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## **PART III**

### **Staff**

### **Reports**

## **1. Business Cycles**

### **STATISTICAL INDICATORS**

A few months after the recovery in business activity began in August 1954, we compiled a table designed to (1) test the hypothesis that the strength of a recovery in its early stages depends upon the level from which it starts and (2) permit us to compare the strength of the current recovery with that of earlier cyclical revivals. The full table shows the percentage changes in each of some fifty monthly and quarterly economic series during the first 3, 4, 5, 6 . . . 24 months of the revivals that began in July 1924, November 1927, March 1933, June 1938, October 1949, and August 1954. Table 1 is an abbreviated version of this compilation.

A rough measure of the level from which a recovery starts is provided by the magnitude of the preceding contraction. To rephrase our hypothesis, moderate contractions can be expected to give rise to moderate recoveries, severe contractions to vigorous recoveries. Consequently the columns in the table are arranged from left to right according to the severity of the preceding contraction, as measured by the average percentage decline in three indexes of business activity.<sup>1</sup> On this scale, the 1953-1954 contraction turns out to be next to the mildest in the list.

The recoveries in many of the series, most notably that of the Federal Reserve index of industrial production, rank themselves roughly in order of the severity of the preceding contractions, and the hypothesis underlying the table is substantially supported. The effect appears during the first few months of the recovery and persists for some time, although it can, of course, be upset by developments peculiar to the recovery. The most notable example of this in our table is the effect of the Korean War, which began in June 1950 after

<sup>1</sup>This is an extension of the method used by Arthur F. Burns and Wesley C. Mitchell in *Measuring Business Cycles* (National Bureau of Economic Research, 1946), Table 156. The three indexes are American Telephone and Telegraph Co., Ayres (Cleveland Trust Co.), and Persons-Barrons, and are adjusted for long-term trend.

the 1949 recovery had been under way for some eight months. The first six months (October 1949-April 1950) produced increases comparable to those in other recoveries from

mild contractions. But the increases registered for the first fifteen months (to January 1951) are well above most of the other entries in the table.

TABLE 1  
PERCENTAGE CHANGES IN SELECTED ECONOMIC SERIES AFTER BUSINESS CYCLE TROUGHS,  
ARRAYED ACCORDING TO AMPLITUDE OF PRECEDING BUSINESS CYCLE CONTRACTION,  
1927-1955

	FIRST SIX MONTHS AFTER THE TROUGH					
	Nov. 1927	Aug. 1954	Oct. 1949	July 1924	June 1938	Mar. 1933
	to May 1928	to Feb. 1955	to Apr. 1950	to Jan. 1925	to Dec. 1938	to Sept. 1933
1. Nonagricultural employment		+0.9	+2.0		+4.2	+11.3
2. Industrial production	+4.0	+8.1	+10.4	+17.1	+22.7	+40.0
3. Gross national product <sup>a</sup>	-0.7	+4.6	+8.0	+10.0	+8.7	+11.4
4. Personal income	+0.7	+2.1	+7.0	+6.3	+4.0	+11.2
5. Retail sales	0	+3.9	+4.1	0	+8.6	+13.6
6. Wholesale prices	-0.4	+1.1	+0.8	+3.8	-1.4	+15.8
7. Industrial stock prices	+12.3	+18.3	+14.4	+23.2	+20.5	+66.1

  

	FIRST FIFTEEN MONTHS AFTER THE TROUGH					
	Nov. 1927	Aug. 1954	Oct. 1949	July 1924	June 1938	Mar. 1933
	to Feb. 1929	to Nov. 1955	to Jan. 1951	to Oct. 1925	to Sept. 1939	to June 1934
1. Nonagricultural employment		+4.4	+9.1		+7.6	+17.4
2. Industrial production	+16.0	+17.1	+27.1	+19.5	+40.9	+40.0
3. Gross national product <sup>a</sup>	+11.9	+10.7	+25.0	+16.2	+12.0	+23.5
4. Personal income	+10.2	+8.6	+19.8	+12.0	+9.9	+23.5
5. Retail sales	+2.7	+11.2	+24.0	+11.8	+16.2	+18.2
6. Wholesale prices	-1.5	+4.4	+16.6	+5.1	+0.9	+19.0
7. Industrial stock prices	+60.5	+37.5	+31.5	+52.6	+15.2	+60.2

  

	FIRST TWENTY-FOUR MONTHS AFTER THE TROUGH					
	Nov. 1927	Aug. 1954	Oct. 1949	July 1924	June 1938	Mar. 1933
	to Nov. 1929	to Aug. 1956	to Oct. 1951	to July 1926	to June 1940	to Mar. 1935
1. Nonagricultural employment			+10.9		+8.8	+19.7
2. Industrial production	+12.0		+22.9	+24.4	+50.0	+50.0
3. Gross national product <sup>a</sup>	+10.6		+31.6	+14.7	+20.5	+27.5
4. Personal income	+9.3		+28.3	+13.2	+14.5	+31.7
5. Retail sales	+2.7		+17.0	+8.8	+25.2	+31.8
6. Wholesale prices	-2.7		+14.6	+1.7	+1.0	+17.7
7. Industrial stock prices	+18.5		+45.1	+58.9	-6.0	+67.0

<sup>a</sup> Changes are measured over the first two, first five, and first eight quarters after the quarterly business cycle trough.

Note: The base for each percentage change is the three-month average centered on the trough month of the business cycle. All series except 6 and 7 are adjusted for seasonal variation. The percentage amplitudes of the preceding contractions (see text) are: Oct. 1926-Nov. 1927 - 9; July 1953-Aug. 1954 - 14; Nov. 1948-Oct. 1949 - 18; May 1923-July 1924 - 22; May 1937-June 1938 - 45; and June 1929-Mar. 1933 - 75.

Line

Source

- 1 Bureau of Labor Statistics; data not available before 1929.
- 2 Board of Governors of the Federal Reserve System.
- 3 and 4 Unpublished estimates by Harold Barger and Lawrence Klein through 1940; Department of Commerce estimates thereafter.
- 5 Department store sales before 1938, Board of Governors of the Federal Reserve System; sales of all retail stores from 1939, Department of Commerce.
- 6 Bureau of Labor Statistics; excluding farm products and foods.
- 7 Dow-Jones Co., Inc.

The pace of the current recovery has been more or less what one would expect in view of the mild decline in business activity that preceded it. That is to say, the percentage rates of increase in such measures of aggregate activity as gross national product have been moderate. This statement may seem surprising since the increases exceeded most published predictions and have given rise to descriptions of the current expansion as "unprecedented." Although certain aspects of the current expansion are undoubtedly unprecedented, this is not true of the rate of increase in output, employment, or income. Economic experience in previous cyclical recoveries apparently can help us to evaluate current experience and to formulate sound judgments about future prospects.

Of course, the character of a cyclical expansion is not wholly dependent on what has happened in the previous contraction. Nor do expansions maintain their pace indefinitely. Almost all of the economic measures shown in the table are substantially higher at the end of fifteen than at the end of six months. But a comparison of the last two panels of the table tells a different story. In the 1927 recovery, the increases for the first twenty-four months (November 1927-November 1929) are lower than those for the first fifteen (November 1927-February 1929). By November 1929, the general business contraction was already under way. In the 1949-1951 and 1924-1926 recoveries, some twenty-four-month increases are smaller, and others not much larger, than the fifteen-month increases — indicating a decline or markedly reduced rate of growth in the interval. Only in the 1933-1935 and 1938-1940 recoveries were there substantial increases between the first fifteen and the first twenty-four months. Even these increases did not match the rates attained during the first six months. Rather surprisingly, in none of the five recoveries was the advance in wholesale prices appreciably greater at the end of twenty-four months than at the end of fifteen — in four instances prices declined in this interval.

Work has continued on the compilation and

analysis of diffusion indexes, on the interpretation of the behavior of particular economic indicators, and on the extension of our business cycle chronology. A paper of mine presenting some new results on diffusion indexes was published in the October 1955 issue of *The American Statistician*, under the title, "Diffusion Indexes: A Comment." Victor Zarnowitz presented a paper at the December 1955 meetings of the American Statistical Association on "Manufacturers' Orders as Indicators of Cyclical Revivals and Recessions," and is revising it for possible publication as an Occasional Paper. Alexander Pitts has extended the business cycle chronology to 1954. The peak and trough dates are:

	Monthly	Quarterly	Calendar Year	Fiscal Year (ending June 30)
Trough	October 1949	IV 1949	1949	1950
Peak	July 1953	II 1953	1953	1953
Trough	August 1954	III 1954	1954	1954

During 1956, we are planning to prepare a volume on business cycle indicators, which will bring together papers published in recent years, include new papers, and provide historical data for selected indicators and diffusion indexes.

GEOFFREY H. MOORE

## SUBCYCLES

Seasonally corrected time series often seem to show waves too short, or too slight, or both, to be called specific cycles, yet too persistent to attribute to causes that the economist can afford to ignore. In the shoe, leather, hide industry, the cause of these "subcycles," which average about a year and a half in duration, became fairly evident in the course of our studies. There is every reason to suppose that the basic factors that generated subcycles in the shoe, leather, hide sequence operate in other industries too, though in different combinations and proportions.

But, whatever the cause of subcycles in a particular industry, their economic significance will differ depending on whether or not they

tend to occur at roughly the same time in a wide variety of activities over a long stretch of years. To determine whether this general confluence was present, I selected thirty-three time series that cover a long period. These include the major general series having a broad economic coverage (composite general indicators were purposely avoided) as well as activity in many important industries. The list includes fourteen series on the output of investment goods as well as of consumption goods, six on financial markets, and thirteen nonagricultural price series. If specific subcycles are found to occur at more or less the same time in these data, such times, if they also accord with other information, may be tentatively designated as subcycles in the economy at large and used as a reference frame for further study.

Accordingly, for the years 1875 through 1941, specific subcycles were marked independently in each series. How a subcycle was identified is discussed in Chapter 4 of my *Consumption and Business Fluctuations: A Case Study of the Shoe, Leather, Hide Sequence*. For each month, in effect, the number of series in a contraction phase was subtracted from the number in an expansion phase. The net number of series expanding each month was cumulated. The operations were performed for each of four subdivisions and for all thirty-three series together. These constructed time series provided the backbone for the selection of periods when business activity seemed to be experiencing sufficiently general rises or falls to warrant their tentative inclusion in a reference subcycle scheme.

Information about the intensity of movements of broad aggregates and other pertinent information were also used. For the period 1921 to 1941, selections based primarily on these thirty-three series could be checked by recourse to a far richer collection of time series. These data pointed to the same subcycles with only slight modification of peak and trough dates. The more plentiful materials will also be used to extend the chronology through 1955.

Between March 1879 and June 1938, 16

business cycles have been identified; they average 46 months in duration. From August 1876 to April 1940, I identify 21 additional waves. If all of the waves are counted — 37 in all — they have an average duration of 20.7 months. Individual variation is wide; subcycles run from 54 to 8 months in duration; their median duration is 18 months. Expansions, as in business cycles, tend to be longer than contractions.

The selection of this series of dates has two objectives. The first, as indicated, is to reveal whether there appear to be times when movements too short, or too weak, or both, to be designated business cycles occurred in many activities at roughly the same time.

The second is to provide a tool for the examination of how various industries or various sorts of economic functions or aspects (output, prices, shipments, orders, stocks) participate in these movements. Such information is necessary to give meaning to the phenomenon of an economic subcycle. For the strength and diffusion of fluctuation in business as a whole is a matter of degree. When a *sufficient* number of industries or aspects of economic life have specific subcycles of specified intensities at roughly the same time, the episode is designated a subcycle. Thus the marginal "reference subcycle" is defined in terms of this just sufficient participation — an arbitrary judgment at best. The information concerning participation will further provide a few rough clues to the cause of specific and general subcyclical fluctuation and its relationship to the phenomenon of business cycles. During the year, I expect to prepare a few short papers dealing with these questions.

RUTH P. MACK

#### ANALYSIS OF BUSINESSMEN'S EXPECTATIONS

Last year we reported on preliminary efforts to use the Dun and Bradstreet surveys of businessmen's expectations to forecast changes in such economic aggregates as sales, employment, and inventories of manufacturers, wholesalers, and retailers. Though the scheme used

was primitive and was based on relationships obtaining in the pre-recession period 1949-1952, it seemed desirable to advance the forecasts on the basis of each new survey without revising the basic relationships to take account of more current data. In this way we hoped that any deficiencies of the method and of the underlying theory of the relationship between diffusion data and aggregate change would be brought sharply to light.

The main deficiency disclosed is a tendency for the estimated changes to run too high. This tendency affects all variables. But it is most glaring in the case of inventories and led to forecasts that failed to disclose any inventory liquidation in the recession period 1953-1954. At the same time, the fluctuations in the higher predicted rates of change roughly parallel corresponding fluctuations in the actual rates as disclosed in the estimates of the Department of Commerce.

Of the various hypotheses that might be advanced to account for this bias, we have considered three: (1) the period analyzed, embracing as it does the Korean reconversion crisis, is atypical of normal relations between expectations and subsequent outcomes; (2) the model used to relate diffusion data, actual and expected, to aggregate change is too rigid; and (3) the use of diffusion data as a sensitive index of aggregate change requires that the individual reports of directions of change be weighted by a relevant measure of firm size.

Concerning the first, we have achieved marked improvements in forecasting the level of estimated changes by using moving regression relations. The regressions are based on a fixed number of the most recent surveys and so are revised continuously in a manner analogous to the variation in a regular moving average. An interesting by-product of the process is the fact that in each succeeding regression, the quantitative effect of a given change in expectations on realized aggregate change is increased. Thus while expectations moved more sharply in the Korean period than they have since, they were associated with proportionately smaller changes in inventories. This fact suggests that there was considerable

disappointment of businessmen's expectations during both the 1950 rise in activity and the subsequent decline in 1951. This tendency is clearest for inventories, and likewise easiest to understand; but it appears to have affected other economic variables as well.

Several of our results also throw light on the second hypothesis. We have at times improved our forecasts by adding variables to our model, for example, the recent change in the aggregate to be forecast. We have also found cases where expectations of rise and expectations of fall do not appear to be related to the aggregate change in a symmetrical fashion. And finally, there is evidence to suggest that the relation of diffusion data to aggregate change may not be linear. Evidence on this last point is mainly theoretical and is clearest in the case of weighted diffusion data. It will therefore need to be taken into account in our efforts to evaluate the third explanatory hypothesis mentioned above.

The argument for weighting diffusion data by a measure of firm size scarcely admits of serious opposition. Such weighting has been employed with success by the IFO-Institute for Economic Research of Munich, Germany, and it gets strong support from the well-nigh universal finding that the expectations of large firms tend to be more accurate than those of small.

Fortunately, we shall now be able to investigate this question for the Dun and Bradstreet data directly, for we have been granted permission to work with the punched-card file of individual-firm reports submitted in the expectations surveys from mid-1952 to date. These records are coded to conceal the identities of individual firms, but they are classifiable by industry and by various measures of firm size — in particular, by tangible net worth and in some cases by total sales. Besides providing the necessary data for constructing diffusion indexes of expectations weighted by the importance of the reporting firm, these records will (1) permit a rough test of the consistency of individual-firm expectations about related variables, (2) facilitate a study of the factors influencing the formation of expectations, and

(3) make possible an investigation of forecasting success as a function of firm size.

Also the Dun and Bradstreet questionnaire is now including a new pair of questions on manufacturers' new orders. The first question, introduced in the June 1955 survey, calls for new order information that compares expected orders two quarters hence with actual orders in the quarter just concluded, rather than with the corresponding quarter a year earlier, as hitherto. The second, introduced in the January 1956 survey, asks for corresponding information on the actual trend of new orders during the two quarters just closed when the survey is taken. Table 2 summarizes the results to date and includes corresponding results on the standard four-quarter basis.

Though experience with the new questions is limited, the following points already stand out:

1. In the four surveys to date, manufacturers have been less optimistic about new order prospects on a two-quarter basis than on the four-quarter basis terminating in the same quarter. Apparently, in each survey, a number of respondents felt that in the previous two quarters they had already experienced the full increase in new orders to be expected in the four-quarter period covered by the standard question. So they expressed this fact by shifting their expectations for the remaining two quarters to "no change" or "decrease." The correctness of this shift cannot be tested for all four surveys. But such a shift accords with

TABLE 2  
COMPARISON OF TWO-QUARTER WITH FOUR-QUARTER SURVEYS OF BUSINESSMEN'S EXPECTATIONS,  
1955 AND 1956

	EXPECTED CHANGES IN NEW ORDERS								ACTUAL CHANGES IN NEW ORDERS			
	June 1955 Survey IV 54- II 55- IV 55 IV 55		Sept. 1955 Survey I 55- III 55- I 56 I 56		Jan. 1956 Survey II 55- IV 55- II 56 II 56		April 1956 Survey III 55- I 56- III 56 III 56		Jan. 1956 Survey IV 54- II 55- IV 55 IV 55		April 1956 Survey I 55- III 55- I 56 I 56	
<b>All manufacturers:</b>												
Number of firms	505	493	630	615	675	658	708	682	713	689	728	715
Percentage expecting:												
Increase	73	62	61	52	64	50	56	50	73	61	68	53
No change	24	22	36	38	33	38	41	39	22	26	27	30
Decrease	3	16	3	10	3	12	3	11	5	13	5	17
Net percentage expecting increase	70	46	58	42	61	38	53	39	68	48	63	36
<b>Durable goods manufacturers:</b>												
Number of firms	265	260	304	298	314	310	365	355	328	321	376	371
Percentage expecting:												
Increase	72	60	60	54	69	54	56	49	77	60	74	58
No change	24	23	38	36	28	38	39	37	17	25	20	26
Decrease	4	17	2	10	3	8	5	14	6	15	6	16
Net percentage expecting increase	68	43	58	44	66	46	51	35	71	45	68	42
<b>Nondurable goods manufacturers:</b>												
Number of firms	240	233	326	317	361	348	343	327	385	368	352	344
Percentage expecting:												
Increase	75	65	62	51	59	47	55	51	70	63	61	48
No change	23	21	35	40	37	37	43	41	25	26	34	35
Decrease	2	14	3	9	4	16	2	8	5	11	5	17
Net percentage expecting increase	73	51	59	42	55	31	53	43	65	52	56	31

Source: Dun and Bradstreet, Inc.

the general impression that the recent boom has been leveling off since the middle of 1955, and the two reports so far available on *actual* changes in new orders (see the surveys of January and April 1956) show the same shift from a four-quarter to a two-quarter basis.

2. The figures obtained on two-quarter actual changes in the January and April surveys this year confirm fairly well the corresponding two-quarter expected changes obtained in the June and September surveys of 1955. In fact, the two-quarter expectations are not notably less accurate than those for four quarters. The poorest forecasts on both bases were made in the September 1955 survey; compared with outcomes reported in the April 1956 survey, the four-quarter expectations of durable goods manufacturers were substantially too low, while the two-quarter expectations of nondurable goods manufacturers were about as much too high. That the two-quarter forecasts should compare so favorably with those for four quarters is somewhat surprising, for the former represent genuine forecasts whereas the latter concern a period that is half over at the time the expectations are formed and might therefore be expected to have greater accuracy. The result is the more striking in that the sample of firms reporting expectations has almost no firms in common with the subsequent sample reporting actual changes.

3. A somewhat more discriminating appraisal results from comparing shifts in business sentiment between successive surveys with corresponding shifts in actual outcomes. Between the June and September 1955 surveys, both two- and four-quarter expectations worsened. Compared with the actual change in conditions as revealed in the January and April 1956 surveys, the shift in four-quarter expectations was excessive, whereas the shift in two-quarter expectations fell short. Moreover, the insufficiency of the two-quarter shift in expectations reflects a contradictory migration of firms into the no-change category from both the rising and falling categories. This contradiction is not borne out by the shift in actual two-quarter experience, which shows

the normal situation of a decrease in rising firms together with an increase in falling firms.

4. One systematic discrepancy between two- and four-quarter expectations is puzzling. On our usual convention of dating the expectation associated with a given interval at the midpoint of that interval, one would expect substantial agreement between the two-quarter expectations (or actuals) of one survey and the four-quarter expectations (or actuals) of its immediate successor. For example, the expectations for the interval IV 1955-II 1956 would be centered in the first quarter of 1956, and so would the subsequent expectations for the interval III 1955-III 1956. The presumed agreement, however, is missing. In every one of the three comparisons that can be made, the two-quarter expectations tend to be lower than the corresponding four-quarter expectations, and in fact are invariably lower on a net basis. Moreover, this tendency is borne out in the one comparison of actual experience that can be made — that for two-quarter actual changes in the interval II 1955-IV 1955 with the four-quarter actual changes in the interval I 1955-I 1956. Careful study of Table 2 does not reveal any pattern of developments over the period since last June to suggest that two-quarter prospects should have been appraised in a less favorable light than those for four quarters, nor does the like tendency of the actuals allow us to believe that we are dealing with a purely expectational bias. The possibility that seasonal factors may be involved must of course be considered for two-quarter diffusion data. But these would not be expected to produce discrepancies in the same direction in three successive comparisons of two- and four-quarter expectations. Besides, the expectations concern new orders, which in general do not disclose a sufficiently systematic seasonal component to require seasonal adjustment. For the present, therefore, we incline to the view that the smoothing involved in four-quarter comparisons submerges erratic factors more effectively than that involved in two-quarter comparisons, and thus that four-quarter diffusion indexes tend to have the



greater amplitude. Since our data cover only the leveling off phase of a period of expansion, two-quarter indexes can be expected to run lower than four-quarter ones.

MILLARD HASTAY

### COSTS AND PROFITS

*Labor cost per unit of product.* The number of man-hours of work that must be paid for per unit of product is an important factor in cost. Annual indexes of man-hours per unit of product are available for many industries, especially for manufacturing industries between 1919 and 1950. We analyzed the changes that occurred in each industry during each expansion or contraction in its production (for which we have data). Better plant, equipment, and processes reduced input per unit in most expansions and in most contractions. Man-hours per unit, however, increased in 45 per cent of the contractions but in only 45 per cent of the expansions. A conformity index of -42, based on the rates of change in input per unit in all industries in all cycles of output, indicates that the decline in unit requirements during expansions was faster than the decline, if any, during contractions. These figures suggest that, in the absence of technological improvement, man-hours per unit would typically decline in expansions and rise in contractions.

In computing the general conformity index,

we included observations for industries where we have information for only one or two cycles in output. We also computed indexes for individual industries where we had data for eight or more successive phases of output. Sixteen industries had conformity indexes somewhere between -100 and -26, seven industries had indexes between -25 and +25, and only one had a positive index of +26 or higher.

Although input per unit was usually smaller in the last year of an expansion than in the first, and larger in the last year of a contraction than in the first, the direction of change may not have been uniform throughout either kind of period. Accordingly, we constructed monthly estimates of man-hours per unit of product for the cement industry and the steel industry. Data on the direction of change in these and in two industries previously studied are summarized in Table 3. Declines in man-hours per unit predominated in all segments of expansion, and rises, in all segments of contraction. The predominance was smaller, however, in the last segment than in the earlier ones.

The foregoing conclusions, among others, were presented in a paper I read at a joint meeting of the American Economic Association and the American Statistical Association in December. We are now investigating monthly changes in other industries. A survey of available monthly data on man-hours and output, however, indicated that there are many

TABLE 3  
NUMBER OF CHANGES IN MAN-HOURS PER UNIT FROM STAGE TO STAGE OF  
PRODUCTION CYCLES, CLASSIFIED BY DIRECTION, FOUR INDUSTRIES

From	STAGE		RAILROADS <sup>a</sup>		MEAT PACKING		CEMENT		STEEL		ALL FOUR	
	To		Rises	Falls	Rises	Falls	Rises	Falls	Rises	Falls	Rises	Falls
I	II		0	6	0	4	1	2	0	4	1	16
II	III		0	6	1	3	1	2	0	4	2	15
III	IV		0	6	1	3	0	3	1	3	2	15
IV	V		1	5	0	4	2	1	2	2	5	12
V	VI		6	0	4	0	3	0	3	1	16	1
VI	VII		3	3	4	0	2	1	4	0	13	4
VII	VIII		4	1	2	2	3	0	3	1	12	4
VIII	IX		2	4	2	2	2	1	3	1	9	8

<sup>a</sup> In one cycle, input per unit did not change from VII to VIII.

Note: For a description of cycle stages, see Arthur F. Burns and Wesley C. Mitchell, *Measuring Business Cycles*, National Bureau of Economic Research, 1946, p. 29.

for which measures of man-hours per unit cannot be constructed without gross statistical indiscretion.

*Cost and profit per dollar of sales or investment.* A manuscript dealing with these ratios in eight major industries or groups of industries was completed. Expense ratios most often fluctuated inversely, and profit ratios directly, with sales (Table 4). The turnover of capital followed sales more closely than profit margins did, and return on net worth consequently was more closely related to sales than margins were. Changes in taxes on income and on excess profits occasionally caused aggregate profits, margins, and rates of return to change in one direction while the corresponding items, before taxes, changed in the opposite direction. Exceptions to the generalizations suggested by

the table occurred mostly during the World War II, the period of price dislocation that followed, and the period of defense effort beginning in 1950.

The manuscript shows that profits of corporations manufacturing durables fluctuate more than those of corporations making nondurables, as might be expected. In a separate project, we are trying to analyze differences in profit experience among manufacturing industries and some mining industries in much greater detail. Each business expansion and contraction will be considered separately.

*Profits and the stock market.* Two new analyses confirm our previously reported conclusion that there is little relation between short-term changes in a company's earnings and short-term changes in the market value of

TABLE 4  
YEAR-TO-YEAR CHANGES IN VARIOUS COST AND PROFIT AGGREGATES OR RATIOS,  
CLASSIFIED ACCORDING TO DIRECTION OF CHANGE IN AGGREGATE SALES,  
EIGHT INDUSTRIES, 1919-1954

<i>Item</i>	<i>Percentage of Observations in Which Direction of Change in Item and Direction of Change in Sales Were:</i>	
	<i>Similar</i>	<i>Opposite</i>
<b>Aggregates:</b>		
Operating expenses <sup>a</sup>	95	5
Overhead expenses <sup>b</sup>	79	21
Total expenses	97	3
Profits before tax	82	18
Profits after tax	79	21
Net worth	71	29
<b>Ratio to sales of:</b>		
Operating expenses	36	64
Overhead expenses	27	73
Total expenses	29	71
Profits before tax <sup>c</sup>	70	30
Profits after tax <sup>c</sup>	65	35
<b>Ratio to net worth of:</b>		
Sales	81	19
Profits before tax	74	26
Profits after tax	70	30

<sup>a</sup> Labor, materials, etc.

<sup>b</sup> Depreciation, property taxes, interest, etc.

<sup>c</sup> Includes some profits not derived from sales.

Note: Industries: manufacture of durables, 1919-1953; manufacture of nondurables, 1919-1953; trade, 1922-1952; construction, 1932-1952; railroads, 1919-1954; electric utilities, 1926-1953; gas companies, 1937-1953; Bell telephone system, 1920-1954. Some items were not available for some years.

its common stock. Our former analysis was made on a simultaneous plan. The change in a company's profits from the first quarter of 1928 to the second, for example, was compared with the change in value between the same two quarters.

In one of our new analyses, the change in earnings from the first quarter to the second is compared with the change in value from the second to the third, on the theory that the market does not react to the change in profits until the earnings report is published. In the other analysis, the change in value from the first quarter to the second is compared with the change in profits from the second to the third, on the theory that the market anticipates changes in earnings.

The correlation between profit changes and price changes indicated by either of these systems of comparison is even weaker than the correlation indicated by the simultaneous system. Dissimilar changes (profits up, value

down; or profits down, value up) are almost as frequent as similar changes under all three systems.

But longer, more persistent changes in profits *are* reflected in prices. This becomes clear when an intermediate quarter of a business expansion or contraction is compared with a more or less remote terminal quarter (Table 5). From the third quarter of 1931 to the first quarter of 1933, for example, the stocks of nine companies with rising profits declined, on the average, 36 per cent. Their rising profits did not cause the price of their stocks to go up in the face of the generally deepening economic gloom; but the stocks of forty-five companies with diminishing profits declined much more; they fell, on the average, 53 per cent.

In deciding what prices to pay or accept, buyers and sellers of stocks are influenced by dividends as well as earnings, and dividends often are stationary while earnings fluctuate;

TABLE 5  
AVERAGE PERCENTAGE CHANGE IN MARKET VALUE OF COMMON STOCKS OF CORPORATIONS  
WITH EXPANDING PROFITS, AND CORPORATIONS WITH CONTRACTING PROFITS,  
DURING 1929-1933 BUSINESS CONTRACTION

QUARTER	FROM DATE INDICATED TO I 1933, COMPANIES WITH:				FROM II 1929 TO DATE INDICATED, COMPANIES WITH:			
	EXPANDING PROFITS		CONTRACTING PROFITS		EXPANDING PROFITS		CONTRACTING PROFITS	
	<i>Companies</i>	<i>Change</i>	<i>Companies</i>	<i>Change</i>	<i>Companies</i>	<i>Change</i>	<i>Companies</i>	<i>Change</i>
	(number)	(per cent)	(number)	(per cent)	(number)	(per cent)	(number)	(per cent)
II 1929	0							
III 1929	0				86	9	98	1
IV 1929	0				67	-17	98	-31
I 1930	0				25	-10	86	-28
II 1930	0				13	-10	84	-31
III 1930	1	-60	38	-73	9	-16	81	-45
IV 1930	4	-41	38	-66	7	-25	77	-60
I 1931	4	-46	40	-66	5	118	71	-57
II 1931	6	-32	44	-60	3	-2	71	-67
III 1931	9	-36	45	-53	2	-4	63	-71
IV 1931	29	-24	49	-34	1	-31	61	-79
I 1932	38	-16	49	-26	0			
II 1932	62	33	57	11	0			
III 1932	81	-16	58	-18	0			
IV 1932	111	-11	59	-9	0			
I 1933					0			

Note: Similar information is available for business contractions and expansions from 1920-1921 to 1937-1938; the statistical base, however, is thin in earliest years.

sometimes dividend payments and profits change in opposite directions. We are therefore planning to collect dividend data corresponding to our profits data, and to take account of dividends in a more refined analysis.

THOR HULTGREN

## LABOR MARKETS DURING BUSINESS CYCLES

The long-term goal of the present study is to analyze the cyclical behavior of the labor market. Employment and hours, labor turnover, payrolls and earnings, labor productivity, and labor costs all must be considered in a systematic analysis of labor market activities. Work during the past year was almost entirely concentrated on the physical aspects of labor input: hours, employment, and labor turnover.

*Hours and employment.* The analysis of average hours worked per week and of employment was based on monthly National Industrial Conference Board data for the interwar period and on Bureau of Labor Statistics data from 1932 on.

In making the seasonal adjustment of the postwar data, we had an opportunity to experiment with data processing by large scale electronic computers, such as the Univac. We used an early program, developed by Julius Shiskin at the Bureau of the Census. The procedure was time-saving and, on the whole, produced good results at low cost. Some additional work by hand calculator proved necessary, but refinements in the program have reduced the number of such corrections required. Some preliminary findings follow:

1. The long-term downward trend in the length of the work week of the first four decades of the century was not pronounced during recent postwar years. In manufacturing, hours, on the average, remained almost the same. In nonmanufacturing, some industries showed a substantial reduction in hours (coal mining, railroads, and so forth) but the tendency was far from universal.

2. Cyclically, hours showed widely diverging patterns both in size of swing and in con-

formity to changes in business activity. Cyclical amplitudes ranged from fractions of an hour (wholesale trade) to four, five, or more hours (primary metals, textile mill products, coal mining).

3. Fluctuations in hours were smaller than in employment — for manufacturing, perhaps half as large. Industries with larger than average employment variations tended to show greater fluctuations in hours.

4. In general, the larger the employment amplitude, the smaller the variation in total man-hours accounted for by fluctuations in the length of the work week. Custom limits fluctuation in hours, so that, in comparison with changes in employment, changes in hours tended to be smaller in deep contractions than in mild ones, in durables than in nondurables, in producer than in consumer goods.

5. The lead of average weekly hours over employment and over turns in general business activity appeared both in industry as a whole and in every one of the thirty manufacturing and nonmanufacturing industries examined so far, though not invariably for every turn or cycle.

*Labor turnover.* Completed analyses of gross accession, gross separation, quit, discharge, lay-off, and net accession rates for total manufacturing were available from 1919 on. For the period after World War II, we added labor turnover rates for total durables and nondurables and for petroleum and coal products (with relatively low turnover and mild cycles) and for transportation equipment (with relatively high turnover and more pronounced cycles). These data should help us see how useful labor market turnover rates are for gaining an understanding of the dynamics of labor input. We can report only tentative findings:

1. Labor turnover rates vary widely among industries. In 1954, for example, the monthly separation rate for petroleum and coal products averaged about 1.1 per cent of employment, that for transportation equipment, 4.6 per cent. The differences between "minor industries" can be appreciably larger. Thus the

separation rate for petroleum refining was only 0.7 per cent per month, that for shipbuilding, as high as 12.5 per cent.

2. There is also considerable diversity in the amplitudes of labor turnover rates. During recent postwar cycles, average monthly separation rates in petroleum and coal products varied cyclically, both during expansions and during contractions, by about 0.8 per cent of employment (around an average level of about 1.2 per cent for the period). The comparable variation for transportation equipment was 4 per cent (around an average level of approximately 5 per cent). Measures of relative amplitude, in terms of percentage changes in turnover rates, show that separation rates in both industries varied cyclically by about 70 or 80 per cent of their average levels. A relation between levels and amplitudes of separation rates is suggested by these figures.

3. Labor turnover rates (specifically total accession, total separation, and quit rates) showed distinct downward trends during the 1920's and during the post-World War II period. Both periods were characterized by sustained high employment. However, institutional developments, like seniority rules, pension funds, and subsidized unemployment benefits, must also be considered in any analysis of this tendency.

4. Voluntary quit rates rose and fell with employment, showed distinct leads at peaks, but no similarly distinct timing relations at troughs. Workers evidently respond quickly to early signs of a softening labor market. But at business cycle troughs, early signs of increased demand for labor did not lead immediately to increased quitting. At this stage of the cycle, labor input is increased primarily by changes in average hours, rehiring of recent lay-offs, and hiring of the unemployed. Also the substantial lags in wage rates suggest that monetary inducements to change jobs are relatively weak in this phase.

5. Lay-off rates showed inverse cyclical conformity and tended to exhibit long leads at both peaks and troughs.

GERHARD BRY

## INVENTORY CYCLES SINCE 1938

The purpose of the present study is to make a systematic analysis of available manufacturers' sales and inventory data for the period 1939-1954. The investigation is being carried out within the general framework of hypotheses and methods used by Moses Abramovitz in his *Inventories and Business Cycles, with Special Reference to Manufacturers' Inventories*.<sup>1</sup> The principal data to be analyzed are:

1. Monthly inventory and sales series (Office of Business Administration, two-digit industry classification, since 1939)
2. Individual commodity stocks and shipments series (Abramovitz' series or comparable ones)
3. Monthly inventory by stage of fabrication series (OBE, unpublished, restrictions on publication, two-digit industry classification)

Other data to be examined for possible relevance are:

4. Annual data on book value of inventories by stage of fabrication (Bureau of the Census, three-digit and certain four-digit industry classifications, 1947 and 1949-1953)
5. Quarterly inventory data (Securities and Exchange Commission and Federal Trade Commission, two-digit industry classification)
6. Manufacturers' new and unfilled orders series (OBE, certain two-digit industry classifications, since January 1948)

The study thus far reveals that, although stocks are somewhat smaller than prewar in relation to the total volume of business, postwar movements in business inventories have played an important role in cyclical disturbances. Changes in business inventories (i.e. business inventory investment) have varied widely, sometimes contributing to, sometimes dampening, cyclical instability. Changes in the rate of inventory investment have been relatively large in the early stages of both

<sup>1</sup> National Bureau of Economic Research, 1950.

contraction and expansion, larger in the contraction phases.

During the first two quarters of the recession of 1949, decreases in inventory investment accounted for 82 per cent of the decline in gross national product. During a similar period of the 1953-1954 recession, decreases in inventory investment actually exceeded the decline in gross national product by 5 per cent. During the first two quarters of the expansions that began in late 1949 and 1954, increases in inventory investment were 56 per cent and 42 per cent of increases in gross national product.

Preliminary analysis of quarterly data indicates that manufacturers' total inventories have moved with less lag than Abramovitz's findings indicated for the prewar period. Both deflated and book value series demonstrated a maximum lag of one quarter behind business cycle turns during the decade 1945 to 1955.

The behavior of inventory investment also differed somewhat from that described by Abramovitz. During both expansion periods of the two postwar cycles, total manufacturers' inventory investment reached its peak very early, more than two years prior to business cycle peaks. An additional cycle in inventory investment was noted in each instance, however, with peaks occurring at dates roughly coincident with business cycle peaks. During the two brief recessions since 1945, inventory investment troughs coincided with business cycle troughs. Movements in inventory series for major industry groups showed similar behavior. Turning points in total manufacturers' inventory investment have lagged turning points in rates of change in industry activity with a sufficient degree of consistency to suggest that the relationship between first differences in levels of stocks and in output or shipments should be carefully explored at the industry level.

During the months ahead, a more refined analysis will be carried out. Present plans call for the preparation of a manuscript by June 1956 covering the findings of the study.

T. M. STANBACK, JR.

## MONEY AND BANKING

A volume is in preparation on the estimates of the money stock compiled by Anna J. Schwartz and summarized in last year's annual report. The first part of the volume will analyze the secular and cyclical behavior of the money stock; the second part will describe the methods of estimation and present some of the basic data used. I hope the volume will be completed during 1956.

A more intensive analysis of the role of monetary factors in the United States since 1875 is continuing. Phillip Cagan has been working on the factors determining the supply of money in an attempt to isolate the separate influence of changes in (1) the gold stock, (2) Treasury or Federal Reserve creation of currency and Reserve Bank deposits, (3) the reserve policy of banks, and (4) the form in which the public holds its money. A parallel study of the factors determining the demand for money balances is planned.

These monetary studies are being carried on in cooperation with the Workshop in Money and Banking of the University of Chicago. The Workshop has been continuing its study of the relative accuracy of the quantity theory of money and the income-expenditure theory in predicting short-run changes in income and prices. It has recently started an analysis of some monetary episodes to find out how far monetary changes can be regarded as autonomous.

The mutually supporting character of the Workshop's and the National Bureau's monetary studies is well brought out by a volume tentatively entitled, "Studies in the Quantity Theory of Money" which is being published by the University of Chicago Press under the auspices of the Workshop. This volume contains papers by Phillip Cagan, John Klein, Eugene M. Lerner, and Richard Selden, and an introduction by me. These papers present an analytical framework for the analysis of demand mentioned in the second paragraph, as well as much relevant empirical evidence.

MILTON FRIEDMAN

## REGIONAL AND INDUSTRIAL FLUCTUATIONS

I have been measuring and analyzing the cyclical variations of manufacturing employment in thirty-three states during three business cycles. The cycles are identified with the following periods of business contraction and expansion: 1919-1921-1923, 1929-1933-1937, and 1948-1950-1953. The dates conform approximately to years of peaks and troughs in business activity. Data on manufacturing employment for the first two cycles are annual averages taken from the censuses of manufactures for the respective years. Data for the third cycle are monthly averages from the Bureau of Labor Statistics series, with peaks and troughs identified through the use of twelve-month moving totals.

A fourth cycle was introduced, which overlaps with the first — with an expansion from 1914 to 1919 and a contraction from 1919 to 1921. The use of 1919 as a proxy for a peak year, in the absence of data for 1918 or 1920, does not do much violence to the facts because the rise between 1914 and 1919 is far greater than either the 1918-1919 contraction or the 1919-1920 expansion.

I hope to discover whether there is any relation between the growth and decline of states and the amplitude of the cyclical swing they experience. In general, I expect to find the widest cyclical swings in declining economic regions.

A declining region contains workers who have not yet migrated to areas with growing per capita real income. It also contains idle plant capacity. It can thus adjust to cyclical expansions of demand more easily than a region where alternative employment opportunities exist and where new plant capacity must be installed before production can expand. A corollary of this is that the greater variability of the declining region will be observed in very short-run periods. The same relation may hold for seasonal fluctuations.

Of course, the kind of industries a region has largely determines the region's cyclical characteristics. The cyclical variability attributable to industrial composition can be isolated

and eliminated by standardizing the cyclical variability of each state industry at the level of its national counterpart. By this method, a corrected state amplitude of aggregate employment presumably due to regional characteristics can be obtained.

The importance of industrial composition in accounting for state differences in the cyclical swings in employment is seen if one ranks the thirty-three states according to actual and hypothetical cyclical amplitudes. The Spearman coefficient of rank correlation is shown for each of the four cycles:

	<i>Rank Correlation between Actual and Hypothetical Amplitudes</i>
1948-1950-1953	+0.45
1929-1933-1937	+0.81
1919-1921-1923	+0.75
1914-1919-1921	+0.80

The size of a state also appears to have a strong influence on the corrected state amplitude. For example, in the 1948-1950-1953 cycle, the coefficient of rank correlation between size (average number of manufacturing employees during the period) and corrected amplitude is  $-0.41$ . The influence of size remains even if the states are stratified into size and growth classes.

Why should the large states tend to be less variable than the small? One hypothesis is that the larger the unit of observation, the greater the tendency for differences in the timing of peaks and troughs in different sectors of the state's economy to cancel out and reduce the amplitude of cyclical fluctuation in total employment.

One can test this hypothesis by examining the degree to which small states tend to exhibit more uniform timing patterns among their component industries than the large states do. Or one can group the more homogeneous small states into larger units of observation and determine the effect on cyclical amplitude. These computations are now being carried forward for the 1948-1950-1953 cycle. For this period, industrial employment data on a monthly

basis are published by the employment security agencies of each state.

The long-term trend in a state appears to have the expected influence on the corrected state amplitude. For the 1948-1950-1953 cycle, the rank correlation between corrected amplitude and growth is  $-0.35$ . In this cycle, therefore, the states with the more rapid long-term growth rates experienced smaller cyclical swings. In addition, analysis of variance tests indicate that growth has a significant influence on variability within size classes.

I am continuing this analysis on the relation between size, growth, and variability for the other three business cycles mentioned above. A brief report indicating how the analysis applies to a single state was published in the *Review of New Jersey Business*, January 1956, entitled, "Employment Cycles in New Jersey Manufacturing Industries."

GEORGE H. BORTS

#### OTHER STUDIES

Five studies were published during 1955 and early 1956:

*Personal Income during Business Cycles*, by Daniel Creamer

*Consumption and Business Fluctuations: A Case Study of the Shoe, Leather, Hide Sequence*, by Ruth P. Mack

*Short-Term Economic Forecasting*, Studies in Income and Wealth, Volume Seventeen

*Policies to Combat Depression*, Special Conference Series 7

*The Korean War and United States Economic Activity, 1950-1952*, Occasional Paper 49, by Bert G. Hickman

Two books are in press:

*A Theory of the Consumption Function*, by Milton Friedman

*Measurement and Behavior of Unemployment*, Special Conference Series 8

The monograph by Oskar Morgenstern, "International Financial Transactions and Business Cycles," will shortly be ready for review by the Board. Other manuscripts in preparation are "Harvest Cycles," by Geoffrey H. Moore, and "Cyclical Behavior of Federal Receipts and Expenditures since 1879," by John Firestone.

An exploratory study of the quality of credit in booms and depressions is reported in Section 4; Ilse Mintz reports on her study of cycles in foreign trade in Section 6.

## 2. National Income and Capital Formation

### CAPITAL FORMATION AND FINANCING IN THE UNITED STATES

The results of this study of long-term trends and future prospects, initiated in 1950 with the aid of a grant from the Life Insurance Association of America, are being issued in a series of monographs and briefer papers as well as in a summary volume. The reports published to date are:

*The Role of Federal Credit Aids in Residential Construction*, Occasional Paper 39, by Leo Grebler

*The Volume of Residential Construction, 1889-1950*, Technical Paper 9, by David M. Blank

*Capital and Output Trends in Manufacturing Industries, 1880-1948*, Occasional Paper 41, by Daniel Creamer

*The Share of Financial Intermediaries in National Wealth and National Assets, 1900-1949*, Occasional Paper 42, by Raymond W. Goldsmith

*Trends and Cycles in Capital Formation by United States Railroads, 1870-1950*, Occasional Paper 43, by Melville J. Ulmer

*The Growth of Physical Capital in Agriculture, 1870-1950*, Occasional Paper 44, by Alvin S. Tostlebe

*Capital and Output Trends in Mining Industries, 1870-1948*, Occasional Paper 45, by Israel Borenstein

"Proportion of Capital Formation to National Products," by Simon Kuznets, *American Economic Association Proceedings*, May 1952

"Factors in the Demand for Capital Funds," by Simon Kuznets, *Investment of Life Insurance Funds*, edited by David McCahan, University of Pennsylvania Press, 1953