This conclusion, however, does not follow necessarily from the evidence presented in the paper. The reason why real *annual* earnings were higher in the 1850s is that labor spent more time on the job. Unless manufacturing workers were constrained in the 1840s, working less than they wished, labor welfare (defined to be a function of the real monthly wage and annual "leisure"—time not spent working) was lower in the 1850s than in the 1840s.[21]

Adams (1986) tracked prices and wages in Maryland agriculture from 1750 to 1850 drawing on account books. Average annual prices were computed for twelve agricultural commodities, chiefly meats and grains. The account books also yielded an abundant collection of wage quotations. Like the Rothenberg study discussed below, Adams focused primarily on wages for unspecified farm labor, using these to construct nominal wage indices for monthly and daily labor.

Labor hired on a daily basis received a higher wage than the average daily wage paid to labor hired on a monthly basis, a fact that Adams attributes to greater regularity of employment with monthly contracts and to additional nonwage compensation given to workers who were hired monthly. Harvest labor also commanded a premium; in many contracts,

workers reserved the right to hire themselves out on a daily basis on those occasions in which premia could be had (such as the harvest). Female and child labor earned about 60 percent of the daily wage of adult males, with little evidence of a long-term trend. The account books also provide information on the value of board, which appears to have averaged about 50 percent of total expenditure for a typical adult male.

The basic finding is that money wages in Maryland agriculture increased only slightly from the 1820s to the 1850s. If the period is extended to encompass 1800–1850, nominal wages grew at about 0.3 percent per year. Using his agricultural commodity price series as the deflator, Adams computes a real wage index, which is better labeled a *real cost of labor* index (as in Rothenberg 1988). This real wage series registers a decline from the 1820s to the 1850s (and even from the 1800s to the 1850s). As pointed out below in the discussion of Rothenberg (1988), the real wage of farm labor might still have risen if the relative price of nonfarm goods fell in Maryland after 1820.[22] At the very least, however, the failure of real wages to rise (when defined in Adams's terms) suggests little or no productivity growth in Maryland agriculture during the first half of the nineteenth century.

Finally, Adams (1992) used account books to chart prices and wages in the western counties of Virginia from 1790 to 1860. The price series refer solely to basic foodstuffs (imported and locally produced). The "common labor" series reported in the appendix refers solely to agricultural labor (which the text makes clear), although Adams provided decadal averages of money wages for skilled workers in the building trades.

Although West Virginia counties were clearly isolated geographically, changes in the price level evident in the major wholesale markets in seaboard cities (e.g., Philadelphia or New York) matched those in West Virginia. There were, however, significant differences in the level of commodity prices. Food prices were lower in West Virginia than in Northeastern cities—not surprising since, over time, food was being exported from West to East. Consistent with Berry's (1943) evidence on food prices in Cincinnati, prices in West Virginia rose over time relative to prices on the coast, which Adams attributes to declining costs of internal transportation. On the basis of the price evidence, Adams (1992, 207) concludes that "a national commodity market was beginning to develop very early in the nation's history."

For agricultural labor, the daily wage ranged from $0.47 to $0.58 between the 1820s and the 1850s. Money wages actually fell from the 1820s to the 1850s, while food prices rose. Adams defined the real wage of agricultural labor to be the daily (money) wage divided by his price index; using this definition, real wages in West Virginia agriculture fell in the four decades before the Civil War (from an index number of 92.6 in the 1820s to 79.1 in the 1850s). The decline in real wages is consistent with the western

path of internal migration and with commodity price equalization between regions, but Adams does not speculate on the sources of the decline.

Although the decline in real wages suggests little or no agricultural productivity growth in West Virginia before the war, Adams is somewhat cautious in drawing firm conclusions because the price deflator is produced from individual commodity price series by weighting by consumption shares—that is, it is not a producer price index. Later in the paper, however, he shows that prices of locally produced foodstuffs were rising (prices of imported foods were falling), which does suggest a stagnant agricultural economy. Ignoring trends, Adams compares cycles in real wages in West Virginia with his earlier estimates of real agricultural wages in the Brandywine region and Maryland and with the Margo-Villaflor (1987) real wage index for common labor in the Northeast, again finding a good deal of cyclic synchronicity.

Adams was able to measure the secular trend in skill differentials where, as noted above, *skilled* means artisans in the building trades. The level of the skill differential between the 1820s and the 1850s (these are ratios of decadal average wage rates of artisans to those of agricultural laborers) ranged from 2.1 to 2.4. Skill differentials rose in the 1830s, but declined between the 1830s and the 1850s, and were no higher at the end of the 1850s than in the 1820s.

Winifred Rothenberg's (1992) important study of Massachusetts agriculture provided valuable data on farm wages. Rothenberg (1988) used farm account books to examine the development of an agricultural labor market in rural Massachusetts from the mid-eighteenth to the mid-nineteenth centuries. Along the way, she also presented a time series of nominal and real wages. The ninety account books examined in the study covered sixty-five New England towns, 80 percent of which were located in Massachusetts. Rothenberg's goals were two: to date the "emergence" of a market for farm labor and to measure the trend in "real labor cost," from which inferences can be made about movements in labor productivity. The unit of observation was the daily wage by "task"; an example would be mowing and threshing.

By *real labor cost,* Rothenberg meant the money wage of farm labor divided by a (farm-gate) price index of agricultural output (from Rothenberg 1979). Rothenberg estimated a time-series regression of real labor cost on a polynomial time trend. The regression coefficients (and an accompanying figure) suggested rising labor productivity from the 1820s to the 1840s but a decline from the 1840s to the first half of the 1850s. In fact, computation of decadal averages from the annual figures provided in an appendix to Rothenberg (1988) indicates that labor productivity in Massachusetts agriculture in the early 1850s was no higher, on average, than it was during the 1820s.[23] However, the nominal wage was about 31 percent higher in the 1850s than it was in the 1820s. Thus, while agricul-

tural productivity did not rise appreciably in Massachusetts in the four decades before the Civil War, the real wages of agricultural labor arguably did. Such gains in real wages occurred as the relative price of nonfarm products (i.e., relative to farm-gate prices of agricultural goods) declined as a consequence of productivity growth in the nonfarm sector and improved internal transportation (Taylor 1951; Sokoloff 1986b).[24]

The studies reviewed thus far make use of either retrospective surveys or archival evidence but not both. Two important studies have attempted to splice together longer time series drawing on the Weeks or the Aldrich Reports, and various archival series are David and Solar (1977) and Williamson and Lindert (1980).

David and Solar (1977) is a widely cited paper on (very) long-term movements in the wages of unskilled labor. David and Solar attempted to trace these movements from 1774 to 1974, in both nominal and real terms. The primary sources of wage evidence for the antebellum period are Wright (1885), the Weeks Report, Smith (1963), and Lebergott (1964).

The period from 1800 to 1830 is covered by the data compiled by Wright (1885). David and Solar (1977) prefer the Massachusetts data to Adams's (1968) compilation of common laborers' pay for Philadelphia on two grounds: the Massachusetts data stretch back further into the eighteenth century, and they themselves believe that the Massachusetts sample was larger and more diverse geographically.[25] To compute daily wages, they simply averaged the quotations in the Massachusetts report for any particular year.

The period from 1830 to 1860 combines estimates from Lebergott (1964), the Weeks Report, and the Erie Canal series. The 1850 and 1860 figures were benchmarked to Lebergott and thus pertain to national average daily wages of common labor derived from the federal Censuses of Social Statistics.[26] The 1830 and 1840 figures were also benchmarked to Lebergott and thus pertain to the McLane Report and the 1840 census. Lebergott's 1830 figure is actually an average for 1830–32, and David and Solar (1977, 62) simply assume that money wages did not change between 1830 and 1832. From 1832 to 1840, David and Solar interpolated between their benchmark estimates based on geometric averages of wage rates from the Weeks Report compiled by Abbott (1905) and Smith's (1963) figures for the Erie Canal. From 1840 to 1850, and from 1850 to 1860, David and Solar's interpolations were based entirely on the Weeks data. All interpolations were trend corrected—that is, they adjust for the fact that the trend implied by the benchmark figures may have been (and, in fact, was) different from the trend of the interpolating series.

Like their wage index, David and Solar's price index is spliced together from previously available sources. Its method of construction—trend-corrected interpolation between benchmark dates—is also similar. The benchmark dates for the antebellum period derive from Brady (1966).

Because Brady provided no pre-1850 figures on housing costs, David and Solar calculate their own housing price index by geometrically averaging their common labor nominal wage series and the Warren-Pearson (1933) building price index for New York.[27]

The first steps in the construction of the price deflator were to compute index numbers for benchmark dates from Brady's data and to factor the housing price index into the overall price deflator. Next, David and Solar interpolated between benchmark dates using T. M. Adams's (1939) series of prices paid for various goods by Vermont farmers for the period before 1850. For the 1851–60 portion of the antebellum period, David and Solar linked into Hoover's retail price index, which is based on national prices.[28] Thus, the David-Solar price index is a hybrid between a Northeastern (pre-1850) and national (post-1850) price index. Finally, David and Solar produced their real wage index by dividing the money wage index by their price index, setting the base year (the value of the index is set equal to 100) to 1860.

David and Solar performed several econometric analyses of their wage and price series. Over the two centuries covered by the series, the real wage of common labor rose at about 1.55 percent per year; for the period 1774–1860, the rate of growth was somewhat slower (1.23 percent per year). Visual inspection of the real wage series (David and Solar 1977, 28) suggested a decline in volatility after 1820, which David and Solar attributed to an improvement in the quality of the underlying wage data rather than to any fundamental economic change prior to the Civil War (David and Solar 1977, 30). David and Solar also observed cyclic movements in wages, similar in duration to business cycles and also of longer duration (so-called Kuznets cycles [see David and Solar 1977, 32–33]). Finally, they note a strong coincidence in growth rates of labor productivity and real wages over the long term (David and Solar 1977, 38).

Williamson and Lindert (1980) presented a nominal and real wage series for "urban unskilled labor"—something of a misnomer since the evidence underlying the index does not pertain solely to urban areas. Since their primary interest was in the movement of skill differentials, they also present a skilled wage index.[29] The construction of the Williamson-Lindert index is described in Williamson (1975). Later, I scrutinize the Williamson-Lindert indices when comparing them with my own. My purpose here is simply to describe their general construction and attributes, focusing first on the skilled index and then on the unskilled index.

For the 1820s, Williamson relied on Zabler's (1972) skilled wage estimates. For the 1840s, he used the Aldrich Report, locating wage observations that pertained to occupations covered by Zabler's series. Three variant indices were computed: variant A, pertaining to carpenters and furnace keepers; variant B, which adds smiths; and variant C, which adds

millwrights (not found in Zabler's data). Variant A, however, is used in the construction of the final linked series. Lacking suitable data for the 1830s, Williamson interpolated between the 1820s and the 1840s using Smith's (1963) estimates for teamwork even though these refer to an unskilled occupation (teamster). For the 1850s, Williamson constructed his own series from data for six industries from the Aldrich Report, linking it to variant A for the 1840s (the overlap years are 1851–54).

For unskilled labor, Williamson also produced a spliced series of nominal wages. The period 1820–34 was covered by estimates for Vermont farm labor, even though the relevance of the Vermont data to economywide movements in nonfarm common pay may be questioned.[30] For 1835–39, Williamson simply appended Layer's (1955) estimates of operative pay in textiles to the Vermont series.[31] After 1840, the series reverted to Abbott's (1905) compilation of common labor rates from the Aldrich Report, with some minor modifications. Using his nominal wage series, Williamson also computed a real wage index for unskilled labor; the price deflator was constructed from wholesale prices in New York.

A key inference that Williamson and Lindert (1980) derived from the two indices for the antebellum period concerns skill differentials. In particular, their indices suggest that skilled wages grew more rapidly than unskilled wages—the antebellum United States appears to have experienced a surge in wage inequality, assuming that the skilled-unskilled wage gap can serve as a measure of inequality (Williamson and Lindert 1980). Notwithstanding the apparent rise in inequality, common labor gained in real terms before the Civil War, as did, a fortiori, skilled labor.[32] All the growth in real wages occurred in the 1830s and 1840s. The 1850s were a decade of stagnant or declining real wages compared with the 1840s.

2.2 Antebellum Wage Movements: Stylized Facts

In the previous section, I reviewed the principal literature on antebellum wages and prices. In this section, I select three studies and examine their implications for long- and short-run movements, the aim being to establish some stylized facts. For this purpose, I use the studies by Smith (1963), Williamson and Lindert (1980), and David and Solar (1977). For the Erie Canal I report results for common laborers and carpenters, for Williamson and Lindert common laborers and skilled artisans, and for David and Solar common laborers. The time period covered by the Erie Canal regressions is 1828–60, for the other two series 1821–60.

To convert the Erie Canal series into real terms, I divide by Williamson and Lindert's price index (Williamson and Lindert 1980). To convert the Williamson-Lindert and David-Solar nominal wage series into real terms, I use both the Williamson-Lindert and the David-Solar price indices.

Williamson and Lindert's price index is based entirely on wholesale prices in New York City, while, as noted earlier, David and Solar's price index is an attempt to measure retail prices.

Panel A of table 2.1 reports the coefficient of a time trend from regressions of the log of the real wage. All the coefficients are statistically significant at the 1 percent level. For common labor, the growth rates range from 1.2 to 1.9 percent per year, depending on the nominal wage series and the price index. Note that, compared to deflating by the Williamson-Lindert price index, deflating by the David-Solar price index adds 0.24 (in log terms) to the growth rate, or about 0.24 percent per year. Over the forty-year period, this adds about 10 percent to the cumulative growth of real wages—not a trivial sum, but not a substantial one, either.

The trend growth of skilled wages (1.6–2.5 percent per year) exceeded the trend growth of unskilled wages. The difference is not statistically significant in the case of the Erie Canal series but is statistically and economically significant in the case of the Williamson-Lindert series. The difference (0.9 percent per year) forms an important part of the basis for Williamson and Lindert's (1980) contention that a "surge" in skill differentials took place before the Civil War.

The results of the trend regressions suggest that, in the long run, real wages grew from 1820 to 1860 for both skilled and unskilled labor and possibly faster for the former than for the latter. Less consensus is evident, however, on short-run movements. Panel B reports the coefficients of dummy variables for five-year intervals. The left-out dummy variable is 1856–60.

In the case of common labor, the Erie Canal series shows little growth from the late 1820s to the late 1830s. Real wages grow substantially, however, during the early 1840s, an increase that was sustained in the late 1840s. However, little further growth occurred in the 1850s; that is, the 1850s appears to have been a decade of real wage stagnation for common labor, according to the Erie Canal data.

Whether the Williamson-Lindert wage series is deflated by the Williamson-Lindert or the David-Solar price indices, the early 1830s emerges as a period of very rapid real wage growth, in contrast to the Erie Canal series. Growth continued from the early 1830s to the late 1830s; however, the extent of growth is somewhat larger if the David-Solar index is used as the deflator. As in the case of the Erie Canal series, the Williamson-Lindert series suggests that growth occurred in the early 1840s, growth that was then sustained into the late 1840s. The Williamson-Lindert price index implies that real wages of common laborers actually peaked in the late 1840s, while the David-Solar price index suggests that some slight additional growth (about 4 percent) took place during the 1850s. Regardless of the price index, the Williamson-Lindert wage series suggests that

Table 2.1 **Growth Rates of Real Wages, 1821–60**

	A. Average Annual Rates of Growth, Linear Trend ($\ln w = \alpha + \beta T + \varepsilon$)	
	β	t-Statistic
Erie Canal (1828–60):		
Common labor:		
WL	.0136	7.014
DS	.0140	14.097
Carpenters:		
WL	.0158	6.025
DS	.0162	8.054
Williamson-Lindert:		
Common labor:		
WL	.0161	9.809
DS	.0184	13.950
Skilled labor:		
WL	.0252	14.693
DS	.0276	19.172
David-Solar (unskilled):		
WL	.0119	7.523
DS	.0143	10.965

	B. Real Wage Indices by Five-Year Periods (1856–60 = 100)						
	1821–25	1826–30	1831–35	1836–40	1841–45	1846–50	1851–55
Erie Canal (1828–60):							
Common labor:							
WL		72.0	74.2	76.6	101.1	102.6	100.5
DS		66.4	73.4	82.7	85.7	91.3	102.2
Carpenters:							
WL		69.0	71.9	69.1	98.9	97.6	99.9
DS		63.5	71.1	74.5	83.8	86.9	101.7
Williamson-Lindert:							
Common labor:							
WL	60.2	66.0	78.1	80.3	105.4	107.8	96.8
DS	52.6	59.6	77.3	86.5	89.3	96.0	98.4
Skilled labor:							
WL	45.4	52.8	64.1	69.4	93.8	108.4	100.3
DS	39.7	47.7	63.4	74.9	79.6	96.6	102.0
David-Sollar (unskilled):							
WL	70.2	73.1	68.4	82.6	98.7	98.1	94.6
DS	61.4	66.1	67.6	89.0	83.6	87.4	96.3

Source: See text.

Note: WL = Williamson-Lindert price deflator. DS = David-Solar price deflator. T = linear trend.

real growth was slower after 1840 than before and that the decade of the 1850s saw little or no growth.

The David-Solar series differs considerably from the others; in particular, real wage growth appears much more consistent across decades compared with the other indices. According to the David-Solar index, the late 1830s witnessed a spectacular jump in real wages. However, the path followed by real wages in the early 1840s is influenced by the price deflator: if the David-Solar price index is used, real wages fell, but, if the Williamson-Lindert price index is used, they rose. The choice of a price deflator matters in judgments about the 1850s: reasonably robust growth (about 14 percent) between the periods 1846–50 and 1856–60 if the David-Solar index is used but stagnation if the Williamson-Lindert series is used.

The results for artisanal wages resemble those for common wages (allowing for the trend in the skill differential noted above). The Erie Canal series suggests that artisanal wages experienced little growth in the 1830s, a big jump in the early 1840s that was maintained into the late 1840s, and little growth (about 2.5 percent) in the 1850s. According to the Williamson-Lindert series, skilled wages grew substantially from the early 1820s to the late 1830s and again in the early 1840s and late 1840s but actually fell through the 1850s. Comparing the late 1850s to the early 1820s, the skilled index grew by 0.282 (in logs) relative to the unskilled index; fully 49 percent (= 0.139/0.282) of that growth occurred before 1840.

As noted above, the David-Solar real wage index suggests different real wage patterns in certain subperiods than do the other two indices. Although differences in the numerator—nominal wages—play a role (see chap. 3), many of the differences across indices can be traced to certain highly questionable features of the David-Solar price deflator. First, the David-Solar price index shows a much greater decline in the price level from the early 1820s to the early 1830s than do other price indices. This is a consequence of using Vermont prices as the interpolating series; the Vermont series (Adams 1939) shows a much steeper rate of decline than do wholesale prices. Although David and Solar corrected the Adams interpolator for its excessive downward trend relative to Brady's benchmarks, they had no benchmark for the early 1820s. That the Adams interpolator gives too steep a rate of decline is suggested by a regression that David and Solar estimated of their price index against wholesale prices in Philadelphia, which shows a far smaller *predicted* decline in prices from the early 1820s to the early 1830s than the actual David-Solar index.

Second, the David-Solar price index shows a considerably smaller increase in prices from 1834 to 1839 (especially from 1834 to 1836) than do other price indices.[33] Some of this smaller rate of inflation can be traced to Brady's (1966) data and David-Solar's expenditure weights. Brady's data show sharp declines in the prices of coffee and tea (two consumption staples) between 1834 and 1836, declines not present in wholesale price

data. Brady's data also show extraordinary short-run declines in the prices of several clothing items, such as hosiery and buttons. In constructing their price index, David and Solar gave a lower weight to food (39.5 percent) than is customary in nineteenth-century price indices, which tends to dampen price increases in the mid-1830s and hence show larger increases in real wages in the late 1830s than are warranted.[34]

Regarding the 1850s, the basic reason why the David-Solar price index produces an increase in real wages turns on the behavior of the subindices making up Hoover's (1960) price index. The Hoover food price index shows a much smaller increase in food prices after 1851 than do other price indices and virtually no change in clothing prices despite very large increases in the wholesale prices of cotton and leather. The Hoover housing price index, as well, shows virtually no increase in housing prices after 1851, but recent research indicates that rents did rise, at least in the urban Northeast (Margo 1996; see also chap. 3 below). The basic problem, noted by Lebergott (1964), is that the price data in the Weeks Report pertained primarily to company stores and company-owned housing in small towns. Price movements from the late 1840s to the Civil War in Hoover's index (and thus David and Solar's) may be artificially dampened, therefore, leading to too rosy a picture of real wage growth.

In sum, my analysis of the three data series reveals two important stylized facts. First, long-run growth rates were positive over the period 1820–60, ranging from a low of 1.2 to a high of 2.5 percent per year, depending on the series. The best current estimate of the growth rate of per capita income between 1820 and 1860 is 1.2 percent per year (Weiss 1992). Thus, the three data series suggest that real wages grew at least at the rate of per capita income and quite possibly faster—and, a fortiori, faster than output per worker because the aggregate labor force participation rate rose between 1820 and 1860.[35] Second, growth was not continuous; real wages grew more rapidly in some subperiods than in others and may even have declined at certain points.

But the evidential basis on which these stylized facts rest is tenuous. There are differences across the series in trend growth rates and, more important, short-run movements. As noted above, the sources of these differences are both the numerators, the nominal wage indices, and the denominators, the price indices.

Even if the discrepancies could be resolved, there is still the fundamental problem that the wage data pertain to the Northeast. This would not be a problem if the vast majority of workers lived in the Northeast throughout the period or if wage series moved in a similar manner at all locations. But, as discussed in detail in chapter 5, the Northeastern share of the labor force declined sharply between 1820 and 1860. The geographic evidence on wages collected in the pre–Civil War national surveys discussed earlier suggests that wage levels varied across regions (Lebergott

1964). Given the redistribution of population, it would be highly premature to presume that the existing series of real wages are appropriate for other regions or for the nation as a whole. Without series for other regions, it is obviously impossible to investigate the effect of population redistribution on regional wage differences—that is, regional labor market integration (see chap. 5).

Perhaps because they are more sensitive to the frailties of historical evidence, labor historians are much more skeptical than economic historians about the course of real wages before the Civil War. Some of this skepticism concerns issues that I have not directly addressed—such as the "deskilling" of artisanal trades attendant to the decline of the artisanal shop, the use of outwork, the effect of a more intense and regimented workplace through the use of the factory system, and unemployment, among other issues—and that, given the limitations of the available evidence, probably never will be addressed. Still, conventionally defined real wages—such as those discussed above and those newly developed in chapter 3—are relevant to the historical debate. While basing their arguments on a thick web of historical evidence—some quantitative, some not—some historians flatly deny that real wages rose before the Civil War or else emphasize that growth was slow, erratic, and negative at times (Sullivan 1955, 31; Ware 1924, 32; Wilentz 1984, 117, 363; Licht 1995, 68).

The primary contribution of this book is to improve the measurement of the numerator of the real wage index, that is, the measurement of nominal wages. I do this by expanding the existing body of wage evidence for the antebellum period in terms of occupations and location. The locational component of the evidence, in particular, permits me to study issues of labor market integration in chapters 4–6 in ways impossible with previously collected series.

Although the emphasis is on wages, I do make minor contributions to the denominator (prices)—first, by constructing regional price deflators from primary sources (albeit previously collected wholesale price data) and, second, by incorporating some new archival evidence on housing prices (Margo 1996). To expand the body of price evidence for the antebellum period to an analogous degree as I have for nominal wages would have vastly increased the scope of this research project—and, indeed, may ultimately prove an impossible undertaking for any economic historian. Nonetheless, the limitations of the price evidence must always be kept in mind in using the series developed in this book. Improving the existing body of price evidence for the antebellum period remains a priority for future research (see chap. 7).

2.3 New Evidence on Antebellum Wages

Section 2.1 reviewed the existing literature on antebellum wages. Previously constructed series have been based on retrospective data contained in surveys conducted after the Civil War, or in archival records, or in (some combination of) both. The retrospective data are inherently limited in sample size. Archival series, like those for the Erie Canal, are based on large samples but obviously pertain to a single location. The restriction to a single location is not necessarily a limitation—it could be that antebellum labor markets were sufficiently integrated that series for any given location are representative of the entire country. But such an assumption needs to be investigated, not assumed.

In this section, I discuss two new sources of wage evidence developed for this book. The first source consists of payrolls of civilian workers employed at military installations throughout the United States. Compared with other sources of antebellum wage evidence, the payrolls cover a vastly broader array of locations and occupations. The manuscript Census of Social Statistics for 1850 and 1860 is the second source. This source contains even greater detail on wage variations across locations than the payroll sample, albeit for only two points in time; in addition, it contains evidence crucial for constructing location-specific cost-of-living deflators.

2.3.1 *Reports of Persons and Articles Hired*

Civilians were employed at military installations throughout the nineteenth century. The installations most commonly employing civilians were forts, naval yards, and arsenals. Although the original payrolls do not appear to have survived, duplicates were prepared and sent to Washington, where they were used to keep track of expenses and to prepare budgets. These duplicates were eventually filed and stored at the National Archives, in Record Group 92.

By far the most extensive collection of surviving payrolls pertains to civilian employees at forts. As it forged a path for western settlement, and as it sought to protect the coastal seaways, the United States Army built and maintained a large number of posts throughout the United States. The great majority of these posts employed civilians in a wide variety of occupations found in civilian life. Civilians were hired as carpenters, masons, painters, and plasterers and in other building trades; as unskilled laborers; as cooks and teamsters; as inspectors, clerks, and foragemasters; as spies on occasion; and in many other jobs.

The tasks of building, maintaining, and supplying the forts, along with the transportation of troops and supplies, fell to the Quartermaster's Department. At each post, an officer was placed in charge of these tasks. Following the reorganization of the Quartermaster's Department in 1818, post quartermasters were required to maintain payroll records documenting

the hiring and pay of the post's civilian employees, the so-called *Report of Persons and Articles Hired.* The individual in charge of maintaining fort supplies and monitoring civilian employees was called the *quartermaster.*[36] Although there were slight variations, the *Reports* are, by and large, standardized, which greatly simplifies collection of the information contained in them.

In general, the following information was reported for each worker (almost all workers were male): the date and place of hire (i.e., the fort); his money wage, daily or monthly; the number of days worked per month; whether he received army rations and, if so, how many; and his occupation or a description of the task performed. Slaves were employed at forts in the South, and there the worker's legal status (slave or free) was commonly notated. At forts hiring only a small number of workers, the name of each worker might be notated, but the recording of names was not consistent across forts or over time.

The civilian payrolls on which this study relies owe their existence largely to the peacetime army's efforts to tame the wilderness (Prucha 1953). It is fortunate that some forts established during and just after the American Revolution in the Northeast and Middle Atlantic colonies remained in operation well after their usefulness as defense posts against British aggression had ceased—otherwise, I would have little to contribute to the literature on the course of wages on the Eastern Seaboard and urban areas like Philadelphia or New York.

The regular army's role in forging a path for western settlement is well known (Prucha 1969). Forts were built in advance of settlement, serving as entrepôts for trade with Native Americans and as "central places" for burgeoning local economies. Many were located near navigable waterways or early settlements that would eventually become major urban areas. For example, forts were located near New Orleans, St. Louis, Baton Rouge, Pittsburgh, Des Moines, Leavenworth, Kansas, and San Francisco. Some installations were located in exceedingly remote areas and remained inaccessible throughout the period (indeed, to this day).

American antipathy toward a standing army and congressional reluctance to provide the necessary revenues meant that army resources were frequently stretched to the limit. Prospective settlers wanted the army to remove the threat of attack from Native Americans by whatever means necessary—unless the settlers benefited from the whiskey trade or other dubious activities. Congress was reluctant to finance its activities, but it expected that the army would serve as a buffer between settlers and Native Americans, all the while expanding the frontier.

Niggardly congressional support meant that the hard work of operating the forts fell squarely on the shoulders of the soldiers and officers. Men who enlisted were frequently unaware that some portion of their time

would be spent in the sort of manual labor that they may have been trying to escape in civilian life. "I am deceived," wrote one such enlistee in 1838:

> I enlisted for a soldier because I preferred military duty to hard work; I was never given to understand that the implements of agriculture and the mechanic's tools were to be placed in my hands before I had received a musket or drawn a uniform coat. I was never told that I would be called on to make roads, build bridges, quarry stone, burn brick and lime, carry the hod, cut wood, hew timber, construct it into rafts and float it to the garrisons, make shingles, saw plank, build mills, maul rails, drive teams, make hay, herd cattle, build stables, construct barracks, hospitals, etc., etc. . . . I was never given to understand that such duties were customary in the army, much less that I would be called on to perform them, or I never would have enlisted. I enlisted to avoid work, and here I am, compelled to perform three or four times the amount of labor I did before my enlistment. (quoted in Prucha 1969, 169–70)

Perhaps because of the physical burden imposed on the soldiers, posts were constructed that frequently went beyond the purely functional. On visiting Fort Atkinson in 1823, the duke of Wurttemberg commented favorably on the "good-looking, white washed buildings," the spacious administrative quarters, the ample storehouses, and the numerous artisanal facilities. "The American military establishment," he proclaimed, "must be looked upon as a great industrial center, which provides the post with all its requirements even beyond its needs" (quoted in Prucha 1969, 176–77).

At some locations, the soldier's job extended to growing his own food. A War Department directive in 1818 established a field cultivation program in an attempt to see whether forts could become self-sufficient in foodstuffs (Prucha 1969, 181). Soldiers at Fort Atkinson implemented the directive with a vengeance, harvesting over twenty-six thousand bushels of corn in 1823. The opportunity cost of time spent farming was time spent at military training. When Inspector General George Croghan visited Fort Atkinson in 1826, he noted the "barn yards that would not disgrace a Pennsylvania farmer" and "the herds of cattle that would do credit to a Potomac grazier, yet where is the gain in this, either to the soldiers or to the government?" (quoted in Prucha 1969, 182). Croghan's observations notwithstanding, the farming program lasted until 1833; subsequently, it was revived after the Mexican War for frontier locations that were distant from civilian sources of supply.

Inevitably, however, there were important and recurring labor demands for which soldiers could not be spared or the necessary skills could not be found among the troops. In such instances, post quartermasters turned to the civilian labor market (Risch 1962, 211; Prucha 1953, 165–69; Prucha 1969).[37] At many forts, the demand for civilian labor was sporadic and

small, creating many apparent gaps in the records; at others, civilians were routinely hired in large numbers.[38]

A preliminary sampling of the extant payrolls was begun in 1981. This sampling attempted to include every surviving payroll from 1820 to 1844. From 1844, the sampling included every extant payroll where total retrieval was feasible (e.g., forts in large cities in the Northeast) and a selection of reports where total retrieval was too costly. An extract from the preliminary sample formed the basis for earlier estimates of nominal and real daily wages of unskilled laborers, artisans, and clerks by census region from 1820 to 1856 (Margo and Villaflor 1987; Goldin and Margo 1992b). For the purposes of this book, the sampling was carried forward to 1860.

The *Reports* do not exhaust available wage information from military records at the National Archives.[39] Arsenals and naval yards also hired civilians in large numbers, and their payroll records survive. The *Reports,* however, are much easier to collect than these alternative sources, and, except in a few instances, I make no use of arsenal or naval records.[40]

Table 2.2 shows the distribution of the full sample of payrolls drawn from locations in the Northeast, Midwest, and Southern states.[41] Observations are grouped within census region by the state in which the fort was located, decade, and occupational category. The definition of *census region* is the modern one (see, however, below). The full sample is larger than the sample used to produce time series of nominal wage estimates (see chap. 3), but the smaller sample does not differ significantly in its distributional characteristics from the full sample.[42] The unit of observation in table 2.2—and elsewhere when the payroll sample is analyzed—is the "person-month"; that is, each worker appears once for every month he worked. Counting in this manner produces a grand total of 56,190 wage observations.[43] The number of observations per decade is large, except in the 1820s.[44]

It is clear that the geographic coverage of the sample is very wide—far wider than any wage data used in previous studies of the antebellum period. Within the Midwest and South Central states, there is a tendency for frontier locations to be overrepresented compared with the geographic dispersion of population.[45] This is especially true in the Midwest, where locations in the Old Northwest states of Ohio and Michigan are represented by relatively few observations.

For the primary analysis in chapter 3, where I use the payroll sample to generate time series of nominal wages, I rely on the regional categorization of table 2.2. However, a case can be made that Pittsburgh was sufficiently "Midwestern" before the Civil War to include in the Midwest samples (see, e.g., Berry 1943). Chapter 3 also presents wage series for the Northeast and Midwest under this alternative regional definition.

The range of occupations in the sample is exceedingly wide, certainly

Table 2.2 **Distribution of Observations: *Reports* Sample**

	Unskilled		Artisans		White Collar	
	N	Share of Total	*N*	Share of Total	*N*	Share of Total
Northeast:						
1820–30	540	.116	147	.053	404	.132
1831–40	1,037	.222	1,203	.435	951	.311
1841–50	1,226	.262	797	.288	983	.321
1851–60	1,872	.400	619	.224	722	.236
New York City	657	.141	166	.060	637	.208
Upstate New York	445	.095	894	.323	136	.044
Philadelphia	2,650	.567	641	.232	1,071	.350
Carlisle, Pa.	361	.077	422	.153	163	.053
Pittsburgh	303	.065	21	.008	355	.116
Southern New England	156	.033	202	.073	630	.206
Northern New England	102	.022	420	.152	68	.022
Total	4,675		2,766		3,060	
Midwest:						
1820–30	127	.013	169	.026	284	.156
1831–40	1,218	.128	1,285	.197	632	.347
1841–50	1,386	.146	2,107	.323	442	.242
1851–60	6,794	.713	2,967	.454	465	.255
Ohio	42	.004	49	.008	127	.070
Michigan	403	.042	388	.059	380	.208
Iowa-Wisconsin-Minnesota	470	.049	1,272	.195	110	.060
Missouri	1,180	.124	592	.091	831	.456
Kansas	7,394	.776	4,227	.648	375	.206
Total	9,525		6,528		1,823	
South Atlantic:						
1820–30	555	.064	910	.182	334	.115
1831–40	5,134	.590	1,889	.376	1,350	.463
1841–50	2,611	.299	1,749	.348	886	.304
1851–60	409	.047	481	.096	342	.117
Maryland, D.C.	369	.042	449	.089	632	.217
Virginia	1,157	.133	582	.116	330	.113
N. Carolina	61	.007	133	.026	N.A.	N.A.
S. Carolina	408	.047	253	.050	349	.120
Georgia	487	.056	650	.129	265	.091
Florida	6,227	.715	2,962	.593	1,336	.459
Total	8,709		5,029		2,912	
South Central:						
1820–30	316	.049	306	.092	167	.118
1831–40	1,103	.172	1,046	.315	466	.329
1841–50	1,732	.270	1,270	.382	418	.295
1851–60	3,271	.509	700	.211	366	.258
Arkansas	3,051	.475	1,408	.424	359	.253
Kentucky	155	.024	254	.076	35	.025
Tennessee	184	.029	122	.037	46	.032
Alabama-Mississippi	160	.025	144	.043	15	.011
Louisiana	2,878	.448	1,394	.420	962	.679
Total	6,422		3,322		1,417	
Grand total	29,331		17,645		9,214	

Source: See the text. Unit of observation is a person-month.

Note: N.A. = no observations. Florida observations from 1835 to 1842 included in South Atlantic totals (see n. 41 in text).

compared to other sources of antebellum wage evidence.[46] Some of the occupations at the posts were unusual or specific to military activities, such as "Indian guide" or "spy," but the majority were not military specific and could readily be classified as unskilled (e.g., common laborer), artisan (e.g., mason), or white collar (e.g., clerk). Typical occupations of civilian employees at the forts were carpenter, clerk, laborer, mason, painter, and teamster, occupations that were also extremely common elsewhere in the antebellum economy.[47]

2.3.2 Censuses of Social Statistics, 1850 and 1860

In 1850, 1860, and—for the final time—1870, the federal government conducted a Census of Social Statistics whose purpose was to supplement the information collected on population, manufacturing, and agriculture. Data were canvased on aggregate wealth, the number and type of churches, the number of libraries, the extent of pauperism, and several other variables, including agricultural yields.[48] In addition, census marshals were instructed to collect information on the average monthly wage of farm laborers, with board; the average daily wage of nonfarm laborers, with board; the average daily wage of nonfarm laborers, without board; the average weekly wage of female domestics, with board; and the average weekly cost of board to "laboring men."

The instructions to the marshals specified that the social statistics were to be collected for civil subdivisions of counties "as far as practicable" and that information was "not to be ascertained entirely by personal inquiry of individuals, but in part from public records and reports, and public offices of towns, counties, states, or other sources of information" (DeBow 1853, xxiv). While "public records" may have been sufficient to determine the number of libraries or the number of individuals receiving poor relief, it is highly doubtful that such records would provide the necessary wage evidence, and it is reasonable to assume that marshals obtained the great bulk of quotations from "personal inquiry of individuals."[49]

State averages of wages from the social statistics were published in the 1850 and 1860 censuses, and these have long been deemed reliable—and relied on—by economic historians (Lebergott 1964). However, microfilms of the census manuscripts for a number of states are available at the National Archives or from various state archives. For the purposes of this study, I retrieved and computerized the information on wages and the cost of board from the census manuscripts for the states shown in table 2.3. The number of observations given for each state indicate the number of minor civil divisions; later, when I analyze the data (e.g., in chap. 4), I aggregate to the county level. While these states do not constitute a random sample of all states, it is clear that coverage is geographically wide.

I use the census manuscript data for two purposes. The first use (see

Table 2.3 **Distribution of Observations: Census of Social Statistics Sample**

	1850		1860	
	MCDs	Counties	MCDs	Counties
Alabama	54	43	63	47
Delaware	20	3	24	3
Florida	23	23	34	32
Georgia	89	88	130	113
Iowa	62	35	375	92
Illinois			540	100
Kentucky	141	97	115	104
Kansas			63	22
Louisiana	52	43	60	46
Massachusetts	311	14	334	14
Michigan	302	33	289	58
North Carolina	98	76	113	84
Pennsylvania	1,137	63	1,465	65
South Carolina	46	29	42	27
Tennessee	157	76	97	74
Texas	65	60	117	108
Virginia	151	130	165	141
Washington			17	17
Total	2,708	813	4,043	1,147

Source: Manuscript census schedules, 1850 and 1860 federal Census of Social Statistics; see the text.

Note: MCD = minor civil division. County = number of counties for which wage observations exist, after aggregating MCD observations to county averages.

below) is as a check on the reliability of the *Reports* sample. This involves matching forts with locations in the census to determine whether the pay of civilian workers in the army systematically deviated from pay in the local labor market.

Second, I use an eight-state sample drawn from the larger sample to study various aspects of labor market integration (see chaps. 4 and 5). In the eight-state sample, there are two states per census region—Northeast (Massachusetts and Pennsylvania), Midwest (Iowa and Michigan), South Atlantic (Virginia and North Carolina), and South Central (Kentucky and Tennessee). I use the eight-state sample for studies of labor market integration because it is more regionally balanced in terms of sample size than the full sample of states listed in table 2.3.

In addition to the data on wages and board, the data on poor relief were also collected. These have been used to study the correlates of the antebellum "welfare explosion" of the 1850s (see Kiesling and Margo 1997; and chap. 7 below).

2.4 Comparing the *Reports* with the Census

By themselves, wages paid to the army's civilian employees are of little inherent interest—except perhaps to a few military historians. What makes the *Reports* sample of such potential value is that the data cover locations and occupations for which little or no wage information was previously available for the antebellum period. But whether the data constitute *information* in this sense depends on whether the wages paid by the army reflected wages paid for comparable work performed for purely civilian employers.

Generally speaking, the tasks the army demanded of its civilian employees do not appear to have been unusual compared with the tasks demanded in the occupation in the civilian economy. Carpenters were hired to build and maintain forts. On the basis of descriptions of the buildings and surviving drawings, it appears that the construction of barracks, supply houses, and so on was not fundamentally different than the construction of similar buildings in the civilian economy. Masonry, painting, and plastering were the same as in civilian life. Army horses required the same amount of attention from teamsters as civilian horses. Clerks and other white-collar workers assisted officers in maintaining records, obtaining provisions, managing stores—just as their counterparts in civilian enterprises did.[50]

Even if the work were comparable, the wages might not have been. Wages at the forts might have deviated from those in the civilian economy by being systematically different in level at some point in time, or they might have deviated over time, either in the short or in the long run.

To investigate biases in the *Reports* sample, I compare wages at a fort with wages paid in the civilian economy surrounding the fort for the same occupation. Such comparisons are necessarily limited in temporal or geographic scope—if they were not, there would have been no need to collect the *Reports* sample in the first place.

One set of comparisons that can be made is between the Erie Canal and forts in upstate New York. These comparisons are shown in panel A of table 2.4. Shown are the sample mean, mode, and range of wages observed, by occupation, at upstate New York forts between 1838 and 1843, along with modal wages at the canal.

The correspondence between the two sets of data is excellent. Although it might be surprising if the modes matched exactly in the comparisons, they do match in five cases. More to the point, the modal wage on the canal falls within the range observed at the forts (except in one case). Clearly, forts in upstate New York were not paying daily wage rates out of line with wages of similar workers hired on the canal.

Additional comparisons can be made using the manuscript Censuses of Social Statistics. These are necessarily limited to 1850 and 1860, but the

Table 2.4 **Comparisons with *Reports* Sample**

A. With Erie Canal, Daily Wage Rates, 1838–43

	New York Forts				Erie Canal
	N	Mean ($)	Mode ($)	Range ($)	Mode ($)
Common laborers and teamsters:					
1838	31	.85	.75	.75–1.00	.90
1839	44	.93	1.00	.75–1.00	1.00
1840	26	.77	.75	.75–.88	.88
1841	71	.86	.90	.50–1.25	.88
1842	71	.81	.88	.75–.88	.88
1843	13	.75	.75	.65–.88	.75
Carpenters:					
1838	299	1.49	1.50	.75–1.75	1.25
1839	89	1.51	1.50	1.25–1.75	1.50
1840	115	1.47	1.50	1.25–1.75	1.50
1841	116	1.45	1.63	.75–2.00	1.50
1842	78	1.34	1.38	1.00–1.75	1.50
1843	23	1.45	1.50	1.00–1.50	1.25
Masons:					
1840	60	1.72	1.75	1.38–1.75	1.75
1841	109	1.41	1.50	1.20–1.81	1.75
1842	4	1.35	1.35	1.35–1.35	1.50
1843	9	1.40	1.38	1.38–1.50	1.25

B. With Censuses of Social Statistics (CSS), 1850 and 1860

	Reports			Census		
	N	Mean ($)	Mode ($)	Mean ($)	Mode ($)	Range ($)
Common laborers:						
Philadelphia, 1850	39	1.00	1.00	.98	1.00	.75–1.12
Philadelphia, 1860	190	1.25	1.25	1.16	1.25	.96–1.25
Pittsburgh, 1860	12	.96[a]	.96	.98	1.00	.84–1.00
Norfolk, 1850	10	1.00	1.00	1.00	1.00	.75–1.00
Charleston, 1860	9	1.25	1.25	1.13	[b]	1.00–1.25
New Orleans, 1850	37	1.50	1.50	1.57	1.50	1.50–1.75
New Orleans, 1860	61	2.00	2.00	1.95	[b]	1.50–2.50
Baton Rouge, 1860	15	1.25	1.00	1.00	1.00	1.25–1.25
Fort Atkinson, Kans., 1860	21	1.12	1.25	1.50	1.50	1.50–1.50
Leavenworth, Kans., 1860	165	1.15[a]	1.15	1.25	1.25	1.25–1.25
Carpenters:						
Philadelphia, 1850	1	1.25	1.25	1.39	1.50	1.00–1.75
Philadelphia, 1860	60	1.54[a]	1.54	1.59	1.50	1.25–2.25
Norfolk, 1850	12	1.50	1.50	1.57	[b]	1.38–1.75
New Orleans, 1850	14	2.45	2.50	2.36	2.50	2.00–2.75
Baton Rouge, 1850	36	2.26	2.25	2.75	[b]	2.50–3.00
Baton Rouge, 1860	27	2.19	2.25	3.00	[b]	3.00–3.00
Leavenworth, Kans., 1860	8	1.92[a]	1.92	2.00	2.00	2.00–2.00

(*continued*)

Table 2.4 (continued)

	C. Wage Growth, 1850–60			
	Northeast	Midwest	South Atlantic	South Central
Common labor:				
Reports	.148	.223	.258	.258
CSS	.135	.221	.211	.320
Artisans:				
Reports	.237	.260	.251	.218
CSS	.160	.222	.225	.235

Note: Figures are log (wage 1860/wage 1850). CSS: computed from published 1850 and 1860 Censuses of Social Statistics; see the text and chap. 3. *Reports:* using 1850 CSS benchmarks (see chap. 3) and 1860 values of nominal wage indices (see the text and chap. 3).

[a]Daily wage estimated by dividing monthly wage by twenty-six days per month of work.

[b]Mode not unique.

geographic scope of the comparisons is wider than that of those in panel A. Comparisons with the census are shown in panel B of table 2.4. In the case of the census, *mean, mode,* and *range* refer to statistics computed for the county in which the fort was located. As in the case of the Erie Canal, the correspondence is extremely close—there is no evidence that the army paid wages (to common laborers or carpenters) that were atypical of the county in which the fort was located.

A final comparison concerns change over time. In chapter 3, I use the census data to compute benchmark estimates of nominal daily wages of common and artisanal labor in 1850, while the *Reports* sample is used to compute annual nominal wage indices. Multiplying the 1850 benchmarks by the 1860 index numbers generates a set of wage estimates for 1860, which can be compared with values from the 1860 Census of Social Statistics. As can be seen in panel C of table 2.4, the *Reports* sample (properly analyzed; see chap. 3) generates wage growth between 1850 and 1860 that generally matches up with that implied by the census data.

In sum, it would appear that, in terms of compensating its civilian employees, the army simply paid the going wage in the local labor market.[51] While this suggests that the army data approximate competitively determined wages, it does not follow that, for example, simple averages accurately measure wage levels or changes in the payrolls. An appropriate analysis of the *Reports* sample requires the estimation of so-called hedonic wage indices, the subject of chapter 3.

2.5 Conclusion

This chapter has summarized the available literature on antebellum wages. While existing bodies of wage evidence suggest that real wages were

rising in the long run, there were also periods of stagnation and decline. However, existing data are very limited in terms of geographic and occupational coverage. The chapter concluded with the presentation of two new bodies of archival evidence that provide much scope for further measurement of antebellum wage levels and changes over time.