

Appendix. Historical Price and Wage Indices

Frequently, a common denominator, or index, is needed to evaluate the real value of wages, benefits, and expenditures over the last 200 years, or so, of the history examined in this volume. This appendix contains a measure of consumer prices back to the eighteenth century, and it contains a brief history of incomes and wages in the United States. We also present a measure to easily convert historical dollar amounts to current purchasing power equivalence. We have constructed a cost-of-living index to allow the reader to make comparisons in real and nominal terms. “Multiplicative factors” for each year are provided so that one can convert nominal values to inflation adjusted or “real” values. These factors are shown in Appendix Table 1 for each year from 1720 through 2000. An example of the use of the factors is provided.

For example, we estimated that the mean annual nominal military pension in 1866 was \$121.92 (Table 8.8). In Appendix Table 1, the multiplicative factor for December 1866 is 9.07. The product of the nominal amount and the factor, \$121.92 times 9.07, is \$1,105.81. This amount is the estimated 1866 pension as measured in purchasing power equivalence as of December 1999 (the date at which the multiplicative factor is equal to 1.0). In this fashion, any nominal amount can be converted into purchasing power equivalence for a common recent date.

Historical Cost of Living Measures in America, 1720–2000

The figures in Appendix Table 1 are derived from an index of consumer prices estimated by Wilson (2000). Although the Bureau of Labor Statistics Consumer Price Index (CPI) series is available, we have constructed an index that has a standard definition over the period and is more consistent than the “official” BLS series. The BLS changes definitions and procedures

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APPENDIX TABLE 1. Multiplicative Factors (K) for Conversion of Household Dollar Amounts at Any Year-End for United States Purchasing Power Equivalence to the Year 2000, for December of the Year Indicated, 1720-2000

Year	K	Year	K	Year	K	Year	K	Year	K	Year	K
1720	25.5	1770	18.4	1820	12.8	1870	11.5	1920	7.9	1970	3.9
1721	25.5	1771	18.8	1821	12.6	1871	12.0	1921	8.8	1971	3.8
1722	23.8	1772	18.6	1822	13.1	1872	11.8	1922	9.1	1972	3.6
1723	22.8	1773	19.0	1823	14.4	1873	12.5	1923	8.7	1973	3.4
1724	22.3	1774	19.2	1824	15.2	1874	13.0	1924	8.7	1974	3.0
1725	21.7	1775	19.4	1825	14.5	1875	13.4	1925	8.3	1975	2.8
1726	21.7	1776	15.0	1826	14.7	1876	13.5	1926	8.5	1976	2.7
1727	22.5	1777	10.5	1827	15.1	1877	14.3	1927	8.7	1977	2.5
1728	23.3	1778	11.8	1828	15.3	1878	15.0	1928	8.8	1978	2.4
1729	23.1	1779	11.1	1829	15.9	1879	14.0	1929	8.8	1979	2.1
1730	25.5	1780	12.1	1830	16.3	1880	14.6	1930	9.5	1980	1.9
1731	27.3	1781	12.9	1831	16.8	1881	14.0	1931	10.7	1981	1.8
1732	27.9	1782	12.2	1832	17.2	1882	14.1	1932	11.9	1982	1.7
1733	27.1	1783	13.9	1833	17.1	1883	14.7	1933	11.5	1983	1.6
1734	27.0	1784	14.5	1834	17.1	1884	15.1	1934	11.1	1984	1.6
1735	28.4	1785	15.1	1835	16.0	1885	15.3	1935	10.6	1985	1.5
1736	28.1	1786	15.5	1836	15.8	1886	15.4	1936	10.4	1986	1.5
1737	26.2	1787	16.0	1837	15.8	1887	15.3	1937	10.1	1987	1.4
1738	28.5	1788	16.7	1838	15.3	1888	15.5	1938	10.5	1988	1.4
1739	26.3	1789	16.3	1839	16.3	1889	16.1	1939	10.5	1989	1.3
1740	22.5	1790	15.7	1840	16.9	1890	15.7	1940	10.4	1990	1.3
1741	20.6	1791	15.4	1841	16.9	1891	16.4	1941	9.5	1991	1.2
1742	23.0	1792	14.9	1842	19.2	1892	15.7	1942	8.7	1992	1.2
1743	27.0	1793	14.3	1843	19.5	1893	17.0	1943	8.4	1993	1.2
1744	28.3	1794	12.5	1844	19.6	1894	17.3	1944	8.3	1994	1.1
1745	28.0	1795	11.2	1845	18.7	1895	17.2	1945	8.2	1995	1.1
1746	26.0	1796	11.1	1846	18.6	1896	17.6	1946	6.9	1996	1.1
1747	22.8	1797	11.9	1847	17.9	1897	17.3	1947	6.3	1997	1.1

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APPENDIX TABLE 1. *Continued*

1748	21.5	1798	11.8	1848	19.0	1898	18.0	1948	6.2	1998	1.1
1749	22.1	1799	11.8	1849	18.9	1899	17.0	1949	6.3	1999	1.0
1750	21.8	1800	11.5	1850	18.6	1900	17.5	1950	5.9	2000	.
1751	21.4	1801	12.2	1851	19.5	1901	17.2	1951	5.6		
1752	21.7	1802	13.4	1852	18.6	1902	16.4	1952	5.6		
1753	22.6	1803	12.7	1853	17.9	1903	16.6	1953	5.5		
1754	23.5	1804	12.2	1854	17.2	1904	16.4	1954	5.6		
1755	23.2	1805	12.2	1855	17.0	1905	16.5	1955	5.5		
1756	23.5	1806	12.2	1856	17.0	1906	16.0	1956	5.4		
1757	20.6	1807	12.2	1857	17.6	1907	15.8	1957	5.2		
1758	19.4	1808	11.6	1858	17.5	1908	16.0	1958	5.1		
1759	19.1	1809	12.0	1859	17.8	1909	15.3	1959	5.1		
1760	19.6	1810	11.3	1860	17.0	1910	15.6	1960	5.0		
1761	20.3	1811	11.5	1861	17.0	1911	15.2	1961	5.0		
1762	19.0	1812	9.9	1862	13.4	1912	14.8	1962	4.9		
1763	20.5	1813	8.5	1863	11.3	1913	14.5	1963	4.8		
1764	20.7	1814	8.7	1864	8.2	1914	14.4	1964	4.8		
1765	19.4	1815	9.7	1865	9.2	1915	14.1	1965	4.7		
1766	18.9	1816	10.7	1866	9.3	1916	12.6	1966	4.6		
1767	20.1	1817	11.4	1867	10.1	1917	10.6	1967	4.4		
1768	20.0	1818	11.2	1868	10.5	1918	8.8	1968	4.3		
1769	18.9	1819	12.1	1869	10.9	1919	7.7	1969	4.1		

Source: Wilson (2000) with textual explanation attached.

For any year take an amount of \$100, for instance in 1776. That \$100 in 1776 has a purchasing power equivalence in terms of the year 2000 of (15) (\$100) or \$1,500. A transaction of \$100 in 1860 is equivalent in purchasing power of the year 2000 of \$1,700. For a more modern example, a \$100 transaction in 1974 is equivalent to a \$300 transaction in the year 2000 purchasing power.

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every decade or so, but BLS does not typically revise its indices backward based on the new definitions. An “X-CPI” index was back-estimated with monthly data at the time of the revision in 1987, and was available for research purposes from the BLS, but it was never published. Similarly, for the definitional changes to the index in 1998, monthly back-estimates were made for the period December 1977 through December 1998 (Stewart and Reed 1999). This series has been given the name of “CPI-U-RS,” which stands for “CPI research series for urban consumers using current BLS methods.” This series has been continued further through December 2000, and will probably be continued on an annual basis into the future. We have incorporated these reestimates because they are on a consistent definitional basis, and provide a better estimate of the changes in the cost of living over time than the BLS “official” historical record. However, since these revised data are based on “current methods,” they too will probably be revised into the future, and hence there is no “final” index that can be considered a permanent record of the cost of living. Given this situation, we have chosen to use the best data available at the time of completion of our study, which are the data through December 2000.

Some researchers have used a “wholesale” or “producers” price index for deflation of such series. We have compared the movements of our consumer index with wholesale indices, and the two series have quite different characteristics. The wholesale price index, which measures the price of raw materials and semi-finished inputs, is considerably more volatile than the consumer price index, and it does not seem the appropriate measure of the “value of the dollar” or “purchasing power” for these purposes. For the modern period in the United States, the Producer’s Price Index has exhibited much lower inflation than for the Consumer Price Index. As an example, from December 1950 through December 2000, the Producer Price Index had a total inflation of 365.67 percent, or 3.124 percent per annum compounded. The “official” Consumer Price Index had a total inflation of 610.67 percent, or 4.000 percent per annum. Therefore, given the different characteristics of the level of inflation and the volatility of price movements, it is desirable to have a consistently defined measure, and preferably one that reflects household expenditures. Another difference between historical measures of producer and consumer prices is their availability. For almost the complete period, monthly estimates of producer prices are available, but for the period prior to 1913, only annual estimates of consumer prices are available. Therefore we used the richer information from the various monthly producer price index (PPI) estimates in our methodology of generating monthly household cost of living (CPI) estimates.

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Review of Historical Consumer and Producer Price Index Measures

The major components that have been used in estimating our annual CPI index from 1720 are as follows:

1720–1850. Estimates of the cost of living for this very early period are speculative at best, and the distinction between a price index for consumers and households versus a price index for producer's prices is much less distinct. However, researchers have been able to compile estimates of the prices of basic commodities. We have relied primarily on the work of Brady (1964), David and Solar (1977), who carry household price estimates back to 1774, and McCusker (1992), who carries prices back to 1720, as the basic sources for estimated annual data for this period. Their sources are varied, and in some cases are limited to a particular geographical area. Some specific examples include the Pennsylvania wholesale prices by Bezanson, Gray, and Hussey (1935, 1936, 1951); D. R. Adams's (1968) price and wage data for Philadelphia; wholesale price data from 1720 to 1800 for New York compiled by Warren, Pearson, and Stoker (1932); and T. M. Adams's (1939) household price data for Vermont.

1850–1914. There are many estimates of the cost of living for portions of this period. Most estimates for the early part of the period are based in whole or in part from the data of Weeks (1886) from the Tenth (U.S.) Census, and from Aldrich in Senate reports (1892, 1893). The federal government reports of both Weeks and Aldrich were based on survey data that had been collected from vendors. The chronological order of the later studies proceeds from Mitchell (1908), with an annual index for 1860–80, Hansen (1925) for the period 1820–1923, Douglas (1930) for 1890–1926, Burgess (1920) for 1841–1920, Hoover (1960) for 1850–90, Long (1960) for 1880–90, Rees (1961) for 1890–1914, and Lebergott (1964) for 1860–80. A basic flaw in the indexes of Mitchell, Hansen, Douglas, and Burgess was the exclusion of shelter costs. Our final series for this period was constructed using Hoover for 1850–59, Lebergott for 1860–80, Long for 1881–89, and Rees for 1890–1914. An annual index back to 1774 constructed by David and Solar (1977) uses essentially the same sources for this particular period. For the Civil War and the early postwar period, any estimates of the cost of living are tenuous. The geographical coverage of estimates was the Union states, and this was further complicated by the presence of and changes in the purchasing power of greenbacks relative to gold. The price index data assembled for the later part of this period, 1871–1914, are similar to that used by Wilson and Jones (1987), except that Lebergott's estimate for 1860–80 is substituted for Hoover's data.

1915–1946. Regular surveys of prices paid by households and charged by vendors was initiated by both the Bureau of Labor Statistics (BLS) and by the National Industrial Conference Board (NICB). The NICB did annual

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surveys beginning in 1914, twice a year in 1918, quarterly from 1919 through 1925, and monthly from 1926 through 1947 (see Beney 1936; Sayre 1948; and NICB 1927, 1928, 1930, and 1931). The BLS surveys were not as frequent or regular as those of the NICB, yet the BLS monthly data extend back to 1913, while the NICB monthly estimates go back only to 1920. The NICB surveys covered a larger number of cities, a greater number of goods and services, and a broader population base and measured shelter costs on a rental equivalent basis, whereas the BLS measured the cost of purchasing a home, including mortgage interest. It is difficult to determine which source borrowed how much from the other for the early part of the period. Both consumer price index measures relied on the monthly food prices that were collected by the Department of Agriculture—a process that began in 1909 and extended back annually until 1890. The BLS maintained a rather constant set of expenditure weights, whereas the NICB changed the weights and the index base with every new publication of their historical index. Because of the broader coverage by the NICB and their treatment of shelter costs, we use the NICB series for most of this period, as did Hamilton (1992) and Cecchetti (1992). In order to correct for the ever-changing NICB budget weights, we recorded the indexes for the major expenditure categories over this period and reestimated the overall index using BLS budget weights. We use the BLS data for 1915–20, and the NICB reestimate for the period 1921–46. Since this was a period of declining and or relatively stable prices until 1942, and since price controls were in effect from 1942–46, there is little difference in the two series.

1947–1978. By this time the BLS was conducting regular monthly surveys over a wide geographical area and publishing high-quality index estimates on a regular basis. In the late 1970s, when interest rates on mortgage loans began to reach extraordinarily high levels, the official CPI became suspect because of the method of measuring shelter costs as the purchase price instead of as the rental equivalence. These problems are detailed and summarized by Blinder (1980) and by Dougherty and Whiteman (1982), and the problems involved double counting and an excessive weight to mortgage interest. When the BLS shifted the base from 1967=100 to 1982–1984=100, the definition of shelter costs was changed to rental equivalence instead of the purchase price. The BLS published internally a reestimate of the monthly CPI, called the X-CPI, back to 1967 using the new budget weights (1983), but this was never incorporated into the historical series. The monthly indices back to 1947 rely on the new definition, and this index has been used by, among others, Huizinga and Mishkin (1984) and Mishkin (1991). We have obtained these data from Mishkin, and use these revised data for this period. There is a considerable difference between the two estimates. For example, the published BLS CPI increased by 316.52 percent from December 1947 through December 1982, or at 4.16 percent per annum over the 35 years. The recent “research series” consumer

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price index by the Bureau of Labor Statistics initiates their CPI-U-RS as of December 1977. Another example of the differences in these inflation measures is provided from December 1982 through December 2000, with the increase in the “official” CPI being 78.28 percent, or 3.36 percent per annum, whereas for the “research series” measure the total inflation was 70.16 percent, or 3.00 percent per annum. The X-CPI measure increased by 277.50 percent or at 3.87 percent per annum. One of the highest rates of inflation measured by the “official” CPI in the post-World War II period was in 1979. In 1979 the official inflation rate was 13.31 percent, whereas the CPI-U-RS measured the inflation rate as 10.83 percent. As shown by these examples, on average, the BLS official CPI has overestimated inflation, but this is not the case for every single year. For instance, in 1971 the BLS inflation rate was 3.36 percent relative to the X-CPI measure of 3.53 percent. We have used the X-CPI and the CPI-U-RS versions of inflation over this period because they represent an improvement over the original BLS series, and the new definitions more closely match the NICB series that we have used from 1921 through 1946, especially with the definition of shelter costs.

1978–1998. A revised version of the index (with a base of 1977=100) of consumer prices “research series,” labeled CPI-U-RS, from the BLS, by Stewart and Reed (1999) for the period 1978–98 is spliced into current estimates of the official BLS CPI levels, and inflation rates have been calculated from these data.

1998–2000. The data for the CPI-U-RS, being updated currently on an annual basis are extended through December 2000, with some additional minor monthly revisions of the series back into the 1978–98 period. None of the price indexes that we have used are seasonally adjusted.

Use of the Monthly Producer Price Index to Derive Estimates of Consumer Prices

A monthly consumer price index was formed using Warren-Pearson estimates of the WPI from January 1850, spliced to CPI in October 1913 (Warren, Pearson, and Stoker 1932). The monthly PPI values were averaged for each calendar year and paired with the annual estimates of the ‘cost of living’ index. This showed much greater volatility over the period 1850–1915 for the PPI monthly series. However, the general movements were in the same direction over the period. The averaged annual prices were compared further with the PPI series of Hanes (1998), which had been calculated from 1860 based on constant definitions for the period. This series matched closely with the original Warren and Pearson estimates. A straightforward splice showed that the monthly volatility of the WPI up to the splice date was greater than the monthly volatility of the CPI from 1913. The PPI series was smoothed by a centered five-month moving average,

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which didn't affect the PPI series greatly in terms of the level of the values, but provided a less volatile series. This experiment suggested that these results could be extended back to the beginning of the Warren-Pearson-Stoker data, with Stoker's "Part II" of the book, extending the estimates from New York back from 1800 to 1720.

With the monthly producer price index (PPI) data, a mean calendar year PPI was calculated from the 12 monthly values for each year. Then, for each year, the ratio of the monthly value to the mean PPI was calculated. These ratios were then multiplied by the annual average CPI estimates to provide estimates with the monthly pattern of the PPI. The resulting tentative CPI estimates had to be smoothed in order to eliminate all of the discontinuities between adjacent years. The smoothing was done on the basis of a centered 11-month moving average, with each target month combined with five monthly values led and five monthly values lagged. The smoothing of the data over the pre-1913 period resulted in variance differences between the CPI and PPI changes that were very similar to the actual variance differences of the monthly PPI and CPI changes for the post-1913 data.

On the basis of the monthly CPI on the 1982–84=100 base that had been estimated back to 1720, the base was shifted to December 1999=100, with this index being inverted, yielding a multiplicative factor with December 1999=1.0. The values for the December factors are those provided in Appendix Table 1. From 1720 through 1940, the cost of living measure was relatively flat on average, with consumer prices moving up rather sharply during wartime, such as in 1776–82, 1812–15, 1862–66, and 1916–20, then settling back down to pre-war levels in each case. However, during World War II prices were frozen, as well as wages, and following that war, the greatest inflation in this 280-year period took place, and may still be continuing. The inflation during this period is reflected in the comparison of inflation of the PPI and CPI shown above from 1950–2000.

Wages and Earnings for Military Personnel and Government Employees, 1785–1939

Wages and earnings in America have generally fluctuated around a long-run positive trend, but wages and earnings generally show less volatility than that of the cost of living measure detailed above. Over this time period, average income of Americans has shown a steady increase, reflecting the improvement in the standard of living. As with the level of the prices of goods and services, our predecessor colleagues have done extensive research in documenting historical wages and salaries, which, adjusted by the cost of living, offers standard measures of the pace of improvements in the standards of living.

Examples of nominal wage and earnings levels over this 150-year period are provided in the tables below, along with the CPI factors needed for

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comparing “inflation-adjusted” or “real” earnings in earlier years with present day earnings. A basic rationale for including wages for active labor force participants is to compare those levels with the pension compensation levels discussed in earlier chapters and documented in the tables.

Since public pensions in the United States began with the post- Revolution military, it might be instructive to begin with a benchmark in 1797. Relative to equipping three new navy frigates, estimates for their operation costs are shown in Appendix Table 2. These detailed estimates are based on the number of officers and seamen by specialty, totaling over 1,000 men. The number of men by category is shown in the first column. The column to the right of the specialist category presents an estimate of the monthly money wage of each person. This is followed by columns of per annum costs, number of daily rations (at \$0.28 each, or about \$8.40 per month), and the total annual cost for wages and rations. In comparisons of wages and earnings of seamen with other occupations, the considerations of rations are important.

Relative earnings of officers to seamen are also available for comparison. Petty officers, seamen, and the like are grouped together as earning, on average, about \$15 per month. Captains’ earnings are about five times

APPENDIX TABLE 2. Wages for Equipping New U.S. Navy Frigates, 1797

No.	Pay for officers and crew	Per month each	Per year total ^a	Rations per day	Total 12-month rations ^b
3	Captains	\$75	\$2,700	6	6,570
11	Lieutenants	40	5,280	3	12,045
5	Marine lieutenants	30	1,800	2	3,650
2	Chaplins	40	960	2	1,460
3	Surgeons	50	1,800	2	2,190
5	Surgeon’s mates	30	1,800	2	3,650
3	Sailing masters	40	1,440	2	2,190
3	Pursers	40	1,440	2	2,190
3	Gunners	20	720	2	2,190
3	Boatswains	20	720	2	2,190
3	Sailmakers	20	720	2	2,190
3	Carpenters	20	720	2	2,190
994	Petty officers, seamen, ordinary seamen, and marines	15+	180,000	1	362,810
Total			\$200,100		405,515

Source: *American State Papers*, Finance (1934) 1: Report no. 123, Fifth Congress, Second Session, Military and Navy Expenditures, 1798, p. 550. The three frigates under construction (United States, Constitution, and Constellation) being fitted for duty are costed out, including personnel operating costs.

Subsistence of 405,515 rations at 28 cents per ration is \$113,544.20 per year. Total cost, pay plus rations, equals \$313,644.20 per year.

^a The total per month times 12, times the number of persons of that rank or specialty.

^b The total per day times 365.

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those of seamen, with a “ration” ratio of six to one. Narrower wage differentials exist in the extreme range of skill levels between captains and seamen, like those of lieutenants, surgeons, boatswains, and so forth.

In any calculation of probabilities for possible pension liabilities, the division of the population of the navy by earnings level is relevant. The simple numbers of seamen to captains is approximately 333 to one, lieutenants to captains three to one, and chaplains to captains less than unity. Probabilities of disability among these categories is another consideration in determining potential liability. However, we have found no evidence that any such calculations were ever done relative to such liabilities.

Turning to the “real” values, the CPI multiplicative factor for 1797 is 11.51 (from Appendix Table 1). The monthly wage of a captain of \$75 in 1797, plus the approximate monthly money value of six daily rations over the month of \$50 ($6 \times \0.28×30) is equal to \$125 per month. This monthly income, in December 1999 purchasing power, would be equivalent to approximately \$1,438.75, or at an annual rate of \$17,265. For a seaman with approximately \$15 in money monthly wages, plus \$8.40 in rations at one per day during the month, the total monthly money earnings would be \$23.40. In terms of 1999 purchasing power, this would be equivalent to about \$269.33 per month, or \$3,232 per annum. Though rations were important in determining compensation, they never seemed relevant in deciding of the amount of pensions to be awarded, which seemed to be always a percentage of wages.

A view of money wages over the time period 1785–1830 provides information as to the trend of compensation for the period. With the CPI adjustment factors, it is possible to assess the course of living standards of skilled and unskilled craftsmen. Adams (1968), using original sources of payments to construction workers, provides hourly money wages for various skilled workmen. These data are shown in Appendix Table 3. Over this 45-year period, money wages seem quite stable. Simple linear trend estimates show that the average annual increase in daily wages ranged between 0.7 cents to 1.0 cents per year. The cost of living fluctuated over the period, as the CPI multiplicative factors decreased from 14.72 in 1785 to 8.31 in 1813, then moved back up to 15.86 in 1830, suggesting little overall change in purchasing power or in inflation-adjusted earnings.

Appendix Table 4 provides some evidence of monthly money wages over the period 1800–75 for able-bodied seamen. Again, the level of money wages seems remarkably stable. The money wages for seamen of the U.S. navy are similar to those in 1797 shown in Appendix Table 2, net of rations. Over the period, the cost of living as shown by the CPI multiplicative factors in Appendix Table 1 indicate levels of 11.16 in 1800 and 13.02 in 1875. This represents an increase of 0.20 percent per annum in the factors. The cost of living, though, had some pronounced peaks, especially during the War of 1812 and during the Civil War, then settling down toward a rather normal level.

APPENDIX TABLE 3. Daily Money Wage of Ship Carpenters, Joiners, Riggers, House Carpenters, and Common Laborers in Philadelphia, along with the CPI Multiplicative Factors, 1785–1830

<i>Year</i>	<i>Ship carpenter</i>	<i>Joiner</i>	<i>Rigger</i>	<i>House carpenter</i>	<i>Common laborer</i>	<i>CPI factor</i>
1785	\$1.33	\$1.33	\$1.33	\$1.11	\$.665	15.1
1786	1.00	—	1.00	1.00	—	15.5
1787	1.00	1.00	1.00	1.00	.53	16.0
1788	.93	—	.93	.93	—	16.7
1789	—	—	—	1.00	.50	16.3
1790	1.06	1.00	—	1.065	.50	15.7
1791	1.16	1.00	—	—	.53	15.4
1792	1.20	—	—	—	.66	14.9
1793	1.50	1.25	—	—	.80	14.3
1794	1.86	1.50	—	1.065	1.00	12.5
1795	2.00	1.66	—	—	1.00	11.2
1796	2.13	1.66	—	1.385	1.00	11.1
1797	2.00	1.66	—	—	1.00	11.9
1798	2.00	1.66	—	—	1.00	11.8
1799	2.00	1.66	—	1.33	1.00	11.8
1800	2.00	1.66	—	1.33	1.00	11.5
1801	2.00	1.66	—	1.33	1.00	12.2
1802	1.50	1.66	—	1.00	.75	13.4
1803	1.75	1.50	1.81	1.25	.75	12.7
1804	2.00	1.50	2.12	1.00	1.00	12.2
1805	2.12	1.66	—	1.00	1.00	12.2
1806	2.00	1.50	—	—	1.00	12.2
1807	2.00	1.50	2.00	—	1.00	12.2
1808	—	1.67	—	1.50	.75	11.6
1809	—	1.67	—	1.50	1.00	12.0
1810	—	—	—	—	1.00	11.3
1811	2.00	1.67	2.00	—	1.00	11.5
1812	1.50	1.67	1.50	1.50	1.00	9.9
1813	—	—	—	1.25	1.00	8.5
1814	—	1.75	—	1.50	1.00	8.7
1815	2.00	1.75	2.00	2.00	1.00	9.7
1816	2.00	2.00	2.00	1.75	1.00	10.7
1817	—	—	—	1.75	1.00	11.4
1818	2.00	1.75	2.00	1.75	1.00	11.2
1819	—	—	—	1.25	1.00	12.1
1820	1.50	1.62	1.50	1.50	—	12.8
1821	1.10	1.50	1.10	—	.75	12.6
1822	1.75	1.50	1.75	1.25	.75	13.1
1823	1.50	1.50	1.50	1.25	1.00	14.4
1824	1.75	1.50	1.75	1.50	1.00	15.2
1825	2.00	—	2.00	1.25	1.00	14.5
1826	1.75	1.50	1.75	1.25	1.00	14.7
1827	—	—	—	1.25	1.00	15.1
1828	1.50	1.75	2.00	1.25	1.00	15.3
1829	—	1.62	1.80	—	1.00	15.9
1830	1.50	1.50	1.50	—	1.00	16.3

Source: Adams (1968), App. tables 1, 2, and 3, pp. 418–20.

In some cases a range was provided, in which case the lower of the bounds was recorded.

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Appendix Table 5 shows estimates of annual money salaries of government employees for the years 1900 through 1939. These employees are categorized by federal and state/local, and further by major occupational categories. The purpose of including these employees is to support the argument in Chapter 8 as the idea of retirement pensions expands from the military to state and municipal government police and fire departments, to teachers, and to federal employees. This period includes the First World War, followed by the Great Depression, with volatility of the cost of living in the postwar period and thereafter, and depressed price levels during the depression.

Nominal annual money salaries of government employees roughly doubled or tripled, depending on which category one considers, over this 40-year period. The cost of living as measured by the CPI multiplicative factors moved from a value of 16.99 in 1900 to 10.24 in 1939. This 40 percent decrease in the CPI factor over the period translates to a 1.3 percent per annum deflation rate. Taking the salaries of those in public education as an example, the nominal annual salary increased from \$345 in 1900 to \$1,403 in 1939. The total percentage increase in money salary was four-fold, a total increase of 306.67 percent, or 3.67 percent per annum compound. Using the CPI multiplicative factors to convert to 1999 purchasing power, the salary would have been \$5,861.55 (which is the result of \$345 times 16.99) in 1900 and \$14,366.72 (the product of \$1,403 x 10.5) in 1939. In terms of constant purchasing power the total increase would have been 145 percent, or 2.33 percent per annum compound. These increases are more dramatic than for the other employment categories shown in Appendix Table 5, but show an increase in living standards that was not evident for the 1785–1875 period, as shown above and in Appendix Tables 3 and 4.

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APPENDIX TABLE 4. Monthly Money Wages of Able Bodied Seamen, 1800–1875, with CPI Multiplicative Factors

<i>Year</i>	<i>Coastal/ Europe</i>	<i>China/ Pacific</i>	<i>U.S. navy</i>	<i>From San Francisco</i>	<i>CPI factor</i>
1800	\$20	\$19	—	—	11.5
1801	17	17	—	—	12.2
1802	15	14	\$12	—	13.4
1803	18	17	10	—	12.7
1804	20	—	12	—	12.2
1805	20	—	—	—	12.2
1806	—	—	—	—	12.2
1807	20	—	—	—	12.2
1808	—	—	—	—	11.6
1809	—	—	—	—	12.0
1810	19	—	—	—	11.3
1811	20	—	—	—	11.5
1812	—	—	12	—	9.9
1813	—	—	—	—	8.5
1814	—	—	—	—	8.7
1815	—	—	16	—	9.7
1816	13	—	—	—	10.7
1817	11	—	—	—	11.4
1818	12	—	—	—	11.2
1819	12	—	—	—	12.1
1820	10	—	—	—	12.8
1821	11	—	—	—	12.6
1822	12	—	—	—	13.1
1823	12	—	—	—	14.4
1824	12	—	—	—	15.2
1825	13	—	—	—	14.5
1826	14	—	—	—	14.7
1827	14	—	—	—	15.1
1828	—	—	—	—	15.3
1829	—	—	—	—	15.9
1830	13	—	12	—	16.3
1831	14	—	—	—	16.8
1832	14	—	—	—	17.2
1833	13	—	—	—	17.1
1834	13	—	—	—	17.1
1835	—	—	—	—	16.0
1836	15	—	—	—	15.0
1837	14	—	—	—	15.8
1838	14	—	—	—	15.3
1839	14	—	—	—	16.3

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APPENDIX TABLE 4. *Continued*

<i>Year</i>	<i>Coastal/ Europe</i>	<i>China/ Pacific</i>	<i>US navy</i>	<i>From San Francisco</i>	<i>CPI factor</i>
1840	14	—	12	—	16.9
1841	14	—	—	—	16.9
1842	13	—	—	—	19.2
1843	13	—	—	—	19.5
1844	14	—	—	—	19.6
1845	14	—	—	—	18.7
1846	14	—	—	—	18.6
1847	15	—	—	—	17.9
1848	15	—	—	—	19.0
1849	—	—	—	—	18.9
1850	15	—	12	—	18.6
1851	15	—	—	—	19.5
1852	15	—	—	—	18.6
1853	15	—	—	—	17.9
1854	15	—	—	\$30	17.2
1855	\$15	—	—	—	17.0
1856	—	—	—	—	17.0
1857	15	—	—	\$15	17.6
1858	—	—	—	—	17.5
1859	—	—	—	—	17.8
1860	—	—	\$15	20	17.0
1861	—	—	—	20	17.0
1862	—	—	—	—	13.4
1863	—	—	—	20	11.3
1864	—	—	—	20	8.2
1865	—	—	—	20	9.2
1866	—	—	—	30	9.3
1867	—	—	—	—	10.1
1868	—	—	—	—	10.5
1869	18	—	—	25	10.9
1870	—	—	—	—	11.5
1871	—	—	—	—	12.0
1872	—	—	—	32	11.8
1873	—	—	—	—	12.5
1874	—	—	—	25	13.0
1875	—	—	—	25	13.4

Source: Lebergott (1964) table A-21, p. 530.

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APPENDIX TABLE 5. Average Annual Money Earnings of Government Employees in the U. S., All Employees and by Major Categories, 1900–1939, with CPI Multiplicative Factors

<i>Year</i>	<i>All</i>	<i>State/ local</i>	<i>Public education</i>	<i>Federal civilian</i>	<i>CPI factor</i>
1900	\$584	\$590	\$345	\$940	17.5
1901	572	605	354	974	17.2
1902	584	612	364	967	16.4
1903	602	621	377	1,009	16.6
1904	614	640	397	971	16.4
1905	628	646	412	976	16.5
1906	651	664	430	999	16.0
1907	675	694	453	1,014	15.8
1908	683	695	479	1,001	16.0
1909	710	696	501	1,071	15.3
1910	725	699	518	1,096	15.6
1911	739	712	535	1,113	15.2
1912	757	724	556	1,140	14.8
1913	788	779	575	1,169	14.5
1914	798	788	593	1,197	14.4
1915	753	804	608	1,224	14.1
1916	844	826	636	1,273	12.6
1917	880	832	682	1,318	10.6
1918	1,023	902	725	1,415	8.8
1919	1,156	1,022	852	1,609	7.7
1920	1,245	1,164	970	1,707	7.9
1921	1,317	1,296	1,109	1,683	8.8
1922	1,358	1,316	1,206	1,694	9.1
1923	1,378	1,336	1,239	1,704	8.7
1924	1,400	1,346	1,269	1,747	8.7
1925	1,425	1,377	1,299	1,762	8.3
1926	1,482	1,422	1,342	1,888	8.5
1927	1,531	1,488	1,393	1,907	8.7
1928	1,550	1,500	1,433	1,916	8.8
1929	1,551	1,549	1,445	1,916	8.8
1930	1,553	1,576	1,455	1,836	9.5
1931	1,547	1,541	1,463	1,904	10.7
1932	1,477	1,479	1,399	1,807	11.9
1933	1,328	1,413	1,300	1,625	11.5
1934	1,284	1,391	1,265	1,677	11.1
1935	1,292	1,425	1,293	1,768	10.6
1936	1,279	1,457	1,329	1,885	10.4
1937	1,355	1,493	1,367	1,818	10.1
1938	1,336	1,517	1,406	1,823	10.5
1939	1,337	1,530	1,403	1,873	10.5

Source: Lebergott (1964), Table A-18, p. 526.