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Volume Title: Behavior of Wage Rates During Business Cycles

Volume Author/Editor: Daniel Creamer, assisted by Martin Bernstein

Volume Publisher: NBER

Volume ISBN: 0-87014-349-2

Volume URL: <http://www.nber.org/books/crea50-1>

Publication Date: 1950

Chapter Title: Appendices to "Behavior of Wage Rates During Business Cycles"

Chapter Author: Daniel Creamer, Martin Bernstein

Chapter URL: <http://www.nber.org/chapters/c0784>

Chapter pages in book: (p. 40 - 66)

As we have already noted, the downward adjustment in average hourly earnings during the postwar contraction of 1948-49 was scarcely perceptible despite fairly substantial declines in factory production and employment, declines about equal to those of the contraction of 1923-24. This postwar experience, therefore, is similar to the prewar trend toward greater rigidity of wage rates in business contractions, although to generalize on the basis of a period so brief and current is hazardous at best.

APPENDIX A

Wage Rate Indexes, with Notes on their Construction, and Average Hourly Earnings in Manufacturing, United States
Wage rate indexes for 9 manufacturing industries from 1919 to 1931 and, in the case of all manufactures, to 1935, are constructed from data published by the Bureau of Labor Statistics in its *Monthly Labor Review*. Between August 1931 and July 1935, when this series was discontinued, data on the percentage change in wage rates for all manufactures only were available.

From 1919 to June 1922 the BLS presented changes in wage rate schedules in narrative form. The following excerpt selected at random is typical (*Monthly Labor Review*, XIV, 3, March 1922, pp. 121-2):

“During the period December 15, 1921 to January 15, 1922 there were wage changes made by some of the establishments in 10 of the 14 industries.

Iron and steel—an increase of 1½ percent was granted to 64 percent of the men in one plant. A reduction of 19 percent was made to 4 percent of the force in one mill, while another mill reduced the wages of 45 percent of the employees 15 percent. Twelve plants reported a decrease of 10 percent affecting all employees. . . .”

The same information was published in tabular form from June 1922 to March 1923. Thereafter until August 1931 the tables included information on the percentage of workers affected by changes in wage rates. Our table, showing the BLS column headings, contains hypothetical data to illustrate our computation. The essential information for the construction of an index of wage rates is given in columns 4 and 7. Thus for industry A the weighted average per-

INDUSTRY	ESTABLISHMENTS		% CHANGE		EMPLOYEES AFFECTED AS % OF ALL EMPLOYEES		
	Total no. report.	No. report. changes in wage rates	IN WAGE RATES		Total no. (5)	In estab. report. changes in wage rates (6)	In all estab. report. (7)
	(1)	(2)	Range (3)	Av. (4)			
INCREASES							
A	200	15	7-12	10	10,000	73	20
B	350	16	8-11	9	6,200	42	5
C	150	9	5-7	6	3,200	67	7
DECREASES							
A	200	6	4-7	5	5,000	82	10
D	175	15	2-8	6	2,000	25	3
E	400	4	1-6	4	800	30	2

centage change is 1.5: the algebraic sum of the product, 150, is divided by the total weights, 100. The index of wage rates for, say, February, would therefore be 1.5 percent higher than the index for January.

Rate of Change from col. 4 (1)	% of Employees Affected (weights) from col. 7 (2)	Product (1 x 2) (3)
+10	20	200
-5	10	-50
0	70	0
Total	100	150

Wage rates in April 1923 are taken to equal 100 and the monthly link relatives are chained to this base. When a relative monthly increase or decrease is less than 0.1 percent it is cumulated until it amounts to 0.1 percent, then included in the index.

For the period before April 1923 the only index we can construct is cruder, because employee weights for combined changes in the wage rates of individual establishments are lacking. As is clear from the excerpt quoted above, the relative change in wage rates in establishments reporting changes can be reduced to the percentage change for each establishment, affected and unaffected workers alike, by multiplying the reported change by the percentage of workers affected. In terms of the quotation, the 1.5 percent increase affecting 64 percent of the workers in one plant becomes a plant-wide increase of 0.96 percent (.015 times 64 percent). The average change for establishments reporting changes in a given industry is an unweighted average of the plant-wide percentage changes. The latter percentage for establishments reporting changes is combined with the zero change for establishments not reporting any change by using the relative number of establishments in each category as weights. The monthly link relatives derived in this

TABLE A (cont.)

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
<i>1919</i>												
Rate ^a	101.7	101.7	101.7	101.7	102.4	102.8	102.9	103.6	104.0	104.2	104.4	104.4
<i>1920</i>												
Rate ^a	104.5	104.6	104.8	105.4	105.8	105.8	105.9	105.9	106.1	105.9	105.8	105.0
Earnings						71.3	72.5	71.9	71.3	69.8	67.8	64.5
<i>1921</i>												
Rate ^a	104.1	103.9	103.9	103.6	103.6	103.1	102.4	101.8	100.7	100.4	100.3	99.9
Earnings	64.9	63.8	62.9	61.7	59.9	61.0	61.5	60.3	59.0	59.6	60.4	57.9
<i>1922</i>												
Rate ^a	99.1	99.1	98.9	98.9	99.0	99.3	99.3	99.3	99.4	99.4	99.5	99.5
Earnings	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	58.3	59.7	59.4	58.7	58.9	58.9
<i>1923</i>												
Rate ^a	99.5	99.6	99.7	100.0	100.2	100.2	100.3	100.3	100.3	100.3	100.3	100.3
Rate ^b				100.0	100.1	100.1	100.1	100.1	100.1	100.1	100.1	100.1
Earnings	60.5	60.5	61.2	62.0	63.9	62.1	63.8	64.2	65.2	64.9	64.4	65.0
<i>1924</i>												
Rate ^b	100.1	100.0	100.0	100.0	100.0	100.0	99.9	99.9	99.9	99.9	99.9	99.9
Earnings	66.0	66.7	65.9	66.0	65.3	65.6	64.9	64.9	64.5	65.0	65.3	65.5
<i>1925</i>												
Rate ^b	99.9	99.9	99.9	99.9	99.9	99.9	100.0	100.0	100.0	100.0	100.0	100.1
Earnings	65.3	65.1	65.0	65.2	64.2	65.3	65.5	65.7	64.8	66.0	66.5	67.5
<i>1926</i>												
Rate ^b	100.1	100.1	100.1	100.1	100.1	100.2	100.2	100.2	100.2	100.3	100.3	100.3
Earnings	65.1	66.1	65.9	65.6	65.8	67.0	66.2	66.0	66.5	65.8	66.0	64.5
<i>1927</i>												
Rate ^b	100.3	100.3	100.3	100.3	100.4	100.4	100.4	100.4	100.4	100.5	100.5	100.5
Earnings	66.8	67.1	66.2	66.6	66.9	67.5	67.6	68.3	68.7	68.6	69.2	67.9
<i>1928</i>												
Rate ^b	100.5	100.5	100.5	100.5	100.5	100.5	100.6	100.6	100.6	100.6	100.6	100.6
Earnings	67.6	67.8	68.1	67.9	67.9	67.8	68.2	68.6	69.0	69.3	67.3	67.8
<i>1929</i>												
Rate ^b	100.6	100.6	100.6	100.6	100.6	100.6	100.6	100.6	100.6	100.7	100.7	100.9
Earnings	68.9	68.6	69.2	70.0	69.6	69.9	69.9	68.9	69.2	68.8	70.3	70.4
<i>1930</i>												
Rate ^b	100.9	100.9	100.9	100.9	100.9	100.9	100.9	100.8	100.8	100.8	100.8	100.8
Earnings	70.0	70.1	70.4	70.3	70.3	69.5	70.5	69.7	68.8	67.8	69.2	69.6
<i>1931</i>												
Rate ^b	100.8	100.8	100.8	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7	100.7
Earnings	69.6	69.5	69.2	69.0	68.9	68.6	67.4	67.6	67.5	67.8	66.0	65.9

TABLE A (cont.)

	Jan.	Feb.	March	April	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
ELECTRICAL GOODS												
1920 Earnings						61.0	60.9	62.3	63.1	63.1	62.5	61.9
1921 Earnings	60.7	58.8	55.0	55.5	55.2	55.1	54.9	52.4	52.5	50.6	50.3	49.7
1922 Rate ^a Earnings	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	98.0	98.0	98.4	98.6	98.6	98.7
1923 Rate ^a Earnings	98.7	98.9	99.3	100.0	101.5	101.9	102.0	102.0	102.0	102.0	102.1	102.1
1924 Rate ^b Earnings	51.3	51.8	52.8	54.4	57.3	57.4	57.4	58.4	59.6	60.3	60.2	60.2
1925 Rate ^b Earnings	103.0	103.0	103.1	103.1	103.1	103.1	103.1	103.1	103.1	103.1	103.1	103.1
1926 Rate ^b Earnings	60.3	60.4	60.3	60.2	59.7	60.4	59.9	59.9	59.3	60.0	60.0	60.1
1927 Rate ^b Earnings	103.1	103.1	103.1	103.1	103.0	103.0	103.0	103.0	103.0	103.0	103.0	103.1
1928 Rate ^b Earnings	60.2	60.5	60.9	61.1	61.5	60.5	60.4	60.3	58.4	60.0	59.8	59.6
1929 Rate ^b Earnings	103.1	103.1	103.1	103.1	103.2	103.3	103.3	103.3	103.3	103.4	103.4	103.4
1930 Rate ^b Earnings	58.1	58.2	58.6	58.8	58.6	59.5	59.2	59.3	59.7	59.4	59.9	59.8
1931 Rate ^b Earnings	103.4	103.4	103.4	103.5	103.5	103.5	103.5	103.5	103.5	103.5	103.5	103.5
1932 Rate ^b Earnings	60.7	60.9	60.4	60.7	61.1	60.9	60.9	61.0	61.1	61.2	61.7	61.4
1933 Rate ^b Earnings	103.5	103.5	103.5	103.5	103.5	103.5	103.5	103.5	103.5	103.5	103.5	103.6
1934 Rate ^b Earnings	60.9	61.2	61.6	61.4	61.5	61.6	61.2	60.7	61.5	61.6	62.1	62.4
1935 Rate ^b Earnings	103.7	103.8	103.8	103.8	103.8	103.9	104.0	104.1	104.1	104.1	104.1	104.1
1936 Rate ^b Earnings	62.1	62.4	61.5	61.8	62.1	61.8	62.5	63.2	63.9	63.4	63.4	63.8
1937 Rate ^b Earnings	104.3	104.3	104.3	104.3	104.3	104.3	104.3	104.3	104.3	104.3	104.3	104.2
1938 Rate ^b Earnings	63.8	63.9	65.0	65.1	64.8	65.1	64.6	64.3	65.0	64.3	64.3	64.1
1939 Rate ^b Earnings	104.1	104.1	104.0	104.0	103.9	103.8	103.8	103.7	62.7	63.1	63.0	62.3
1940 Rate ^b Earnings	64.5	64.2	64.4	63.7	63.6	62.4	62.5	62.3	62.7	63.1	63.0	62.3

IRON AND STEEL

1919 Rate ^a	109.0	109.0	108.3	108.2	107.2	107.2	107.1	106.1	106.3	106.4	106.6	106.6
1920 Rate ^a	107.0	111.7	113.9	114.0	115.1	115.2	116.9	117.4	117.9	118.5	118.9	118.8
Earnings					71.3	70.5	70.9	70.8	70.8	72.4	73.5	68.4
1921 Rate ^a	116.8	110.8	107.1	105.6	104.2	98.5	98.0	93.0	87.7	85.5	84.8	84.7
Earnings	65.5	61.3	59.8	59.5	56.7	52.3	46.0	47.1	46.4	44.5	43.2	43.0
1922 Rate ^a	83.6	82.8	82.2	82.1	83.0	83.6	85.2	85.5	94.1	95.5	96.4	96.5
Earnings	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	43.6	45.3	51.7	54.8	54.2	54.0
1923 Rate ^a	96.9	97.7	98.1	100.0	105.6	105.8	106.4	106.8	109.6	110.1	110.0	110.0
Rate ^b				100.0	107.0	107.1	107.5	107.6	111.4	112.0	111.9	112.0
Earnings	51.9	53.4	52.7	57.3	58.6	60.3	59.4	59.9	64.3	66.0	66.8	64.9
1924 Rate ^a	112.0	112.1	112.1	112.1	112.1	112.1	111.8	111.8	111.8	111.8	111.7	111.7
Earnings	63.7	64.0	63.8	63.9	63.3	63.5	63.9	64.1	64.2	63.7	63.7	61.9
1925 Rate ^b	111.7	111.6	111.6	111.6	111.6	111.6	111.6	111.5	111.5	111.4	111.4	111.3
Earnings	63.3	63.2	63.1	63.5	63.5	63.3	62.7	63.4	63.3	63.6	62.9	63.7
1926 Rate ^b	111.3	111.5	111.5	111.6	111.7	111.7	111.7	111.7	111.7	111.8	111.8	111.8
Earnings	62.7	62.9	63.2	63.4	63.5	62.9	63.4	63.0	63.7	63.6	65.6	65.8
1927 Rate ^b	111.8	111.8	111.8	111.8	111.7	111.7	111.7	111.7	111.7	111.7	111.7	111.7
Earnings	64.0	64.1	64.6	64.6	64.0	64.3	64.4	64.5	64.5	64.5	64.2	64.8
1928 Rate ^b	111.7	111.7	111.6	111.6	111.6	111.6	111.6	111.6	111.6	111.6	111.6	111.6
Earnings	64.3	64.2	64.8	63.7	64.3	64.3	64.3	64.6	65.1	65.2	65.5	65.8
1929 Rate ^b	111.6	111.6	111.6	111.6	111.7	111.7	111.7	111.7	111.7	111.7	111.7	111.7
Earnings	65.7	64.8	64.8	64.9	65.2	65.3	65.2	65.7	66.2	66.1	65.3	65.5
1930 Rate ^b	111.7	111.7	111.7	111.7	111.7	111.6	111.5	111.5	111.5	111.4	111.4	111.4
Earnings	66.7	65.9	66.0	66.3	66.2	66.2	66.6	66.7	65.5	66.0	65.7	65.6
1931 Rate ^b	111.4	111.3	111.1	111.1	111.0	111.0	110.9	110.8	63.7	58.8	58.2	59.0
Earnings	67.1	64.4	64.9	65.4	65.6	65.5	65.3	65.6				

TABLE A (cont.)

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
<i>1919</i>												
Rate ^a	97.2	97.2	97.2	97.2	97.4	98.1	99.1	100.0	100.7	100.9	101.1	101.7
<i>1920</i>												
Rate ^a	102.5	103.5	104.5	106.4	110.1	111.4	111.4	111.7	111.7	111.8	111.8	111.4
Earnings						59.3	59.1	59.8	59.8	59.9	59.9	60.2
<i>1921</i>												
Rate ^a	110.6	109.4	108.2	106.3	104.7	103.8	102.1	101.6	100.2	98.4	98.2	97.8
Earnings	59.5	58.6	56.9	55.7	49.6	49.8	49.5	48.5	47.4	46.1	46.2	46.1
<i>1922</i>												
Rate ^a	97.1	96.7	96.1	95.8	95.9	95.7	95.9	96.0	96.3	96.5	96.7	96.8
Earnings	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	44.5	44.7	45.1	45.3	46.3	46.8
<i>1923</i>												
Rate ^a	97.7	98.0	98.2	100.0	102.8	103.1	103.1	103.2	103.2	103.2	103.3	103.3
Rate ^b				100.0	103.5	103.9	103.9	104.0	104.0	104.0	104.1	104.1
Earnings	46.6	47.2	47.5	50.1	51.0	50.9	51.6	52.4	51.4	52.2	51.7	52.0
<i>1924</i>												
Rate ^b	104.0	104.0	104.0	104.0	104.0	104.0	104.0	104.0	103.8	103.8	103.7	103.7
Earnings	52.2	52.2	52.3	52.2	52.3	52.7	52.7	53.7	52.3	53.5	53.8	53.4
<i>1925</i>												
Rate ^b	103.7	103.7	103.7	103.7	103.7	103.7	103.7	103.7	103.7	103.8	103.8	103.8
Earnings	52.8	52.4	53.3	53.1	53.0	53.0	52.9	52.9	52.9	53.1	52.9	52.9
<i>1926</i>												
Rate ^b	103.8	103.8	103.8	103.8	103.8	103.8	103.8	103.8	103.8	103.8	103.8	103.8
Earnings	52.6	52.8	52.9	51.8	52.2	52.8	52.8	52.5	53.1	52.9	53.2	53.2
<i>1927</i>												
Rate ^b	103.8	103.8	103.8	103.8	103.8	103.8	103.8	103.8	103.8	103.8	103.8	103.8
Earnings	53.7	53.4	53.8	53.7	53.5	53.4	52.8	52.5	52.8	53.4	53.2	53.5
<i>1928</i>												
Rate ^b	103.8	103.8	103.8	103.8	103.8	103.8	103.8	103.8	103.8	103.8	103.8	103.8
Earnings	53.4	53.7	53.4	53.5	53.1	53.5	52.9	53.0	53.2	53.6	53.3	53.6
<i>1929</i>												
Rate ^b	103.8	103.8	103.8	103.8	103.8	103.8	103.8	103.8	103.8	103.8	103.8	103.8
Earnings	54.4	54.3	54.4	54.3	53.8	54.1	54.2	53.7	53.7	54.3	54.7	53.7
<i>1930</i>												
Rate ^b	103.8	103.8	103.8	103.8	103.8	103.8	103.8	103.7	103.7	103.7	103.6	103.6
Earnings	54.2	54.0	53.9	53.4	54.0	53.7	54.3	54.0	54.7	54.4	55.5	54.8
<i>1931</i>												
Rate ^b	103.2	103.0	103.0	102.9	102.2	101.6	101.5	101.2	101.2	101.8	101.6	101.8
Earnings	54.9	54.2	54.3	53.9	54.0	54.1	53.0	53.0	52.3	51.8	51.6	51.8

TABLE A (concl.)

	Jan.	Feb.	March	April	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1927												
Rate ^a	105.5	105.5	105.5	105.5	105.5	105.5	105.5	105.5	105.5	105.5	105.5	105.5
Earnings	51.3	51.5	51.2	50.5	50.5	50.4	51.1	50.8	51.2	51.1	50.6	50.9
1928												
Rate ^b	105.5	105.5	105.5	105.5	105.5	105.5	105.5	105.5	105.5	105.5	105.5	105.5
Earnings	51.0	51.2	51.0	50.8	51.1	50.9	51.1	51.7	51.4	51.5	51.4	50.9
1929												
Rate ^b	105.5	105.5	105.5	105.5	105.5	105.5	105.5	105.5	105.5	105.6	105.6	105.6
Earnings	51.2	51.1	52.0	51.1	51.1	51.7	51.1	51.5	51.3	51.4	52.7	53.1
1930												
Rate ^b	105.6	105.6	105.6	105.5	105.5	105.4	105.4	105.3	105.3	105.2	105.2	105.2
Earnings	52.9	53.4	53.8	53.2	53.5	53.0	53.0	52.4	53.1	53.1	51.8	51.8
1931												
Rate ^b	105.2	105.2	105.2	105.1	105.1	105.0	105.0	104.9				
Earnings	52.5	52.4	52.3	52.0	51.4	51.3	51.5	51.3	51.5	50.9	46.6	45.9
WOOLENS AND WORSTEDS												
1919												
Rate ^a	83.9	83.9	83.9	83.9	83.9	96.8	96.8	97.0	97.2	97.2	97.2	110.9
1920												
Rate ^a	110.9	110.9	110.9	111.1	111.1	126.0	126.0	126.0	126.0	126.0	125.6	125.6
Earnings						58.0	57.9	57.6	57.6	58.0	56.9	57.0
1921												
Rate ^b	100.6	98.5	98.1	98.1	98.1	98.1	98.1	98.1	98.1	98.1	98.1	98.1
Earnings	50.9	47.9	46.9	46.9	47.7	47.5	46.0	45.9	46.1	46.5	46.2	46.3
1922												
Rate ^a	98.1	98.1	97.7	97.7	97.7	97.7	97.6	97.6	98.2	98.2	98.3	98.5
Earnings	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	45.5	45.2	45.7	46.6	46.2	47.2
1923												
Rate ^a	98.6	98.7	98.9	100.0	107.2	107.3	107.3	107.3	107.3	107.4	107.4	107.4
Rate ^b				100.0	109.4	109.4	109.5	109.5	109.5	109.5	109.5	109.5
Earnings	46.4	46.3	47.1	48.3	52.6	52.1	52.4	52.1	52.5	52.4	52.3	52.1

APPENDIX B

Wage Rate Indexes, with Notes on their Construction, and Average Hourly Earnings on Class I Railroads, United States

In constructing an index of wage rates for all employees on Class I railroads paid by the hour, our starting point is the decision of the Railway Labor Board, effective May 1, 1920, granting a 22 percent increase to all railroad employees. Making April 1920 the base, we compute the index for May 1920 (centered at the middle of the month) to be 122.0. All subsequent changes are converted to link relatives and chained to this base. The effective dates of changes in wage rates are used rather than the dates of the decisions or bargaining agreements that brought them about.

Information on changes in wage rates is from *Wages and Labor Relations in the Railroad Industry, 1900-1941* by H. E. Jones (Bureau of Information of the Eastern Railroads), and *Historical Development of the Railroad Wage Structure* by B. M. Jewell and G. M. Cucich (American Federation of Labor, Railway Employees' Department, Chicago, 1941). When absolute changes in cents per hour or day are given, the wage rate before the change is estimated from *Wage Statistics of Class I Steam Railways in the United States* (ICC monthly release), in addition to these two sources. The percentage change in wage rates can then be estimated.

The percentage of all Class I railroad workers affected by changes in wage rates is necessary for weighting purposes. Whenever a change involves a given occupation on all railroads the weights can be computed directly from the ICC monthly release. When a change affects only workers in a given occupation in one of the three regions (East, West, or Southeast) or on a specific railroad the weights are estimated by assuming that the relative composition of occupations on each railroad and in each region is identical with that for all Class I railroads. The ratio of industry-wide employment in a given occupation to total railroad employment (Class I) is then multiplied by the ratio of employment on a given railroad or in a given region, as the case may be, to total railroad employment. This procedure is illustrated by an example showing how the weighted percentage change in the index of wage rates from Janu-

ary to February 1927 was computed. The sum of the products, .307, divided by the total weights, 100, is +0.3 percent. Since the index for January 1927 is 105.1, February 1927 becomes 105.4.

	FIREMEN IN EAST	CONDUCTORS & TRAINMEN IN SOUTHEAST	OTHER R.R. EMPLOYEES	TOTAL
1) % change in wage rates	+7.5	+7.5	0	
2) Ratio: emp. in region affected to total emp. on Class I roads (%)	43.0	19.8		
3) Ratio: no. of emp. in given occupa- tion to total emp. on Class I roads (%)	4.1	11.7		
4) % of emp. affected, weights (2 x 3)	1.8	2.3	95.9	100.0
5) Product (1 x 4)	.135	.172	0	.307

In the case of clerical and station employees, signalmen, and telegraphers receiving increases from individual railroads during 1923-30, a tally is made for each occupation, listing chronologically (by effective dates) the specific railroads affected and the amount or percentage of increase in wage rates. As in constructing the manufacturing wage rate indexes, when the increase is less than 0.1 percent from one month to another, it is cumulated until 0.1 percent is reached. When, during 1923-24 and again in 1926, no precise effective date is mentioned for the increase granted by individual roads, ultimately affecting all workers in the mechanical trades, the weighted percentage change is distributed equally over each period. In 1926, for example, the weighted percentage change in wage rates received by this group, 1.2, is distributed so that March, June, September and December reflect 0.3 percent increases.

Data on the number of employees on individual roads and in the three regions of the United States are from *Statistics of Railways in the United States* (ICC annual reports). For the tallies, tables in the Jewell-Cucich study are used.

TABLE B
 Index of Wage Rates, Employees on an Hourly Basis, Average Hourly Earnings,
 Employees on an Hourly and Daily Basis.* Class I Railroads, United States, 1920-1939

Base of index of wage rates is April 1920:100; average hourly earnings in cents
 are corrected for seasonal variation

	Jan.	Feb.	March	April	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
<i>1920</i>												
Rate				100.0	122.0	122.0	122.0	122.0	122.0	122.0	122.0	122.0
Earnings				n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
<i>1921</i>												
Rate	122.0	122.0	122.0	122.0	122.0	122.0	107.4	107.4	107.4	107.4	107.4	107.4
Earnings	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	60.9	60.4	59.8	60.4	60.0	59.9
<i>1922</i>												
Rate	107.4	107.4	107.4	107.4	107.4	107.4	99.8	99.8	99.8	100.5	100.5	100.5
Earnings	60.3	60.3	60.4	60.6	60.2	60.4	57.8	57.6	58.2	58.9	58.8	59.2
<i>1923</i>												
Rate	100.5	100.5	100.6	100.6	100.6	100.8	100.8	100.8	100.8	101.1	101.4	101.6
Earnings	58.6	58.8	58.7	59.3	59.1	59.2	59.6	59.3	59.6	59.5	59.5	59.6
<i>1924</i>												
Rate	102.2	102.2	102.2	102.4	102.4	102.6	102.6	102.6	102.8	102.8	102.8	103.0
Earnings	59.5	59.4	60.2	60.0	60.1	60.6	60.4	60.7	60.3	60.5	60.8	60.7
<i>1925</i>												
Rate	103.3	103.3	103.3	103.3	103.3	103.3	103.3	103.3	103.3	103.3	103.3	103.3
Earnings	60.6	60.8	60.9	60.7	61.1	60.8	60.9	61.3	60.9	61.2	61.5	61.1
<i>1926</i>												
Rate	103.3	103.3	103.6	103.6	103.7	104.0	104.0	104.0	104.3	104.3	104.3	105.1
Earnings	61.7	61.6	61.5	61.5	61.8	61.4	61.5	61.9	61.7	62.2	61.9	62.4
<i>1927</i>												
Rate	105.1	105.4	105.7	105.7	105.8	105.8	105.9	106.2	106.3	106.3	106.4	106.5
Earnings	62.8	62.7	62.4	62.5	62.9	62.4	63.1	63.1	63.3	63.7	63.2	63.5
<i>1928</i>												
Rate	106.5	106.5	106.6	106.6	106.9	106.9	106.9	106.9	106.9	106.9	106.9	107.0
Earnings	63.9	63.3	63.6	64.1	63.4	63.6	64.3	63.8	64.4	64.2	64.3	64.9

APPENDIX C

Cost of Fringe Benefits in Anthracite Coal Mining

Fringe payments is a phrase that has gained currency to describe payments to wage earners by employers as a supplement to wages paid on the basis of hours worked or production completed. The stipulations concerning wage rates are regarded as the heart of the wage contract while the stipulations concerning the supplements are deemed to be on the periphery or fringe. During 1949 wage supplements have occupied the center of the stage in collective bargaining negotiations. However, supplements in some form, as we define them for purposes of measurement, have existed for at least several decades. Demands for fringe benefits, originating in the deep-seated desire of workers for security and leisure, could be pressed in recent years because of the great strength of trade unions and full employment. Moreover, the policy of wage stabilization during the war years served to focus attention on the possibilities of altering the fringes of the contract without touching its heart.

Until wage supplements began to loom large in the total picture employers could regard average hourly earnings as a close approximation to the average cost of employing labor for an hour. As wage supplements become more important, average hourly earnings become less adequate as an approximation to the cost of an hour's labor. For to the employer supplements are additional costs of employing labor and are not reflected in average hourly earnings.

We define wage supplements as the benefits in cash or kind received by wage earners as a result either of state or federal legislation or of collective bargaining negotiations. The expenditures on benefits are paid in whole or in part by employers. The following is a reasonably comprehensive list of wage supplements:

- I Wage supplements provided by legislation
 - A Workmen's compensation
 - B Old-age and survivors insurance
 - C Unemployment compensation
 - D Sickness insurance

- II Wage supplements provided by collective agreements
 - A Pension and retirement payments
 - B Disability payments
 - C Group life insurance
 - D Hospitalization
 - E Medical care
 - F Travel time
 - G Paid vacations
 - H Paid holidays

The first three wage supplements, or rights thereto, provided by legislation are received by a very high percentage of wage earners except those employed in agriculture, domestic service, or nonprofit institutions. Sickness insurance, the most recent of these social security schemes, is operative in only a few states. The share and amount of these expenditures borne by employers is published in government reports. The extent of wage supplements under collective agreements varies from industry to industry, and from firm to firm within a given industry. Information on which wage supplements are in force in a given industry can be obtained from the collective agreement and the expenditures of the employer estimated. The estimate, however, will be more or less accurate only if the industry is completely unionized, or virtually so, and the collective agreement is industry-wide.

The anthracite coal industry fulfills these requirements; accordingly, we chose it to illustrate the difference between average hourly earnings and average labor cost per hour worked and the changes in these magnitudes in recent years.

Employers spent 39 cents on wage supplements in anthracite coal mining in 1948 and only 8 cents in 1939 for each hour worked by each wage earner (Table C). Therefore the average cost of an hour's labor in 1948 was not \$1.81, as indicated by the BLS figures on average hourly earnings, but \$2.20 (average hourly earnings, \$1.81, plus expenditure on supplements per manhour worked, 39 cents). Similarly, in 1939 the average hourly cost was \$1.00, not 92 cents, the amount reported as average hourly earnings.

Thus, in the course of a decade, expenditures on wage supplements quintupled while average hourly earnings about doubled. Relatively, expenditures on wage supplements were two and a third

TABLE C
Expenditures of Employers on Wage Supplements, Anthracite
Coal Mining, 1939 and 1948

TYPE OF WAGE SUPPLEMENT	EXP. OF EMPLOYERS	
	1939	1948
1 Workmen's compensation	\$5,470,000	\$13,742,000
2 Old-age and survivors insurance	1,100,000	2,230,000
3 Unemployment compensation	3,530,000	2,294,000
4 Health and welfare fund	8,397,000
5 Paid vacations	6,254,000
6 Travel time	18,220,000
7 Total wage supplements	\$10,100,000	\$51,137,000
8 Total manhours worked	123,969,000	132,239,000
9 Exp. on wage supplements per manhour worked (7 ÷ 8)	\$0.08	\$0.39
10 Average hourly earnings	0.92	1.81
11 Exp. on wage supplements per manhour worked as % of av. hourly earnings (9 ÷ 10)	8.7%	21.5%

times as large in 1948 as in 1939. In the latter year, for example, expenditures on supplements per manhour added 8.7 percent to hourly earnings; 10 years later, 21.5 percent.

An investigator relying solely on average hourly earnings statistics as currently compiled would find that the cost of labor per hour had increased 97 percent between 1939 and 1948. If expenditures on wage supplements are included, the cost of a manhour of labor has risen 120 percent. The evidence suggests that expenditures on wage supplements continued to increase in 1949. Thus, if royalty payments into the Health and Welfare Fund in 1948 had been at the 1949 rate, 20 cents per ton, instead of the 1948 rate, 10 cents, on all tonnage mined from January 1 to July 15 and 20 cents thereafter, expenditures on all wage supplements per manhour worked would have been 41 cents—nearly 23 percent of average hourly earnings in 1948 and 22 percent of average hourly earnings in 1949.

In 1948 about three-fifths of expenditures on wage supplements were incurred for workmen's compensation and travel time. In less hazardous industries and when payment for travel time is less common, such as most branches of manufacturing, supplementary labor costs would constitute a smaller proportion of average hourly earnings.

Notes on Sources of Data and Methods of Estimating

The numbered paragraphs that follow correspond to the lines in Table C.

The first three wage supplements represent legislative social security programs operative in Pennsylvania, the seat of most anthracite coal mines. The last three wage supplements are stipulated in the collective agreement between the owners of anthracite coal mines and the anthracite coal miners represented by the United Mine Workers. The terms of the collective agreements operative in 1939 and 1948 were summarized for us by the Division of Industrial Relations, Bureau of Labor Statistics, Department of Labor.

1) Workmen's compensation: derived by applying the average premiums for workmen's compensation and occupational disease insurance to the annual payrolls of production workers.

Payrolls in 1948 were estimated by multiplying total manhours worked each month by average hourly earnings for the given month and adding the 12 monthly totals. For our estimates of total man-hours worked each month see 8. Average hourly earnings in anthracite mining were compiled by the BLS. The average premium for workmen's compensation in 1948 was \$3.58 per \$100 of payroll; the average premium for occupational disease insurance was \$1.62 (letter from the Coal Mine Section, Pennsylvania Compensation Rating and Inspection Bureau, Harrisburg).

Payrolls in 1939, from the 1939 Census of Mineral Industries, represent payments to wage earners only. The premiums in 1939, reported by the Rating Bureau in correspondence, were \$9.51 for the first half of the year and \$7.22 for the second half for workmen's compensation and \$0.90 during the entire year for occupational disease insurance. The Bureau cautions, however:

"Several things must be taken into consideration in order to make an intelligent comparison between rates in effect in 1939 and in 1948. In 1939 there was a much smaller amount of insured anthracite business than there is at the present time. At that time, most of the mines were rather small and the loss experience in that type of mine has always been unfavorable. At the present time, the larger part of the underground mining that is insured is covered by fifteen or twenty medium-sized or large mines. This in itself accounts for a tremendous improvement in the loss experience."

In the light of this information it seemed that errors would be

minimized by applying the average workmen's compensation premium of 1948 to the payroll total for July-December 1939 and this premium, increased 31.72 percent ($\$9.51 \div \7.22), to the January-June 1939 payroll. The annual payroll was divided into semi-annual payrolls on the basis of the BLS monthly payroll indexes for 1939. The occupational disease insurance premium, \$0.90, reported for that year was applied to the annual 1939 payroll. The estimate for 1939 is probably somewhat low.

2) Old-age and survivors insurance: payroll taxes paid by employers were obtained by correspondence with the Division of Research and Statistics, Social Security Administration, Federal Security Agency. They include also the taxes paid on the payrolls of non-production employees. To confine the costs to production workers we multiplied the reported total for 1939 by 93.87 percent, the ratio of wage earners to all employees reported for anthracite mining in the 1939 Census of Mineral Industries. The comparable percentage for 1948, according to the BLS, was 94.75. The use of this adjustment percentage assumes that the relation between taxable wages of production workers and total taxable wages is the same as the above relation based on the number employed. This adjustment probably does not remove all the taxes paid on the taxable earnings of nonproduction workers, especially in 1939.

3) Unemployment compensation: payroll taxes paid by employers; source and adjustments as in 2.

4) Health and welfare fund: financed by employers by royalty payments on tonnage mined. The royalty was 10 cents per ton from January 1 to July 15, 1948 and 20 cents per ton thereafter. The weekly and monthly production figures are compiled by the Bureau of Mines and published in the *Mineral Industry Surveys*. There was no such fund in 1939.

5) Paid vacations: the collective bargaining agreement, as summarized by the Bureau of Labor Statistics, provides that:

"Vacation compensation shall be at the rate of one hundred (\$100) dollars per year for each employee and payment of the full amount of \$100 per year shall be predicated on an employee having worked in each of the twenty-four semi-monthly pay periods in the year ending June 15.

Where an employee has not worked in all of the semi-monthly periods for any cause, compensation payable to him shall be a pro rata share of the \$100 on the number of pay periods actually worked for his employer

in said year provided . . . that no vacation compensation shall be payable to any employee who has worked for his employer in less than six semi-monthly pay periods in each vacation year."

We do not know of any data that classify anthracite mine workers employed as of a specific date by the number of pay periods worked in the preceding 12 months. However, from the statistics compiled by the Bureau of Old-Age and Survivors Insurance it is possible to classify these workers by the number of calendar quarters in which they had some work during the calendar year. The latest available distribution is for 1947. In using this distribution we are obliged to assume that some work in a calendar quarter means work in all pay periods in a calendar quarter. This is probably a reasonably good assumption in years of full employment such as 1947 and 1948. Whatever overstatement results from this assumption is offset in part at least by the further assumption that no one working for only one quarter worked for as many as 6 semi-monthly pay periods. The percentage distribution of workers by employment in 4, 3, 2, and 1 quarters applied to the average number of wage earners in 1948 (estimated by the BLS) yields an estimate of the number of workers entitled to vacation pay of \$100, \$75, \$50, and \$0, respectively. The sum of the products of the number of workers and the respective amounts of vacation pay yields an estimate of total vacation pay. There was no provision for paid vacations in 1939.

6) Travel time: the collective bargaining agreement stipulates that: "The present travel time shall be \$1.339 per shift with the understanding that contract workers, in keeping with the custom and practice, shall be paid this amount per start. This is on the basis of an accepted and agreed travel time for all inside employees of forty-five (45) minutes per day, at a rate of \$1.191 per hour at rate and one-half, taking into account the extreme difficulty of measuring accurately the actual travel time of individual underground workers."

The cost of travel time then is the product of the number of man-shifts for underground workers and \$1.339. The Bureau of Mines compiles each year statistics on the average number of days worked and of underground workers. The ratio of underground workers to all production workers in 1948 was applied to the estimate of all production workers in 1948 (BLS) to obtain an estimate of the average number of underground workers in 1948. The latter figure

multiplied by the average number of days worked equals the number of manshifts. This, in turn, multiplied by \$1.339 yields the estimated cost of travel time. There was no provision for travel time in 1939.

8) Total manhours worked: total manhours paid for was first estimated. This was accomplished for 1948 in the following manner: For each month the average length of the workweek was multiplied by the number employed and by the number of weeks in the month. The sum of these 12 products equals the estimated manhours paid for. Manhours paid for minus the manhours involved in paid vacations and in travel time yields manhours worked. The manhour equivalent of paid vacations was derived by dividing the cost of paid vacations (line 5) by average hourly earnings in June and July 1948 (BLS). The amount of travel time equals the number of manshifts multiplied by 45 minutes.

In 1939 manhours worked and paid for are identical. The total is reported in the 1939 Census of Mineral Industries.

10) Average hourly earnings: the figures for 1939 and 1948 are from BLS compilations.

2,005,656

National Bureau of Economic Research, Inc.

Creamer, Daniel Barnett, 1909-

Behavior of wage rates during business cycles, by Daniel Creamer with the assistance of Martin Bernstein. (New York, National Bureau of Economic Research, 1950, 66 p. diagrs. 23 cm. (National Bureau of Economic Research, Occasional paper 84))

1. Wages. 2. Business cycles.

1. Title.

(Series)

H11.N2432 no. 34

331.215

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CATALOG ENTRY

AUTHOR 05AA National Bureau of Economic Research.
05BA _____
05CA _____
05DA _____
05EA _____

TITLE 07AA Behavior of wage rates during business cycles [by]
07BA Daniel Creamer with the assistance of Martin Bernstein.
07CA _____
07DA _____
07EA _____
07FA _____

EDITOR/
TRANSLATOR 09AA _____
09BA _____

SERIES 11AA (National Bureau of Economic Research. Occasional paper
11BA 34).
11CA _____

PLACE/PUBLISHER 13AA [New York] National Bureau of Economic Research [1950].
DATE 13BA _____
ILLUS 13CA _____

COMMENTS 15AA _____

VOLUME 19AA _____
19BA _____

LANGUAGE 21AA _____

Restrictions 23AA _____ 23AB _____ 23AC _____ 23AD _____
R.R. No. 25AA R00 1098 C Roy % Mic 25AB 10000 Roy % Xerox 25AC 10000
LC Class No. 27AA _____ LC Card No. 27AB 50-12777

COMMENTS:
1/6/78pb

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