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industries where wage rates are controlled by collective agreements it would be sheer coincidence if a contract expired exactly at the trough of employment or of business activity. And contracts expiring before the trough would hardly be renewed at higher rates.

4 *Similar Lags in the Railroad Industry*

Wage rates in the railroad industry too turn later than business activity or employment (Chart 4). Our index of wage rates for railroads was computed in much the same way as our index for manufactures. However, because railroad wage negotiations are so centralized and public the record of changes in wage rates on Class I railroads is more nearly complete (see App. B).

Wage rates in the railroad industry did not trace mild cycles in the middle 1920's or short phases such as the contraction of 1937-38. Nor did the wage rate index reflect the May 1923 peak. With these exceptions, wage rates turned at each major turn in business: January 1920, July 1921, June 1929, and March 1933 (Table 2). However, they turned 14-31 months later, the lag averaging sightly more than 19 months.[15] Indeed, the lags in 1920 and 1922 are so long that wage rates may be said to run counter to business activity. Compared with the turning points in railroad employment (manhours worked) the lags in wage rates were somewhat shorter but still substantial, ranging from 8 to 29 months.

The average lag in railroad wage rates was about twice that in manufacturing. At two peaks the downturn came 8 and 24 months

TABLE 2

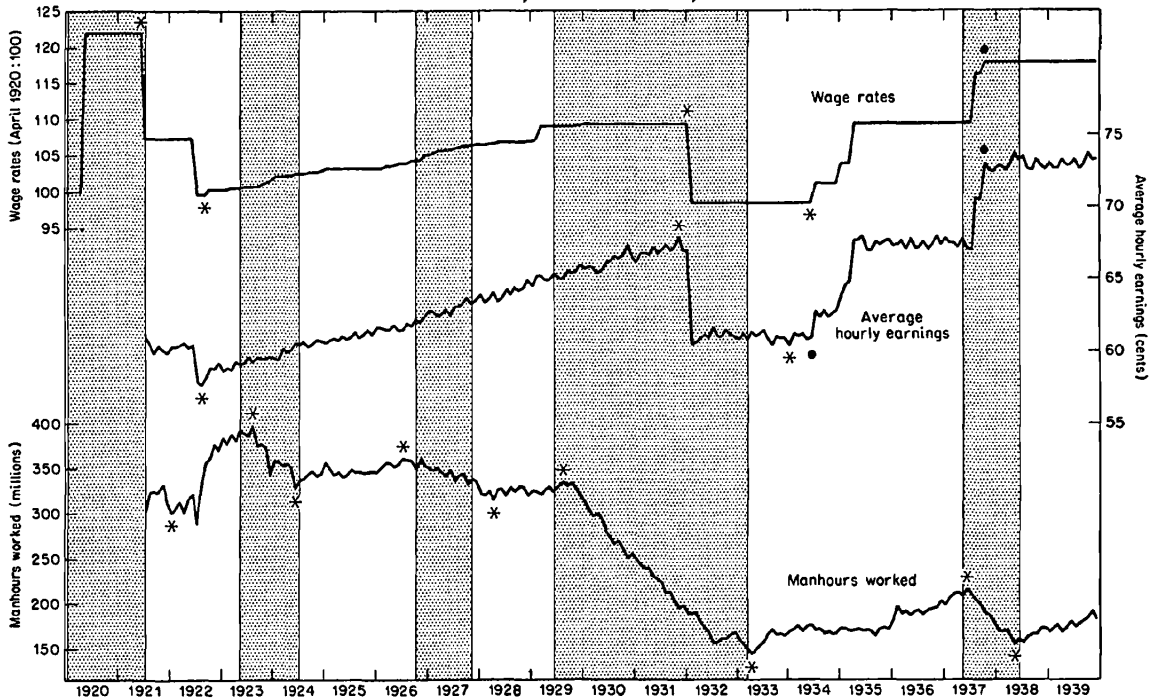
Turning Points in Business, Manhours Worked and Wage Rates
Class I Railroads, United States, 1920-1938

BUSINESS ACTIVITY		TURNING POINTS IN R.R.		LAG OF WAGE RATES BEHIND	
	Turning	Manhours	Wage	Business activity	Manhours worked
Level	points	worked	rates	(months)	
Peak	1/20		6/21	17	
Trough	7/21	1/22	9/22	14	8
Peak	5/23	8/23			
Trough	7/24	6/24			
Peak	10/26	7/26			
Trough	11/27	4/28			
Peak	6/29	8/29	1/32	31	29
Trough	3/33	4/33	6/34	15	14

[15] If the beginning of the wage rate plateau in October 1937, which continued until the latter part of 1941, is taken as a peak, the lag would be 5 months behind the peak of business activity in May 1937.

Chart 4

Index of Wage Rates, Average Hourly Earnings, and Total Manhours Worked Class I Railroads, United States, 1920–1939



Shaded periods are contractions in business activity.
Average hourly earnings relate to employees on hourly and daily basis; wage rates and manhours worked on hourly basis.

* Turning points according to standard method.
• Turning points according to alternate method.

after the turn in factory wage rates; at two troughs the upturn in railroad wage rates came 5 and 13 months later.

The longer lags of railroad wage rates can be traced to institutional differences. Unlike the manufacturing industries during the greater part of these two decades, railroad wage rates have been changed only after prolonged negotiations between management and unions. For in the railroad industry about half of all workers were members of trade unions between 1923 and 1933 and about 70 percent were covered by trade union agreements by 1935.[16] Wage negotiations typically were carried on with the carriers organized in regional or national associations, and the federal government has maintained an elaborate system of mediation to forestall the collapse of collective bargaining.

A second institutional difference also serves to lengthen negotiations on wage rates: changes in prices of railroad service, freight rates and passenger fares, must be approved by the Interstate Commerce Commission.

How collective bargaining may create lags is well illustrated by the negotiations of the 1937 changes in wage rates, which are not unrepresentative of the process. Harry E. Jones, Executive Secretary, Bureau of Information of the Eastern Railways, describes the negotiations (*Wages and Labor Relations in the Railroad Industry, 1900-1941,* pp. 104-5):

"Wages for all classes of railroad employees having been restored on April 1, 1935, to the levels prevailing in 1931, and the year 1936 having witnessed some revival in business, railroad labor in the spring of 1937 presented demands for wage increases. These demands were, in the first instance, presented by the fourteen nonoperating organizations on March 4, 1937. . . . These demands were followed on March 22nd by demands from the four transportation brotherhoods and the switchmen. . . . Negotiations with respect to the two sets of demands proceeded separately.

The negotiations with the nonoperating organizations reached an impasse on June 29th, when the National Mediation Board proffered its services. As a result an agreement was reached on August 5, 1937, which was ratified by the general chairmen of the organizations on August 13th, and which established increased rates of pay effective as of August 1st. . . .

[16] Wolman, op. cit., pp. 123 and 131.

Meanwhile, negotiations had been proceeding with the engine and train service organizations. A strike vote was taken which authorized the executives of the brotherhoods to call a strike in the event that the negotiations failed to produce a satisfactory solution. Mediation was proffered by the National Mediation Board on August 25th, and an agreement was finally closed on October 3rd . . . (retroactive to October 1).

Hardly had these wage increases been placed in effect than a severe business recession set in during the fall and winter of 1937."

Indeed, by March 1937 railroad traffic began to decline, and by June railroad employment had reached its peak; the recession in general business activity is dated from May 1937. Thus increases in wage rates, demanded at the peak in traffic and 3 months before the decline in employment, became effective 2 to 4 months after the peak of employment and 5 to 7 months after the falling off of rail traffic.

This process seems to have hardened with the passage of the Railway Labor Act in 1926 which formalized the collective bargaining procedures and federal mediation, reducing sensitivity to pressures for downward adjustments. Thus, the reduction of wage rates in the first major depression was initiated 17 months after the peak in business activity while the first reductions in the Great Depression were not instituted until 31 months after the high point of the preceding boom.[17] Moreover, the severe but short-lived contraction of 1937-38 caused merely a leveling off, not a reduction, in railroad wage rates.

This experience in the railroad industry suggests that as changes in manufacturing rates become more and more subject to collective bargaining the lags may become even longer.

5 *Lags also in British Manufacturing Industries*

Wage rates in British manufacturing industries constitute a third sample that can be analyzed for its timing behavior. A monthly index of wage rates in 64 minor industries and 12 major industry groups was prepared some years ago by Lorie Tarshis for the National Bureau of Economic Research. We have, however, confined our investigation to the 7 major industry groups that comprise

[17] As in manufactures, railroad wage rates prior to the 1920-21 contraction had increased very rapidly whereas during the 'twenties they rose little.