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3 observations in any subgroup, the basis for this conclusion is rather tenuous.

INDUSTRY GROUP	CORRESPONDING TURNS OF RATES & EARNINGS AT MAJOR TURNING POINTS IN BUSINESS (number)	ROUGH COINCIDENCES
All manufactures	4	4
Automobiles	3	2
Boots and shoes	3	2
Electrical goods	1	0
Iron and steel	3	2
Paper and pulp	3	3
Rubber tires and tubes	2	1
Silk and rayon	3	2
Slaughtering and meat packing	2	2
Woolens and worsteds	3	3

The timing of cyclical turns in average hourly earnings at major turning points in business activity seems to be a somewhat less reliable indicator of the timing of cyclical turns in wage rates for individual branches than for aggregate manufactures. In the railroad industry, however, they seem to have been a reliable guide. For example, all turning points in wage rates and in average hourly earnings either coincided or differed by no more than 2 months (Chart 4). That is, every substantial change in average hourly earnings coincided with a similar change in wage rates.

Although the movement of hourly earnings reflects various adjustments made by management to changes in the level of production, at the major turning points our materials on manufactures and railroads indicate that the main determinant of the reversal in the movement of hourly earnings seems to be the reversal in the movement of wage rates themselves.

7 *Cyclical Amplitudes of Wage Rates and Average Hourly Earnings*

Our data have little to say positively about the similarity in the amplitude of cyclical fluctuations in wage rates and average hourly earnings. Charts 1 and 2 suggest that the relative changes in average hourly earnings in manufacturing are substantially larger than in wage rates during corresponding cyclical phases. Unfortunately, the assumption required in constructing our indexes of wage rates in manufacturing—that the establishments that did not report a change in wage rates in a given month made no change—causes the index to understate seriously the actual magnitude of changes in wage rates. The series on average hourly earnings are not sub-

ject to this sort of bias but, as pointed out above, other factors may produce differences in the magnitude of changes in earnings as compared with wage rates. Changes in overtime pay, in the relative number of skilled and unskilled workers or of high and low wage plants, in the relative number of time- and piece-rate workers, in the productivity of piece workers, and up- or downgrading may affect hourly earnings. Their net effect upon the amplitude of hourly earnings relative to that of the type of index we have been able to construct (see App. A) is not clear, and the empirical data are too fragmentary to settle the matter.

The data for the railroad industry are more enlightening. As previously explained, under-reporting in the wage rate index for Class I railroads must, under the circumstances, be negligible. In this index, therefore, our sampling error is deemed to be very small. In 2 of the 3 cyclical phases the amplitudes of average hourly earnings and wage rates are virtually identical (Table 4). In the third phase, the long expansion from the end of 1922 to the end of 1931, average hourly earnings had an 86 percent larger relative amplitude.

TABLE 4

Relative Amplitudes of Cyclical Fluctuations in Wage Rates and Average Hourly Earnings, Class I Railroads, United States, 1922-1937

	PHASE OF CYCLE IN		RELATIVE AMPLITUDE*	
	Rates	Earnings	Rates	Earnings
Expansion	9/22- 1/32	8/22-11/31	9.6	17.9
Contraction	1/32- 6/34	11/31- 6/34	10.0	10.3
Expansion	6/34-10/37	6/34-10/37	19.7	20.0

* Total change during the phase expressed as a percentage of the standing of the series at the beginning of the phase.

However, half of the excess in this long phase occurred after March 1929 and for a reason that is probably peculiar to the railroad industry: the postponement of maintenance work during contractions. Average hourly earnings continued upward between March 1929 and January 1932 although wage rates were virtually constant. The continued rise in hourly earnings can be explained by the relatively larger decline in the manhours worked by the lowest paid (those receiving 54 cents or less per hour in 1929) than in those worked by all other hourly workers. Thus, the manhours worked by the lowest paid accounted for 46 percent of the manhours worked by all other hourly workers in August 1929,

the peak of this percentage; by January 1932, when the rise in average hourly earnings halted, this percentage was reduced to 36.[21] The decline is explained by the fact that most of the lowest paid workers are engaged in maintaining ways and structures, and this work was reduced to a minimum.

In manufacturing industries, on the contrary, maintenance workers constitute a relatively small percentage of the total labor force; consequently, cycles in maintenance work would not cause substantial cyclical changes in the composition of the labor force. On the other hand, the changing productivity of workers paid by the piece, a factor that conceivably could make for larger amplitudes in average hourly earnings than in wage rates, would be operative in many branches of manufactures but would figure scarcely at all in the railroad industry.

These considerations suggest that the cyclical amplitudes of rates and earnings are probably about the same except when the occupational composition of the labor force is altered substantially, which in most branches of manufactures seems unlikely during the short period of a business cycle.[22] This assumption is our justification for presenting the cyclical amplitudes of average hourly earnings in manufactures as though they measured the cyclical amplitudes of wage rates. To establish the relative magnitude of the adjustment of wage rates to the changing vicissitudes of business activity, we compare the amplitudes of corresponding cycles in average hourly earnings in manufactures (the price of an hour's labor) first with manufacturing activity represented by factory production and employment, secondly with the prices of materials used in manufacturing represented by the indexes of wholesale prices of

[21] These computations are based upon statistics compiled monthly by the Interstate Commerce Commission. The data have been corrected for seasonal movements.

[22] The smallness of the seasonal correction in our series on average hourly earnings supports our contention that the occupational composition of the labor force in manufacturing industries does not change substantially during short periods since the considerations affecting occupational selectivity in dismissals and hirings at seasonal peaks and troughs are much the same as at cyclical peaks and troughs. It is this selectivity that brings about whatever seasonal movement exists in average hourly earnings. How important the seasonal element has been can be judged by the seasonal amplitudes of our 10 series on average hourly earnings: all manufactures, 0.4; automobiles, 3.0; boots and shoes, 2.9; electrical goods, 1.0; iron and steel, 2.0; paper and pulp, 0; rubber products, 2.2; silk and rayon, 2.1; slaughtering and meat packing, 1.4; woolen and worsted goods, 1.2.

raw and semifinished commodities, and thirdly with the index of wholesale prices of finished goods which represents the prices received for factory production.

Manufacturing activity has fluctuated much more, relatively, than hourly earnings in both expansion and contraction (Table 5). Obviously the same would hold for the full cycle. This has been true also for the wholesale prices of raw materials and with minor exceptions for the wholesale prices of semifinished goods. In other words, of the two principal elements of direct costs, labor and materials, the price of materials has been subjected to relatively larger adjustments both upward and downward and over the entire cycle than the price of labor.

TABLE 5

Amplitude of Fluctuations of Corresponding Specific Cycles in Average Hourly Earnings, Wholesale Prices, and Factory Production and Employment, United States, 1919-1939

PHASE OF SPECIFIC CYCLE	DATE OF CORRESP. PHASE OF BUSINESS ACTIVITY	AMPLITUDE OF CYCLE RELATIVES					
		AV. HRLY. EARN.	WHOLESALE PRICES OF			FACTORY	
			Raw materials	Semi-fin. goods	Fin. goods	Prod.	Empl.
Contraction	1/20- 7/21	−24.0	−71.0	−104.8	−50.1	−39.1	−33.9
Expansion	7/21- 5/23	+15.1	+20.6	+33.0	+8.7	+47.4	+26.2
Contraction	5/23- 7/24	−0.8	−8.6	−20.7	−7.6	−19.0	−13.8
Expansion	7/24-10/26	+3.3	+13.0	+6.0	+7.2	+23.3	+10.0
Contraction	10/26-11/27	−0.4	−14.0	−15.8	−7.4	−5.1	−5.0
Expansion	11/27- 6/29	+3.0	+8.3	+1.9	+3.6	+25.8	+11.5
Contraction	6/29- 3/33	−25.0	−62.4	−47.8	−36.9	−69.8	−49.9
Expansion	3/33- 5/37	+42.1	+54.2	+42.0	+27.9	+80.5	+54.9
Contraction	5/37- 6/38	−0.8	−27.4	−18.6	−10.7	−47.6	−27.7

Based on the business cycle files of the NBER.

Our third comparison of average hourly earnings and wholesale prices of finished goods provides an interesting variation. In all 5 declines the prices received for factory production have decreased, relatively, much more than the price of labor; indeed, in 3, the decline in hourly earnings was scarcely perceptible. However, in 2 of the 4 expansions the relative rise in the price of labor was significantly larger than in the prices received for factory output. The opposite relation obtained in the 2 minor expansions. When we measure amplitudes over the full cycle—adding the amplitude of expansion to the amplitude of contraction without regard to sign—we find that, measuring from trough to trough, hourly earnings had a smaller amplitude than the wholesale prices of finished goods

in 3 of the 4 full cycles. In short, there was usually less adjustment in the price of labor than in the price of factory output.

To explore the implications of these differences for business cycle analysis calls for a broader and deeper framework than is appropriate for this Paper.

8 *Average Hourly Earnings in a Postwar Contraction*

From our analysis of the two decades between World War I and II we turn to the brief period following World War II. In this period there has been at least one contraction in general business—in 1948-49.[23] Factory production reached a peak in October 1948 and declined 17 percent to a low in July 1949; factory employment declined 13.5 percent between its high point of January 1948 and its low of November 1949.[24] Average hourly earnings, on the other hand, did not have any sustained decline, remaining, with negligible deviations, upon the plateau they entered in the last quarter of 1948 until the fourth quarter of 1949.

AVERAGE HOURLY EARNINGS, PRODUCTION AND NONSUPERVISORY WORKERS, ALL MANUFACTURING INDUSTRIES

	1948	*1949*	*1950*
January	$1.302	$1.405	$1.418
February	1.308	1.401	1.420
March	1.310	1.400	1.423
April	1.314	1.401	1.434
May	1.324	1.401	1.441
June	1.340	1.405	
July	1.356	1.408	
August	1.373	1.399	
September	1.386	1.407	
October	1.390	1.392	
November	1.397	1.392	
December	1.400	1.408	

Source: *Monthly Labor Review.*

If in measuring average hourly earnings we could take account of the growing importance of 'fringe benefits,' the plateau would probably be replaced by a gently upward slope (App. C). The decline in general business, however, continued only about 9 months, a period that just about equals the average lag of average hourly earnings behind turns in general business (Table 1). Factory employ-

[23] There is some indication of a contraction in 1945-46. We pass over that period because the cyclical movements are ambiguous and their interpretation uncertain owing to continued enforcement of price and other controls.

[24] Based on seasonally adjusted indexes of factory production and employment published in the *Federal Reserve Bulletin.*