

This PDF is a selection from an out-of-print volume from the National Bureau of Economic Research

Volume Title: Aspects of Manufacturing Operations During Recovery

Volume Author/Editor: Frederick C. Mills

Volume Publisher: NBER

Volume URL: <http://www.nber.org/books/mill35-1>

Publication Date: 1935

Chapter Title: Economic Changes in Manufacturing Industries During Five Periods of Business Expansion, Approximately

Chapter Author: Frederick C. Mills

Chapter URL: <http://www.nber.org/chapters/c0853>

Chapter pages in book: (p. 10 - 14)

Where doubts as to the accuracy of the measurements for the longer period were serious, it appeared desirable to restrict statements to general terms, and not to cite specific figures.)

Shifting the standard of reference to a pre-recession base has one immediate effect—that of reducing the apparent magnitude of the shifts of recovery. For the recession carried most economic series to such low levels in the winter of 1932-33 that the succeeding rises, in percentage terms, run into relatively high figures. On a pre-recession base the percentage changes are much less pronounced.

In summary, the situation as of January-February, 1935, with reference to the situation existing in June-July, 1929, was marked by the following features:

The gross income of manufacturing industries had been reduced 38 per cent, in current dollars, 25 per cent, in dollars of constant purchasing power, at wholesale. The physical volume of manufacturing production was 28 per cent below the 1929 standard. Per-unit prices were lower, but the average per-unit purchasing power of manufactured goods in wholesale markets was higher. Relatively to other goods, commodities of this type cost more, per unit, than in 1929.

The actual volume of manufacturing employment, measured in man-hours, had been reduced more than 40 per cent and the working force had been reduced one-fourth.

Industrial productivity, per wage-earner employed, had declined. Productivity per man-hour had risen. The amount of the rise may be estimated at something more than 20 per cent. This gain had been scored during the period of recession and in the first spurt of revival.

The aggregate purchasing power of manufacturing labor was some 26 per cent lower. The purchasing power of the earnings of each employed worker (whose hours of work were reduced about 30 per cent) had been reduced about 3 per cent. The purchasing power of an hour's wage (i.e. the real hourly wage) had increased approximately 24 per cent.

The total wage bill of manufacturing industries, measured in dollars of constant purchasing power, at wholesale, was approximately 27 per cent lower. Average labor cost per unit of goods produced had risen approximately 2 per cent (cost being here measured in terms of the same constant value standard).

It is apparent from these figures that the recovery in American manufacturing industries has fallen far short of restoring the pre-recession level of gross income, of production, of employment, or of aggregate purchasing power of labor. Industrial productivity on a man-hour basis, is higher than before the recession, nominal and real

wage rates are higher, and real labor costs are somewhat higher.

But we need other criteria, in appraising the shifting movements of the current recovery. Earlier periods of business expansion furnish a useful standard of reference.

III. ECONOMIC CHANGES IN MANUFACTURING INDUSTRIES DURING FIVE PERIODS OF BUSINESS EXPANSION, APPROXIMATELY EQUAL IN RESPECT OF DEGREE OF RECOVERY

A comparison of manufacturing operations during different periods of business expansion may be expected to disclose some of the distinctive features of the current movement. It is true that there exists no fixed schedule of recovery, to which business movements always conform, but something of the nature of a common pattern is found in the cyclical fluctuations of the economic system. Some of the characteristics of this pattern, and distinctive deviations from it, are revealed by the series of measurements presented in this section.

Various modes of comparison are possible, in any such survey. For the present purpose it seems desirable to trace the movements of important economic series over periods of expansion marked by approximately equal degrees of increase in the physical output of manufacturing industries. This magnitude, as averaged for the months of December, 1934, and January, 1935, was 37 per cent greater than at the low point of February-March, 1933.⁹ It is pertinent to inquire how the changes occurring in manufacturing industries during this period, in respect of employment, productivity, labor costs, etc., compared with corresponding changes during earlier periods of equal increase in volume of output.¹⁰ We should note that in concentrating attention upon the operations of manufacturing industries we ignore numerous economic factors—such as monetary and credit conditions, relations among elements of the price structure, saving and investment—which condition the course and character of recovery. Our interest, however,

⁹ Advances of approximately equal magnitude could not be secured for the three preceding revivals, if the record were carried through January-February, 1935. Since we are interested in operating changes accompanying similar advances, we restrict the survey of recent changes to the movements up to January, 1935.

¹⁰ If we compare, with respect to changes in aggregate production, periods of business recovery widely separated in time, error may be introduced into our conclusions by the changing character of the elements entering into the aggregate. Different industries, marked by important differences of cyclical behavior, may dominate a national economy at different times. These dominant industries would place their own impress on the aggregate into which they enter. But over a period of fifteen years no great changes occurred in the relative importance of elements entering into aggregate manufacturing production, in the United States. It is true that the incidence of recovery may be different, at different times, but this is a condition affecting all comparisons of this sort, in which aggregates of any kind are used.

TABLE 5

CHANGES IN MANUFACTURING OPERATIONS DURING FIVE PERIODS OF BUSINESS EXPANSION APPROXIMATELY EQUAL IN DEGREE OF RECOVERY

	Percentage change from				
	Dec. 1921- Jan. 1922 to Sept.-Oct. 1922	June-July 1924 to Feb.-March 1925	Nov.-Dec. 1927 to April-May 1929	Feb.-March 1933 to May-June 1933	Feb.-March 1933 to Dec. 1934- Jan. 1935
GROSS INCOME AND ITS ELEMENTS					
1. Gross income	+42	+46	+31	+50	+69
2. Production (physical volume)	+33	+36	+31	+43	+37
3. Selling price of products (average)	+7	+7	0	+5	+23
EMPLOYMENT AND ITS ELEMENTS					
4. Total employment (man-hours)	+19	+14	+13	+21	+23
5. Wage-earners employed	+16	+7	+9	+8	+31
6. Working hours per person (average weekly)	+3	+7	+4	+12	-6
PRODUCTION AND ITS ELEMENTS					
2. Production	+33	+36	+31	+43	+37
5. Wage-earners employed	+16	+7	+9	+8	+31
7. Output per wage-earner (average)	+15	+27	+20	+32	+5
4. Total employment (man-hours)	+19	+14	+13	+21	+23
8. Output per man-hour (average)	+12	+19	+16	+18	+11
WAGE DISBURSEMENTS AND ELEMENTS					
9. Wage disbursements	+24	+14	+14	+16	+65
5. Wage-earners employed	+16	+7	+9	+8	+31
10. Earnings per wage-earner (average)	+7	+7	+5	+7	+26
4. Employment (man-hours)	+19	+14	+13	+21	+23
11. Hourly wages (average)	+4	0	+1	-4	+34
2. Production	+33	+36	+31	+43	+37
12. Labor cost per unit (average)	-7	-16	-13	-19	+20

is not in the economy at large, nor in the full complex of circumstances that shape a business revival. It is in a particular segment of the total, and in the internal relations among the elements of this segment. These relations will not be unaffected by external developments, but these developments are of secondary importance in the present comparison.

In this comparison, as in the earlier one, no attempt is made to introduce corrections for seasonal movements. Accurate indexes of seasonal variation are not available for all the series. Moreover, it is known that in important industries the customary seasonal pattern has been modified, in recent years. For this reason, and because the cyclical changes here in question are of much greater magnitude than the seasonal changes, it seems advisable to utilize the uncorrected records. Accurate adjustment for seasonal swings would modify the picture in detail, but not in fundamental respects.

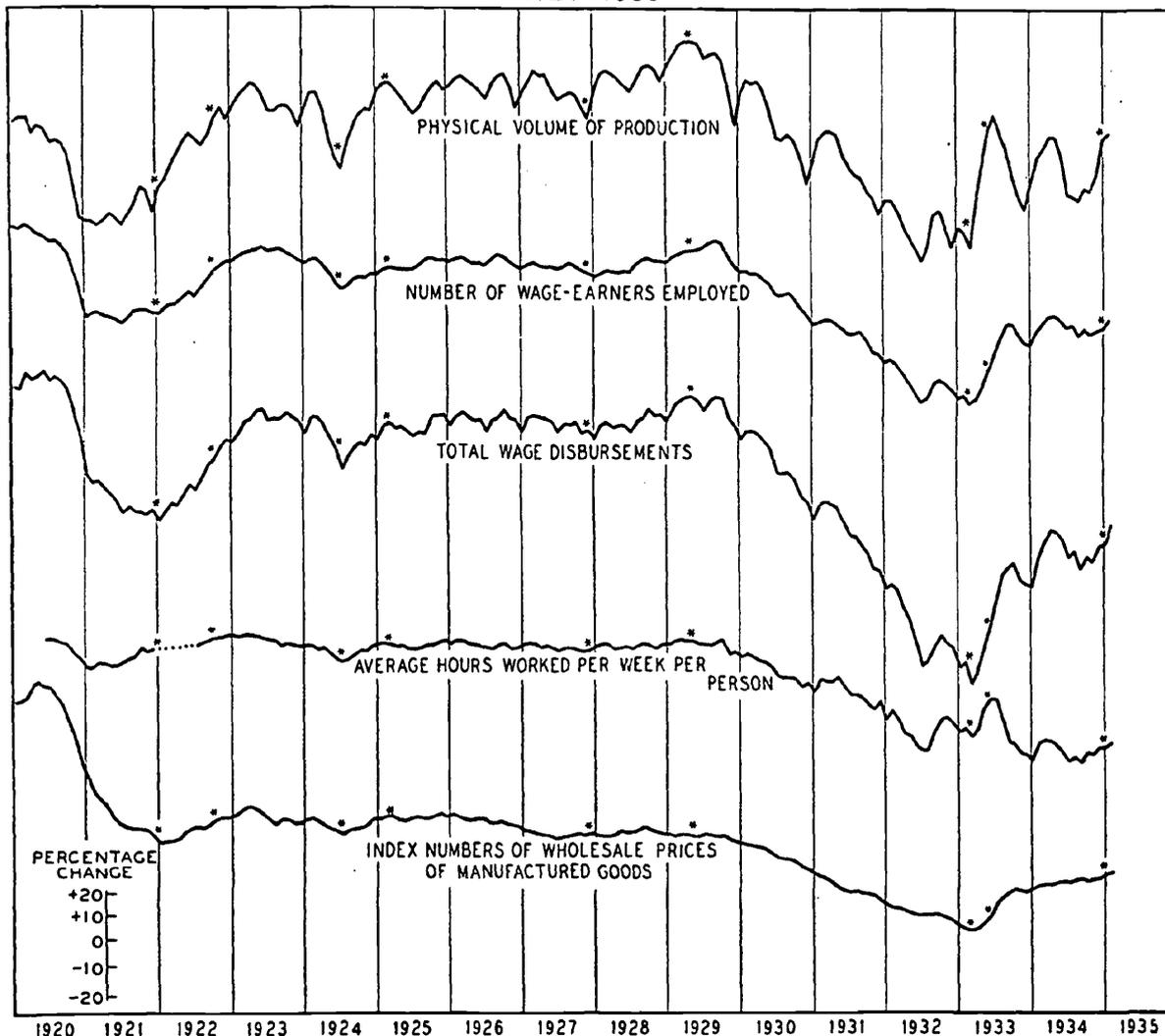
We may increase the value of this survey by utilizing two different sets of figures for the most recent recovery. The early spurt of 1933 brought an increase in volume of output well in excess of 37 per cent. The closest possible approach to that figure is provided by the period from

February-March, 1933, to May-June, 1933, during which the volume of manufacturing production increased 43 per cent. The changes of this phase may be compared with those of the period February-March, 1933, to December, 1934-January, 1935, as well as with those of the recoveries that began in 1921, in 1924, and in 1927. The period of the first rise, in 1933, is short, and therefore the changes must not be looked upon as resulting from a major technical revolution. They are significant changes, however, as regards the actual operating conditions of industry, and the relation of currently-expended effort to current outlay and current returns.

As in the preceding section we shall deal with certain major series and constituent elements of each series. The measurements appear in Table 5. The basic series are presented graphically, and the dates to which the entries in Table 5 relate are indicated in Figure 1, in order that the nature of the measurements to be compared may be clear. Data are picked from their setting, for the purpose of the quantitative comparison, and it is proper that the reader see what this setting is, in each case.

It is obvious, of course, that although the periods of business expansion here compared cover equal degrees of

FIGURE 1
SELECTED SERIES RELATING TO AMERICAN MANUFACTURING INDUSTRIES
1920-1935



*Asterisks mark the terminal dates of the five periods of recovery analyzed in the text.
Plotted on ratio scale. Uncorrected for seasonal fluctuations.

recovery, when physical output of manufactured goods is the yardstick of recovery, they do not cover equal proportionate parts of business cycles. Phases of revival and expansion vary in amplitude and duration, as do business cycles themselves. In studying certain of the technical aspects of business cycles it is desirable to isolate identical cyclical segments. But interest attaches, also, to the comparison of cyclical movements accompanying given degrees of increase in volume of production. This comparison is here made.¹¹

Comparison of the items in Table 5, for different periods of recovery, may be readily made in detail by the reader. Certain general conclusions based upon the above evidence, and other data, are given in the final section of this paper. At this point we may be content with a brief summary of the main points revealed by Table 5.

In respect of the attributes defined by the above measurements, the sharp initial recovery of 1933 appears to have conformed to the pattern of earlier revivals, a pattern which is strikingly repeated in the first four of

¹¹ Reference has already been made to the exceptional severity of the recession of 1929-33, and to the fact that the relative changes of recovery are affected by the severity of the earlier decline. It is to be expected that recoveries, following recessions of varying magnitudes, will differ, in some respects. We do not now know, however, how the pattern of recovery is affected by the preceding recession. The reader will bear in mind the differing magnitudes of the recessions preceding the phases of expansion to which the measurements in Table 5 relate. It will be useful to recall that the volume of manufacturing production declined approximately 27 per cent prior to the 1921 recovery, 26 per cent prior to the 1924 recovery, and 13 per cent prior to the 1927 recovery, as compared with a drop of about 50 per cent from 1929 to 1933. The price drop of 1920-21 exceeded that of 1929-33.

TABLE 6

CHANGES IN MANUFACTURING OPERATIONS DURING FIVE PERIODS OF BUSINESS EXPANSION APPROXIMATELY EQUAL IN DEGREE OF RECOVERY

Measurements Corrected for Changes in the Value of Money

	Percentage change from				
	Dec. 1921- Jan. 1922 to Sept.-Oct. 1922	June-July 1924 to Feb.-March 1925	Nov.-Dec. 1927 to April-May 1929	Feb.-March 1933 to May-June 1933	Feb.-March 1933 to Dec. 1934- Jan. 1935
GROSS INCOME AND ITS ELEMENTS					
1. Gross income ¹	+32	+33	+32	+39	+29
2. Production (physical volume)	+33	+36	+31	+43	+37
3. Selling price of product (average) ²	- 1	- 2	+ 1	- 3	- 6
WAGE DISBURSEMENTS AND ELEMENTS					
9a. Wage disbursements ²	+27	+12	+18	+15	+46
5. Wage-earners employed	+16	+ 7	+ 9	+ 8	+31
10. Earnings per wage-earner (average) ³	+ 9	+ 5	+ 8	+ 6	+11
4. Total employment (man-hours)	+19	+14	+13	+21	+23
11. Hourly wages (average) ²	+ 7	- 2	+ 4	- 5	+19
9b. Wage disbursements ¹	+15	+ 5	+15	+ 7	+26
2. Production	+33	+36	+31	+43	+37
12. Labor cost per unit (average) ²	-14	-23	-12	-25	- 8

¹ The all commodities index number of wholesale prices constructed by the United States Bureau of Labor Statistics was used as a deflator for the three earlier periods. For the last two periods the index number of wholesale prices compiled by the National Bureau of Economic Research was used.

² The index of the cost of living of industrial workers constructed by the National Industrial Conference Board was used throughout as a deflator.

the five periods covered. But the measurements of net change from early 1933 to early 1935 depart appreciably from the customary pattern of recovery, after depression. The notes that follow relate to the net movements of the period from February-March, 1933, to December, 1934-January, 1935.

This period brought a greater increase in gross income than did equal degrees of recovery, in physical terms, in earlier revivals. A much more rapid rise in per-unit selling prices accounted, of course, for the greater increase in gross income.

The number employed increased much more rapidly. Average hours worked per person decreased; earlier recoveries were marked by increases in average hours worked.

Output per worker advanced only slightly. Substantial increases had marked earlier recoveries. The recent increase in volume of production was effected primarily through the employment of more workers.

The net gain in output per man-hour compares favorably with earlier advances. (The gain in the recent period was effected, it has been noted, during the first five months of recovery.)

Total wage disbursements, earnings per wage-earner, and number employed increased much more rapidly than in earlier revivals.

Earnings per hour increased much more rapidly than in earlier periods of revival.

The total wage bill of manufacturing industries and average labor cost per unit of goods produced increased much more rapidly than in earlier revivals.

It is desirable that we supplement these comparative measurements with others in which some account is taken of changes in the standard of value. A rise of 20 per cent in the average selling prices of manufactured goods will have one meaning when the general level of prices remains constant. It will have a quite different meaning when the general price level falls 20 per cent. So, also, a given gain in aggregate payrolls will mean one thing when living costs remain constant, and quite a different thing when living costs are rising rapidly. No single instrument, suitable for correcting all our value series for changes in the value of money, is available. However, by using a general index of wholesale prices in deflating certain series, and an index of living costs for industrial wage-earners for other series, we may approximate the measurements we desire. The results are given in Table 6.

It is apparent, from a comparison of Table 6 with Table 5, that certain of the distinctive features of the recovery of 1933-35 have been due entirely to the more rapid rise of general prices. The apparent advantage of the more recent recovery in respect of per-unit gain in the selling prices of manufactured goods is removed, when account is taken of changing monetary values.²² So, also, the gain in the gross

²² The 6 per cent loss in per-unit worth of manufactured goods between February-March, 1933, and December, 1934-January,

income of manufacturing industries, which was higher for the recent period than for any of the earlier periods, when current dollars were the standard of value, becomes the lowest of the figures compared, when correction is made for changing monetary values.

Recent advances in wage disbursements and in the rewards of labor remain substantially above similar gains during earlier periods of recovery, after full account is taken of changing living costs. The total purchasing power of manufacturing labor increased 46 per cent between the low point of early 1933 and the beginning of 1935. The nearest approach to this figure, during periods marked by equal degree of recovery, came in the 1921-22 recovery, when payrolls, corrected for changes in the cost of living, advanced 27 per cent. Comparison of the entries for the last two periods shows that the major part of the recent gain of 46 per cent came after mid-summer, 1933. Reference to the measurements relating to average real hourly wages shows that the active factor in this gain was provided by a sharp increase in real hourly rates of pay (i.e. money rates corrected for living costs). The rise of 19 per cent in these rates, from 1933 to 1935, stands in notable contrast to the narrower movements of earlier revivals.

If we may measure changes in the purchasing power of the manufacturer's dollar with reference to changes in the general level of wholesale prices, and deflate total payrolls accordingly, we have the corrected wage disbursement figures given after item (9b) of Table 6. In dollars of constant purchasing power at wholesale the wage bill of manufacturing industries shows an advance of 26 per cent over the period of recovery in 1933-35. This is distinctly higher than the advances during earlier revivals marked by roughly equal increases in the volume of manufacturing production. The explanation is found in the measurements of changing labor costs, per unit of product. In terms of the same constant dollars, these costs dropped 8 per cent from 1933 to 1935, as compared with drops of from 12 to 25 per cent in earlier recoveries.

Perhaps the most significant comparisons to be made, among the measurements in Tables 5 and 6, are those relating to the changes from February-March, 1933, to May-June, 1933, and from February-March, 1933, to December, 1934-January, 1935. The actual degrees of recovery were nearly the same; the bases from which changes are measured are identical. It is reasonable to assume that the differences between the two sets of measure-

1935, is to be interpreted with reference to the base from which the change is measured. At the low point of early 1933 manufactured goods enjoyed a much greater relative advantage than in any of the three preceding depressions. Reduction of this advantage was the more imperative, therefore, with reference to the conditions of general recovery.

ments are due to new factors introduced into the operations of manufacturing industries after June, 1933. The most important of these new factors were those connected with the industrial codes.

IV. SUMMARY

We may accept the figures presented above as generally representative of the currents of change that have been running in recent months and in earlier periods of business revival, although we recognize that in detail they would be subject to correction were data relating to all manufacturing industries available. Certain general conclusions are suggested by the findings of fact.

The advance of the pre-code period, from February-March, 1933, to June-July, 1933, definitely followed the pattern of the earlier periods of revival. Primary emphasis was on production as a means of expanding income, profits and the returns of labor. Production advanced more rapidly than selling prices. Production advanced more rapidly than the number of persons employed, and productivity per worker increased. Production advanced more rapidly than number of man-hours worked, and output per man-hour increased. Production advanced more rapidly than wage disbursements, and labor cost per unit of product declined. Expanding production was a major factor in advancing gross income.

With respect to the purchasing power of labor, expanding production played a dominant part. Labor costs per unit of output declined, with rising volume augmenting the total wage bill. Time rates for labor held practically constant, during revival; increasing man-hours of employment operated as the active factor in the expansion of aggregate returns. Total employment (man-hours) rose more rapidly than did the number of persons employed; hours of employment per person increased.

Rapidly increasing production and more slowly rising prices contributed to a sharp advance in gross income. This meant, although present records do not bear on this point, immediate increases in profits, in the aggregate.

These were the conditions accompanying a revival of the traditional type. There is, of course, no reason to accept the pattern of earlier revivals as a criterion to which recovery from the depression of 1931-33 must necessarily conform. This was a graver depression than those we had known before; it differed in character as well as in degree from similar periods of economic stagnation in the past. Moreover, the periods of activity that were launched by these earlier revivals were marked by important economic as well as social defects. There is nothing sacred about the standard defined by these precedents. Yet, in default of other standards, we must get from them such information as we may concerning the operating conditions of this little-understood industrial machine of ours.