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CHAPTER 5

Real Wages

THIS chapter deals with our estimates of real wages, i.e. the money-wage series of Chapter 3 divided by the cost-of-living index of Chapter 4. Table 44 and Chart 8 present our series for real wages for

TABLE 44

Real Earnings in All Manufacturing, 1890–1914

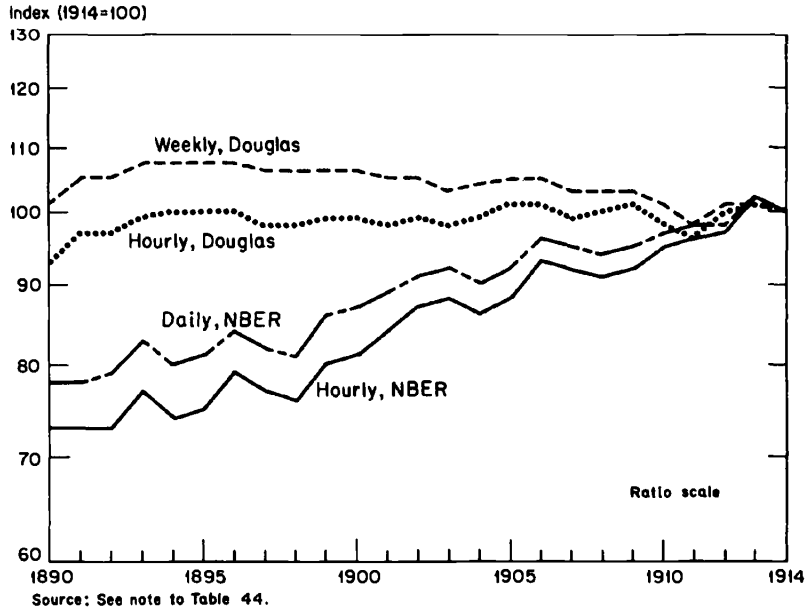
	REAL EARNINGS, NBER (1914 DOLLARS)		INDEXES OF REAL EARNINGS (1914=100)			
			NBER		*Douglas*	
	Hourly	Daily	Hourly	Daily	Hourly	Weekly
1890	$0.158	$1.58	72	77	93	101
1891	0.158	1.58	72	77	97	105
1892	0.160	1.60	72	78	97	105
1893	0.168	1.68	76	82	99	107
1894	0.162	1.61	74	79	100	107
1895	0.165	1.64	75	80	100	107
1896	0.172	1.72	78	84	100	107
1897	0.168	1.67	76	82	98	106
1898	0.166	1.66	75	81	98	106
1899	0.176	1.75	80	86	99	106
1900	0.179	1.77	81	87	99	106
1901	0.185	1.82	84	89	98	105
1902	0.191	1.87	87	91	99	105
1903	0.193	1.88	88	92	98	103
1904	0.190	1.84	86	90	99	104
1905	0.194	1.88	88	92	101	105
1906	0.204	1.96	93	96	101	105
1907	0.203	1.95	92	95	99	103
1908	0.201	1.92	91	94	100	103
1909	0.203	1.94	92	95	101	103
1910	0.209	1.99	95	97	98	101
1911	0.213	2.01	96	98	96	98
1912	0.213	2.00	97	98	100	101
1913	0.224	2.09	102	102	101	101
1914	0.220	2.04	100	100	100	100

SOURCE: Tables 10 and 22 and Paul H. Douglas, *Real Wages in the United States, 1890–1926*, Boston, 1930, pp. 108 and 130.

all manufacturing, and compare them with the Douglas series. Our index of daily earnings is directly comparable with Douglas's index of full-time weekly earnings, since we regard all changes in the length of the full-time workweek as changes in hours per day.

The total rise in real hourly earnings from 1890 to 1914 shown by our series is 40 per cent, compared with a rise of 8 per cent in Douglas's. While the Douglas series reaches its 1914 level by 1894, ours

CHART 8
Comparison of Indexes of Real Earnings, 1890–1914



Source: See note to Table 44.

rises throughout the period; it is never below its previous peak for more than three years.

Our real-wage index has a clear tendency to fall in cyclical contractions, though it leads the contraction of 1908 by a year. The small year-to-year movement of the Douglas series often seems random, but it has some tendency to rise in cyclical contractions. This difference arises largely from the inclusion of union rates in the Douglas money-wage series. When the two components of the Douglas series

are examined separately, it is seen that real hourly earnings in payroll industries fall in cyclical contractions while real hourly earnings in union industries rise.

The downward cyclical flexibility of real hourly earnings from 1890 to 1914 is in marked contrast to more recent experience. Since 1929, real average hourly compensation (earnings plus wage supplements) in manufacturing has fallen in only three years—from 1931 to 1932 and from 1944 to 1946. The fall from 1945 to 1946 occurred during a business expansion. There was no decline in 1929–31, 1938, 1949, or 1954.[1]

Our index of real daily earnings rises more or less steadily from 1890 to 1913, while Douglas's index of real weekly earnings moves downward from 1893 to 1913. As we have mentioned earlier, the two Douglas series indicate that workers took all their gains in real hourly earnings in the form of a shorter workweek and, in addition, between the mid-1890's and 1913 reduced the consumption of goods and services per wage earner to get a still shorter workweek. Our indexes indicate that, at most, 77 per cent of the increase in real hourly earnings from 1890 to 1913 was taken as increased consumption of goods and services per wage earner, and at least 23 per cent was taken in increased leisure during the working years.[2] This is slightly smaller than the proportion of gains in real hourly compensation devoted to increasing leisure since 1929. From 1929 to 1957, about 32 per cent

[1] The statements in this paragraph are based on estimates by one of us of real average compensation (earnings plus wage supplements) per hour of work, presented in *Wages, Prices, Profits, and Productivity*, Report of the Fifteenth American Assembly, 1959. For a technical description of the money compensation component of this series, see *New Measures of Wage-Earner Compensation in Manufacturing, 1914–57*, New York, NBER, 1960.

[2] The portion devoted to increased consumption is obtained by dividing the percentage increase in real daily earnings by the percentage increase in real hourly earnings. This is equivalent to dividing the actual increase in daily earnings (consumption) by the potential increase, where the potential increase is the increase in hourly earnings times the average daily hours at the initial date. The comparison ends with 1913 so that both starting and ending years will be cyclical peaks, since the final percentages are sensitive to small changes in the increase in earnings, and hourly earnings were depressed during the recession of 1914.

The figures shown in the text reflect only the shortening of the full-time workweek and do not allow for increases in the number of holidays or vacations, paid or unpaid. This is the reason for the words "at most" and "at least" in the text. Possible increases in holidays or vacations might be taken into account by comparing the rise in real hourly earnings with that in real annual earnings. On this basis, 36 per cent of the gain in earnings was used to increase leisure. However, some of the decrease in the number of days in operation per year from 1890 to 1913 could represent slack demand in 1913 (the cyclical peak in business activity on a quarterly basis was reached in the first quarter). Thus, the most that can be said is that the percentage of the increase in real wages used to increase leisure was between 23 and 36.

of the gains in real hourly compensation was used to increase leisure.[3] On the assumption that there have been no important changes in the demand function for leisure, the rough similarity of these percentages for the two periods tends to support our estimates of real wages.

Table 45 presents our series on real hourly earnings by industry. We find increases in real hourly earnings in every industry from 1890 to 1914, and these increases range in size from 16 per cent in the leather industry to 56 per cent in paper and paper products. The two industries with the smallest increases, leather and dyeing and finishing textiles, were industries in which there was relatively little growth in employment. However, for the group as a whole there is no significant correlation between increase in employment and increase in real wages.

Our finding that real hourly earnings rose in all the industries studied again differs from Douglas's findings. He found a fall in real hourly earnings from 1890 to 1914 in two of six union industries and three of eight payroll industries. In the extreme case, slaughtering and meat packing, real hourly earnings fell 14 per cent. Table 46 compares the changes for the industries common to the two studies.

The rise in real average hourly earnings within industries as shown in Table 45 is usually not as steady as the rise for all manufacturing. In most industries, a peak is reached in 1893 or 1894 that is not regained for a number of years. In dyeing and finishing textiles, real earnings are below the 1893 level until 1906. A more typical case is all textiles, which regains its 1893 level in 1903. The intervening decade includes the depression of the 1890's and the initial years of heavy immigration. The industries with only brief breaks in the rise of real earnings after 1893 are wool, where the 1893 peak is regained in 1896, and iron and steel, where it is regained in 1898. In iron and steel there is a new peak in 1902 that is not regained until 1909.

To compare our data on real wages with productivity data, we have extended the real-wage series backward one year, using Long's data. The comparison is made for 1889–1913 so as to eliminate the effect on all the series of the recession of 1914. We find that the annual rate of increase in real hourly earnings over the period is 1.3 per cent, which is the same as that of output per weighted unit of labor and capital combined for the private domestic economy, as estimated by

[3] Based on the estimates cited in note 1. The increase in leisure for this period includes increases in vacations and holidays.

TABLE 45

Real Hourly Earnings in Fourteen Manufacturing Industries, 1890–1914
(1914 dollars)

	Cotton	Wool	Silk	Hosiery and Knit Goods	Dyeing and Finishing Textiles	All Textiles	Boots and Shoes	Leather	Electrical Machinery	Paper and Paper Products	Rubber	Glass	Foundries and Machine Shops	Iron and Steel
1890	0.109	0.127	0.132	0.103	0.169	0.116	0.176	0.186		0.131	0.173		0.203	
1891	0.108	0.129	0.134	0.106	0.172	0.117	0.174	0.192		0.130	0.170		0.207	
1892	0.108	0.131	0.129	0.111	0.171	0.118	0.178	0.190		0.134	0.168		0.204	0.187
1893	0.116	0.147	0.147	0.118	0.186	0.129	0.182	0.190		0.138	0.181		0.208	0.191
1894	0.121	0.136	0.143	0.120	0.189	0.128	0.187	0.185		0.144	0.179		0.216	0.184
1895	0.114	0.140	0.134	0.118	0.183	0.125	0.184	0.192		0.142	0.181		0.215	0.182
1896	0.116	0.147	0.147	0.120	0.189	0.129	0.179	0.194	0.196	0.145	0.191		0.213	0.189
1897	0.117	0.145	0.138	0.115	0.181	0.127	0.177	0.193	0.198	0.143	0.188		0.208	0.185
1898	0.110	0.149	0.136	0.116	0.183	0.126	0.172	0.187	0.211	0.136	0.192		0.212	0.192
1899	0.111	0.150	0.138	0.123	0.179	0.128	0.175	0.183	0.208	0.148	0.191	0.219	0.209	0.217
1900	0.118	0.155	0.129	0.121	0.177	0.131	0.175	0.181	0.206	0.151	0.186	0.231	0.213	0.222
1901	0.119	0.154	0.127	0.120	0.175	0.131	0.177	0.180	0.214	0.152	0.191	0.239	0.214	0.230
1902	0.121	0.156	0.135	0.120	0.182	0.135	0.178	0.179	0.216	0.158	0.185	0.243	0.225	0.235
1903	0.124	0.158	0.140	0.125	0.178	0.138	0.188	0.179	0.233	0.151	0.183	0.226	0.229	0.230
1904	0.120	0.154	0.135	0.121	0.174	0.133	0.183	0.182	0.220	0.159	0.184	0.241	0.225	0.216
1905	0.116	0.157	0.147	0.127	0.186	0.134	0.194	0.180	0.224	0.160	0.188	0.254	0.228	0.219
1906	0.121	0.165	0.143	0.141	0.186	0.140	0.194	0.191	0.228	0.158	0.200	0.244	0.236	0.225
1907	0.132	0.164	0.146	0.131	0.177	0.142	0.197	0.190	0.222	0.169	0.191	0.242	0.233	0.229
1908	0.132	0.169	0.136	0.133	0.183	0.144	0.201	0.195	0.229	0.193	0.214	0.256	0.239	0.233
1909	0.130	0.171	0.151	0.136	0.190	0.146	0.201	0.200	0.228	0.183	0.214	0.245	0.241	0.241
1910	0.137	0.170	0.151	0.138	0.190	0.149	0.205	0.198	0.233	0.183	0.220	0.253	0.243	0.245
1911	0.137	0.169	0.158	0.139	0.184	0.150	0.208	0.204	0.235	0.190	0.220	0.257	0.246	0.260
1912	0.140	0.176	0.160	0.144	0.187	0.155	0.210	0.195	0.242	0.195	0.224	0.257	0.248	0.255
1913	0.142	0.175	0.181	0.147	0.194	0.161	0.212	0.226	0.244	0.197	0.225	0.265	0.254	0.277
1914	0.141	0.190	0.169	0.160	0.201	0.160	0.212	0.214	0.240	0.205	0.239	0.263	0.253	0.266

SOURCE: Tables 13 and 22.

Kendrick.[4] The rate of increase in output per production-worker man-hour in manufacturing over the same period was 2.1 per cent.[5]

The fact that output per man-hour in manufacturing rose more than the real hourly earnings of production workers implies that the wage earner's share of manufacturing output declined. This inference is supported by Solow's more direct study of the wage earner's share of value added in manufacturing.[6] A falling share for wage earners probably means a rising share for capital, and this might be thought

TABLE 46

Changes in Real Average Hourly Earnings, by Industry, 1890–1914 (per cent)

	NBER	Douglas
Cotton	+30	+18
Wool	+50	+12
Hosiery and knit goods	+55	+14
Boots and shoes	+20	+8
Iron and steel[a]	+42	−2
Foundries and machine shops	+25	−4[b]

SOURCE: Table 45 and Paul H. Douglas, *Real Wages in the United States, 1890–1926*, Boston, 1930, pp. 98 and 104.

[a] 1892–1914.

[b] Union rate data for metal trades.

to support the conclusion of Hansen and Rubinow that the lag of wages behind prices had increased profits. However, we have found no such lag.

Although this study cannot investigate the causes of changes in relative shares in manufacturing income, it may be appropriate to point out that factor proportions were changing in the same direction as relative shares. Kendrick has reported a sharp rise in capital-output ratios in manufacturing during the period. One plausible interpretation of the rising share of capital is therefore that this larger share was needed to cover the costs of using more capital and to sustain the

[4] See John W. Kendrick, *Productivity Trends in the United States* (to be published by Princeton University Press for the NBER).

[5] This estimate is based on Kendrick's index of manufacturing output, Fabricant's estimates of production worker employment in manufacturing, and the series on days in operation and average daily hours presented in this study. The man-hours are thus identical with those underlying the estimates of average hourly earnings.

[6] Robert M. Solow, "The Constancy of Relative Shares," *American Economic Review*, September 1958, p. 627.

inflow of capital to the manufacturing sector over a long period. This is, however, not the only possible interpretation.[7]

What, then, of the idea that immigration held down real wages during the period? The finding of an increase in real wages in no way denies the importance of immigration. We have seen that the wave of heavy immigration that began in 1900 coincided with a sharp rise in our rent index, and that during this wave our real wage measures for a number of industries remained below their previous peaks for several years. In a larger sense, immigration was probably an important factor in keeping both the rate of increase in real wages and in productivity during this period below the rates achieved more recently.[8]

It is, of course, reasonable that the assimilation of the massive immigration of 1900–1914 should retard the growth of real wages. Not only were the new immigrants less skilled, on the whole, than the native born, but the shift in the sources of immigration from northern and western Europe to southern and eastern Europe meant that they were, on the whole, less skilled and less literate than were the new immigrants of earlier periods. But, in reckoning productivity, so long as we measure labor inputs in man-hours and not in units of constant quality, these arguments suggest a retardation in the growth of productivity as much as in real wages. There undoubtedly were individual cases in which employers took advantage of the ignorance of immigrants to pay them less than their worth, but such cases could hardly drive a huge wedge between the movements of productivity and real wages for a large sector of the economy.

We conclude that the accepted view that real wages did not rise in the quarter century before World War I is largely the product of faulty statistics. Since our measures of money wages differ from previous ones principally in level and very little in movement, the fault in the earlier indexes of real wages lies largely on the cost-of-living side.

[7] We are grateful to Zvi Griliches for persuading us to modify an earlier, more dogmatic version of this passage. This does not imply his agreement with the present version.

It has been assumed in the text that supplies of factors to a sector of the economy are quite elastic over long periods so that the effects on income shares of changes in factor proportions are not fully offset by opposite shifts in factor prices. If factors receive their marginal products, this amounts to assuming that the production function for a sector over a long period is not a fixed Cobb-Douglas function.

[8] For 1929–57, one of us has estimated the increase in real hourly compensation of manufacturing wage earners at 3.5 per cent a year and the increase in output per production-worker man-hour in manufacturing at 2.7 per cent a year. See *Wages, Prices, Profits, and Productivity*, p. 24.

This study has not examined real wage statistics for any country except the United States. However, since the cost-of-living indexes for the United Kingdom before World War I have the same kinds of defects as the accepted indexes for the United States, it might well be worth while to re-examine also the conclusion that real wages in the United Kingdom were unchanged from 1890 to 1913.