

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: Appendices to "Aspects of Manufacturing Operations During Recovery"

Chapter Author: Frederick C. Mills

Chapter URL: <http://www.nber.org/chapters/c0855>

Chapter pages in book: (p. 17 - 20)

creasing, this means that manufacturing labor, as a producer, is getting rewards of higher productivity in the form of higher pay. If the real selling prices of manufactured goods fail to fall, at such a time, it means that the benefits of the increased productivity are not being passed on to consumers generally. (Agents of production other than labor are almost certain, of course, to gain, also.)

If we compare early 1935 with June-July, 1929, we find a notable increase in productivity (probably exceeding 20 per cent per man-hour), practically constant real labor costs per unit of product, substantially higher real rates of pay, per hour of work done, and an actual advance in the real prices at which manufactured goods exchange for other goods. In place of the reduction of real production costs and real selling prices that was to be expected in manufacturing industries, in view of the substantial increase in industrial productivity that had occurred between June, 1929, and February, 1935, those costs and prices had advanced. At a time when the strongest considerations relating to general recovery called for lower selling prices, these prices were maintained at levels above those prevailing for commodities in general.

There is some analogy between the situation prevailing in manufacturing industries from 1933 to 1935 and that which prevailed from 1922 to 1929 (see *Economic Tendencies in the United States*, National Bureau of Economic Research, 1932, Ch. VIII). From 1922 to 1929 profits and overhead charges were maintained at high levels, and the selling prices of manufactured goods failed to decline, to a degree commensurate with the increase in industrial productivity and the fall in labor costs that occurred in that period. This situation tended to reduce marketings and so contributed to the unstable situation existing in 1929. The rise in time rates of pay and in total wage payments in

1933-35, and the failure of overhead and fabricational costs to reflect the great gain in productivity that had occurred since 1929, helped to perpetuate excessively high prices of manufactured goods. (The fabricational costs which thus remained high were not restricted to labor costs. The fact that labor costs did no more than parallel changes in selling prices, when material costs were relatively low indicates that other fabricational charges, such as overhead costs, remained on the same high level as labor costs.) The advance in the prices of these goods, at a time when such goods were already over-valued, retarded a needed expansion in the volume of sales. During the decade of the 'twenties a high manufacturing differential (profits are here included with the differential) was a factor in preventing the *maintenance* of a large volume of production and sales. From 1933 to 1935 a high manufacturing differential was a factor in preventing the *restoration* of a large volume of production and sales.

We are far from knowing all the conditions essential to the steady and efficient operation of a modern industrial economy. But experience during the last ten years seems to justify one general conclusion. The immediate passing on to consumers of a major part of the benefit of increasing industrial productivity, in the form of lower prices, contributes directly to the maintenance of industrial operations on a high level, and to the raising of the standard of living of the people at large. Action designed to procure for special groups the advantages of increasing industrial productivity, or action tending to decrease industrial productivity and advance costs, runs the grave danger of defeating its own purpose, through setting barriers to the maintenance (or the restoration) of the volume of production and employment that is essential to the general welfare.

APPENDIX A

NOTE ON SOURCES OF DATA AND CONSTRUCTION OF INDEXES

Production: Index numbers are constructed by the Federal Reserve Board from 55 individual series of data representing the production of about 34 industries and estimated to represent, directly or indirectly, about 80 per cent of the total industrial production of the United States. The figures are reduced to a daily average output and are presented to show the actual production. No correction for seasonal movements has been made in the index numbers here employed. The monthly average for 1923-25 is the base.

Number employed and payrolls: Index numbers are constructed by the United States Bureau of Labor Statistics. The basic data are supplied by representative establishments in 90 important manufacturing industries of the country. For November, 1934, reports were received from over 25,000 establishments employing more than 3,550,000 workers, whose weekly earnings were about 70 million dollars during the pay period ending nearest the 15th of the month. The employment reports received cover more than

50 per cent of the total wage-earners in all manufacturing industries of the country. The three-year average, 1923-25, equals 100.

Average hours worked per week: The index numbers are constructed from data compiled by the United States Bureau of Labor Statistics. The reports come from a smaller number of establishments than are covered in the monthly survey of manufacturing industries. Not all reporting establishments furnish man-hour information. The figures are presented for only those manufacturing industries (78 in number) for which available information covers at least 20 per cent of all the employees in the industry.

Prices: Index numbers are computed by the National Bureau of Economic Research from wholesale prices compiled by the United States Bureau of Labor Statistics. The weighted index for manufactured goods includes 536 price series. The average for the year 1926 is used as base. For the three earlier periods, an average of the index numbers of the wholesale prices of semi-manufac-

tured and finished goods, constructed by the United States Bureau of Labor Statistics, was used. In averaging, these were weighted 1 and 6, respectively.

For the present purpose the base of each of these index numbers has been shifted to February-March, 1933.

The index of changes in gross income is the product of indexes of changes in physical volume of production (number of units produced) and in average selling price per unit. Thus, in deriving the gross income index for June-July, 1933, we have

$$1.57 \text{ (production index)} \times 1.09 \text{ (price index)} = 1.71$$

In the tables these measurements are given in relative, rather than in ratio, form.

The index of total employment (man-hours) is the product of indexes of number of wage-earners employed and of average number of working hours per week, per person.

The index of average output per wage-earner is secured by

dividing the index of physical volume of production by the index of number of wage-earners employed.

The index of average output per man-hour is secured by dividing the index of physical volume of production by the index of total employment (man-hours).

The index of average earnings per wage-earner is secured by dividing the index of total wage disbursements by the index of number of wage-earners employed.

The index of average hourly wages is secured by dividing the index of total wage disbursements by the index of total employment (man-hours). We should note that a change in average hourly earnings may result from an actual change in wage rates, or from a shift in the relative proportions of men working at different rates, in the total labor force. An increase in the proportion of men receiving relatively high wages will raise the average, of course, without any modification of wage rates.

The index of average labor cost per unit of product is secured by dividing the index of total wage disbursements by the index of physical volume of production.

APPENDIX B

COMPARISON OF INDEX NUMBERS DERIVED FROM MONTHLY DATA WITH INDEX NUMBERS BASED ON CENSUS RECORDS, MANUFACTURING INDUSTRIES

Supporting evidence that the measurements given in the preceding pages are representative of the general movements occurring in manufacturing industries of the United States is furnished by a comparison, by Census periods, of index numbers derived from the monthly series here utilized with index numbers based directly upon much more comprehensive Census rec-

ords. For employment and payroll statistics the series compared are not independent, prior to the 1931-33 period, since the monthly records of the Bureau of Labor Statistics have been adjusted to biennial Census records. This process of adjustment, of course, helps to validate the measurements for the earlier periods, which are given in the text.

PHYSICAL VOLUME OF PRODUCTION	1921	1923	1923	1925	1925	1927	1927	1929	1929	1931	1931	1933
Index of National Bureau of Economic Research, based on Census data ¹	100	146	100	102	100	103	100	113	100	75	100	93
Index of Federal Reserve Board ²	100	151	100	104	100	101	100	112	100	67	100	94
AVERAGE SELLING PRICE OF PRODUCTS												
Index of National Bureau of Economic Research, based on Census data	100	99	100	99	100	94	100	98	100	78	100	85
Index of United States Bureau of Labor Statistics	100	100	100	99	100	94	100	99	100	81 ³	100	93 ³
NUMBER OF WAGE-EARNERS EMPLOYED												
Census	100	126	100	96	100	100	100	106	100	74	100	93
United States Bureau of Labor Statistics	100	126	100	96	100	100	100	106	100	74	100	89
TOTAL WAGE DISBURSEMENTS (PAYROLLS)												
Census	100	134	100	97	100	101	100	107	100	62	100	73
United States Bureau of Labor Statistics	100	136	100	97	100	101	100	107	100	62	100	72

¹ Weighted by value of product.

² Weighted by value added.

³ For the last two periods the index given is that of wholesale prices of manufactured goods, constructed by the National Bureau of Economic Research.

In only four of the comparisons are there notable differences between the measurements drawn from Census records and those derived from monthly observations. Of these, three are of some concern in the present study. The monthly data on employment and payrolls show a somewhat greater change, from 1931 to 1933, than do the Census measurements. Again, the 1931-33 de-

cline in realized prices, as defined by the Census records, appears to have been greater than the decline in the quoted prices compiled by the Bureau of Labor Statistics. In the two former cases greater stability is found in the more broadly-based Census records. (This same condition, it may be noted, is found in the production records over times of rapid change, as from 1929 to 1931.)

It is difficult to gauge the possible effects of these conditions on the measurements relating to the 1933-35 recovery. The greater steadiness of the figures for all manufacturing industries would tend to make total production, total employment and total payrolls rise somewhat less rapidly than do production, employment and payrolls relating to the sample available for monthly study. On the other hand, a tendency to understate the degree of advance in employment and payrolls, during revival, arises from the use of a fixed sample in the Bureau of Labor Statistics compilations. For the results of the operations of new enterprises are necessarily excluded from such compilations. A comparison of Census records with averages of uncorrected monthly figures indicates that the negative bias is probably the more important, for employment and payrolls. This would mean that the advance

recorded in the various tables understates the actual advance of these series in 1933-35. Such bias as is present in the monthly production figures probably works toward an overstatement of the actual advance, because of the greater steadiness of the total. As regards prices, however, it is probable that actual realized prices have risen somewhat more rapidly than the quoted prices indicate.

In general, the above comparison of the two sets of basic data confirms the accuracy of the measurements based on monthly records. The fluctuations in the monthly records are probably wider (with the exceptions noted) than those that would be found in more broadly-based index numbers, but the general directions of movement and the relations among the different measurements are definitely similar.

This paper is a by-product of Dr. Mills' study of the price aspects of recession and recovery which the National Bureau hopes to publish within the year. To round out the discussion of price changes, production movements and changes in purchasing power will also be treated in the book.

The report will deal with the fortunes of four major economic groups—producers of primary products, those engaged in manufacturing operations, producers of capital equipment, and consumers—as they were affected by the forces of contraction and by the conflicting currents of the years 1933 to 1935. Primary producers have been in a peculiar position since the World War, and their difficulties were accentuated by the recession of 1929. Manufacturing industries have enjoyed notable gains in productivity and have faced exceptionally difficult problems of readjustment brought about by drastic changes in price levels. The heavy industries, as a special class, are always in a position of strategic importance during depression and recovery. And consumers, at the terminal stage of economic activity, have been greatly affected by the shifting tides of business activity. Alterations in the purchasing power of important consuming groups have played a role of critical importance in the events of the last five years.

The emphasis of the study is definitely upon the price system, as it functioned during a period of severe recession and depression, and as it reacted to the stimulus of changes in monetary and other conditions. In some respects this report will be a continuation of the story told by ECONOMIC TENDENCIES, which dealt with the modifications occurring in the domestic economy of the United States during periods of expansion prior to and following the World War. The present study is more sharply focussed, however, upon price phenomena. It departs from the pattern of the earlier book also in that it gives some attention to changing world conditions since 1929.

TRADE BOOK DESIGN, 1934-1935

Mechanization in Industry, by Harry Jerome, published by the National Bureau in 1934, has been included in the American Trade Book Design Exhibition, 1934-1935, as "an intelligently planned and well-executed technical book." The exhibition, which is sponsored by the American Institute of Graphic Arts, opened at the New School for Social Research, 66 West 12th Street, New York, on May 7, and will continue for two weeks. Efforts are being made to have booksellers throughout the country arrange duplicate exhibitions in order to stimulate interest in the problems of bookmaking and design.

Since only twenty-five books were chosen out of over two hundred submitted by publishers the selection of a National Bureau book is recognition of the care with which its books are manufactured. Ernst Reichl, of H. Wolff Book Manufacturing Company, which printed and bound the book, is the designer.

STAFF PLANS

David L. Wickens, who is known for his work on the farm mortgage studies of the Bureau of Agricultural Economics, and who recently supervised the analysis of 350,000 questionnaires concerning urban real estate financing in sixty-five cities obtained by the Real Property Inventory—a Civil Works Administration project sponsored by the Department of Commerce—has joined the National Bureau staff as an Associate. He is in charge of the study of Real Estate Financing and Economic Stability, which the National Bureau has undertaken at the request of the Social Science Research Council, Committee on Credit and Banking of the Division of Industry and Trade, of which Dr. David Friday is Chairman. Dr. Wickens has a staff at work in Washington.

The appointment of Oswald W. Knauth to direct the organization administering relief in New York City makes it necessary to postpone plans for his early return to the National Bureau staff.

The National Bureau of Economic Research was organized in 1920 in response to a growing demand for scientific determination and impartial interpretation of facts bearing upon economic and social problems. Freedom from bias is sought by the constitution of its Board of Directors without whose approval no report may be published. Rigid provisions guard the National Bureau from becoming a source of profit to its members, directors or officers, or from becoming an agency for propaganda.

Officers

OSWALD W. KNAUTH, *Chairman*
 JOSEPH H. WILLITS, *President*
 CHARLES A. BLISS, *Executive Secretary*

GEORGE SOULE, *Vice-President*
 SHEPARD MORGAN, *Treasurer*
 MARTHA ANDERSON, *Editor*

Research Staff

WESLEY C. MITCHELL, *Director*
 ARTHUR F. BURNS
 SIMON KUZNETS
 LEO WOLMAN
 EUGEN ALTSCHUL, DAVID L. WICKENS, *Associates*

F. R. MACAULAY
 FREDERICK C. MILLS

Directors at large

OSWALD W. KNAUTH
 H. W. LAIDLER
 L. C. MARSHALL
 GEORGE O. MAY

ELWOOD MEAD
 SHEPARD MORGAN
 GEORGE SOULE
 N. I. STONE

Directors by University appointment

EDWIN F. GAY, *Harvard*
 WALTON H. HAMILTON, *Yale*
 HARRY JEROME, *Wisconsin*
 HARRY ALVIN MILLIS, *Chicago*
 WESLEY C. MITCHELL, *Columbia*
 JOSEPH H. WILLITS, *Pennsylvania*

Directors appointed by other organizations

FREDERICK M. FEIKER
American Engineering Council
 DAVID FRIDAY
American Economic Association
 LEE GALLOWAY
American Management Association
 GEORGE E. ROBERTS
American Bankers Association
 M. C. RORTY
American Statistical Association
 ARCH W. SHAW
National Publishers Association

BUSINESS PROFITS

Excerpts from reviews of INDUSTRIAL PROFITS IN THE UNITED STATES, by Ralph C. Epstein (678 pp., 123 tables, 69 charts, \$5)

New York Daily Investment News, March 12, 1935

"Dr. Epstein has done a remarkably fine job, and his study should be in the hands of all those who want to know about American business. It will aid those interested in stocks as well, for too few investors have a clear idea of the forces that go to make earnings, and the general characteristics of corporation earnings in this country.

Indeed, prior to the publishing of this book there was no equally good volume on the subject. It is no longer necessary to guess as much as before, and, if one is really interested in the subject of earnings and is willing to do some work in finding out the facts, the reading of this book should be of great value. Do not, however, expect a 'popularization' of the facts. Dr. Epstein does not 'sugar-coat' his material. He presents long and intricate tables.

The book is recommended heartily by this reviewer as a genuinely valuable contribution to economic knowledge."

The Annalist, December 28, 1934

"This is an attempt, among other things, to answer one of the most fundamental and most controversial questions of the day, namely, what is the long-run rate of return on invested capital. Economists have in the past answered the question on the basis

of economic theory, and statisticians have answered it on the basis of available figures. Although few informed observers, or Professor Epstein himself, would be prepared to state that this book gives a complete and unequivocal answer, it is undoubtedly the most thorough piece of research work yet done on the problem and rests on the most elaborate set of earnings figures ever compiled."

Dun and Bradstreet Monthly Review, April 1935

"Many efforts have been made to ascertain what rates of profit business enterprises earn upon the capital invested, and how these rates fluctuate. The task is important because the fortunes of millions of employees, investors, managers, and consumers fluctuate as the prospects of profits grow brighter or darker.

But the task is also exceedingly difficult; for profits vary widely from year to year in the same enterprise; in a given year they vary widely from one enterprise to another in the same industry; also some industries, taken as a whole, flourish in years when other industries languish. To get trustworthy results, it is necessary to include a large number of identical enterprises, engaged in many lines of business over a considerable period of years.

Dr. Epstein has secured fuller and better data concerning profits than any of his predecessors. For 2,046 manufacturing and for 664 trading corporations he has an unbroken record of income statements for each of the years 1919-1928. Supplementary statements for 71 corporations carry the record through 1932. With these materials at his disposal, Dr. Epstein is able to make knowledge of business profits wider, more definite and more secure."

CORPORATE PROFITS AS SHOWN BY AUDIT REPORTS, by W. A. Paton (151 pp., 10 tables, 5 charts, \$1.25)

Copies of this book, Volume 28 in the National Bureau publications series, have been distributed to subscribers and are now on sale. Although fewer corporations are covered than in Dr. Epstein's sample and the period studied is shorter, the individual statements give fuller details. For these financial statements the National Bureau is indebted to cooperating members of the American Institute of Accountants. The preface by Mr. George O. May points out that much might be learned about the workings of our economic system if a broadly representative sample of audited financial statements could be made available for analysis year after year.

RECENT BOOKS

- | | | |
|--|-----------------------|-----------------|
| 23. PRODUCTION TRENDS IN THE UNITED STATES SINCE 1870 (1934) | By Arthur F. Burns | 363 pp., \$3.50 |
| 24. STRATEGIC FACTORS IN BUSINESS CYCLES (1934) | By John Maurice Clark | 238 pp., \$1.50 |
| 25. GERMAN BUSINESS CYCLES, 1924-1933 (1934) | By Carl T. Schmidt | 283 pp., \$2.50 |
| 26. INDUSTRIAL PROFITS IN THE UNITED STATES (1934) | By R. C. Epstein | 678 pp., \$5.00 |
| 27. MECHANIZATION IN INDUSTRY (1934) | By Harry Jerome | 484 pp., \$3.50 |
| 28. CORPORATE PROFITS AS SHOWN BY AUDIT REPORTS (1935) | By W. A. Paton | 151 pp., \$1.25 |
| 29. PUBLIC WORKS (in press) | By Arthur D. Gayer | 484 pp., \$3.00 |