Volume Title: Real Wages in Manufacturing, 1890-1914

Volume Author/Editor: Albert Rees, Donald P. Jacobs

Volume Publisher: Princeton University Press

Volume ISBN: 0-87014-069-8

Volume URL: http://www.nber.org/books/rees61-1

Publication Date: 1961

Chapter Title: The Background for the Study

Chapter Author: Albert Rees, Donald P. Jacobs

Chapter URL: http://www.nber.org/chapters/c2284

Chapter pages in book: (p. 6 - 17)

CHAPTER 2

The Background for the Study

THE earliest estimates of real wages for any part of the period 1890–1914 can be found in Bulletin 53 of the Bureau of Labor.[1] This bulletin brought together the retail prices of food collected for the *Eighteenth Annual Report of the Commissioner of Labor*,[2] then in press, and the money wage series of the *Nineteenth Annual Report*,[3] then in preparation. These two sets of data were combined into two series of index numbers of "the purchasing power of wages measured by retail prices of food," which were maintained by regular collection of new data and published in subsequent bulletins[4] until 1907. The two indexes, one based on hourly wages and the other on full-time weekly wages (hourly wages times standard or full-time hours), are shown in the first column of Tables 2 and 3. The hourly index shows a small, irregular rise over the period; the weekly index has no appreciable trend. The money wage series used in constructing these indexes covered sixty-seven industries, not confined to manufacturing.[5] The wage statistics for each industry were simple averages of relatives for occupations, and the industries were combined using as weights the aggregate wage bill of each industry according to the Census of 1900. The index of retail food prices was an average of relatives for thirty food items weighted by expenditures on these items in 1901 for a subsample of 2,567 families. It was taken from Part I of the *Eighteenth Annual Report*.

After 1907 the regular work of the Bureau of Labor was interrupted for four years, apparently by the intensive inquiry then made into the conditions of labor of women and children. When the work was resumed by the Bureau of Labor Statistics (BLS) after 1911, it was

[1] July 1904, p. 723.

[2] *Cost of Living and Retail Prices of Food*, 1904.

[3] *Wages and Hours of Labor*, 1905.

[4] Nos. 59, 65, 71, and 77.

[5] The nonmanufacturing industries (as defined in the *Census of Manufactures, 1905*) were blacksmithing and horseshoeing; building trades; men's custom work; and streets and sewers, municipal work. In addition, two industries were included that were then considered part of manufacturing and are not now: illuminating and heating gas, and steam railroad cars (now excluded if built by railroad companies).

TABLE 2

Five Indexes of Real Hourly Wages, 1890–1914[a]
(1890–99 = 100)

	Bulletin 77	Rubinow	Jones	Douglas and Lamberson	Douglas, All Manufacturing
1890	97.9	98.3	97.9	97.5	95
1891	96.6	96.6	96.2	96.0	98
1892	98.9	98.7	98.4	98.5	98
1893	96.6	97.2	96.9	97.1	101
1894	98.2	99.7	99.2	98.8	102
1895	100.5	101.5	100.8	101.1	101
1896	104.4	105.0	104.7	105.3	102
1897	103.4	103.0	103.4	103.6	100
1898	101.5	100.5	101.5	101.2	100
1899	102.5	100.6	101.9	101.6	101
1900	104.4	101.6	103.6	103.7	101
1901	102.7	98.6	101.7	100.1	100
1902	101.2	97.7	101.0	98.5	101
1903	105.4	100.7	104.7	102.2	100
1904	104.7	100.0	104.1	101.7	101
1905	105.8	102.8	106.4	103.1	103
1906	107.3	102.7	106.8	103.9	103
1907	106.8	102.7	107.2	104.2	101
1908	—	98.8	103.0	101.2	102
1909	—	94.7	98.5	97.2	102
1910	—	93.0	96.5	95.1	100
1911	—	95.3	99.0	97.8	98
1912	—	91.8	95.0	94.6	102
1913	—	—	—	96.1	102
1914	—	—	—	96.5	102

[a] All series except Douglas's show the purchasing power of wages in terms of food only. For sources and methods, see text.

much changed. The number of food items whose prices were collected dropped from thirty to fifteen. The amount of wage data collected within each industry was increased, but the number of industries covered decreased sharply. For some industries, union rates were collected, rather than rates taken from employer payrolls. Most of the new series ran back through the missing years 1907–11, but no official average has ever been published of the new wage series for 1907–14, nor, of course, any official continuation of the series on the purchasing power of wages in terms of food.

TABLE 3

Six Indexes of Real Full-Time Weekly Wages, 1890–1914[a]
(1890–99 = 100)

	Bulletin 77	Rubinow	Jones	Douglas and Lamberson	Hansen[b]	Douglas, All Manufacturing
1890	98.6	99.4	98.9	98.4	94	96
1891	97.1	97.5	97.1	96.8	95	99
1892	99.4	99.4	99.1	99.3	98	99
1893	96.9	97.6	97.3	97.5	97	101
1894	98.0	98.9	98.4	98.7	99	101
1895	100.6	102.2	101.4	101.2	101	102
1896	104.2	104.7	104.4	104.6	104	101
1897	103.0	102.5	102.9	103.2	107	100
1898	101.2	100.1	101.1	100.5	104	100
1899	101.7	99.8	101.1	100.3	101	100
1900	103.0	100.2	102.1	101.6	99	100
1901	100.7	96.8	99.8	97.6	101	99
1902	98.5	94.3	98.4	95.1	101	99
1903	101.8	97.3	101.3	97.6	100	98
1904	100.4	96.0	99.9	96.9	100	98
1905	101.4	98.6	102.1	98.3	102	100
1906	102.4	98.0	101.9	98.6	101	99
1907	101.5	97.7	102.0	98.2	100	97
1908	—	93.0	97.3	94.6	102	97
1909	—	89.4	92.9	90.7	99	98
1910	—	87.2	90.6	87.8	98	95
1911	—	88.9	92.4	90.1	100	93
1912	—	85.3	88.4	85.9	100	96
1913	—	—	—	86.8	98	95
1914	—	—	—	87.0	98	95

[a] All of these indexes except the last two show the purchasing power of wages in terms of food only. For sources and methods, see text.
[b] Converted from the original base 1913 = 100.

In 1914, I. M. Rubinow published the first index of real wages covering the period after 1907.[6] His money wage series covered the building trades and fourteen manufacturing industries for which continuous data were available since 1890. (No use was made of the data available, up to 1907, for other industries.) After 1907 the data underlying the series for the building trades and five other

[6] "The Recent Trend of Real Wages," *American Economic Review*, December 1914, pp. 793–817.

series[7] were union rates; the data underlying the nine remaining series[8] were from payrolls. For all the payroll industries except carbuilding, the indexes used were computed by the Bureau of Labor Statistics and were employment-weighted averages of occupational relatives. For carbuilding and the union-rate industries, Rubinow computed simple averages of relatives. The fifteen industries were combined in a simple average. On the price side, Rubinow used a weighted index, computed by the Bureau, including only the fifteen food items whose prices had been collected continuously since 1890.

Rubinow's results, which indicate a sharp fall in real wages after 1907, are shown in the second column of Tables 2 and 3. His estimates are based throughout on the continuous series only. They differ, therefore, from those of Bulletin 77 even prior to 1907. Rubinow states his conclusions as follows: "When confronted with a rapidly rising price movement (accompanied as it was by a violent growth of profits), the American wage-worker, notwithstanding his strenuous efforts to adjust wages to these new price conditions, notwithstanding all the picturesque I.W.W.-ism, new unionism, and the modish sabotage, has been losing surely and not even slowly, so that the sum total of economic progress of this country for the last quarter of a century appears to be a loss of from 10 to 15 per cent in his earning power."[9]

In 1917, F. W. Jones published an amended version of Rubinow's results.[10] The sole change consisted of linking the price index of fifteen food items to the older series of thirty items at 1907, rather than using the fifteen items throughout. Jones' series are shown in the third column of Tables 2 and 3. Although they fall somewhat less than Rubinow's, they do not materially alter his conclusions. Indeed, Jones writes, "The doctrine so popular in certain quarters that while the rich have grown rapidly richer in recent years the poor have also steadily risen in the scale of economic welfare, has no foundation in fact."[11]

In 1921, Paul H. Douglas and Frances Lamberson published an article bringing Rubinow's series down to 1918.[12] Rejecting Jones's

[7] Bakers, marble and stone cutters, foundry and machine shops, book and job printing, and newspaper printing.

[8] Cotton goods, woolen goods, silk goods, boots and shoes, knit goods, lumber, millwork, furniture, and carbuilding.

[9] "Trend of Real Wages," p. 812.

[10] "Real Wages in Recent Years," *American Economic Review*, June 1917, pp. 317–330.

[11] *Ibid.*, p. 330.

[12] "The Movement of Real Wages, 1890–1918," *American Economic Review*, September 1921, pp. 409–426.

improvement, they returned to the index of fifteen food items. On the wage side, they found that continuous data were available until 1918 for only ten of Rubinow's fifteen industries, of which only three had payroll data.[13] New indexes were computed for these ten industries for 1912–18, based on simple averages of occupational relatives, and these were spliced to Rubinow's series at 1912. The final wage indexes were simple averages of the ten industry indexes. Since only ten industries were used even prior to 1912, the results differ slightly from Rubinow's before that date. These results are shown in the fourth column of Tables 2 and 3. They show a slight rise of real earnings from 1912 to 1914, but not nearly enough to offset the fall from 1907 to 1912.

In 1925 Alvin H. Hansen made another computation of real wages for this period.[14] He accepted the full-time weekly money wage series of Douglas and Lamberson, but computed a new cost-of-living index. This included the BLS index of the retail price of food (based on thirty items to 1907 and fifteen items thereafter) with a weight of 40; and the BLS wholesale price indexes of cloths and clothing (weight 17), fuel and light (weight 6), and house furnishings (weight 5). The weights are approximations of the pattern of family expenditures shown by the 1918 budget study of the Bureau of Labor Statistics.[15] Thus, for the first time, the purchasing power of wages during this period was not expressed entirely in terms of food.

Hansen's index is shown in the fifth column of Table 3. It shows no trend; although 1914 lies slightly above 1890, it lies slightly below the average for 1890–99. This flatness implies an increase in real hourly earnings, for which Hansen made no index. Hansen comments on the fall in real wages from the peak reached by his index in 1897, explaining it as a result of a lag of wages behind prices during an inflation. He states, in part: "Rising prices amount in fact to a redistribution of the national income in favor of the entrepreneurial class. It amounts to an enforced taxation of wage-earners, salaried persons, investors and landlords with long-term rent contracts. In the period from 1897 to 1915 when real wages were falling in spite of an enormous increase in national production, business profits far outran

[13] The omitted industries are silk goods, knit goods, lumber, furniture, and car-building. In addition, only union rate data were now available for millwork, for which Rubinow had used payroll data.

[14] "Factors Affecting the Trend of Real Wages," *American Economic Review*, March 1925, pp. 25–42 and 294.

[15] *Cost of Living in the United States*, BLS Bulletin No. 357, May 1924.

the general price level."[16] Elsewhere he adds, "Undoubtedly the lag of real wages behind production from 1897 to 1915 was to some extent the result of the increasing scarcity of land."[17]

It was against this background that Douglas's book[18] appeared. Of course, *Real Wages* covers far more than manufacturing. We shall be concerned here with its manufacturing series only. It is one of the virtues of this work that, for the first time, it separated wages in manufacturing from wages in the building trades and presented manufacturing wages alone. The number of manufacturing industries covered was increased to fourteen by interpolation in some of the series containing gaps. Six of the series were based on union rates[19] and eight on payroll data.[20] Within industries, the averages were weighted averages of actual rates (rather than of relatives); the industries were combined using census employment weights.

For the cost-of-living estimates, Douglas followed Hansen in using wholesale prices where retail prices were not available. The former were used for clothing, furniture, and spirits and tobacco, and for fuel and light until 1907. The retail prices of gas and coal, collected by the BLS since 1907, were used for 1907–14. The food index used twenty-nine items at retail until 1907 and fifteen thereafter. The fourteen omitted items were continued by means of wholesale prices until 1914 and throughout the period for eleven items for which retail prices had not been collected before 1907. All wholesale prices (both of foods and nonfoods) were adjusted to a presumed retail basis according to the differences between the wholesale and retail price indexes of identical food items. The various group indexes were combined using family expenditure weights for 1901 from the *Eighteenth Annual Report.*

Douglas's results are shown in the last column of Tables 2 and 3.

[16] Hansen, "Factors Affecting Real Wages," p. 40. Several economic historians, including Wesley C. Mitchell and Earl J. Hamilton, have noted lags of wages behind prices in inflations of the nineteenth century and earlier. Like Hansen, they argued that this increased profits. However, inflations in the United States since 1914 have clearly been accompanied by rising real wages. It is not clear whether this difference represents a change in the behavior of wages in recent inflations or whether it represents an improvement in the quality of the data on which the wage and price series are based. Hansen's use of weekly earnings deflated by consumers' prices is inappropriate for drawing inferences about profits. Hourly earnings deflated by the prices of the products produced would be more appropriate.

[17] *Ibid.*, p. 36.

[18] *Real Wages in the United States, 1890–1926*, Boston, 1930.

[19] Metal trades, granite and stone, book and job printing, newspaper printing, planing mills, and bakers.

[20] Cotton, boots and shoes, clothing, hosiery and knit goods, woolens, lumber, iron and steel, and slaughtering and meat packing.

The real hourly earnings series shows a slight rise over the whole period covered, for the first time since Bulletin 77. However, much of the rise occurs in the single year 1890–91, and all of it by 1894. In 1914 the series on real weekly earnings lies slightly further below its 1890–99 average than does Hansen's.

After the appearance of Douglas's book, discussion of the course of real wages before 1914 came to a halt. Perhaps this was because Douglas had made most of the possible refinements in processing the BLS data. Perhaps, since his series showed some slight rise in real hourly earnings, there no longer seemed to be any problem to solve. Perhaps, too, as time passed there was less interest in the period before World War I.

Nevertheless, the passing of time heightens the uneasiness that one feels on reviewing Douglas's results. We have become accustomed to the idea that continuously improving technology, the accumulation of physical capital, and rising levels of education have combined to bring steady, substantial improvement in the standard of living of all major groups in our population.[21] Was the material progress of manufacturing workers really interrupted for almost a quarter of a century? If so, why?

A second puzzle may also be considered. Douglas estimates that real full-time weekly earnings in manufacturing fell about 1 per cent from 1890 to 1914, and 5 per cent from the decade average 1890–99 to 1914. He also estimates that this fall in real weekly earnings was accompanied by a reduction in full-time weekly hours from 60.0 in 1890 to 55.2 in 1914. The historical record for longer periods suggests that an increase in real hourly earnings will be used in part to increase real earnings exclusive of leisure (to increase the consumption of goods and services) and in part to reduce hours of work (to increase the consumption of leisure). This record is entirely consistent with a theory of the demand for leisure in which it is a normal commodity for which the demand is relatively stable over time.[22] But the record as a whole does not suggest that leisure is so strongly preferred that workers will consume all of an increase in hourly earnings in the form of leisure and will, in addition, cut into their previous consumption of goods and services to shorten hours. Douglas's findings suggest a

[21] For an eloquent statement of this view, see Solomon Fabricant, *Economic Progress and Economic Change*, Thirty-fourth Annual Report, National Bureau of Economic Research, New York, 1954.

[22] See H. G. Lewis, "Hours of Work and Hours of Leisure," *Proceedings of the Ninth Annual Meeting of the Industrial Relations Research Association*, 1957, pp. 196–206.

strong unexplained shift of preferences toward leisure during this period (unless it is assumed that shorter hours were forced on unwilling workers by employers, governments, or unions, which seems most unlikely). Putting the matter differently, we can say that Douglas's results might be easier to accept if they showed hourly earnings, weekly hours, and weekly earnings all unchanged, implying a complete absence of progress. As they now stand they show modest progress used entirely to shorten the workweek, and still failing to account for all the shortening that occurred.

In the writings of Rubinow and Hansen we have already encountered one explanation for the failure of real wages to rise. They stated that wages lagged behind prices, resulting in abnormally high profits. Our willingness to accept this explanation must be tempered by the experience of more recent periods of rising prices. Douglas shows a rise of 11 per cent in real hourly earnings in manufacturing from 1914 to 1920, a period in which the cost of living more than doubled. More recently, real average hourly earnings in manufacturing have increased 62 per cent from 1939 to 1957, a period in which the Consumer Price Index doubled.

Another possible cause of the failure of real wages to rise in this period is the closing of the frontier. For earlier periods it has been argued that the existence of free or cheap land in the West served as a "safety valve" for labor. It absorbed part of the inflow of immigrants, and part of the natural increase of population in the rural East that might otherwise have gone into urban employment. Perhaps there was also some direct movement of eastern urban workers to the frontier, though they were more likely to become workers in frontier towns than farmers.

By 1900, however, the pull of the frontier must have been greatly weakened. A distinguished economic historian writes: "By the close of the century the supply of free and fertile farming land had almost disappeared."[23]

After about 1898, the rate of growth of agricultural output decreased sharply. In the sixteen years from 1898 to 1914, agricultural output increased 22 per cent; in the preceding sixteen years, it had increased 46 per cent.[24] Urban population continued to grow

[23] Chester W. Wright, *Economic History of the United States*, 2nd ed., New York, 1949, p. 462.

[24] Frederick Strauss and Louis H. Bean, *Gross Farm Income and Indices of Farm Production and Prices in the United States, 1869–1937*, U.S. Department of Agriculture Technical Bulletin No. 703, Table 58.

rapidly. The combination of rapid urban growth with slackened agricultural growth helped to bring about the rise in the price of farm products that began in 1896 and thus helped to limit the gains in urban real wages.[25]

Douglas is more concerned with explaining the rise in real wages over the whole period 1890–1926 than with explaining their failure to rise until 1914. However, in his discussion, he introduces one major factor, immigration, that clearly operated differently in the two parts of his period. If, as Douglas believes, the curtailment of immigration during and after the war caused real wages to rise, the unprecedented level of immigration just before the war and the low levels of skill and literacy of the immigrants may well have had an opposite effect.[26] This argument is put directly by W. I. King, who estimated from census data that real annual earnings (money annual earnings deflated by the wholesale price index) declined slightly from 1900 to 1910. He explained his finding in what may well be one of the purplest passages in the literature of academic economics:

"And so, the dawn of the twentieth century saw the spoilers gazing longingly from east and west at the riches wrested by American brawn and brains from the grasp of Nature. The advance guard of the Asiatics reached our Pacific coast but the forces of labor organized against the "Yellow Peril" and successfully repelled the invasion. But into our Atlantic ports, unresisted and almost unheeded, pounced, at the same time, another army of invaders, the "White Peril" from Southern and Eastern Europe. And still it comes! Its advance is marked by no waving banners, no rattle of musketry, and no boom of artillery, but the army streams in company by company, regiment by regiment, brigade by brigade and division by division. . . . The low standard of the Old World tends to force itself upon the New and turn back the tide of progress."[27]

This explanation, if soberly stated, is not unreasonable. A great influx of unskilled labor could both drive down money wages and bid up the prices of those commodities consumed primarily by the lowest

[25] We are indebted to George Soule for pointing out the importance of changes in agricultural output in this context.

[26] For annual estimates of net immigration during this period, see Simon Kuznets and Ernest Rubin, *Immigration and the Foreign Born*, Occasional Paper 46, New York, NBER, 1954.

[27] Willford Isbell King, *The Wealth and Income of the People of the United States*, New York, 1919, pp. 175–177.

income groups. The real wages of all workers, including the immigrants, would tend to fall.[28]

Before we accept this explanation, however, we should note that in roughly the same period we are considering available estimates of real wages for other countries also fail to rise or rise slowly, and these countries did not have net immigration. The most dramatic case is the United Kingdom, where Phelps Brown and Hopkins find that real hourly wages were unchanged from 1890 to 1913.[29] These authors also report a retardation in the increase of real wages after 1886 in three of the four other countries studied, the United States, France, and Germany.[30] This retardation is called "the late nineteenth-century climacteric." On the basis of their work on real income per capita, the authors comment on the change in the movement of real wages: "One hypothesis can be put aside at the outset: this change does not seem to have arisen from a change adverse to labour in the distribution of the national income."[31] Thus they disagree with the basic position of Rubinow and Hansen. Instead they believe that the "climacteric" resulted from a "check to productivity" and that this in turn came about because progress in technology had turned toward new products and away from new processes for making old products at lower cost.

In so far as this explanation applies to the United States, let us examine it in the light of productivity data. John W. Kendrick has recently estimated that total factor productivity (output per unit of all tangible inputs) in the private domestic economy rose at an average annual rate of 1.3 per cent a year from 1889 to 1919, and that, over the same period, the output-labor ratio rose 1.6 per cent annually.[32] For manufacturing, Fabricant finds a decrease of 27 per cent in man-hours per unit of output from 1899 to 1914.[33] These rates are substantially below the corresponding rates for more recent periods,

[28] However, the real wages of those already on the scene when the immigration began might tend to rise. The original labor force can, for the most part, be regarded as a factor (skilled or semiskilled labor) whose real returns rise because of an increased supply of a complementary factor (unskilled labor).

[29] E. H. Phelps Brown with Sheila V. Hopkins, "The Course of Wage-Rates in Five Countries, 1860–1939," *Oxford Economic Papers*, n.s. II, 1950, pp. 226–296. The real wage series for the United Kingdom is based largely on the work of G. H. Wood and A. L. Bowley.

[30] The exception is Sweden. The United States data used for 1890–1913 are from Douglas, *Real Wages*.

[31] Phelps Brown and Hopkins, "Course of Wage-Rates," p. 238.

[32] Thirty-eighth Annual Report, New York, NBER, 1958, p. 61.

[33] Solomon Fabricant, *Employment in Manufacturing, 1899–1939*, New York, NBER, 1942, p. 331.

but they are far above the rates of growth of real wages shown by Douglas. The 27 per cent fall in the labor-output ratio for manufacturing may be compared with a rise of 1 per cent in real hourly earnings for the same years. The average annual percentage rate of growth in real wages shown by Douglas for 1890–1919 is 0.4 per cent, compared with the growth rates for productivity of 1.3 and 1.6 per cent in Kendrick's estimates. It should be noted that this rise in average productivity took place despite the immigration of the unskilled, which should by itself tend to reduce average productivity as well as real wages.

Whatever the correspondence of estimates of productivity and real wages for other countries, those for the United States clearly diverge. It is possible, of course, that real wages were held down by immigration in the United States at precisely the same time as they were held down by the lag of productivity in the United Kingdom. However, the correspondence in timing suggests the possibility of some common cause, either real or arising from the kinds of data collected and the statistical procedures used for that period.

There is an especially strong possibility that the similarities of movement of real wages in the United States and the United Kingdom arise in part from similar kinds of errors in measuring the cost of living. In both cases, the official, complete cost-of-living indexes begin in 1914, and, in both cases, the indexes before that date are put together from inadequate or fragmentary materials. In Britain, as in the United States, retail prices were collected before 1914 only for a few items of food and fuel, and wholesale prices had to be used to estimate several components of the cost of living.[34]

When, in the exploratory phase of this study, we reviewed the reasons advanced in the literature for the failure of real wages to rise appreciably during the period, we were dissatisfied. None of them seemed compelling enough to rule out the possibility that all the writers we have cited were seeking to explain something that never happened. The course of our own work has since made even clearer to us the temptation to economic statisticians to rationalize in terms of real forces results that eventually prove to arise from statistical error. And major sources of possible error seemed to be present in all the estimates of real wages in the United States before World War I. On the money wage side, there was the heavy reliance on union rates

[34] For a description of the British data, see A. L. Bowley, *Wages and Income in the United Kingdom Since 1860*, Cambridge, 1937, Appendix D.

in a period when unions were relatively unimportant. On the price side, there was the almost complete reliance on wholesale prices for nonfoods, and the absence of any series for rents.

It did not seem possible to improve on Douglas's processing of the materials he used. We therefore decided to construct new estimates using new sources of data as far as possible. The problem that gave rise to the study was one of long-term trends, and this has guided our acceptance or rejection of data. Although our work may have some value for cyclical problems, it must be used for such problems with great caution, for, at times, our data or our procedures would be inadequate or inappropriate for an investigation of cyclical fluctuation.