



Afterword to Part III

12.1 RELATIONSHIP TO MEASURINGWORTH

MeasuringWorth is a historical website created and headed by Samuel H. Williamson. Sam graciously asked me to be co-founder of the site and to serve as Director of Research, which I did for several years. Under that rubric I developed a deep and sustained interest in long-term economic series. Some of the data series in Part III are available on MeasuringWorth in updated format.

12.2 TERMS OF TRADE (CHAPTER 9)

In reviewing Officer (2021), Devereux (2022) states:

Take the external terms of trade. Officer covers commodity and service trade for the entire period, where most work in economic history is for commodity trade. He improves deflators and replaces the fixed weight price indices with a more appropriate deflator. The result is that we now have an external terms of trade series for the U.S. from 1790 to now that is superior to the estimates for other developed economies.

Devereux's most-serious criticism is that "some of the most important series appear only as diagrams—including the external terms of trade and the various price series." In listing the terms of trade and related series, Table 9.1 provides a partial response.

12.3 VALUE OF CONSUMER BUNDLE

In Officer (2007b) I develop three related U.S. series: value of the consumer bundle (VCB), number of consumer units (CU), and average size of the consumer unit (SZ) annually for 1900–2004. VCB is average annual expenditures per consumer unit. A consumer unit, the entity that makes expenditures decisions, is different from a household. One household is the entirety of persons who occupy a housing unit. There can be more than one consumer unit in a household, and there can be consumer units in a non-household setting, namely, non-institutional “group quarters.” So the number of consumer units exceeds the number of households. Table 12.1 presents the series “value of the consumer bundle” (VCB) and “number of consumer units” (CU).

Size of a consumer unit is the number of persons that constitute the unit. Average size of the consumer unit (SZ) is 3.5 1900–1902, 3.4 1903–1917, 3.3 1918, 3.4 1919–1921, 3.3 1922–1933, 3.2 1934–1938, 3.3 1939–1941, 3.2 1942–1962, 3.1 1963–1966, 3.0 1967–1970, 2.9 1971–1974, 2.8 1975–1978, 2.7 1979–1982, 2.6 1983–1991, 2.5 1992–2004.

VCB is denominated in current dollars. To serve as a measure of standard of living over time, VCB needs to be adjusted, performed in Sect. 11.1.2.

One would think that “consumer unit,” which by definition is the decision-making unit for expenditures, would be the preferred entity for economic analysis. However, “household,” the body of people who occupy a dwelling unit, remains the primary concept for historical research. Consider the monumental work of Robert J. Gordon (2016, p. 36), who computes “average household consumption” [AHC] as \$983 in 1870. That figure is too high relative to \$733 for VCB in 1900 (the earliest year of the series). How can that be explained?

Gordon (2016, pp. 36; 673, note 1) estimates current-dollar per-capita GDP in a roundabout way, adopts a consumption/GDP ratio of 0.76, and applies a five-person average household, resulting in the \$983 figure. What is VCB for 1870? Consider a four-step process.

First, recompute AHC for 1870, retaining Gordon’s methodology but using a direct source for per-capita GDP: Louis Johnston and Samuel H. Williamson (2021). The result is \$744.¹ This figure is personal consumption expenditures [PCE] divided by number of households.

Table 12.1 Value of consumer bundle and number of consumer units

<i>Year</i>	<i>VCB (dollars per consumer unit)</i>	<i>CU (thousands)</i>	<i>Year</i>	<i>VCB (dollars per consumer unit)</i>	<i>CU (thousands)</i>
1900	733	21,214	1953	4287	49,715
1901	779	21,703	1954	4394	50,176
1902	819	22,212	1955	4688	50,969
1903	837	22,744	1956	4853	51,878
1904	854	23,299	1957	5074	52,532
1905	894	23,859	1958	5193	53,217
1906	941	24,460	1959	5501	54,061
1907	972	25,076	1960	5632	55,306
1908	945	25,648	1961	5632	55,306
1909	1018	26,229	1962	5800	56,753
1910	1055	26,820	1963	6014	57,517
1911	1039	27,257	1964	6320	58,655
1912	1090	27,713	1965	6623	60,203
1913	1116	28,255	1966	6994	61,444
1914	1121	28,765	1967	7220	62,553
1915	1076	29,147	1968	7675	64,416
1916	1243	29,568	1969	8087	66,112
1917	1498	29,955	1970	8463	67,603
1918	1667	30,117	1971	8939	69,145
1919	1878	30,455	1972	9512	71,220
1920	1969	31,063	1973	9512	71,220
1921	1588	31,804	1974	10,147	72,740
1922	1677	32,451	1975	11,006	73,914
1923	1817	33,149	1976	11,925	75,566
1924	1802	33,883	1977	12,960	76,749
1925	1922	34,570	1978	14,072	78,534
1926	1988	35,215	1979	15,363	79,737
1927	1959	35,827	1980	16,184	83,052
1928	1999	36,396	1981	16,988	84,249
1929	2046	36,927	1982	17,480	85,742
1930	1828	37,411	1983	19,043	87,564
1931	1570	37,703	1984	21,975	90,223
1932	1255	37,872	1985	23,490	91,564
1933	1172	38,263	1986	23,866	94,044
1934	1295	38,814	1987	24,414	94,150
1935	1385	39,458	1988	25,892	94,862

(continued)

Table 12.1 (continued)

<i>Year</i>	<i>VCB (dollars per consumer unit)</i>	<i>CU (thousands)</i>	<i>Year</i>	<i>VCB (dollars per consumer unit)</i>	<i>CU (thousands)</i>
1936	1385	39,458	1989	27,810	95,818
1937	1498	39,391	1990	28,381	96,968
1938	1452	39,256	1991	29,614	97,918
1939	1526	39,235	1992	29,846	100,019
1940	1626	39,203	1993	30,692	100,049
1941	1834	39,287	1994	31,731	102,210
1942	1950	39,853	1995	32,264	103,123
1943	2074	40,289	1996	33,797	104,212
1944	2193	40,615	1997	34,819	105,576
1945	2401	41,047	1998	35,535	107,182
1946	3051	41,955	1999	36,995	108,465
1947	3419	42,729	2000	38,045	109,367
1948	3597	44,185	2001	39,518	110,339
1949	3553	45,858	2002	40,677	112,108
1950	3740	47,247	2003	40,817	115,356
1951	3938	48,243	2004	43,395	116,282
1952	4084	48,988			

Second, correct AHC so the numerator pertains only to the consumer-unit universe. The technique is to multiply AHC by the share of consumer units (population in households *plus* group-quarters residents) in total resident population (PHGQ/POP, in *Adjustment of PCE for consumer-unit universe*, in Officer 2007b, Sect. 5). The data exist for Census years, including 1870.² The multiplicative factor is 0.96, the same as for the year 1900, reducing the figure to \$715.

Third, estimate the number of consumer units. The technique “to complete the CU series” in Officer (2007b, Sect. 4), was selected there because the developed synthetic series (SCU) is available annually; but there is a serious question of reliability as one proceeds further into the past. A preferred extrapolator, PHGQ (per note 2), can be employed here, because Census data are all that are required. CU in 1870 is estimated as the 1870/1900 PHGQ ratio *times* CU in 1900, with result 11,166 thousand.

Fourth, adjust the corrected AHC so the denominator is the number of consumer units rather than the number of households. With the number of households in 1870 at 7471.754 thousand (Ruggles 2006, Table Ae-A, 1950–1970 definition), the corrective multiplicative factor is $7471.754/11,166$, about two-thirds, whence estimated VCB in 1870 is \$478.

Conclusion: The Gordon figure for average household consumption in 1870 is *more than double* the VCB for that year! In general, with the number of consumer units exceeding the number of households, average household consumption is an overestimate of the consumer expenditures of decision-making units.

12.4 CONSUMER PRICE INDEX (CHAPTER 10)

In Officer (2007a) I generate a new U.S. long-run consumer price index (CPI) that is an improvement over alternatives, the most-important of which is the *Historical Statistics* series, presented in Lindert and Sutch (2006). The new series is better in several respects. First, it utilizes a neglected but impressive series of Paul H. Douglas (1930) for the 1914–1917 period. Second, it links component series for conceptual consistency and superior reliability. Third, it embodies enhanced computational accuracy and avoids rounding error. Various tests in Officer (2007a, pp. 141, 145–146) are indicative of the superiority of the new series over the *Historical Statistics* equivalent.

The new CPI series is shown in Table 12.2. This CPI series pertains to the *domestic U.S. population*; it is distinguished from the CPI series in Sect. 10.1, which applies to *foreign travelers in the United States*.

The new CPI improves the official consumer price index, but only within a narrow statistical framework. There are biases (and other limitations) of the CPI that remain in both the official and improved series. For discussion of the biases, one can consult Brent R. Moulton (1996) and David E. Lebow and Jeremy B. Rudd (2003). For the historical political context of the CPI, one may read Thomas A. Stapleford (2009), the subject of the book review in Sect. 10.2. The VCB and (improved) CPI interact in Chapter 11.

Table 12.2 New CPI series

<i>Year</i>	<i>CPI</i>	<i>Year</i>	<i>CPI</i>
1774	7.82	1890	8.82
1775	7.41	1891	8.82
1776	8.46	1892	8.82
1777	10.31	1893	8.72
1778	13.38	1894	8.34
1779	11.84	1895	8.14
1780	13.29	1896	8.14
1781	10.72	1897	8.04
1782	11.76	1898	8.04
1783	10.31	1899	8.04
1784	9.91	1900	8.14
1785	9.43	1901	8.24
1786	9.19	1902	8.34
1787	9.02	1903	8.53
1788	8.62	1904	8.63
1789	8.54	1905	8.53
1790	8.86	1906	8.72
1791	9.10	1907	9.11
1792	9.27	1908	8.92
1793	9.59	1909	8.82
1794	10.64	1910	9.21
1795	12.17	1911	9.21
1796	12.81	1912	9.40
1797	12.33	1913	9.60
1798	11.92	1914	9.69
1799	11.92	1915	9.74
1800	12.17	1916	10.64
1801	12.33	1917	12.82
1802	10.39	1918	15.06
1803	10.96	1919	17.30
1804	11.44	1920	20.04
1805	11.36	1921	17.90
1806	11.84	1922	16.77
1807	11.20	1923	17.07
1808	12.17	1924	17.10
1809	11.92	1925	17.53
1810	11.92	1926	17.70
1811	12.73	1927	17.37
1812	12.89	1928	17.13
1813	15.47	1929	17.13

(continued)

Table 12.2
(continued)

<i>Year</i>	<i>CPI</i>	<i>Year</i>	<i>CPI</i>
1814	17.00	1930	16.70
1815	14.91	1931	15.23
1816	13.62	1932	13.66
1817	12.89	1933	12.96
1818	12.33	1934	13.39
1819	12.33	1935	13.73
1820	11.36	1936	13.86
1821	10.96	1937	14.36
1822	11.36	1938	14.09
1823	10.15	1939	13.89
1824	9.35	1940	14.03
1825	9.59	1941	14.73
1826	9.59	1942	16.30
1827	9.67	1943	17.30
1828	9.19	1944	17.60
1829	9.02	1945	18.00
1830	8.94	1946	19.54
1831	8.38	1947	22.34
1832	8.30	1948	24.08
1833	8.14	1949	23.85
1834	8.30	1950	24.08
1835	8.54	1951	25.98
1836	9.02	1952	26.55
1837	9.27	1953	26.75
1838	9.02	1954	26.88
1839	9.02	1955	26.78
1840	8.38	1956	27.18
1841	8.46	1957	28.15
1842	7.90	1958	28.92
1843	7.17	1959	29.16
1844	7.25	1960	29.62
1845	7.33	1961	29.92
1846	7.41	1962	30.26
1847	7.98	1963	30.62
1848	7.65	1964	31.03
1849	7.41	1965	31.56
1850	7.57	1966	32.46
1851	7.41	1967	33.40
1852	7.49	1968	34.80
1853	7.49	1969	36.67

(continued)

Table 12.2
(continued)

<i>Year</i>	<i>CPI</i>	<i>Year</i>	<i>CPI</i>
1854	8.14	1970	38.84
1855	8.38	1971	40.51
1856	8.22	1972	41.85
1857	8.46	1973	44.45
1858	7.98	1974	49.33
1859	8.06	1975	53.84
1860	8.06	1976	56.94
1861	8.54	1977	60.61
1862	9.75	1978	65.22
1863	12.17	1979	72.57
1864	15.23	1980	82.38
1865	15.79	1981	90.93
1866	15.39	1982	96.50
1867	14.34	1983	99.60
1868	13.78	1984	103.90
1869	13.21	1985	107.60
1870	12.65	1986	109.60
1871	11.84	1987	113.60
1872	11.84	1988	118.30
1873	11.60	1989	124.00
1874	11.04	1990	130.70
1875	10.64	1991	136.20
1876	10.39	1992	140.30
1877	10.15	1993	144.50
1878	9.67	1994	148.20
1879	9.67	1995	152.40
1880	9.91	1996	156.90
1881	9.91	1997	160.50
1882	9.91	1998	163.00
1883	9.71	1999	166.60
1884	9.51	2000	172.20
1885	9.32	2001	177.10
1886	9.12	2002	179.90
1887	9.22	2003	184.00
1888	9.22	2004	188.90
1889	8.92	2005	195.30

12.5 COMPENSATION OF MANUFACTURING WORKERS (CHAPTER II)

12.5.1 *Reception*

I was flattered by the comment of Robert E. Hall in the back cover of *Two Centuries of Compensation for U.S. Production Workers in Manufacturing* (Officer 2009): “Highly valuable to scholars interested in quantitative economic history...An intellectual triumph.” Subsequently, Joshua L. Rosenbloom (2009) begins and ends his review of (Officer 2009) as follows:

I suspect that few people will be tempted to read this slim volume cover to cover. But many of them will find it an extremely valuable reference to which they will return numerous times...Anyone with an interest in the long-run growth of the U.S. economy, or the development of American labor markets will find this book an important and useful reference.”

12.5.2 *Data Series*

Rosenbloom (2009) makes the following observations on the book’s concluding chapter (which is Chapter 11 of the present work).

Readers who are interested primarily in the bottom line will want to skip directly to the concluding chapter of this volume, in which the author presents his estimates of average hourly compensation and its components, average hourly earnings, and average hourly benefits in both nominal and real terms. The story that these series tell is in one sense not that surprising. Since 1800, there have been huge increases in nominal compensation; although some of this increase is due to changes in the cost-of-living, real compensation has nonetheless increased dramatically in the last 200 years. The series reported here indicate that average hourly compensation adjusted for inflation increased from \$0.33 in 1800 to \$12.09 in 2006 (both measured in 1982-84 prices), a nearly 37-fold increase. Growth was somewhat slower in the nineteenth century, and accelerated after 1900, but the series then leveled off in the 1980s, and remained essentially flat until the early 2000s.

While the broad outlines of Officer’s series are consistent with other sources, the shorter run movements of average hourly compensation differ from those of a number of real wage series available over shorter periods. In particular, it appears that average hourly compensation grew faster

than wage series constructed by other scholars for most of the nineteenth century.

John Pencavel (2011, p. 566) observes that my real hourly compensation series (AHCR) “suggests a rise in real hourly compensation between 1890 and 1914 of 36.4%, a figure between Douglas’ and Rees’ but closer to Rees.” He finds that the lower growth in real hourly compensation compared to Rees results from lower growth in nominal compensation (AHC) rather than higher growth in my CPI.

Gordon (2016, p. 279) uses data of Albert Rees (1961) to state: “By 1914 [from 1870], the average nominal manufacturing wage had increased by 30 percent from seventeen cents per hour to twenty-two cents per hour.” Consistent with Rosenbloom’s rather than Pencavel’s comment, my series shows a growth of 45%.

NOTES

1. The product of Johnston-Williamson per-capita GDP (\$195.76), the Gordon consumption/GDP ratio (0.76), and Gordon’s household size (five).
2. Population in households (PH) in Susan Brower and Steven Ruggles (2006, series Ae85), group-quarters residents (GQ) in Steven Ruggles (2006, p. 1–654, Table Ae-A, 1950–1970 definition), resident population (POP) in Michael R. Haines and Richard Sutch (2006, series Aa9). PHGQ = PH + GQ.

REFERENCES

- Brower, Susan, and Steven Ruggles (2006). “Population in Households, by Household Size: 1790–1990.” In Carter, Susan B., and others eds., *Historical Statistics of the United States, Millennial Edition*, p. 1-668. Cambridge: Cambridge University Press.
- Devereux, John (2022). Review of Lawrence H. Officer, *A New Balance of Payments for the United States, 1790–1919: International Movement of Free and Enslaved People, Funds, Goods and Services*. Eh.Net Book Review.
- Douglas, Paul H. (1930). *Real Wages in the United States, 1890–1926*. Boston: Houghton.
- Gordon, Robert J. (2016). *The Rise and Fall of American Growth*. Princeton, NJ: Princeton University Press.

- Haines, Michael R., and Richard Sutch (2006). “National Population and the Demographic Components of Change: 1790–2000 [Annual Estimates].” In Carter, Susan B., and others eds., *Historical Statistics of the United States, Millennial Edition*, pp. 1-30 to 34. Cambridge: Cambridge University Press.
- Johnston, Louis, and Samuel H. Williamson (2021). “What Was the U.S. GDP Then?” MeasuringWorth.com.
- Lebow, David E., and Jeremy B. Rudd (2003). “Measurement Error in the Consumer Price Index: Where Do We Stand?” *Journal of Economic Literature* 41 (March), pp. 159–201.
- Lindert, Peter H., and Richard Sutch (2006). “Consumer Price Indexes, for all Items: 1774–2003.” In Carter, Susan B., and others eds., *Historical Statistics of the United States, Millennial Edition*, pp. 3-158 to 159. Cambridge: Cambridge University Press.
- Moulton, Brent R. (1996). “Bias in the Consumer Price Index: What Is the Evidence?” *Journal of Economic Literature* 10 (Fall), pp. 159–177.
- Officer, Lawrence H. (2007a). “An Improved Long-Run Consumer Price Index for the United States.” *Historical Methods* 40 (Summer), pp. 135–147.
- _____ (2007b). “Value of the Consumer Bundle: A Data-Series Set.” *Journal of Economic Studies* 34 (No. 3), pp. 160–178.
- _____ (2009). *Two Centuries of Compensation for U.S. Production Workers in Manufacturing*. New York: Palgrave Macmillan.
- _____ (2021). *A New Balance of Payments for the United States, 1790–1919: International Movement of Free and Enslaved People, Funds, Goods and Services*. Palgrave Macmillan.
- Pencavel, John (2011). “Real Wage Index Numbers.” *American Economic Review* 101 (May), pp. 565–570.
- Rees, Albert (1961). *Real Wages in Manufacturing, 1890–1914*. Princeton: Princeton University Press.
- Rosenbloom, Joshua L. (2009). Review of Lawrence H. Officer, *Two Centuries of Compensation for U.S. Production Workers in Manufacturing*. EH.Net.
- Ruggles, Steven (2006). “Family and Household Composition.” In Carter, Susan B., and others eds., *Historical Statistics of the United States, Millennial Edition*, pp. 1-653 to 659. Cambridge: Cambridge University Press.
- Stapleford, Thomas A. (2009). *The Cost of Living in America: A Political History of Economic Statistics, 1880–2000*. New York: Cambridge University Press.