New Facts on

Business Cycles

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Part One

NEW FACTS ON BUSINESS CYCLES

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I The Need for Scientific Work

Despite the relatively good business conditions of recent years, the business cycle continues to haunt the thinking of the American people. The reason is not only a wish to obliterate the human miseries and material wastes of recurring depressions. The reason is also political necessity. The old Marxist dogma that capitalism is doomed to collapse on the rocks of economic crisis has become a weapon of propaganda, used adroitly and energetically to confuse the uninformed and to stir discontent the world over. Our government and other democracies have met the challenge by building a variety of defenses against depression. How well the defenses have been built, no one yet knows. The business decline which started in the fall of 1948 has fortunately been checked, and some credit for this achievement can be assigned to governmental policy. But it is easy to exaggerate the influence of man's design on the course of events. An outstanding feature of the business situation during 1949 was the high and rising activity in the automobile and housing industries, which continued to feel the stimulus of war-induced shortages. Had these industries faced 'normal' markets, it seems fairly certain that the contraction in business would have gone deeper. For the present, obituaries on the business cycle are romantic expressions of human impatience, not records of solid achievement. They serve neither the nation nor economics, and may prove seriously harmful if they lead

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to any relaxation of the scientific work on business fluctuations now going forward in universities and other research centers.

The National Bureau's research on business cycles began nearly thirty years ago. Our first publication on national income was already concerned with its fluctuations, and later studies have added materially to a growing body of knowledge about business cycles. But only a relatively small part of the results reached by the Bureau's investigation has as yet been published. Scientific work flourishes best when investigators are free to permit their researches to mature, and this inevitably means a modest and highly uneven rate of publication. The current year, however, is one of plenty. Among the works on business cycles soon to be published is Wesley Mitchell's unfinished book *What Happens during Business Cycles,* which is remarkably complete as far as it goes. The list includes also Moses Abramovitz' scholarly volume *Inventories and Business Cycles* and three substantial *Occasional Papers:* 'Behavior of Wage Rates during Business Cycles' by Daniel Creamer, 'Cyclical Diversities in the Fortunes of Industrial Corporations' by Thor Hultgren, and 'Statistical Indicators of Cyclical Revivals and Recessions' by Geoffrey H. Moore.

I feel prompted by this upsurge of publications to give some account of the National Bureau's work on business cycles. I cannot attempt to summarize either the research in process or the completed studies. Instead, I shall describe a few facts developed by our investigation that may prove of some help to economists and men of affairs facing the hard task of appraising an uncertain future. What I shall say is based largely on American experience before World War II—a period to which all students must turn when they seek to form a considered judgment of how our business economy functions under peacetime conditions.

II   Dispersion of Specific Cycles

Economic activities generally move in cycles—that is, wave-like fluctuations lasting from about two to ten years. 'Specific cycles' of this character appear in prices as well as output, in markets for securities as well as commodities, in the spending of incomes as well as saving, in the flow of goods to consumers as well as business enterprises. Of the hundreds of time series analyzed by the National Bureau, all but about three per cent have continuously undergone cyclical movements. The occasional exceptions include steady series like railroad commutation traffic, extremely volatile series like net gold movements between the United States and Great Britain, and series of 'list' prices that sometimes remain unchanged for a decade or longer and then rise or fall by a vertical step.

These exceptional series are excluded from Chart 1; also all annual series, and such of the monthly or quarterly reports as cover merely a small part of the period between the two wars. Otherwise, the chart includes virtually all the American series that we have analyzed. They encompass a wide range of activities—producing commodities, merchandising, employment, disbursing incomes, commodity pricing, wages, interest rates, security transactions, inventory holdings, and the behavior of the banking system. Most series summarize

Chart 1
Distribution of Turning Points of Specific Cycles
in a Sample of Over 600 Economic Time Series
1919 - 1939
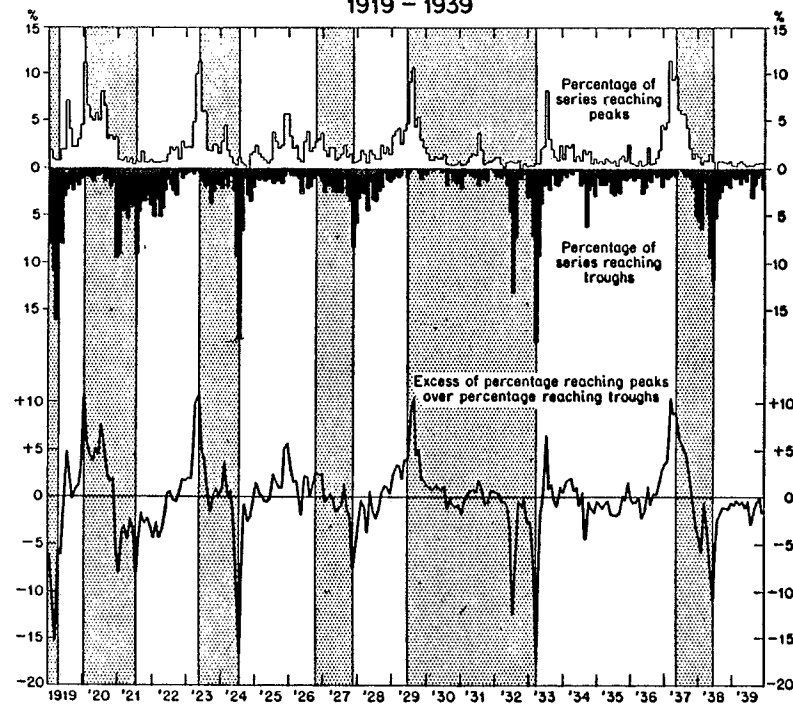
Shaded areas represent contractions of business cycles, according to NBER chronology.
See Appendix.

some activity in the nation at large—for example, production of coal or sales by department stores—but a considerable number are of narrower geographic scope. The precise list varies somewhat from one stretch of the interwar period to another; in most years the total number runs between six and seven hundred.

The chart sets forth the distribution, month by month, of the cyclical turns of this large and varied collection of time series. If anyone is so naive as to believe that most economic activities reach like turns on the same or almost the same month, this chart should disabuse him. What it shows is wide dispersion of cyclical peaks and troughs. Practically every month some series attain peaks while others reach troughs. The occasional gaps on the chart, it may be justly supposed, would be closed if our collection of time series were still more comprehensive.

From the wide dispersion of the specific turning points, a simple but important implication may at once be drawn. If in a given month or quarter some activities are at a peak, they must have been undergoing cyclical expansion in immediately preceding months. If in the same month or quarter other activities are at a trough, they must have been undergoing cyclical contraction in immediately preceding months. Since in each month or quarter some activities attain cyclical peaks while others drop to troughs, it follows that expansions have run side by side with contractions all the time. This persistent feature of economic change is brought out vividly by Chart 2, which is simply an arithmetical transformation of the frequencies of peaks and troughs displayed on the preceding chart. Curve A shows the percentage of series undergoing expansion each month from 1919 to 1939, and curve B shows the excess of the percentage expanding over the percentage contracting. The percentages in curve A fluctuate over a wide range but never reach 100 or 0.

This picture of the diffusion of cyclical movements over our economic system would be very different if the cycles in individual activities followed the same temporal course. In that event curve A would be a step-line, with ordinates of 100 for a stretch of months or years, succeeded by values of 0 for another stretch, then values of 100 again, and so on. With everything rising and falling in unison, there would be little need to fuss with specific factors in business, and one might center attention exclusively on aggregate activity. But business cycles—that is, the cycles in aggregate activity encountered

Chart 2
Percentage of Series Undergoing Cyclical Expansion
and Their Cumulative, 1919-1939
Based on Sample of Over 600 Economic Time Series
A Percentage of series undergoing cyclical expansion
B Excess of percentage of series undergoing cyclical expansion over percentage undergoing contraction
C Cumulative of B

Shaded areas represent contractions of business cycles, according to NBER chronology.
Origin of vertical scale of C is arbitrary, since K is any constant.
See Appendix.
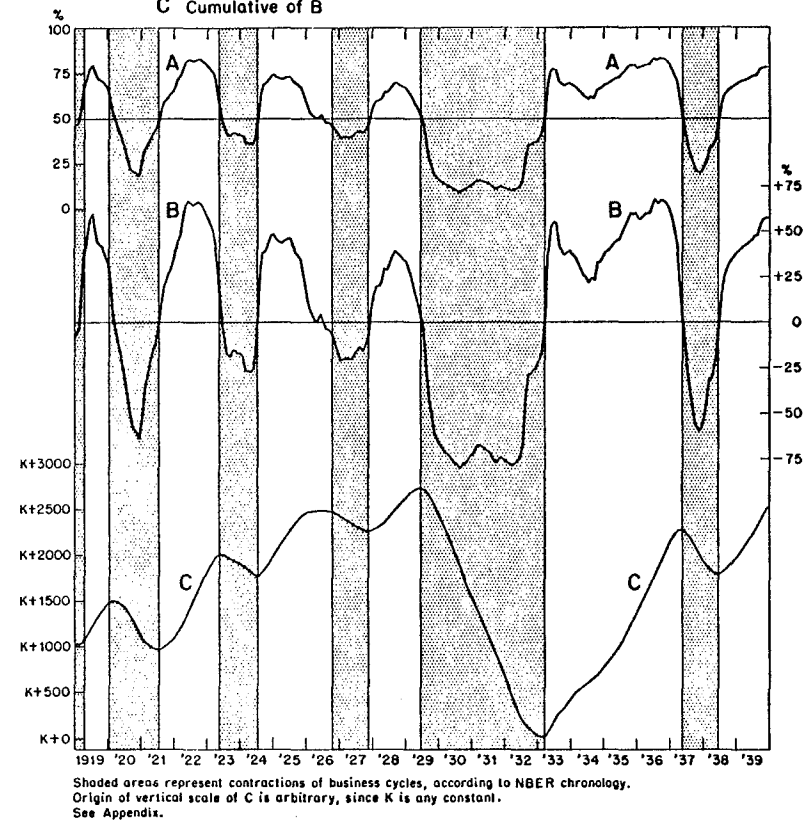
in historical experience—are of a very different character. They are marked by expansions and contractions that are only partially diffused through the economy, and it is therefore of the utmost importance to obtain as clear a notion as we can of how the specific cycles of different activities are tied together.[1]

[1]For further analysis along the lines of this and the next section, see the following publications by the National Bureau: *Measuring Business Cycles*, Ch. 4, Sec. II; *Twenty-sixth Annual Report*, pp. 22-4; Wesley Mitchell's forthcoming volume, Ch. 5; and especially Geoffrey Moore's 'Statistical Indicators of Cyclical Revivals and Recessions' *(Occasional Paper 31)*.

III   The Business Cycle as a Consensus of Specific Cycles

We have already taken one step in this direction by registering, month by month, the frequency with which specific peaks and troughs are reached, and then combining the frequencies so as to show the percentage of series expanding each month. Let us now carry this process of combination a step further. Assume that a series rises or falls each month by one unit. If, therefore, aggregate activity encompassed 100 items, of which 80 rose in a given month and 20 fell, the total rise during the month would be 60 units. If next month 85 rose and 15 fell, the total rise would be 70 units. By starting with a base figure and cumulating the net percentage of rising series—that is, the excess of the proportion rising over the proportion falling—we should get a schematic picture of the movements in aggregate activity itself. Curve C in Chart 2 has been constructed on this principle. It traces out five remarkably clear cycles, which idealize the fluctuations in several familiar indicators of aggregate economic activity—industrial production, factory employment, and freight car loadings—plotted on the next chart. Not only that, but the chronology of turning points in curve C is nearly identical with the chronology of business cycles previously determined by the National Bureau.

Curve C is, of course, no better than its antecedents. It shows the net effect of the temporal distribution of the cyclical turns in our sample of series, and it shows nothing else. It is a highly artificial aggregate which abstracts from every other feature of its components. That is why its cycles are so clear and smooth, in contrast to the jagged fluctuation of most economic time series. It is significant, nevertheless, that this simple construct has enabled us to reproduce rather faithfully the familiar movements of recent business cycle history. For if 'business cycles' can be built up, so to speak, from a mere knowledge of turning points of individual activities, the path to a scientific understanding of business cycles may be considerably shortened by concentrating on the timing relations among specific cycles.

We have seen in Chart 1 that the turning points of specific cycles are so widely scattered that expansions in some activities always accompany contractions in others. But the turning points are not distributed at random through time. If they were, sustained fluctuations such as have occurred in aggregate activity would be highly unlikely. The turns of the specific cycles come in clusters which have, as a rule, definite points of concentration. When the peaks are bunched the troughs are few, and *vice versa*. The bunching is brought out best in Chart 1 by the excess each month of peaks over troughs, which—except for occasional stray items—is continuously of the same sign for numerous months. But the proportion of advancing series must decline when peaks exceed troughs, and rise when troughs exceed peaks. Hence the bunching of cyclical turns is reflected in protracted periods when a majority of series undergo expansion, followed by protracted periods when a majority undergo contraction.

Charts 2 and 3 add the vital fact that each period in which expansion has been dominant matches closely the upward phase of aggre-

Chart 3
Simple Aggregate of Specific Cycles in Over 600 Economic Time Series, Industrial Production, Factory Employment, and Freight Car Loadings 1919 – 1939
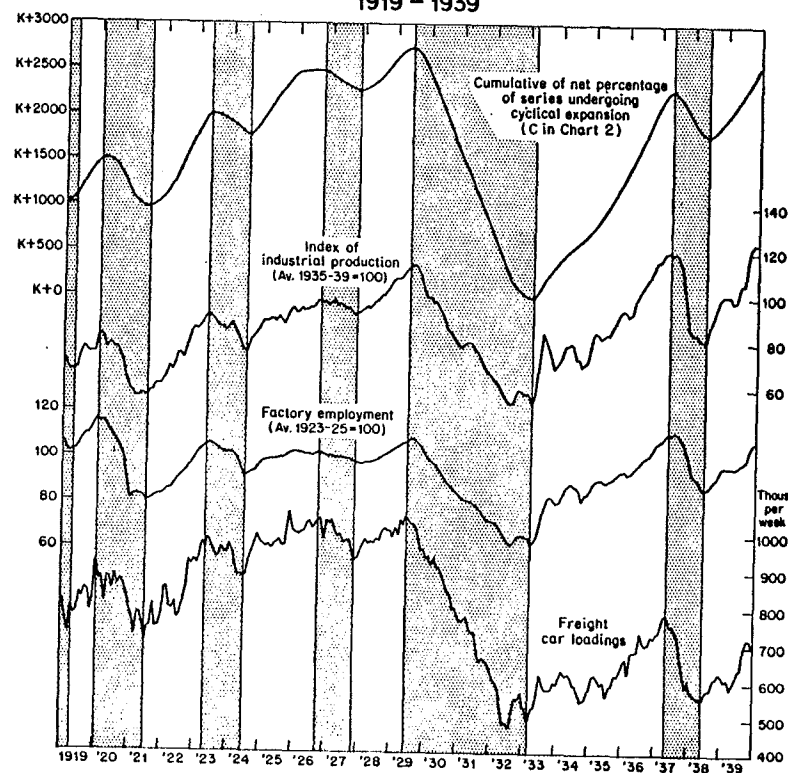
Shaded areas represent contractions of business cycles, according to NBER chronology.
Origin of vertical scale of top curve is arbitrary, since K is any constant.
Top curve is a simple aggregate of specific cycles, as explained in Appendix.

gate economic activity, and each period in which contraction has been dominant matches closely the downward phase; in other words, the succession in time of expanding and contracting majorities is much the same as the succession of expansions and contractions of business cycles. Hence, as Wesley Mitchell observes in his forthcoming book, "business cycles consist not only of roughly synchronous expansions in many activities, followed by roughly synchronous contractions . . . ; they consist also of numerous contractions while expansion is dominant, and numerous expansions while contraction is dominant." And just as the succession of a majority of individual expansions by a majority of individual contractions, or *vice versa*, has been accomplished in periods lasting from about two to eight years during the interwar era, so the cycles in aggregate activity have had this order of duration.

The substitution of one of these majorities for the other takes place gradually, and indeed follows a definite cyclical course as Chart 2 demonstrates. Rising series are only a thin majority at the beginning of a business cycle expansion. Their number swells as aggregate activity increases, though expansion reaches its widest scope not when aggregate activity is at a peak, but perhaps six months or a year earlier. In the neighborhood of the peak, cross currents are the outstanding feature of the business situation. Once the economy is on the downgrade, the number of expanding activities becomes smaller and smaller, though the scope of expansion does not shrink indefinitely. Perhaps six months or a year before the aggregate reaches a trough, the proportion of contracting activities is already at a maximum; thereafter the majority of contracting activities dwindles, while the minority of expanding activities becomes ever stronger and before long becomes the ruling majority.

Thus a continual transformation of the economic system occurs beneath the surface phenomena of aggregate expansion and contraction. A business cycle expansion does not mean that nearly everything within the economy is moving upward, nor does a business cycle contraction mean that nearly everything is shrinking. There are two cycles in economic activity, not one. First, there is the cycle of sustained expansions and contractions in the aggregate itself. Second, there is the cycle in the distribution of expansions and contractions within the aggregate. The first cycle is 'seen' since we are accustomed to following comprehensive records of business condi-

tions. The second cycle is 'unseen' since few of us subject the components of comprehensive aggregates to close examination. An 'unseen' cycle in the relative distribution of expansions and contractions of specific activities corresponds to each 'seen' cycle of their aggregate. But whereas the proportion of expanding activities moves in the same direction as the aggregate in the early stages of a business cycle expansion or contraction, it moves in the opposite direction in later stages. The proportion of expanding activities is already declining months before aggregate activity reaches a peak, and is already rising months before the aggregate reaches its trough.

Further evidence on these basic propositions is supplied by Charts 4 and 5. The first of these charts compares two fairly homogeneous groups of series—production and employment—with our all-inclusive sample. The next chart comes from Geoffrey Moore's *Occasional Paper 31*. It is based on a mass of series selected on account of their

Chart 4
Percentage of Series Undergoing Cyclical Expansion
Three Groups of Series, 1919-1939

Shaded areas represent contractions of business cycles, according to NBER chronology.
See Appendix.
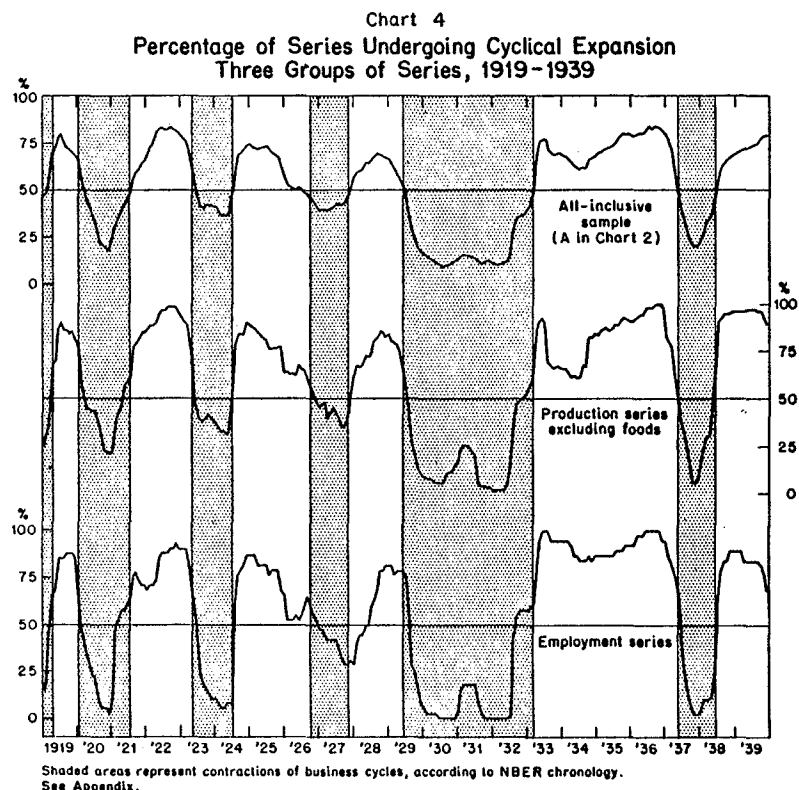
Chart 5

Percentage of Series Undergoing Cyclical Expansion
Moore's Sample of Well Conforming Series, 1885-1939
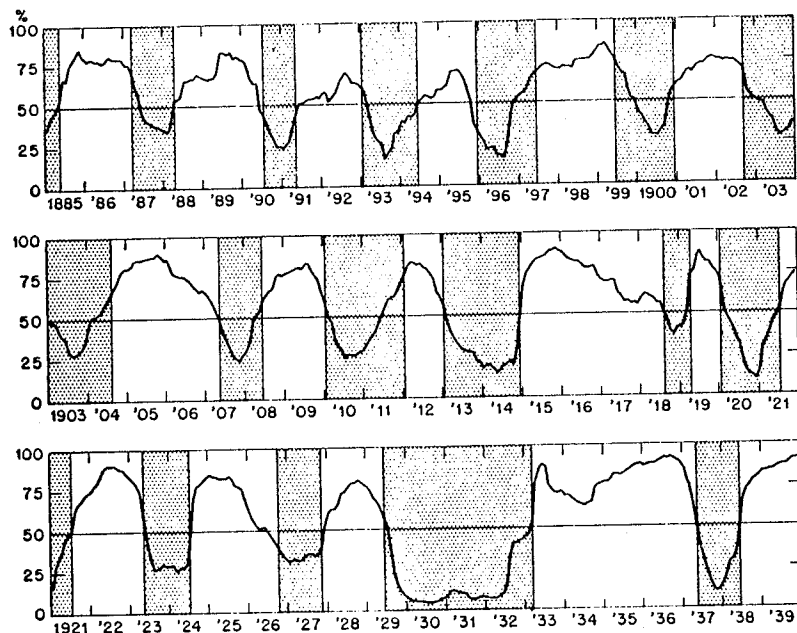
Shaded areas represent contractions of business cycles, according to NBER chronology.
See Appendix.

rather regular conformity to business cycles. Like Chart 1, it includes widely different activities, but spans more than half a century instead of a mere two decades. It appears from these exhibits that the features of business cycles I have emphasized—the variety of cyclical movements in individual activities, their tendency towards a consensus, and an inner cycle in the distribution of expanding and contracting activities within the external cycle of aggregate activity proper—cannot be ascribed to any special characteristics of the interwar period or to the heterogeneity of our full sample of series or the fuzziness of their aggregate, but must be reckoned as underlying properties of over-all aggregates of economic activity however defined.

IV Why Business Fluctuations Spread Unevenly

Before presenting more statistical results, it may be well to pause and consider the reasonableness of the picture of business cycles thus far developed. Let us suppose that economic activity, having recently moved at a depressed level, is jarred out of its routine by a moderate increase in 'spending'. The additional spending might be by business firms, governments, or consumers within the nation, or it might originate outside the domestic economy. For simplicity let it be assumed that domestic consumers, as a class, enlarge their spending, that they do so at a time when their income is unchanged, and that technological changes do not occur in the sequel. What, then, will be the likely consequences of this 'autonomous' increase in spending?

It is plain that in the very short run the direct effects will dominate, and that they will depend upon the direction of the new outlay. If the spending is on railroad travel, theatrical performances, or the like, involving merely the use of some idle capacity, there will be an immediate increase in incomes, but both the number of men employed and their average workweek are likely to remain unchanged. If the spending is on personal services of barbers or lawyers, the number of manhours worked is sure to increase at once and with it the national income, but not necessarily the number of men employed. If the spending is on imported commodities there will not be any immediate increase in domestic employment. So it may be also if the spending is on domestic commodities carried in stock; for dealers or manufacturers may not see fit or be unable to replenish their inventories. If the spending is on goods made to order employment is likely to rise, though that will not happen if the jobs generated in any short period by the new spending are insufficient to offset the decline in work on projects started in earlier periods. Even blinking this complication, there is a distinction between additional spending on custom-made articles such as furniture, which may merely lengthen the workweek in existing shops, and increased spending on new dwellings, which is practically sure to augment the numbers employed.

The preceding remarks may be generalized. Whether the consuming public or some other group is responsible for the increase in spending, as long as we look merely at what happens in the very short run we should expect spotty reactions through the economy,

not over-all expansion. The impact of the new spending will be uneven, perhaps only a small minority of firms benefiting from it. Each firm has its own peculiar heritage of circumstances—size and condition of plant, goods on hand, work in process, liquid assets, outstanding contracts, customers' good will, labor relations, managerial skills. Hence different enterprises will appraise differently whatever expansion in sales they experience; those making fairly similar appraisals will still respond differently, and those who happen to respond in much the same way will not always achieve similar results. Indeed, we could not even be confident that the total number of men and women at work will increase in the circumstances envisaged, unless two conditions are met: first, that the new 'spending' is on goods made to specification in new 'shops' set up for the purpose; second, that purchases of this type ceased their decline some months back and are now at a stable level.

New construction meets adequately the first condition, and if we suppose that the second is also met, we can speak more definitely of the outcome. Practically all construction projects are built to fresh specifications. Each requires a new site on which a temporary factory, so to speak, is set up and a work force assembled. Hence any increase in spending on construction is reasonably certain to add promptly to the number employed. Not only will employment increase, but in view of the long period required to carry out construction projects, the increase will be sustained for months, sometimes years. The work on a construction job is unevenly distributed over time, but for every type of project there is a characteristic pattern of labor input, which often rises until the job is about half completed and then declines. Hence a jump in the rate of starting new construction will lead to a gradual increase in employment on construction sites. In the case we have supposed, employment will grow at an increasing rate for several months, the precise period depending upon the size and character of the projects initiated, then rise at a diminishing rate until a level proportionate to the higher rate of ordering is attained.

In this sketch I have tacitly assumed that the higher rate of new construction 'starts' is maintained over a period at least equaling that required to carry out a typical construction project—which nowadays is probably a little over a half year. As employment on construction sites expands over a period of this duration, there may at first be

no increase in the production of building materials. Dealers or fabricators who consider their stocks excessive will permit them to go lower, and those who seek to augment their supplies may not be able to do so as readily in the case of one material as another. But if the rate of initiating construction is maintained at the new level, an increasing number of dealers will expand their purchases and more and more producers will expand their output. In the long run— which may need to be reckoned in years rather than months—orders, production, employment, shipments, inventories, and related business factors will be generally higher throughout the constructional trades.

Few industries, and none of a magnitude comparable with construction, have its power to convert a discontinuous increase in spending—whether it returns promptly or only after a few months to the old level—into a sustained expansion of employment, which for a time is even accelerative. But whatever the industry, if a higher rate of sales is maintained long enough, employment will surely rise and so will the activities associated with it. For a while the effects will be spotty, but with the passage of time adjustments will be set in motion throughout the industry as well as in those on which it closely depends for its materials and supplies. And as the higher rate of spending generates new incomes, its effects will spread out in new channels having little in common with the original direction of the new spending. People will spend part or all of their larger incomes, and their additional outlay will be swollen by that of business firms seeking to add to inventories or 'fixed' plant. In this cumulative process the banking system and the capital market will play a part; and once the movement has gathered strength, it may continue of its own momentum even if the original increase in spending, which might have been a governmental instead of a consumers' buying spurt, is no longer maintained. But it is not my purpose here to examine the actual process whereby a business cycle expansion cumulates.

My aim has been merely to suggest that there are economic reasons why cross currents are more prominent in some stages of the business cycle than at others. Factors peculiar to individual businesses and markets are always at work. The adoption of new technical processes, introduction of new products, opening up of new sources of supply, migration of people, shifts in demand, formation

of new firms, disappearance of old ones, and the weather itself—these factors, whatever their precise role may be in generating or transmitting business changes, create cross currents in both good times and bad. Nevertheless, I have tried to set forth reasons for expecting the cross currents to be especially numerous at the beginning of a business cycle expansion. As expansion progresses, we should expect its scope to widen, as actually happens according to our statistical summary. But after some time obstacles to further expansion are likely to multiply, though aggregate activity keeps climbing. Here and there banking facilities will be inadequate to finance further expansion. Here and there in the industrial process 'bottlenecks' will emerge, and the increase in supplies slow down or vanish. Here and there prices will remain steady in the face of rising costs, and discourage programs for expansion. Here and there nearly everyone in the labor force will be at work, and the growth of some firms will be at least partly balanced by the decline of others in the neighborhood. Thus it is reasonable to expect what our charts so forcefully show, that with the passage of time the scope of a business cycle expansion will shrink though the expansion still continues.

V Typical Sequences within a Business Cycle

I need not stop to adapt these commonplaces to the phenomena of a business cycle contraction. For present purposes it is sufficient that the statistical finding on which I have dwelt is a meaningful and reasonable result; namely, that the proportion of economic activities undergoing expansion traces out a cyclical curve which precedes the movements of aggregate activity, whether it be rising or falling. In view of this finding two broad propositions may be set down. First, a business recession starts while aggregate activity is still expanding and a recovery starts while the aggregate is still contracting. Second, a recession or recovery spreads gradually over the economic system and in time reverses the tide of aggregate activity. These propositions naturally raise the question whether the transitional changes in business cycles have a stable economic character. For example, the decline in the proportion of advancing series towards the close of expansion might be produced by cyclical peaks in a random assortment of activities. On the other hand, it might be produced by sub-

stantially the same set of activities, cycle after cycle; in other words, the sequence of downturns in one cycle might be much like the sequence in any other. To grapple with this issue, the veil of anonymity clothing our time series must be lifted.

Chart 6 does this in part by segregating three highly important groups of series in our sample—those reporting orders for investment goods, industrial production, and income payments. The curves are constructed on the same principle as the cumulative in Chart 2 which, it will be recalled, is based solely on a specification of the cyclical turning points in individual series. But whereas the simple

Chart 6
Simple Aggregates of Specific Cycles in Three Groups of Series
1919 − 1939
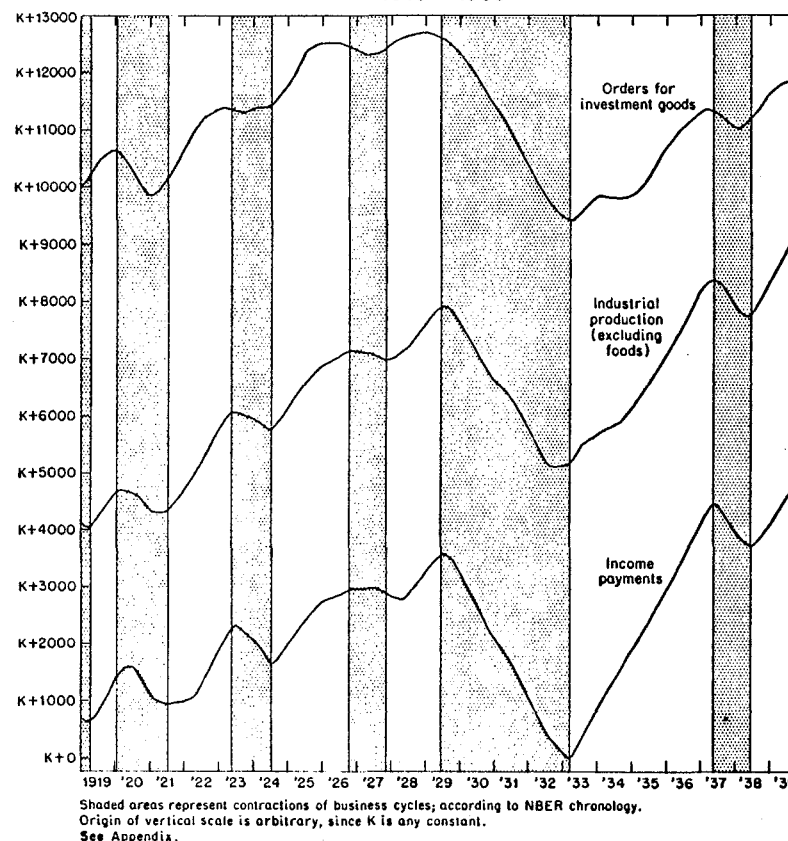
Shaded areas represent contractions of business cycles; according to NBER chronology.
Origin of vertical scale is arbitrary, since K is any constant.
See Appendix.

aggregate of that chart includes our full sample of series, the aggregates of Chart 6 are constructed from 'homogeneous' subgroups. The curve marked 'orders for investment goods' combines all series relating to construction contracts, building permits, equipment orders, and orders for materials such as are predominantly used in making investment goods. The curve for production includes all the production series in our full sample except foodstuffs. The curve for income payments includes all available series of this type, though it happens to be dominated by payrolls. Taken together, these three groups account for about a third of the series in the full sample.

The simple aggregates of the specific cycles in our several groups trace out movements that correspond closely to one another and to the cycles in business activity identified by the National Bureau. But the cyclical timing of the groups varies: as a rule the maxima and minima of investment orders lead the corresponding turns of production, which again lead the corresponding turns of income payments. Now, a maximum or minimum represents a point of balance between expanding and contracting series within a group. Hence the sequence of maxima means that at a downturn in aggregate activity the shift from a majority to a minority of expansions comes first in the group on investment orders, later in production, a little later still in income payments. At an upturn in aggregate activity there is a similar succession of shifts from a majority to a minority of contractions. These systematic sequences express a tendency of our several groups to occupy similar positions relatively to one another within each cluster of turns surrounding a business cycle turn.

The results depicted in Chart 6 are restricted to investment decisions at the time they become effective, the physical volume of production, and the disbursement of incomes. This is only part of the evidence of a system in upturns at business revivals and in downturns at recessions. Speaking broadly, our results indicate that new orders, construction contracts or permits, stock prices and transactions, security issues, business incorporations, and hours worked per week tend to lead the tides in aggregate activity; so do the liabilities of business failures on an inverted basis. On the other hand, production, employment, commodity prices, imports, and business profits tend to move with the tides in aggregate activity; while income payments, wages, interest rates, retail sales, and inventories are

laggards.[2] These cyclical traits are not infrequently obscured or deflected by special circumstances, but when numerous time series and long periods are analyzed a tendency towards repetition in cyclical sequences comes clearly to the surface.

To gain more definite knowledge of cyclical sequences, it is well to concentrate on series of broad economic coverage. Table 1, which is adapted from Wesley Mitchell's analysis of 'comprehensive' series in *What Happens during Business Cycles,* will serve my immediate purpose. Each series in the table has some right to the claim of being a 'true' aggregate or average of its kind, in contrast to the artificial ones I have largely used hitherto. The table shows directions of movement during a typical business cycle—here divided into eight stages, four each for expansion and contraction. Of course, each stage covers several months, and the table is therefore insensitive to minor differences in timing, such as the short lag in income payments. Further, it hides many cross currents that would appear in less comprehensive series, and completely omits certain business factors of which we should take account—especially wage rates, inventories, banking, and governmental finance. But with all its faults, the table identifies actual time series and thus shows more concretely than have previous exhibits the typical round of developments that constitute a business cycle.

Let us then take our stand at the bottom of a depression and watch events as they unfold. Production characteristically rises in the first segment of expansion; so does employment and money income; and so do commodity prices, imports, domestic trade, security transactions. Indeed, every series moves upward except bond yields and bankruptcies. In the second stage the broad advance continues, though it is checked at one point — the bond market where trading begins to decline. Bond prices join bond sales in the next stage; in other words, long term interest rates — which fell during the first half of expansion — begin to rise. In the final stretch of expansion, declines become fairly general in the financial sector. Share trading and stock prices move downward; the liabilities of business failures,

[2]See the following publications by the National Bureau: *Bulletin 69; Measuring Business Cycles* (Ch. 4, 9-12); *Occasional Papers 26* and *31-32;* Evans' *Business Incorporations in the United States, 1800-1943* (Ch. 9); and the forthcoming studies by Mitchell, Abramovitz, and Creamer, previously mentioned. See also the earlier studies by W. M. Persons, especially his papers in *Review of Economic Statistics,* January and April 1919.

TABLE 1

Characteristic Direction and Amplitude of Twenty-six 'Comprehensive' Series during a Business Cycle [a]

TYPICAL DIRECTION OF MOVEMENT DURING A BUSINESS CYCLE [b]

SERIES NO.	SERIES	EXPANSION Trough to first third	First to middle third	Middle to last third	Last third to peak	CONTRACTION Peak to first third	First to middle third	Middle to last third	Last third to trough	NO. OF BUSINESS CYCLES COVERED	% OF CONFORMING MOVEMENTS ... Rise	Fall	AV. AMPLITUDE ... Rise	Fall
1	Bond sales, N. Y. Stock Exchange	+	−	−	−	−	+	+	+	14	86	79	35.0	14.7
2	R.R. bond prices	+	+	+	−	−	+	+	+	19	85	74	7.4	3.8
3	Commercial failures, liab., *inv.*	+	+	+	−	−	+	+	+	14	86	93	74.5	57.8
4	Common stock prices	+	+	+	−	−	−	+	+	16	94	82	26.8	20.2
5	Shares sold, N. Y. Stock Exchange	+	+	+	−	−	−	−	+	16	94	88	40.6	36.2
6	Corporate security issues	+	+	+	+	−	−	−	+	8	100	75	46.9	46.1
7	Construction contracts, value	+	+	+	+	−	−	−	+	7	86	75	43.2	30.4
8	Deposits activity	+	+	+	+	−	−	−	+	16	94	88	14.3	16.7
9	Bank clearings, N.Y.C.	+	+	+	+	−	−	−	+	18	100	89	30.8	26.6
10	Incorporations, no.	−	+	+	+	−	−	−	−	19	84	80	26.9	10.2
11	Bank clearings, outside N.Y.C.	+	+	+	+	−	−	−	−	14	100	79	25.5	12.8
12	Bank clearings, total	+	+	+	+	−	−	−	−	14	100	86	29.2	20.4
13	Imports, value	+	+	+	+	−	−	−	−	16	94	75	26.1	18.9
14	Industrial production, total	+	+	+	+	−	−	−	−	5	100	100	35.2	32.5
15	Fuel & electricity production	+	+	+	+	−	−	−	−	5	100	100	25.5	14.6
16	Pig iron production	+	+	+	+	−	−	−	−	16	100	88	54.2	44.9
17	R.R. freight ton-miles	+	+	+	+	−	−	−	−	6	100	100	27.8	25.1
18	Factory employment	+	+	+	+	−	−	−	−	6	100	100	21.8	22.8
19	Factory payrolls	+	+	+	+	−	−	−	−	5	100	100	36.3	39.9
20	Income payments, total	+	+	+	+	−	−	−	−	4	100	100	22.6	17.6
21	Corporate profits	+	+	+	+	−	−	−	−	4	100	100	168.8	174.6
22	Commercial failures, no., *inv.*	+	+	+	+	−	−	−	−	16	75	88	22.3	26.1
23	Department store sales	+	+	+	+	−	−	−	−	4	100	75	17.6	9.1
24	Wholesale trade sales, value	+	+	+	+	+	−	−	−	3	100	100	17.7	19.1
25	Wholesale commodity prices	−	+	+	+	+	−	−	−	11	82	91	8.7	8.9
26	R.R. bond yields	−	−	+	+	+	+	−	−	19	74	65	3.7	6.2

[a] See Appendix.
[b] A plus denotes rise, a minus denotes fall. Series 3 and 22 are inverted here.
[c] Expressed as percentage of mean value during a cycle.

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which hitherto have been receding, move up again; security issues and construction contracts drop; the turnover of bank deposits slackens; and bank clearings in New York City, though not as yet in the interior, become smaller.

These adverse developments soon engulf the economic system as a whole, and the next stage of the business cycle is the first stage of contraction. Production, employment, commodity prices, personal incomes, business profits — indeed, practically every process represented in the table declines. Of course, the liabilities of business failures continue to rise, which merely attests the sweep of depression. Long term interest rates also maintain their rise. But in the next stage the downward drift of bond prices ceases; that is, the rise in long term interest rates is arrested. By the middle of contraction, bond sales join the upward movement of bond prices. More important still, the liabilities of business failures begin declining, which signifies that the liquidation of distressed business firms has passed its worst phase. These favorable developments are reinforced in the following stage. Share trading and prices revive; business incorporations, security issues, and construction contracts move upward; money begins to turn over more rapidly; even total money payments expand. Before long the expansion spreads to production, employment, prices, money incomes, and domestic trade. But this is already the initial stage of general expansion — the point at which our hurried observation of the business cycle started.

This recital of cyclical developments is rough and inadequate. Of course, it delineates characteristic movements during business cycles, not invariant sequences. That the description fits imperfectly individual business cycles is apparent from the conformity percentages in Table 1. Yet these percentages also suggest that the deviations from type are not so numerous as to destroy the value of our generalized sketch. And if this much can be accepted, an important conclusion immediately follows, notwithstanding the omissions of the table; namely, that the check to the dominant movement of business activity, whether it be expansion or contraction, is typically felt especially early in financial processes and activities preparatory to investment expenditure.

The sequences in the table express interrelated developments; they are not disconnected facts. Even my bleak description has not escaped causal overtones. An informed reader who makes the effort

will not find it hard to forge explicit causal links. Take, for example, the early recovery of the bond market from depression. The explanation can partly be found in the behavior of commercial banks. With reserves growing, short term interest rates declining, and 'sound' loans difficult to arrange, the banks naturally seek to expand their holdings of bonds. Private investors attempt to do likewise, but at the expense of stocks since business profits are still declining rapidly. The broad result is a revaluation of security holdings: bond prices and trading move upward, while the stock market keeps going down. But high-grade preferred stocks are a fairly close substitute for gilt-edged bonds, and blue-chip common stocks for preferred stocks. As the yield on bonds diminishes, stocks of strong concerns become more attractive to alert investors. In time declining interest rates exert an upward pressure on stock prices generally, offsetting the influence of falling profits. And so one may continue to link the signs recorded in the table, and fill the blanks in our knowledge of how expansions and contractions cumulate; for whether or not the business cycle is a self-generating movement, it is at least partly that. But if the links are to be of tolerable strength, they must be hammered out of materials beyond those in the table, among which some knowledge of what goes on within broad aggregates is essential.

VI The Cyclical Behavior of Profits

Of this I shall give a large illustration. The operations of our business economy depend in a significant degree on the relation that unit costs, unit prices, and the physical volume of sales bear to one another. These three factors are summed up in profits — the driving force of business enterprise. According to Table 1 corporate profits characteristically rise throughout the expansion and decline throughout the contraction of business cycles. That this is a tolerably faithful summary of recent experience is evident from Chart 7, which sets profits against industrial production and the National Bureau's chronology of business cycles since 1920. Reliable reports on quarterly profits are not available for earlier years, and we must be content with a span of observations hardly long enough for confident generalization. However, the evidence on profits seems reasonable in view of the behavior of production, just as the latter seems reasonable in view of the behavior of security issues and construction contracts. Accepting the evidence, it appears at first blush that profits

Chart 7
Corporate Profits and Related Movements
1920 – 1938

Shaded areas represent contractions of business cycles, according to NBER chronology.
See Appendix.
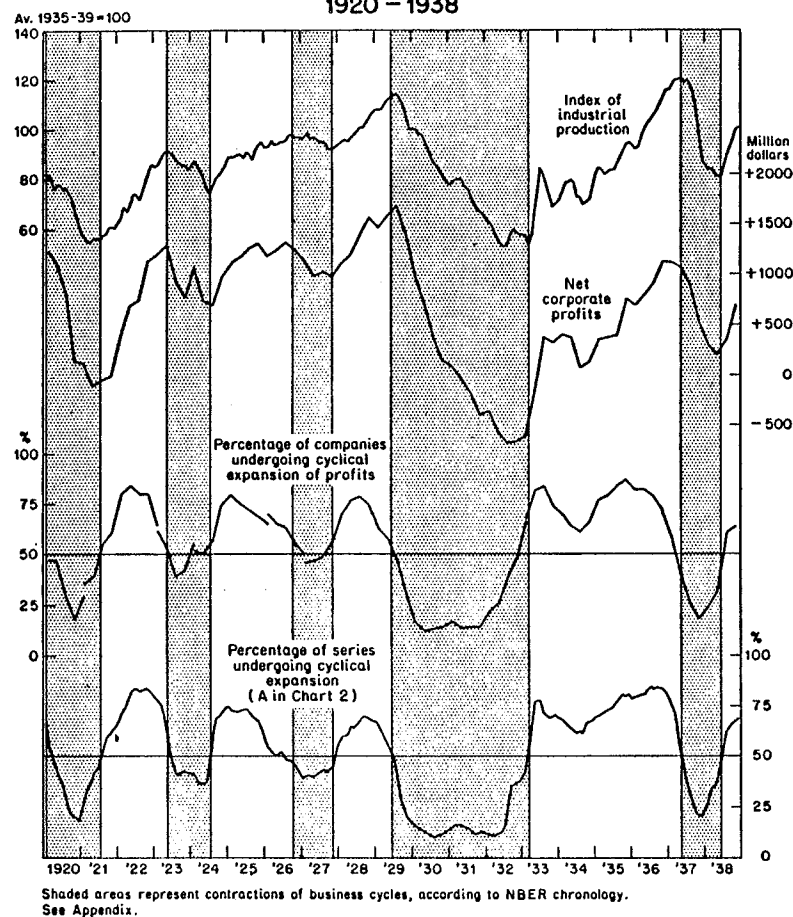
tend to favor the continuation of prosperity or depression practically until the end, and that forces capable of reversing the tides of business activity are ordinarily not to be found in profits as such. Reasoning along these lines will lead one to suppose that actual profits are an unsatisfactory gauge of prospective profits, and to seek this key to business movements elsewhere—in orders, sales, inventories, the price-wage ratio, the stock exchange, or other places.

These lines of investigation are worth pursuing. At the same time, something can be learned about changes in prospective profits from the distribution of actual profits. After all, business firms do not

have a common pocketbook. As long as we reason from aggregates we assume that they behave as if they had one, and it is only common sense to stop and see how much difference separate pocketbooks do make. The third curve from the top in Chart 7 supplies as good a statistical answer as now seems attainable. It is based on the cycles of profits in a sample of companies analyzed by Thor Hultgren. The curve shows that "at every stage of the business cycle the fortunes of some companies . . . ran counter to the main stream."[3] Not only that, but the proportion of firms experiencing an expansion of profits begins to decline well before the peak in total profits or total economic activity, and to increase long before the trough. In other words, developments in the sphere of profits that actually foreshadow reversals in the direction of aggregate activity are obscured when we view profits in the aggregate.

Earlier in this report I noted that there are two cycles in economic activity, one 'seen' and another 'unseen', and that the 'unseen' cycle in the distribution of individual activities throws its shadow ahead of the 'seen' cycle in the aggregate. We now find two cycles in profits, the 'unseen' cycle in the distribution of companies throwing its shadow ahead of the 'seen' cycle for all corporations. Chart 7 demonstrates, moreover, that in the period covered the 'unseen' cycles in profits and in general economic activity follow similar paths. The two curves are made from widely dissimilar and independent materials, but this fact merely corroborates our earlier conclusion that recession and recovery start well in advance of any reversal in the direction of aggregate activity. However, the causal links between the curves are as yet obscure; and while the available data will not permit exhaustive analysis, we should attempt to determine as well as may be whether the companies whose profits run counter to the dominant cyclical movement are in fact the foci of gathering recovery or recession.

Meanwhile, it may be observed that the behavior displayed on our chart accords with rational expectations. In the early stages of an expansion unit costs often decline as industrial facilities are improved or utilized more fully. But as prosperity cumulates, unit

[3]See Hultgren's 'Cyclical Diversities in the Fortunes of Industrial Corporations' (*Occasional Paper 32*). Cf. J. Tinbergen, *Statistical Testing of Business Cycle Theories: A Method and Its Application to Investment Activity*, and L. Klein's note in Part Three of this report.

costs tend to mount for business firms generally; and since in many instances selling prices cannot be raised, profit margins here and there will narrow, thus offsetting the influence on profits of an increase in sales or reinforcing the effects of an occasional reduction in sales. The 'squeeze' on profits becomes more widespread the longer the business expansion continues. In the first place, all firms do not have the same power to advance prices; some are prevented or limited by custom, trade marks, or governmental regulation. Secondly, errors pile up as mounting optimism warps the judgment of an increasing number of businessmen concerning the sales that can be made at profitable prices. Thus, after a business expansion has run for some time, the proportion of firms experiencing rising profits begins to shrink, although the profits of business in the aggregate continue to climb. Such a development spreads doubt or financial pressure to firms whose profits are still rising, and in time moderates their investments in sympathy with that of the growing number of firms whose business fortune is waning. Of course, a check to investment from this source strengthens an emerging tendency to postpone investment projects until a time when, it is felt, construction costs and financing charges will be reduced from the abnormal level to which they have been pushed by prosperity.

Minor changes aside, these are some of the crucial developments generated by prosperity, as Mitchell originally analyzed the problem in his *Business Cycles,* published in 1913. A series of converse developments may be expected in depression. A great deal of evidence may be cited in support of these expectations; though definite knowledge is not yet available of the scale on which investment projects are shelved in late expansion and resuscitated in late contraction, or of the links that tie firms with declining and rising profits into a system of cumulating responses.

One reason for emphasizing the role of profits in the business cycle is their extraordinarily wide fluctuation. Thus far I have abstracted from the cyclical amplitudes of different processes, which together with the variations in timing transform the internal composition of the economy over a business cycle. Of this fundamental feature of business cycles I can say little on the present occasion; but I at least wish to call attention to the wide differences among the amplitudes of the 'comprehensive' series in Table 1, and to record the finding that in our economic system, taken as a whole, production fluctuates

more widely than sales to final users. As a consequence of the latter, additions to inventories trace out cyclical movements that conform closely to the cycles in production, and account for a considerable part of the changes in it. These facts were first glimpsed by Simon Kuznets. Later, Moses Abramovitz, besides making more refined and extensive measurements, developed their rich implications in his *Inventories and Business Cycles,* now in press.[4] More recently, Ruth Mack has brought fluctuations of shorter time span than business cycles within the orbit of the original generalization, and compiled evidence suggesting that inventory investment plays an even more important part in the variations of production that occur every few months than in those that extend over a business cycle.

VII   Forecasting Business Cycles

I have stressed in this report some of the repetitive features of business cycles established by the National Bureau's studies. Yet the very charts on which I have relied as my witnesses attest also variability in the duration of business cycles, in the relative length of their phases of expansion and contraction, their amplitude, their economic scope, the speed with which a sizable majority of expanding activities is converted into a minority or *vice versa,* the intervals separating the upturns or downturns of different activities, and even their sequence. As everyone knows, the contraction of 1929-33 was exceptionally long and deep, as well as very widely diffused. The contraction of 1926-27, on the other hand, was mild though not exceptionally brief. Chart 6 gives some inkling of the dynamic role of investment outlays on the community's plant and equipment during business revivals and recessions, but this branch of expenditure was not the active factor in lifting the nation out of depression in 1914 or 1933. In recent years monetary and fiscal management has left only faint traces of the cyclical pattern of long term interest rates which ruled before the 1930's and which I have recorded in Table 1. The same table states that stock prices move early in revivals and recessions, but is silent on the occasional lapses from this tendency. None of the exhibits in this report shows agricultural

[4]See Abramovitz' forthcoming book, especially Ch. 1 and 21; also *Bulletin 74* by Kuznets. Cf. Alvin H. Hansen, *Fiscal Policy and Business Cycles,* Ch. 1-2.

production, a major industry dominated in the short run by the weather, or singles out exports which fluctuated in virtual independence of business cycles before World War I.

I take it as a matter of course that it is vital, both theoretically and practically, to recognize the changes in economic organization and the episodic and random factors that make each business cycle a unique configuration of events. Subtle understanding of economic change comes from a knowledge of history and large affairs, not from statistics or their processing alone—to which our disturbed age has turned so eagerly in its quest for certainty. If I have emphasized the repetitive elements in business cycles gleaned from statistical records, it is because a constructive contribution can come also from that direction. Findings such as I have reported add to the understanding of business cycles, and may even prove helpful in predicting reversals in the direction of total economic activity—or at least in identifying them as such promptly. That this hope is not entirely a pipedream is indicated by Chart 8.

The chart shows artificially simple aggregates, struck on the plan previously described, of the specific cycles in two small groups of series. Taken together, they are the 21 indicators of cyclical revivals selected by the National Bureau in 1937 on the basis of performance in past revivals.[5] After ranking these 21 series according to their average timing at revivals through 1933, the top third were segregated from the rest. Curve A includes this top third, which spans average leads from 7.8 to 4.2 months. Curve B covers the remaining two-thirds, the extreme series having an average lead of 3.6 months and an average lag of 1.8 months. In view of the method of selecting the two groups, curve A may be expected generally to lead curve B at recoveries. There is no technical reason, however, for a lead at recessions, or for that matter at the recovery of 1938. Nevertheless, curve A turns down and up in every instance before curve B; more important still, it does so before the turning points of general business activity expressed by our chronology of business cycles. If there were no genuine tendency towards stability of cyclical sequences, the probability of attaining such regular results would be slender.

Four forecasting principles are embodied in Chart 8, and they are more significant than their particular expression. First, since the

[5]See 'Statistical Indicators of Cyclical Revivals' (*Bulletin 69*).

Chart 8
Simple Aggregates of Specific Cycles in Two Groups of Series Differentiated by Their Cyclical Timing
1919 – 1939

Shaded areas represent contractions of business cycles, according to NBER chronology.
Origin of vertical scale is arbitrary, since K is any constant.
See text for explanation of arrows, and Appendix for other explanations.
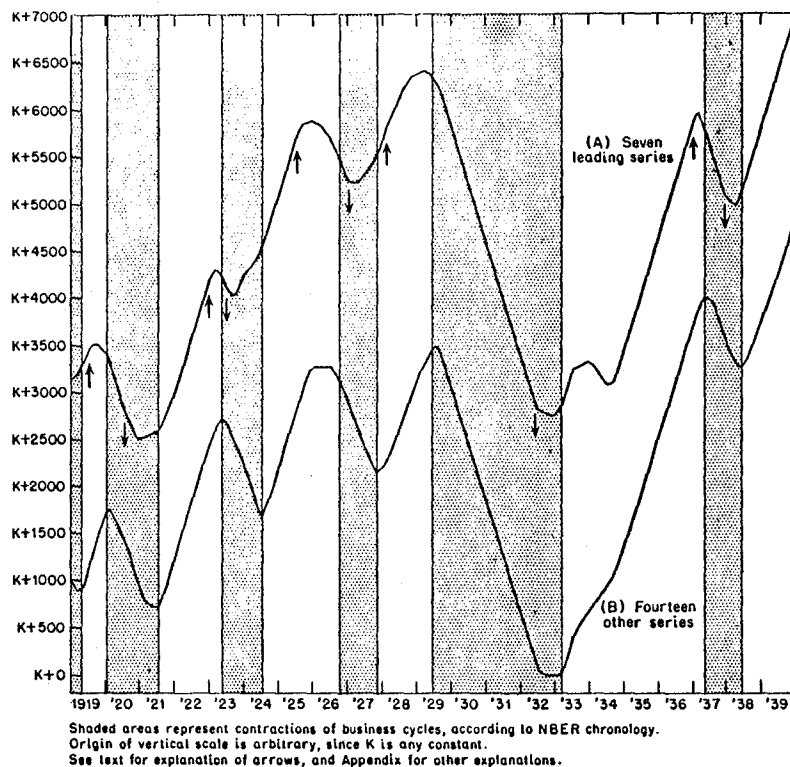
cyclical timing of single processes cannot be implicitly trusted, a measure of protection against surprises of the individual case may be won by combining the indications of numerous series. Second, since there is a tendency toward repetition in cyclical sequences, economic series may be grouped into two or more classes according to their timing. Third, while the group with the longest leads is of keenest interest, groups that tend to move later serve the important function of confirming or refuting the indications offered by the vanguard. Fourth, since the 'unseen' cycle in the distribution of .cyclical expansions and contractions within an aggregate tends to throw its shadow before the movements of the aggregate, this propensity may be harnessed by the forecaster. How that practice would extend the lead of curve A over B is indicated by the upward and

downward pointing arrows on the chart, which are placed respectively at the maxima and minima of the proportion of series in group A undergoing expansion.

These matters are being investigated further by Geoffrey Moore. Besides improving the selection of indicators made in 1937, he has devised a technique for grafting current monthly observations onto cyclical units such as I have combined in Chart 8 on empirical and in Chart 6 on economic considerations. His tentative results are presented in *Occasional Paper 31*, and should prove extremely helpful to the many economists who can master statistical devices without being mastered by them.

VIII   Mild and Severe Depressions

The fear of business cycles which rules economic thinking is a fear of severe depressions. The reasons for concern about the magnitude of emerging business movements are compelling, and extend beyond the sphere of private activity or profit. Our society can readily make political as well as economic adjustments to a mild contraction such as that of 1926-27 or 1948-49, perhaps even to rapid but brief declines such as occurred in 1907-08 and 1937-38. The really serious threat to our way of life comes not from business contractions of this character, but from the long and deep depressions that devastate homes and industries—as in the 1870's, 1890's, and the early 1930's. To glimpse economic catastrophe when it is imminent may prevent its occurrence: this is the challenge facing business cycle theory and policy. A preceding generation concentrated on the causes and cures of commercial crises; later interest shifted to business cycles, and more recently to fluctuations in employment. But the crucial problem of our times is the prevention of severe depressions, not of business or employment cycles. It is in this direction that research must move in the future, and the first and fundamental task is to determine why some business contractions are brief and mild while others reach disastrous proportions.

Some insight into this problem is afforded by the experience of the 1920's. Each of the successive cyclical waves during this decade carried further the belief in a 'new era' of boundless prosperity. As speculative fever mounted, even the business declines that occurred were ignored or explained away. The boom in common stocks of that

decade and its aftermath are notorious, but speculation was by no means confined to stocks. Ilse Mintz has recently added an important chapter on foreign bonds, and Raymond Saulnier has contributed another on urban mortgage lending.[6] Mrs. Mintz' study is concerned with American loans extended to or guaranteed by foreign governments from 1920 to 1930. After observing that "the 1920's were the defaultless era in foreign lending", she suggests that the quality of the loans progressively deteriorated during the decade. This was well concealed until severe depression brought a test of quality. "Only 6 per cent of the issues of 1920 defaulted in the 1930's while 63 per cent of those of 1928 suffered this fate; dividing the period into its earlier and its later half only 18 per cent of all issues from 1920 to 1924 became bad while the corresponding ratio for 1925 to 1929 is as high as 50 per cent." Saulnier's sample survey of urban mortgage loans by life insurance companies suggests a similar relaxation of credit standards during the late 'twenties. It shows, for example, that of the loans extinguished in 1935-39 the foreclosure rate was 40 per cent on such of the loans as were made during 1925-29, but only 32 per cent on those made in 1920-24 and 25 per cent on those made in 1930-34.

These new facts accord with an old hypothesis; namely, that developments during 'prosperity'—which may cumulate over one or more expansions—shape the character of a depression.[7] But the results I have cited do not explain, for example, why the revival in the first half of 1931 proved abortive. That unfortunate episode cannot be understood without study of foreign conditions, the policies pursued by the Federal Reserve System, and other matters. I make these remarks merely to suggest that a host of developments during a business decline, largely unconnected with what happened during the preceding 'prosperity', may convert what might have been a mild contraction into a severe one. This too is an old hypothesis, and of course it supplements rather than rivals the hypothesis that the sources of deep depression are imbedded in preceding prosperity.

Our past work on business cycles has laid an excellent foundation for comparative study of mild and severe cyclical movements. *Measuring Business Cycles* demonstrates a high and positive correlation between the amplitude and economic scope of business cycle phases. Abramovitz has found an inverse correlation between the length of a business cycle phase and the proportion of the change in gross national product that is accounted for by inventory accumulation or decumulation. Geoffrey Moore has found qualitative differences in the movements of agricultural prices and production during mild and severe depressions.[8] In a forthcoming *Occasional Paper* Daniel Creamer supplies important information on the behavior of wages during business cycles of varying intensity, and Milton Friedman is now investigating monetary changes during mild and vigorous cyclical movements. But we have only begun to exploit our vast collection of records which cover expansions and contractions of widely different length and depth in several countries. Full investigation of the problem why some business declines remain mild while others reach catastrophic magnitude is a natural extension of our research program, and one for which we have long prepared. It will call for considerable new effort, and the merging of the skills of the historian, economic theorist, and statistician. If we can turn to it promptly and energetically, we may make a telling contribution to the economic knowledge our society so sorely needs.

Arthur F. Burns
Director of Research

[6]See the forthcoming studies by Ilse Mintz and Raymond Saulnier. The latter's *Urban Mortgage Lending by Life Insurance Companies* is in press. See also an earlier study by George W. Edwards, *The Evolution of Finance Capitalism*, pp. 231-2.

[7]See, for example, *Measuring Business Cycles*, p. 460.

[8]See Abramovitz' forthcoming monograph, Ch. 21. Moore's study of *Harvest Cycles*, which is completed except for final revisions, will probably be published in 1951.

General Note

Only a relatively small fraction of the series summarized in this paper were used in deriving the National Bureau's chronology of business cycles. For the chronology, see A. F. Burns and W. C. Mitchell, *Measuring Business Cycles*, pp. 78-9. Note the revisions made since the publication of that volume: the trough in 1921 shifted from September to July, the trough in 1927 from December to November, and the trough in 1938 from May to June. Concerning the methods used in dating specific and business cycles, see the source cited, Chapter 4.

Except when otherwise noted, all the series in the following charts are monthly.

Chart 1

The sample is an extension of Moore's sample of well conforming series, briefly described in the note to Chart 5. The present sample includes series that conform poorly or slightly as well as those that conform well to business cycles. New series analyzed by the National Bureau since Moore's compilation was made (autumn 1948) are not included in Chart 1 or in any of the subgroups in later charts.

Except for the first year and a half of the period, the number of series in the comprehensive sample exceeds 600 every month. The average number is 656 for the twenty-one years 1919-39 and 665 for 1921-39. From 642 in January 1921, the number rises to more than 680 throughout 1922-28, after which it declines gradually to 635 in 1939.

The comparatively small number of series in the beginning of the period is due to the fact that many series in the National Bureau's collection begin in 1919, together with our practice of counting such series as additions to the sample only from the month of their first cyclical turn. A better practice would have been to introduce such series into the tabulations from the month of their first observation; and we have in fact adjusted this way the tabulations of the subgroups shown in later charts. These corrections proved to be so slight in the subgroups that we have not deemed it essential to make them in the full sample. After 1921 the effects produced by the corrections are not at all significant; they are not carried in the subgroups beyond 1922. A comparable inexactitude attends our practice of treating series that terminate during the period 1919-39 as if they ended in the month following their last observed cyclical turn; but the number of series affected thereby is negligible throughout the period.

To take account of the fact that some series characteristically behave invertedly (falling during business cycle expansions and rising during contractions), the peaks of such series are counted as troughs and the troughs as peaks. For a precise definition of inverted behavior, see *Measuring Business Cycles*, Ch. 5, Sec. I and X. Concerning duplications and weighting, see notes to Charts 4 and 6.

Chart 2

The basic data used are the same as in Chart 1. As noted, the sample changes somewhat during the period covered; but the meaning of curves A, B, and C may be conveyed most readily by assuming a fixed number of series.

Let t represent the number of series reaching troughs in a given month, let p represent the number reaching peaks, let e and c represent the number expanding and contracting respectively, and let subscripts identify the month. Then $e_n = e_{n-1} + t_{n-1} - p_{n-1}$. Thus curve A is essentially derived from the bottom curve in Chart 1.

Curve B, in principle, is defined as follows: $e_n - c_n = e_{n-1} - c_{n-1} + 2(t_{n-1} - p_{n-1})$. Of course, when e and c are percentages, $e_n - c_n = 2e_n - 100$.

Let $e_0 - c_0$ be 0; in other words, fix the origin where $e = c$. Also, let T_n stand for $(t_n - p_n)$. Then the ordinate of curve C in month n is defined, in principle, as follows: $K + (e_1 - c_1) + (e_2 - c_2) + ... + (e_n - c_n)$, where K is an unknown constant. The indicated sum equals $K + 2[nT_0 + (n-1)T_1 + (n-2)T_2 + ... + T_{n-1}]$; the expression in brackets is a cumulative of the cumulative of T.

The meaning of curve C may be grasped without going through the preceding steps. Take a monthly time series, mark off its specific cycles, and discard all information pertaining to it except the dates of its cyclical turns. Draw a straight line with a slope of unity from the date of the first trough to the date of the succeeding peak, connect this peak and the following trough by a straight line with a slope of unity, and so on. Repeat these operations on every series in the group; that is, convert each series into a 'triangular curve'. The arithmetic sum of such converted series will be curve C. That is why it is briefly described in the text and in later charts as a 'simple aggregate of specific cycles'. That is why, also, the scale of the curve is expressed in an abstract unit. (Curve C is described on the chart as the cumulative of B, which is expressed in percentages. From the viewpoint of curve C the percentages serve merely the function of splicing segments based on varying numbers of series.)

Curve C has interesting properties. Assume that its shape is as follows: the curve is continuous, it moves in cycles, the tops and bottoms of the cycles are rounded (first derivative zero), and there is just one point of inflection between the peak and trough. Let the trough come at date a, the point of inflection at i, the peak at s. Then $e_a = c_a$; $e_s = c_s$; $e_n > c_n$ between a and s; e_n increases between a and i; e_n decreases between i and s; $t_n > p_n$ between a and i; $t_n < p_n$ between i and s; and $\sum t_n = \sum p_n$ between a and s.

Chart 3

The specific time series on this chart are so well known that brief identification will suffice.

1) Index of industrial production: Federal Reserve Board, 1943 revision
2) Index of factory employment: Bureau of Labor Statistics
3) Freight car loadings: Association of American Railroads, Car Service Division

The series are seasonally adjusted: (1) by the compiler, (2) by Federal Reserve Board, (3) by National Bureau.

Chart 4

The total number of series included in the production group during some part of the period 1919-39 is 115; the average number in any month is over 100, and in no month is the number less than 97.

The total number of series in the employment sample is 41; the average number in any month is 40, and the number is never less than 38.

Like the 'all-inclusive' sample in Chart 1, both the production and the employment subsamples contain duplications. These arise chiefly because comprehensive series as well as some of their components are included. Another reason is that some processes are represented by different series, as when records are compiled by different investigators. We have also studied nonduplicating groups consisting of 58 production and 21 employment series, and these give results that are almost indistinguishable from those yielded by the 115 production and 41 employment series, respectively. For the list of 21 employment series, see *Twenty-sixth Annual Report*, p. 24. Experiments with weighting, apart from those implicit in duplications, have not been made.

The subgroup samples are handled differently than the all-inclusive sample, in that peaks and troughs of 'inverted series' are not interchanged, but are tabulated as they come.

See notes to Charts 1 and 2.

Chart 5

For a full description of how this sample of well conforming series was selected, see Geoffrey H. Moore, *Occasional Paper 31*.

The number of series in a particular month changes steadily from 75 in January 1885 to 233 in January 1919, through a maximum of 366 in June 1922, to 330 in December 1939. By quinquennial dates, in June, the numbers in (A) Moore's sample and (B) our 'all-inclusive' sample in Chart 1 are as follows:

	A	B
1920	336	602
1925	360	686
1930	356	674
1935	340	648

For the treatment of 'inverted series', see note to Chart 1.

Chart 6

The number of series included in the group of new orders for investment goods during some part of the period 1919-39 is 70; the average number in any month is over 65, and the number is never less than 63.

The group on income payments consists predominantly of payroll series, the only exceptions being (1) dividend payments and (2) total income payments to individuals. There are 33 payroll series in all, some of which are aggregates that overlap other series included in the sample. The average number of series in the group on income payments in any month is 35, and in no month is the number less than 34. Analysis of a nonduplicating sample for this group yielded results very similar to those shown on the chart; cf. note to Chart 4.

For the group on industrial production (excluding foods), see note to Chart 4. See that note also for the treatment of inverted series. For other details or interpretations, see notes to Charts 1 and 2.

Not all of the cyclical turning points can be easily made out in this chart. They are as follows:

CYCLICAL TURN	ORDERS FOR INVESTMENT GOODS	INDUSTRIAL PRODUCTION (EXCLUDING FOODS)	INCOME PAYMENTS
Trough	Jan. 1919[a]	Mar. 1919[b]	Mar. 1919[b]
Peak	Dec. 1919	Feb. 1920	June 1920
Trough	Jan. 1921	Apr. 1921	July 1921
Peak	Mar. 1923	May 1923	June 1923
Trough	Sep. 1923	July 1924	July 1924
Peak	May 1926	Nov. 1926	July 1927
Trough	May 1927	Nov. 1927	Apr. 1928
Peak	Jan. 1929	July 1929	July 1929
Trough	Mar. 1933	Oct. 1932	Mar. 1933
Peak	Mar. 1937	May 1937	May 1937
Trough	Feb. 1938	May 1938	June 1938

[a] Or earlier.   [b] Uncertain.

Chart 7

Industrial production: see note to Chart 3.

Net corporate profits: series is quarterly, seasonally adjusted, and comes from Harold Barger, *Outlay and Income in the United States, 1921-38*, National Bureau, 1942, pp. 297-9.

Per cent of companies undergoing cyclical expansion of profits: series is quarterly and comes from Thor Hultgren, 'Cyclical Diversities in the Fortunes of Industrial Corporations', a forthcoming *Occasional Paper*. Breaks in the series are due to expansion of the sample of companies. In each segment the number of companies is constant, being as follows in successive intervals:

PERIOD	NO. OF COMPANIES	PERIOD	NO. OF COMPANIES
1920-21	17	1926-27	153
1921-23	31	1927-29	155
1923-24	71	1929-33	185
1924-26	101	1933-38	244

None of these profits series enters the 'all-inclusive' sample of Chart 1. Further details on the composition and coverage of the profits sample will be found in the work cited.

Chart 8

The 21 series on which this chart is based are listed below. The first seven constitute the group with longest average leads at revivals; the remainder comprises the group with shorter average leads or with lags at revivals.

1 Dow-Jones index of industrial stock prices	12 Index of wholesale prices, Bradstreet's and B.L.S.
2 Liabilities of business failures (inverted)	13 Ton-miles of freight hauled by railroads
3 Inner tube production	14 Truck production
4 Railway operating income	15 Index of industrial production, Federal Reserve Board
5 Paper production	
6 Bank clearings outside New York City	16 Average hours per week, manufacturing
7 Residential building contracts, floor space	17 Index of business activity, A. T. & T.
8 Passenger car production	18 Index of production, Standard Statistics Co.
9 Steel ingot production	
10 Industrial building contracts, floor space	19 Factory employment, total
	20 Department store sales
11 Pig iron production	21 Factory employment, machinery

For sources and brief descriptions of the behavior of these series, see W. C. Mitchell and A. F. Burns, 'Statistical Indicators of Cyclical Revivals', *Bulletin 69*, May 28, 1938. Readers who consult that bulletin will discover, however, that the top seven series in the present listing are not the same as the top seven presented there, nor are the ranges of the average timing measures the same in the bulletin and the present paper. These discrepancies are the result of revisions of the analyses on which *Bulletin 69* was based, and reflect either changes in the basic data or of the seasonal adjustments, or both. Though the ranking of series has been altered, the changes in average timing measures are slight.

For another analysis along the lines of Chart 8, see Geoffrey H. Moore, *Occasional Paper 31*, Table 2 and Appendix A. The appendix presents a method of utilizing current monthly observations in a framework similar to that based on specific cycle units but not requiring the prior identification of specific cycles.

See note to Chart 1 for the treatment of the inverted series, and note to Chart 2 for the interpretation of the curves.

Table 1

The rise in series 26 and the fall in series 2 might have been treated as extending through mid-contraction. See *Measuring Business Cycles*, pp. 192-3, 195.

In series 2, 17, and 24, the number of expansions covered is greater by 1 than the number of full cycles. In series 4, 7, 10, 19, 21, and 26, the number of contractions covered is greater by 1 than the number of full cycles. In series 17, there are two additional contractions (they arise from a gap in the series).

Most series in this table are identified in the source cited. See Appendix C, notes to Table 21, for series 1, 3-4, 8, 9, 11-13, 17, 22, 25; notes to Chart 9, for series 6; notes to Chart 3, for series 14; and notes to Chart 8 and Tables 18-19, for series 19. Concerning series 2, 5, 16, 26, see *ibid.*, Chapter 6, note 7.

To identify series 7, 18, 20, see Appendix I of *Historical Statistics of the United States, 1789-1945* (a supplement to the *Statistical Abstract of the United States*).

Series 10: G. Heberton Evans, Jr., *Business Incorporations in the United States, 1800-1943*, National Bureau, 1948, pp. 80-1.

Series 15: Computed by National Bureau by compiling a weighted aggregate of seasonally adjusted production data for anthracite coal, bituminous coal, crude petroleum, and electric power. The weight for each is the average value of a unit of output during 1922-31, except that the unit value for electric power is net of the cost of fuel consumed and of current purchased.

Series 21: Barger, *op. cit.*, pp. 297-9.

Series 23: Dollar volume of sales adjusted for price changes. Seasonally adjusted dollar sales from *Federal Reserve Bulletin*, August 1936, p. 631, and subsequent issues. Deflating index supplied by Federal Reserve Bank of New York.

Series 24: Federal Reserve Board index; seasonally adjusted by compiler. *Federal Reserve Bulletin*, December 1927, pp. 26-7, and subsequent issues.

Part Two

ACTIVITIES DURING 1949

ACTIVITIES DURING 1949

NEW STUDIES

A broad study of the capital requirements of the American economy was started last year, with the aid of a generous grant by the Life Insurance Association of America. The study falls within an area of research in which the National Bureau has long had an interest, namely, capital formation and its financing. The scope of the new investigation may be indicated by the leading questions it will attempt to answer: What has been the course of capital requirements in recent decades and what factors have determined it? From what sources have our capital requirements been financed, and what factors have determined the use of, and choice among, sources of funds? What is the current and probable future course of capital requirements and their financing? Since these major questions can best be analyzed within individual sectors of the economy, investment and its financing will be studied separately for agriculture, housing, industry at large, and government. Investment in foreign areas will complete the sector studies. Another major concern of the investigation will be to trace the flow of funds through financial intermediaries. The historical analysis will be supplemented by what may be learned from surveys of investment plans and from experiments in projecting investment. What conclusions may be drawn about future prospects will depend heavily upon the reliability of whatever past relations are established. Simon Kuznets is directing the study, and progress has been made in recruiting a staff.

A study by Ilse Mintz of American investment in foreign government bonds was incorporated in the research program last year. Mrs. Mintz' work was started under a field fellowship of the Social Science Research Council, and was partly done at the National Bureau. Her findings concerning the changing quality of foreign loans during business cycles proved of such keen interest to the staff that facilities were provided for an extension and completion of her investigation. This study is briefly noted in Part One of this report, and is described more fully in Part Three.

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New research has been initiated in the field of consumption as well as investment. Lawrence Klein is in charge of a study of consumption patterns, which will attempt to analyze the influence of income, asset holdings, age, and other factors on consumer spending and savings. The study is being made jointly with the Survey Research Center of the University of Michigan, and will be devoted largely to an analysis of the rich materials on consumer behavior compiled in the last few years by that institution.

Plans for fiscal research were developed, and some new work started. The statistical history of the personal income tax, on which Lawrence H. Seltzer has been working, will be broadened by a parallel study of the corporate income tax by Sergei Dobrovolsky. Daniel Holland, appointed Research Associate in 1949, will attempt to link statistically the corporate and personal income taxes by fitting corporate earnings into a personal distribution of taxable income. George E. Lent, another Research Associate appointed last year, has begun a study of the changing volume, distribution of ownership, and economic effects of tax-exempt securities. Several of these studies are described more fully in Part Three.

Some preliminary consideration was given during the year to a study designed to cross occupational and size distributions of income; as well as to possible investigation of the alleged shortage of equity funds and of several other problems in finance.

PUBLICATIONS DURING THE YEAR

Six publications were issued during 1949, and a seventh in January 1950:

Frederick C. Mills and Clarence D. Long, *The Statistical Agencies of the Federal Government*

Dan T. Smith and J. Keith Butters, *Taxable and Business Income*

Conference on Research in Income and Wealth, *Studies in Income and Wealth, Volumes Eleven and Twelve*

Benjamin H. Higgins, 'Lombard Street in War and Reconstruction', *Occasional Paper 28*

Solomon Fabricant, 'The Rising Trend of Government Employment', *Occasional Paper 29*

Raymond J. Saulnier, 'Costs and Returns on Farm Mortgage Lending by Life Insurance Companies, 1945-1947', *Occasional Paper 30*

As reported last year, Herbert Hoover, Chairman of the Commission on Organization of the Executive Branch of the Government, requested the National Bureau to appraise the efficiency of federal statistical agencies. *Statistical Agencies of the Federal Government*, by Mills and Long, has accomplished this task. The authors review the work and organization of the many federal statistical units, point out the merits as well as the shortcomings of current practice, and make detailed recommendations for improvement.

In *Taxable and Business Income*, Smith and Butters compare and analyze two basic concepts of income. In the aggregate of industry the differences between income as reported by corporations for tax purposes and income as reported in ordinary financial statements are not large, but there are significant differences in some industries and in certain types of income. The book should prove enlightening to the general student of economic affairs as well as to specialists in finance.

Studies in Income and Wealth, Volume Eleven, includes papers presented at the November 1946 meeting of the Conference on Research in Income and Wealth. Two deal with the industrial distribution of gainfully occupied workers in the United States as revealed in successive censuses. The third attempts to translate the concept of parity income for agriculture into real terms. The fourth deals with cost of living comparisons among countries. A review of the economic forecasts for the immediate postwar period is the subject of the fifth, and the sixth analyzes the savings-income ratio. *Volume Twelve* is devoted entirely to papers on national wealth presented at the January 1948 meeting of the Conference.

Occasional Paper 28, by Benjamin Higgins, completes a series of studies by the Financial Research Program on the impact of war on financial machinery. The paper analyzes the role of the London money market in Britain's war economy, and describes the structural changes in British financial institutions since World War I. *Occasional Paper 29,* by Solomon Fabricant, sets forth some illuminating facts on governmental employment in recent decades. A full report on this fundamental subject is now being prepared. In *Occasional Paper 30,* Raymond Saulnier develops and analyzes measures of the cost factor in interest rates—a problem that has suffered from neglect by empirical students as well as theorists.

REPRINTS OF FORMER PUBLICATIONS

Several books published in earlier years were reprinted in 1949 or the beginning of 1950: *Business Cycles: The Problem and Its Setting*, by Wesley C. Mitchell; *Cost Behavior and Price Policy*, by the Committee on Price Determination; *Strategic Factors in Business Cycles*, by John Maurice Clark; and *Production Trends in the United States since 1870*, by Arthur F. Burns. Mitchell's volume was reprinted by the Book-of-the-Month Club; the last two volumes, by Augustus M. Kelley, Inc. These reprints were made on the initiative of the commercial publishers.

FORTHCOMING PUBLICATIONS

Six studies are in press: Moses Abramovitz, *Inventories and Business Cycles, with Special Reference to Manufacturers' Inventories;* Miles L. Colean, *The Impact of Government on Real Estate Finance in the United States;* Raymond J. Saulnier, *Urban Mortgage Lending by Life Insurance Companies;* Geoffrey H. Moore, 'Statistical Indicators of Cyclical Revivals and Recessions', *Occasional Paper 31;* Thor Hultgren, 'Cyclical Diversities in the Fortunes of Industrial Corporations', *Occasional Paper 32;* George J. Stigler, 'Employment and Compensation in Education', *Occasional Paper 33.* Wesley C. Mitchell's volume, *What Happens during Business Cycles,* is being prepared for the press.

Several other publications during 1950 are likely. The studies now being reviewed by the Directors or that will soon be submitted for review include, among others, the following: Morris A. Copeland, *A Study of Moneyflows;* Ernest M. Fisher, *Urban Real Estate Markets and their Financing Needs;* Lawrence H. Seltzer, *Tax Treatment of Capital Gains and Losses.* Two *Occasional Papers* belong in this group: Daniel Creamer, 'Behavior of Wage Rates during Business Cycles', and Sergei Dobrovolsky, 'Corporate Income Retention, 1915-1943'.

RESEARCH IN PROCESS

The research activities of the members of the staff during 1949 are described in Part Three of this report. Their findings have not yet been subjected to the full critical review accorded the National Bureau's studies, and are therefore tentative and provisional.

Systematic research on commodity prices was temporarily suspended during the past year. Otherwise all major divisions of the

Bureau's work made conspicuous progress, especially the program of research on urban real estate finance. Research in the fiscal field was notably expanded, and the investigation of the economic relations between the United States and foreign countries at last got actively under way. The staff working on business cycles was smaller, but research on a considerable scale continued.

COMMITTEE ON FISCAL RESEARCH

The Conference on Research in Fiscal Policy has been dissolved. In its place a Committee on Fiscal Research was organized for a three year term, to advise the National Bureau on the scope and content of its investigations in public finance. Lawrence H. Seltzer is Chairman. Other members, apart from our own staff, are William A. Berridge, Roy Blough, W. Randolph Burgess, Gerhard Colm, W. L. Crum, Lewis W. Douglas, John F. Fennelly, Robert M. Haig, Alvin H. Hansen, Clarence Heer, M. Slade Kendrick, Walter Lichtenstein, Wesley Lindow, Carl S. Shoup, Dan T. Smith, and John H. Williams.

The first meeting of this committee of public-spirited experts was held in February 1950, when the Bureau's current research in the fiscal field was reviewed and several new investigations proposed. The latter will soon be sifted by a subcommittee set up for the purpose.

UNIVERSITIES-NATIONAL BUREAU COMMITTEE

A special Conference on Research in Business Cycles was held under the auspices of the Universities-National Bureau Committee in New York City over the Thanksgiving weekend. About a dozen papers, summarizing research on various aspects of business cycles, were discussed by both appointed discussants and from the floor. The planning committee for the conference, under the chairmanship of Gottfried Haberler, consented to serve as an editorial committee in charge of shaping the papers and some of the discussion into a book.

The papers dealing with the problem of economic growth, presented at the meeting of the Universities-National Bureau Committee in November 1948, were mimeographed and bound under the title *Problems in the Study of Economic Growth.*

The next special conference under the auspices of the Committee will deal with research in business finance. A planning committee in charge of this conference, under the chairmanship of C. R. Whit-

tlesey, has been at work since early 1949. The program of papers to be presented has been completed, and the conference will be held at Haverford College, June 19-21, 1950.

The Universities-National Bureau Committee adopted, and the Executive Committee of the National Bureau approved, a plan for reorganization that substantially increases the number of universities represented. It was decided that all universities offering graduate work in economics and emphasizing economic research be invited to participate. The tentative list includes about thirty institutions. The expanded Universities-National Bureau Committee on Economic Research will hold its first meeting in June, in conjunction with the Conference on Research in Business Finance.

The Executive Committee of the Universities-National Bureau Committee, elected in 1948 to serve during 1949, has been authorized to remain in office until a new Executive Committee is elected, following the reorganization. Simon Kuznets is Chairman; the other members are John D. Black, Arthur F. Burns, Earl J. Hamilton, and I. L. Sharfman.

BOARD OF DIRECTORS AND RESEARCH STAFF

Several changes in the membership of the Board occurred in 1949. Robert B. Warren was elected Director by Appointment of the Institute for Advanced Study, to fill the unexpired term of W. W. Riefler. Theodore W. Schultz was elected Director by Appointment of the University of Chicago, to fill the unexpired term of T. O. Yntema. Murray Shields was elected Director by Appointment of the American Management Association, and Thomas C. Cochran was elected Director by Appointment of the Economic History Association to fill the unexpired term of Arthur H. Cole. Donald R. Belcher was elected Director at Large, as was T. O. Yntema. W. L. Crum, for many years a member of the Board and its President in 1940-41, requested relief from further service, and his resignation was reluctantly accepted by the Board.

Lawrence H. Seltzer was appointed to the Research Staff. Lawrence Klein continued as a Research Associate under a joint arrangement with the Survey Research Center of the University of Michigan. Daniel Holland of Columbia University and George E. Lent of the University of North Carolina were appointed Research Associates for 1949-50.

Part Three

STAFF REPORTS

1 NATIONAL INCOME AND CAPITAL FORMATION

Morris Copeland's manuscript on money flows has been revised and should soon be ready for review by the Directors.

The following reports describe the work by the staff on income distribution and capital requirements, and the activities of the Conference on Research in Income and Wealth. Various reports in subsequent sections also deal with income, investment, or money flows; see especially Section 5; also Section 3 (Creamer, Mack, Klein), Section 6 (Seltzer, Holland), and Section 7 (Mintz).

INCOME DISTRIBUTION

The manuscript of a two volume report on *Shares of Upper Income Groups in Income and in Savings* has been prepared and after revision will be circulated to the Directors. If no unforeseen difficulties arise, the report should appear late this year or early next, and may be preceded by an *Occasional Paper* presenting the findings.

Some of the major findings are summarized here in capsule form:

1) The average income shares (income ex capital gains and before taxes) of upper income groups between the two World Wars were: top 1 per cent of the population, 15 per cent of income; top 5 per cent of population, 30 per cent of income.

2) The shares of upper income groups were largest in the countrywide aggregate of dividends: the top 1 per cent of the population received on the average 65 per cent of total dividends paid to individuals, the top 5 per cent received 77 per cent. Their shares were lowest in the countrywide total of employee compensation, amounting on the average to 6½ per cent for the top 1 per cent and 17 per cent for the top 5 per cent groups.

3) The shares of upper income groups declined substantially from 1939 to 1944 or 1945, and by 1948 had recovered little. From 1939 to 1945 the share of the top 1 per cent group dropped from 13 to 9 per cent and the share of the top 5 per cent group dropped from 28 to 19 per cent. If capital gains and taxes are allowed for, the decline was even more marked—from 12 to 7 per cent for the top 1 and from 27 to 17 per cent for the top 5 per cent group.

4) During business cycles in the interwar period fluctuations in income shares of upper income groups were, on the whole, minor. The percentage shares of the top 1 per cent group were irregularly related to business cycles; those of the upper income groups below the top 1 per cent tended to be inversely related to business cycles.

5) There is some evidence that during business cycles the savings-income ratio for the upper income groups fluctuated much less relatively than for the lower income groups. This, in combination with the finding under 4, suggests that savings of upper income groups constituted a fairly constant proportion of the total income of individuals during business cycles. Consequently, the extreme variability during business cycles of the savings-income ratio for the total population must have been due largely to violent changes in the savings-income ratio for income groups below the top.

6) In view of the distinct probability that savings of upper income groups and those of the groups below the top seek different investment channels, the changing distribution during business cycles of total individual savings between savings by upper income groups and by those below the top should be of significance in cyclical analysis of the savings-investment flow.

These conclusions are necessarily qualified by the brevity of the period covered and the limitations on the reliability of the estimates. But they are sufficiently supported by the evidence to merit consideration, at least as reasonable hypotheses subject to further check.

Simon Kuznets

CAPITAL REQUIREMENTS IN THE AMERICAN ECONOMY
This new study is to deal with the factors that determine the long run demand for capital investment and for capital funds in the economy of this country. It is hoped that light on these factors will be gained by analyzing historical data on the accumulation of real capital in various sectors of the economy, on the ways by which such accumulated capital has been financed, either from the internal funds of enterprises or from outside sources, and on the shifting weights of various financial institutions in external financing. The study will draw heavily upon work already done or under way at the National Bureau on capital investment and the flow of funds, upon studies conducted by governmental and other research agencies in this field, and especially Raymond Goldsmith's study of savings and their components.

In view of the wide scope of the investigation, it is being planned in such a way that various parts can be undertaken separately by responsible scholars; then the parts, each a major undertaking in itself, will be combined into an integrated whole.

Simon Kuznets

CONFERENCE ON RESEARCH IN INCOME AND WEALTH
Volume Eleven of *Studies in Income and Wealth* was published in 1949 and *Volume Twelve* in January 1950. *Volume Thirteen,* containing the papers on the size distribution of income presented at the 1949 meeting of the Conference, should soon be ready for publication.

The Studenski-Wyler manuscript on national income estimates for various countries is being revised and edited.

Irwin Friend's manuscript on concepts and the measurement of individual savings is expected to be ready by midyear to send to the Conference's advisory committee for review.

A draft of an annotated bibliography of United States literature on national income and wealth, covering 1919 through 1947, has been completed under the direction of Raymond Bowman. Originally it was planned to publish this bibliography in the *Studies in Income and Wealth* series. It is now felt, however, that the value of the United States bibliography and of the bibliography of the rest of the world's literature on income and wealth, being prepared by the International Association for Research in Income and Wealth, would be greatly enhanced if they were published together. Arrangements have therefore been made for the International Association to issue the entire bibliography in one volume.

The 1950 meeting of the Conference will be devoted to papers on national wealth, supplementing the discussion begun in 1948. As in

the case of the 1948 meeting, the program is being organized by Morris Copeland.

In addition to its regular meeting, arrangements have been made for a special meeting of the Conference this year at the University of Illinois. The meeting will be devoted to a more intensive consideration of research on the size distribution of income than was possible at the regular 1949 meeting. The program is in the hands of a special committee resident in the Illinois area: Everett Hagen (Chairman), Dorothy Brady, Milton Friedman, Hazel Kyrk, Franco Modigliani, and Margaret Reid. The meeting will, it is hoped, attract economists in the Middle West who are not usually able to attend the regular meetings in the East. If this experiment with a 'regional' meeting proves successful, other regional meetings may be arranged in the future.

Solomon Fabricant, *Chairman*
Conference on Research in Income and Wealth

2 EMPLOYMENT AND PRODUCTIVITY

GOVERNMENT

All measures—number of persons on government payrolls, value of capital assets held by governmental units, cost of goods and services purchased by government from private industry—point clearly to great expansion in the scope of governmental activity during the first half of the century. To deepen understanding of the factors bearing on this trend we have begun a cross-sectional analysis of the relation between the level of public expenditures and certain measurable factors. Data available for 1942 make it possible to determine aggregate expenditures by state and local governmental units in each of the 48 states. We are correlating these expenditures (per capita) simultaneously with average per capita income in the 5 years preceding, degree of urbanization in 1940, and density of population in 1940. Earlier investigations of these relations have treated the three factors individually instead of simultaneously. They have therefore not been able to obtain as clear a view of the interrelations among the several variables as our method should yield. Robert Lipsey, who is doing the statistical work, has already obtained some suggestive preliminary results. These indicate that at given levels of urbanization and density, increase in per capita income is associated

with a roughly proportionate increase in per capita state and local government expenditures; that at given levels of income and density, increase in urbanization up to a point is accompanied by little appreciable change in expenditures, but that beyond that point greater urbanization is associated with a rise in expenditures; and that at given levels of income and urbanization, increase in density is accompanied by decline, then little change, in expenditures. The results are sufficiently interesting to warrant pursuing this part of our investigation further. Particularly, we need to determine the relation between the factors mentioned and each of the major functional categories of expenditures, such as protection and welfare.

Completion of this task should bring the basic work of the present investigation to a close. Portions of the report have already been drafted in preliminary form. As it is now shaping up, the manuscript will consist first of a description of changes in government's input of labor, capital, and purchased goods and services since 1900; second, of notes on factors that may account for changes in the relation between input and service rendered; third, of a description of growth in governmental service and change in its composition; then, of an analysis of some of the factors related to the expansion of governmental activity; and finally, of a summary.

Solomon Fabricant

EDUCATION

A report on employment and compensation in education will be published as *Occasional Paper 33*.

The histories of salaries of public school and college teachers after the two World Wars have been very similar. Average salaries of urban school teachers regained the prewar level of purchasing power

	TEACHERS IN URBAN PUBLIC ELEMENTARY SCHOOLS		COLLEGE TEACHERS	
SCHOOL YEAR	Average current salary	Salary in 1935-39 purchasing power	Average current salary	Salary in 1935-39 purchasing power
1940			$2,886	$2,898
1941	$1,917	$1,904		
1942			2,892	2,617
1943	1,996	1,658	2,988	2,482
1945	2,227	1,754	3,236	2,548
1947	2,552	1,665	3,705	2,417
1948			4,098	2,454
1949	3,185	1,858		

(measured by the BLS cost of living index) by about 1922, but that of college teachers not until 1931. According to the most recent available information, given in the adjoining table, these salaries are tracing a similar course. These two postwar episodes are part of the long term convergence of salaries in the two types of teaching.

George Stigler

TRADE

My study of the history of wholesale and retail margins since the Civil War will report a very gradual rise in the fraction of the consumer's dollar absorbed by distribution. This rise could plainly be accounted for by more rapidly advancing productivity in the industries producing goods, e.g., agriculture, mining, and manufacturing, than in the industries distributing them, wholesale and retail trade. However, the best, though necessarily crude, estimates we have for the volume of goods produced and distributed, and for persons engaged in production and distribution respectively, suggest a far larger differential change in productivity than that necessary to explain the behavior of margins. In other words, the apparently far more rapid rise in goods produced per worker in production than in goods distributed per worker in distribution would lead to the expectation of a much more substantial rise in distributive margins than we actually observe. (This brief statement begs numerous questions of definition, but apparently not enough to explain the paradox.) Such findings naturally have led to the investigation of related topics which might help to reconcile the otherwise contradictory evidence. We are therefore looking into differential changes as between the production of goods on the one hand and their distribution on the other, in services performed, hours of work, hourly earnings, and capital per worker.

I plan to submit a manuscript by the end of this year.

Harold Barger

TRANSPORTATION

Some of our findings were outlined in the 29th Annual Report. A manuscript entitled *The Transportation Industries, 1889-1946: A Study of Output, Employment, and Productivity* has been reviewed by a staff committee and will soon be submitted to the Directors. The first three chapters, after an introductory survey,

describe long time trends in traffic, and review employment and productivity changes in transportation as a whole. The succeeding five chapters discuss separately steam railroads, electric railways, pipelines, waterways, and airlines. Appendices contain basic series for these industries together with scattered material on buses and motor trucking.

Harold Barger

SURVEY OF SERVICE INDUSTRIES

Work has begun on a general analysis of the great relative growth of the service industries in modern times. I am exploring the possible uses of budgetary data in the study of long run trends in consumption. One fairly common and highly inviting approach is to employ the pattern of variation of expenditures among families in a given budget study to predict the variation in expenditures when per family income rises over time. Unless this procedure is considerably elaborated, it is distressingly inaccurate. A second approach is to compare budgets of different dates, as in the accompanying table. This method has some promise for measuring trends, although it places an uncomfortable weight on early budget studies. The service expenditures are of course only indirectly measured by such studies: the 'miscellaneous' category consists chiefly of services, but other services such as retailing and governmental functions financed by indirect taxes are parts of the reported expenditures on commodities.

ENGLISH WORKING FAMILY BUDGETS, PERCENTAGE COMPOSITION
1794 AND 1937-38

	AGRICULTURAL WORKERS		NONAGRICULTURAL WORKERS	
	1794	1937-38	1794	1937-38
Housing	4.6	8.3	6.0	12.7
Grain	46.2	9.7	36.2	6.3
Other foods	28.3	38.7	37.7	33.8
Clothing	9.0	9.1	5.0	9.5
Fuel and light	4.4	8.6	5.4	7.6
Miscellaneous	7.6	25.6	9.6	30.1
Total	100.1	100.0	99.9	100.0

George Stigler

The National Bureau's studies of production and productivity have dealt separately with various sectors of the economy—agriculture, mining, manufacturing, gas and electric utilities, transportation, trade, education, the service industries, and government. My present task is to prepare a general account of the productive record of the United States during the last fifty years. This will be in part a summary and interpretation of the results obtained in the several detailed studies in this series, in part a treatment of new materials.

The chief new materials utilized will be data from the 1947 Census of Manufactures. The Bureau of the Census will itself construct indexes of production for all manufactures and for important groups of manufacturing industries. We shall utilize these indexes in extending to postwar years previously constructed series defining productivity and cost changes in manufacturing.

Preliminary figures reveal the general sweep of economic progress during this half-century. At the rate of growth that prevailed from 1899 to 1948 gross national product, in physical terms, would be doubled every 24 years.

AVERAGE ANNUAL RATE OF CHANGE (COMPOUNDED)

	1899-1948 (%)
Gross national product (constant dollars)	+2.9
Agricultural production	+1.4
Mineral production	+2.7
Manufacturing production	+4.0
Railroad traffic, physical volume	+2.2
Population	+1.3

The relative importance of certain factors in this advance is indicated by growth rates in input and productivity. Labor input rose less rapidly than population. The workweek was shortened steadily except during the war years, and the proportion of children gainfully occupied was substantially reduced. Our productivity gains, that is, were realized in part in the form of more leisure. Mechanical power used in production grew rapidly, and the quality and quantity of tools of production were steadily enhanced. The augmented productive capacity of American industry, using this power and these tools and employing steadily improving administrative methods, is measured by indexes of output per man or per

manhour. From sector to sector of the economy gains in productivity varied widely. In the service industries (which are not represented among those listed) the gains were presumably small. In the production of electric light and power, output per manhour increased between 1919 and 1948 at a rate close to 7 per cent a year; in the economy at large between 1899 and 1948 it approximated 2 per cent a year, compounded.

AVERAGE ANNUAL RATE OF CHANGE (COMPOUNDED)

	1899-1948 (%)		1919-1948 (%)
Labor input (manhours)	+0.9	Output per man Agriculture	+2.4
Energy output from mineral fuels & water power	+4.2	Output per manhour	
Output per manhour, overall (in producing gross national product)	+1.9	Mining	+2.9
		Manufacturing	+2.8
		Steam railroads	+3.7
		Electric light & power	+6.8
		Manufactured gas	+3.9

In carrying these studies forward the factors contributing to cumulative gains in efficiency will be further explored, and attempts made to trace some of their ramifying economic consequences.

Frederick C. Mills

Other studies dealing with employment and the labor market are reported by Wolman and Long in the next section, by Creamer in Section 4, and by Rubin in Section 7.

3 THE LABOR MARKET

TRADE UNION MEMBERSHIP

It is now possible to present several broad conclusions obtained from the forthcoming monograph on a Half-Century of Union Membership. Preliminary estimates of total union membership in the United States in 1948 and 1949 suggest that the large postwar spurt ended in 1947. In that year members numbered nearly a million and a half more than in 1944, bringing the total to 14,100,000. In 1948 and 1949 the number rose only slightly, perhaps as much as 200,000, probably no more than 100,000.

While union membership rose from about 3 million in the early

1930's to about 14 million in the late 1940's both population and the labor force also increased materially. Membership, however, expanded much faster than either. In 1930 the labor force was 48,600,000 and in 1947, 60,200,000. But in 1930 union membership was 6.6 per cent of the labor force, while in 1947 it was 22.4 per cent. If similar comparisons are made between membership and the number of nonagricultural wage and salary employees, the comparable percentages are 11 in 1930 and 31 in 1947.

PERCENTAGE OF WAGE AND SALARY EMPLOYEES ORGANIZED, 1947

All nonagricultural employees	30.7
Manufactures	41.7
Transportation, communication, and public utilities	64.2
Building	74.6
Mining, quarrying, and oil	84.0
Services	8.8
Public service	11.9

The strongholds of trade unionism in 1947, the most recent year for which reasonably accurate estimates can be made, were the mining, building, transportation and other public utility industries. The wage and salary employees of these industries were better than 50 per cent organized, as the table shows. Manufacturing was less than half organized. Lowest in the scale were the services, including retail and wholesale trade, and government employment. In these areas of employment, union members continued to be a small fraction of the total.

Leo Wolman

THE SUPPLY OF LABOR

In December I submitted my manuscript, *Labor Force and Full Employment Under Changing Income,* bringing toward a close the first stage of my inquiry into the empirical laws governing the aggregate supply of labor. The labor supply may be regarded as having four dimensions: the labor force, its average quality, its average hours of readiness to work, its average intensity of effort, i.e., the percentage of a worker's capacity he is willing to put into an hour of work.

The pioneering work in this field was done by Paul H. Douglas who believed there was a tendency for the population in the labor force and the hours in the standard workweek to fall off as real wages went up. At first he thought these two findings described the short run supply curve of labor. But he was really only reporting the tendency of the labor force and hours of work to be somewhat smaller in areas where income was higher at the same moment. Although his hours studies did include some changes over time, most of his analysis of hours and his entire analysis of the labor force were strictly cross-sectional. Even for a given time, he used data only for 38-41 United States cities and did not therefore observe the behavior of the labor force in rural areas, different income groups in the same area, and in different countries (except for some general remarks on Britain).

To find out how the supply of labor behaves under changing income, employment, and armed force mobilization, without neglecting the influence on it of variations in age, sex, race, and rural-urban residence of the population is the aim of the general studies I have in mind for the entire labor supply and have already completed for the labor force.

My findings in *Labor Force and Full Employment* are too numerous to detail here. Keeping in mind the fate of most generalizations about economic behavior, we can describe the major product as the conclusion that the labor force of any area or country, standardized for changes in structure of population, is the same proportion of population in the short and long run regardless of increases or decreases in real or money incomes. People go out of the labor force in small net numbers when employment declines (despite the additional worker theory) and go back to it when prosperity returns. They go into and out of the labor force also as men enter and leave the armed forces. The propensity to be in the labor force varies widely from city to city, nation to nation, or income group to income group. But between any two months of similar job-getting conditions and size of the armed forces the over-all labor force seems to hold to a constant proportion of the population regardless how well off labor is or whether the points in time are widely separated or closely connected. This finding is supported by the experience of five countries and large numbers of cities and localities in the United States.

With few exceptions economists have regarded the supply of labor as a certain number of manhours and have assumed that

labor effort does not vary enough to make it worth considering whether at different times or under changing economic conditions labor puts more or less into an hour of work. If it should turn out that labor effort does fluctuate widely, our measures of labor input and our conclusions about input and output will have to be greatly modified. Recently I have discovered a storehouse of materials on the effort of individual workers performing standard operations in two large Baltimore concerns. These I propose to analyze with a view to a larger inquiry into labor effort in a cross-section of American industry.

Clarence D. Long

See also reports on employment and productivity in Section 2. The reports by Creamer in Section 4 and Rubin in Section 7 also deal with aspects of the labor market.

4   BUSINESS CYCLES

Wesley Mitchell's *What Happens during Business Cycles* has been edited by Arthur Burns and is almost ready to go to press. *Inventories and Business Cycles,* by Moses Abramovitz, is in press. Geoffrey Moore will soon begin final revision of his manuscript on harvest cycles. The status of other current investigations of business cycles is described in the reports that follow. The Conference on Business Cycle Research, held last year, is described in Part Two.

PERSONAL INCOMES

Our study of the cyclical behavior of wage rates has been advanced by analysis of three sets of wage rate indexes, covering nine branches of manufactures and aggregate manufactures in the United States, class I railroads of the United States, and seven branches of British manufactures. The indexes are on a monthly basis, begin in 1919, and end in the 1930's.

In each case we have determined the timing of the cyclical changes in wage rates relative to the cyclical changes in general business activity and, in the case of the United States series, employment. This comparison discloses that changes in wage rates typically lag behind cyclical changes in business activity and employment. The lag, moreover, is substantial. Of the three samples the lag is longest in the railroad industry of the United States and shortest in United States manufactures.

In the United States data on average hourly earnings are available for a longer period and for a larger number of industries than data on wage rates. If the cyclical movements in the two are parallel, we should be able to extend our knowledge of the behavior of wage rates by utilizing information on average hourly earnings. We have compared, therefore, the cyclical movements in average hourly earnings and wage rates for United States manufactures and railroads. At the turning points of major phases the turns in average hourly earnings are a reasonably good indicator of the turns in wage rates. In the railroad industry, moreover, there is good reason to believe that the cyclical amplitudes of the two series are very similar except when the occupational composition of the working force has changed appreciably. In the latter event, the amplitude of fluctuations in average hourly earnings is significantly larger than comparable movements in wage rates. We have not reached any firm conclusions on the relative amplitudes of wage rates and hourly earnings in manufacturing industries. In an appendix we illustrate by reference to the anthracite coal industry the proposition that average hourly earnings are no longer a close approximation to the average cost of employing labor for an hour because of the growing importance of fringe benefits. These findings have been incorporated into an *Occasional Paper,* which will shortly be submitted.

Our plan to analyze the cyclical behavior of British wage rates between the two World Wars has advanced only to a limited degree during the year. We have obtained from the British Ministry of Labour unpublished monthly indexes of wage rates by minor industries, 1941-48, which can be linked with comparable monthly indexes for 1920-41 developed some years ago for the National Bureau by Lorie Tarshis. We have collected all available British series on earnings and employment by months and have inquired into the possibilities of comparing the movements in wage rates, earnings, employment, wholesale prices, and output in identical branches of manufactures.

Daniel Creamer

CONSUMPTION AND PRODUCTION OF CONSUMER GOODS

The first two-thirds of the manuscript *Consumption in Business Cycles, A Case Study: Shoes,* have been submitted for criticism. The book will be finished this year.

One subject studied in some detail, inventory investment, exhibits some interesting contrasts bearing on the behavior of derived demand and the 'principle of acceleration' in the various vertical stages of the shoe-leather-hide industry. I can do no more than mention categorically a few findings.

Investment by retailers in inventories of shoes fluctuates strongly in waves of short duration accounting for a large proportion, at least a half, of the short term fluctuation in shoe production, and somewhat less of the major cyclical swings. Inventory investment reaches peaks and troughs about the same time as retail sales.

Turning to the propagation of change, inventory investment must be analyzed in terms of the hazy concepts of intended and unintended change. The former is at least partly responsible for the extent to which decreases or increases, and even retardations and accelerations, of consumer shoe buying are amplified in the production schedules of shoe manufacturers. For, retailers do broadly aim to increase their stocks when sales increase, though probably less than proportionately. Also, there is evidence suggesting that increases in inventories motivated by operating convenience are at certain times augmented by increases associated with lengthened delivery periods and expectations of rising prices. At such times, retailers' buying must provide for both larger sales and larger stocks, and the behavior is reversed when sales and stocks are expected to decline. This explains why the production of shoes, closely linked as it is to retailers' orders, rises and falls more than consumer buying.

But since shoe retailers must order a sizable part of their stock several months in advance, and since the sales expectations on which such orders are based are fallible, inventories often change in a willful manner. It is this *unintended inventory change* that is primarily responsible for the synchronous relation between the *timing* of peaks and troughs in sales and inventory investment. Shoe retailers, unlike many sorts of manufacturers, dare not fail to bring stocks rapidly into accord with plans. Consequently, current orders are increased (or decreased) to correct for unintended decreases (or increases) in stock. These *corrections* tend to reach maxima and minima when

sales are increasing and decreasing at their most rapid rate, which typically occurs several months before the peaks and troughs in sales proper. The resulting lead in orders compensates for the necessary interval between the receipt of orders by the manufacturer and the delivery of shoes to the retailer and results in the synchronous timing of sales and inventory investment.

The most critical facts in this pattern are two: the need for retailers to order some portion of their expected requirements well ahead of time and consequently on the basis of a necessarily fallible guess as to what those requirements will be; the high priority, relative to other management objectives, placed on the enforcement of intentions with respect to stock. The character of the stock objective is secondary. The lead of retailers' orders relative to consumer buying might still appear if retailers aimed to keep their stocks at a fixed figure, rather than paralleling at least the direction of change in sales, providing only they implemented their intention by prompt correction for the inevitable unintended change in stocks.

Inventory investment in leather by shoe manufacturers also moves up and down in strong, short movements that bear a generally positive relation to business fortunes. However, the peaks and troughs in investment usually precede those in shoe production by several months. This pattern seems to be primarily associated with the need for manufacturers to take account of price movements in leather. If alteration in output is a motive for increasing or decreasing leather stocks, which seems likely, its impact on inventory investment appears to be swamped by price considerations. The lead in inventory investment is made possible on the one hand by the fact that most shoes are produced to order and that shoe producers therefore know ahead of time what their requirements will be, and on the other hand by the fact that it seems to be the rate of change in prices, rather than prices proper, that determine the extent to which producers in the aggregate augment or shade their advance buying position. The rate of change in both leather and hide prices persistently lead turns in shoe production. It is also interesting to note that for the shoe manufacturer, in contrast to the shoe retailer, the timing of inventory investment apparently results from intended rather than unintended stock adjustments.

Tanners' inventories as a whole are dominated by their large

stocks of finished leather which move inversely to fluctuations in output. Thus, for tanners, inventory objectives bow to other management goals such as maintaining a steady flow of work and advantageous hide buying. On the latter score, fluctuations in tanners' stocks of raw hides, which typically constitute less than a sixth of their total holdings of inventories, appear to show many of the same characteristics as leather stocks of shoe manufacturers.

Ruth Mack

COSTS AND PROFITS

We revised and extended the study of cyclical diversities in the profit histories of corporations publicly reporting their profits quarterly, and made several new findings. At some turning points in business a considerable percentage of the companies had no corresponding turn in their profits: one-fifth had no peak near 1926 and one-fourth no trough near 1927. The peak in the percentage of companies with increasing profits, which always preceded the peak in aggregate profits of all the companies, ushered in a period of less rapid growth in the aggregate (in three of four expansions); and the trough in the percentage, which always preceded the trough in aggregate profits, was followed by a less rapid decline in the aggregate (in three of four contractions).

These observations refer to 1920-38. Using a rougher procedure, we computed also the percentage of companies with rising profits in each quarter since 1938. Probably because of conversion to war production and changes in taxation of corporate profits, as well as for other reasons, this percentage (which tells something about the breadth of participation in profits) fluctuated irregularly through 1942, was fairly stable at about 50 to 55 in the period of high war activity from early 1943 to early 1945, dipped a little in the middle quarters of 1945, reached a very clear peak (74 per cent) in the third quarter of 1946, and fell spectacularly from the last quarter of 1948 to 23 in the first quarter of 1949.

In our study of costs we found that, for the two largest steel companies, manhours per ton of finished steel products shipped tended to fall during expansions and rise during contractions of steel production. So did labor expense per ton, and so, less distinctly, did all direct expense per ton. Labor costs have not been segregated for other larger steel companies, but their total direct unit expense

shows the same tendency. The measure of output we use, tonnage shipped regardless of kind, is subject to some question; we are making tests, based on evaluation of the industry's changing product mix at constant prices for each product, to determine whether the zone of doubt is large.

In the electric power industry we found that fuel cost per kilowatt-hour of generating electricity from fuel is not systematically related to cyclical change in output. But cost of generating from water power, most nongenerating expense, and expense in the aggregate per kwh does vary inversely with the number of kwh generated or sold. However, when residential or business consumers reduce their purchases of power, they must pay for a higher percentage of their consumption at the higher rates in the initial brackets of the rate schedules. To some extent, therefore, the rise in cost to the power companies per kwh is compensated by a quasi-automatic change in revenue per kwh.

From national income estimates we derived some information on the changing relations between sales, profits, and investment. Using data in Epstein's *Industrial Profits in the United States*, we compared the average return on capitalization, 1919-28, with the percentage increase in capitalization in each of 74 manufacturing industries. By and large the relation is positive. A line fitted to the data would indicate zero investment at about 5 per cent return— qualitatively a reasonable conclusion. The scatter around the line, however, would be very large.

Prospects of future profits are perhaps more interesting as motivators of investment than profits already earned, although profits seen are no doubt taken as evidence of profits unseen. We began a tentative effort to discover changes in prospects during the 1920's and 1930's, such prospects as might help to generate and explain business cycles. Industries with high and sustained rates of return, new areas and industries in which large investments were made, commodities whose production rose rapidly in business expansion and was little affected in contraction, and still other matters, are pertinent to such an inquiry.

I plan to extend the study of relations between unit cost and cyclical changes in physical volume to a few more industries. In some areas it may be possible to develop quarterly data on unit cost by applying price deflators to records of dollar volume of sales; this

possibility should be explored. I plan also to investigate further the relation between profit and investment. A review of changes in the prices of investment goods, which affect profit prospects, may be desirable. An interesting subject, relatively easy to investigate, is the fidelity and promptness with which changes in the profits of corporations reporting quarterly are reflected in stock market prices and hence in the value of securities as collateral for loans.

<div align="right">Thor Hultgren</div>

MONEY AND BANKING

Estimates of demand and time deposits in all banks in the United States, constructed by Anna Schwartz, are nearly complete. The first step was to construct a call date series beginning 1917. Sources utilized include member and national bank data and data for state banks in selected states derived from reports by state banking commissions and other supervisory agencies. State bank data were compiled for all the larger states and a sample of the smaller states. There remains the problem of selecting interpolators to convert the call date series into a monthly series. It is expected that a manuscript presenting these estimates and describing their construction will be written this year.

Work on the broader study has centered on the secular and cyclical behavior of the volume of currency and deposits. Special attention has been devoted to the distribution of total currency and deposits in public circulation among various types of currency, demand deposits, and time deposits. This distribution is of considerable interest because it is dominated by the desires of the public and thus reflects primarily the influences operating on demand for circulating media, largely independent of supply factors.

The existing distribution of total currency and deposits among currency, demand deposits, and time deposits in the hands of the public is, curiously enough, almost the same as in 1892—roughly one-sixth in the form of currency, one-half in demand deposits, and one-third in time deposits. There were, however, divergent movements during the intervening period: from 1892 to about 1930 currency outside banks fell from roughly one-sixth to one-twelfth of the total, then rose from 1930 to date. The initial decline was interrupted during World War I; the rise after 1930 was accelerated both during the monetary upheaval in the Great Depression and

during World War II. Until the end of World War I, the changes in the relative importance of currency outside banks were almost entirely balanced by opposite changes in time deposits, demand deposits remaining roughly one-half of the total throughout the period. During the 'twenties and early 'thirties demand deposits fell substantially as a fraction of the total, along with currency outside banks, so time deposits gained at the expense of both demand deposits and currency. Since the early 'thirties this movement has been reversed, both demand deposits and currency rising as a fraction of the total, and time deposits falling.

It seems likely that the decline in the relative importance of currency outside banks from 1892 to 1930 is to be explained by long term changes in the economy that have enhanced the availability and usefulness of banking facilities—increasing urbanization, improvements in transportation and communication facilities, broadening of the market for many goods and services—and by the growing wealth of the community which led to larger holdings of time deposits. As these factors, however, have operated since then, some other factors must have come into play sufficiently important to explain the reversal in movement. The loss of confidence in the banking system during the Great Depression undoubtedly explains the bulge in the ratio of currency to the total from 1930 to 1933; but in view of the subsequent banking reforms this can hardly explain the continued reversal in movement. The most promising explanation seems to be the reduction in interest received on deposits—either in the form of services on demand deposits or of actual interest on some demand and all time deposits. The increased use of cash during the two World Wars may be a result, in part, of a changed distribution of income in favor of classes making relatively more use of currency and of a large increase in mobility. The rise in time deposits at the expense of demand deposits during the 1920's probably reflects the change in reserve requirements introduced by the Federal Reserve System. This factor has undoubtedly been very much less significant in the era of large excess reserves subsequent to 1933, which may explain why demand deposits returned to their original relationship to time deposits. It should be emphasized that these suggestions are exceedingly tentative.

The evidence on the cyclical conformity of the three components of the total money supply is not yet complete. The ratio of demand

deposits to the total seems to show high positive conformity at least since World War I; but a more precise analysis must await the completion of the series for the United States discussed above. During much of the period we have covered the absolute magnitudes of all three components display a strong positive trend; in consequence, they typically rise during expansions and contractions alike, though generally more rapidly during expansions. Perhaps the most interesting tentative finding is the importance of the severity of the cyclical movement—the currency and deposit series seem to play a much more decided and perhaps different role in the more severe cyclical movements than in the milder ones. But this finding requires much more study before it can even be stated precisely.

<div align="right">Milton Friedman</div>

RAILROAD INVESTMENT AND OUTPUT

Two related studies were concluded during the year. One covered investment in the railroad industry and the other production of railroad services. The first appeared as a paper entitled Studies in Investment Behavior, presented at the Conference on Business Cycle Research. Railroad investment was analyzed in relation to gross operating income, bond yields, existing stock of capital, price of capital goods, working capital, nonoperating income, unappropriated surplus, age of equipment, and some other variables of lesser importance. The statistical measurements were calculated from two sets of data: annual time series aggregates for the industry, and cross-section data of individual companies in 1928, 1936, 1937, and 1940. In all cases there appeared to be a strong relation between investment and operating income. The time series data showed, in addition, that bond yields, stock of capital, and prices of capital goods influenced investment. The cross-section data were not as definite about the influence of variables other than operating income, but they did show that age of equipment and possibly the stock of capital had some effect.

When the time series results for railroad investment were roughly checked by applying a similar equation to the data for the electric light and power industry the reactions of investment to variations in operating income, or bond yields, or stock of capital showed more sensitivity; otherwise the same general picture prevailed.

The second study tackled the problem of estimating a short run model of production of railroad services from the data of individual companies. Among other things estimates showed that the industry, on the average, was operating at a point of increasing returns to scale; that is to say, a 1 per cent increase in all input factors and a 1 per cent increase in one type of output was associated with an increase of more than 1 per cent in the other type of output. The input factors, variable in the short run to the individual carriers, were manhours, tons of fuel, and train hours, while the outputs were taken to be passenger miles and freight ton-miles. Other variables such as average length of haul, composition of freight tonnage, and average weight of a carload were found to be quite significant for the explanation of output fluctuations. The relationships obtained from cross-section data in a given year were extrapolated to the next two years successively for the entire industry. This experiment showed how one can potentially bridge the gaps between cross-section and time series data.

<div align="right">Lawrence R. Klein</div>

INTERNATIONAL FINANCIAL TRANSACTIONS

My manuscript on International Financial Transactions and Business Cycles, 1870-1939 will soon be submitted to the Bureau. The chapter headings are:

1 International Spread of Business Cycles
2 International Timing of Business Cycles
3 Comparative Cyclical Behavior of Short Term Interest Rates
4 Short Term Interest Rate Differentials
5 Maximal and Minimal Short Term Interest Rate Differentials
6 Behavior of Exchange Rates
7 Cyclical Covariation between Exchange Rates and Short Term Interest Rate Differentials
8 Further Measures of Covariation
9 International Solidarity of Money Markets
10 Measures of Stress between the Money Markets in London, New York, Paris, and Berlin
11 Comparative Cyclical Behavior of Central Bank Discount Rates
12 Gold: Movement and Prices
13 Behavior of Long Term Interest Rates
14 Security Markets and Foreign Capital Issues
15 Conspectus of International Crises and Cycles

<div align="right">Oskar Morgenstern</div>

REGIONAL ASPECTS OF BUSINESS CYCLES

In last year's report we stated as our immediate objective the discovery of "some procedure for obtaining a more detailed view of the cyclical evolutions of a national economic system than can be obtained from national averages and totals". We have continued our inquiries into the regional variation in business fluctuations, using the easily available data on bank debits and department store sales by cities. It would be possible to put together at this time a descriptive account of the joint fluctuation of these many series, but we feel that this would be premature and prefer to pursue the study by developing further our conception of the spatial or geographic structure of an economic system and of how this structure alters as it grows. We are preparing a paper on this subject, and shall incorporate into the general study of regional economic fluctuation an inquiry into regional divergences in economic growth tendencies.

Rutledge Vining

STATISTICAL INDICATORS

Occasional Paper 31, Statistical Indicators of Cyclical Revivals and Recessions, may be summarized in terms of three conclusions. (1) Economic processes, as represented by monthly and quarterly time series, differ widely in the timing of their fluctuations during business cycles. Although there is a strong tendency for many processes to expand and contract at about the same time, in every cycle the peaks and troughs in individual series are rather widely dispersed. (2) By applying objective criteria it is possible to select series whose timing in successive business cycles has been relatively systematic. Tests show that the timing relations among the selected groups of series are fairly stable and persist beyond the period examined in making the selection. (3) Carefully chosen groups of series, interpreted in the light of their past behavior and economic significance, may be expected to yield helpful signs of an approaching recession or revival, and especially to facilitate prompt recognition of such a development once it occurs. Although the systematic application of objective criteria to potential indicators has not been completed, a tentative brief list of current indicators is presented, their recent behavior examined, and a method for summarizing their current status suggested.

Geoffrey H. Moore

ANALYSIS OF TIME SERIES

The task of reanalyzing the United States collection of monthly and quarterly time series was largely completed last year. Several experimental analyses of call-date series were undertaken for Milton Friedman. These series cannot be analyzed by our standard methods since the dates of call are irregularly spaced during the year. The experiments were designed to disclose the merits of several possible adaptations of the method in terms of relative cost in computing time and degree of equivalence to our standard procedures for monthly and quarterly data.

Among new series compiled, the most important is a group of monthly currency series, 1878 to date. These provide data on: (1) currency within and currency outside the Treasury and Federal Reserve Banks; (2) gold, silver, Federal Reserve notes, and other currency.

My work on seasonal variations continued during the year and a manuscript was prepared which may become the basis for an *Occasional Paper* in 1950.

Millard Hastay

See also the reports by Kuznets (Sec. 1), Maxwell (Sec. 6), Saulnier (Sec. 5), and Mintz (Sec. 7).

5 BANKING AND FINANCE

URBAN REAL ESTATE FINANCE

Five of the chief urban mortgage financing studies were completed, or brought close to completion, last year. Miles L. Colean's 'Impact of Government on Real Estate Finance in the United States' was revised and supplemented to take account of developments in the first session of the 81st Congress and is already in the hands of the printer; Ernest M. Fisher's 'Urban Real Estate Markets and Their Financing Needs' was circulated to the staff and to outside readers and is now being revised; my own 'Urban Mortgage Lending by Life Insurance Companies' was revised and is now in press; Carl F. Behrens' 'Commercial Bank Activities in Urban Mortgage Financing' will soon be mimeographed; C. Lowell Harriss' 'History

and Policies of the Home Owners' Loan Corporation' should be available in mimeograph form this spring.

Most of the statistical materials necessary for Edward E. Edwards' study of 'Urban Real Estate Financing by Savings and Loan Associations' have been worked up and a manuscript will be written this summer. J. E. Morton expects to finish his 'Comparative Markets and Risk Experience of Mortgage Lenders' this spring. It will draw on the underlying surveys of lender groups in making cross-institutional comparisons. Wolfgang Stolper's 'Economic Fluctuations and Urban Real Estate Finance' completes the series projected under the Urban Real Estate Finance Project, but will not be ready until next year.

The urban mortgage financing studies are far enough along to afford at least a tentative view of their scope and salient findings. First, they give a more exhaustive and detailed account of the activities of the various institutions extending credit in the real estate market, and of how the characteristics of that market have changed, than has before been available. Second, new methods of measuring lending costs and net returns on mortgage portfolios, developed in the insurance company and commercial bank studies, have yielded data for 1945-47 on a fundamental factor in the credit market. The Life Insurance Association of America plans to carry similar cost studies forward under its Investment Research Committee. As regards current levels of return, the evidence suggests that at the end of 1947 interest rates had reached a level relative to the costs of acquiring and servicing loans (including a reasonable allowance for the accumulation of loss reserves) below which they could not fall substantially without diverting institutional funds from the mortgage market to other areas of investment.

Third, some conclusions concerning the experience of investors with urban mortgages and the factors that affect this experience are fairly firm. Clearly, there is an important cyclical influence at work, such that the frequency of default is highest on loans made at the top of the cycle and lowest on those made at the bottom. This appears to be because loans made at high levels of real estate values and personal and business incomes are weakened as incomes and prices fall while loans made in periods of low prices and incomes are strengthened as incomes and prices rise. Other things being equal (notably the economic conditions prevailing when the loans are made) mortgage investment experience is significantly affected by the terms of loan repayment (amortization is a distinct help in limiting losses). Moderate maturities and conservative loan-value ratios also bear a close relationship to favorable loan experience. Among types of property the single family house seems to have had, all things considered, the most attractive investment record over the last twenty-five years; the results of the HOLC study (covering loans made in New York, Connecticut, and New Jersey) indicate, further, that an essential feature of favorable home mortgage loan experience is a loan contract putting moderately light financial burdens on the borrower. Loans of small amount on dwellings of modest size, even to families with modest incomes, appear, by all the tests our data will permit, to be superior in quality to other types of loans.

The studies of insurance company and commercial bank mortgage lending indicate that in order to have absorbed all losses on uninsured home mortgage loans made over the period 1920-46 it would have been necessary to accumulate reserves at the rate of from .30 to .50 per cent per annum of outstanding balances. No experience study can ever be anything except 'historical', and no one can be certain that future investment conditions will closely resemble those of the past. Yet these measures of experience should be helpful in reaching considered judgments as to what level of interest charges may be necessary if we are to have a fair level of costs to borrowers and maintain, at the same time, a self-supporting private financial system.

Research interest in the mortgage market, and particularly in home financing, is increasing steadily. A special sample enumeration of home mortgage indebtedness will be made as part of the 1950 Census and in this undertaking the Central Staff has cooperated on an advisory basis. Furthermore, there is now in prospect a greatly expanded program of research to be initiated by the Housing and Home Finance Agency. These programs, and the increasing tempo of research by private groups and individual scholars, promise to strengthen greatly our understanding of this vital sector of our credit system.

<div align="right">R. J. Saulnier</div>

AGRICULTURAL FINANCE

The first of the studies to be published under the Agricultural Finance Project—*Costs and Returns on Farm Mortgage Lending by Life Insurance Companies, 1945-1947*—was released in September 1949. The results of this investigation were summarized in the last year's annual report. It will suffice here to recall that the techniques of cost measurements it utilizes are the same as those used in the urban mortgage lending series, and that it is therefore possible to compare interest rates and investment returns in these two important fields. Further, it is encouraging to report that the farm mortgage lending cost analyses are also being carried forward by the Life Insurance Association of America as part of its continuing research program.

A manuscript on 'The Pattern of Farm Financial Structure' by Donald C. Horton, prepared under a cooperative agreement with the Bureau of Agricultural Economics, is in first draft and after revision will be mimeographed for preliminary circulation. The evidence shows that the various lenders that participate in the financing of agriculture—public and private institutions, lenders of short and long term funds, etc.—are, in the main, specialized along functional lines. From a comparison of their respective roles, it should now be possible to get a fairly definite conception of the agricultural capital market.

A rough draft of the study on which David Durand is collaborating with Lawrence A. Jones of the Bureau of Agricultural Economics has been ready for some time, but circulation has been postponed until adequate maps and charts can be drawn. These have proved to be a substantial task because of their number and complexity, but a mimeographed version of the work is expected shortly.

Howard Diesslin's study of 'Agricultural Equipment Financing', to be mimeographed soon, contains new information on the experience of implement manufacturing companies in extending equipment credit to farmers, and an analysis of the relative positions and functioning of the financial agencies active in this credit area. Of the $500 million of this type of financing done in 1947, $250 million was by commercial banks, $75 million by retail farm equipment dealers, $50 million by production credit associations,

$25 million by finance companies, and the remainder by individuals, manufacturers, public agencies and others.

In the 'Financing of Farmers' Cooperatives' E. Fred Koller analyzes differences in the financial structure of cooperatives handling different products and those of different size, age, and location. Ownership funds provided the main financing in 1945, accounting for 57 per cent of the total resources of these enterprises; short term borrowing accounted for 36 per cent and long term debt for 7 per cent. Of the ownership funds, common and preferred stock provided 11 and 8 per cent, respectively, and the remainder came through a wide variety of ownership certificates (certificates of equity, revolving fund certificates, certificates of interest, etc.), book credits issued in lieu of certificates, net worth reserves, and other net worth items issued for net margins retained in the business and for capital retentions deducted from the proceeds of marketed products. However, the financing of cooperatives through ownership funds shows marked regional differences, evidently reflecting differences in state laws and other institutional factors. Among the important changes in financial structure over the period 1936-45 was an over-all increase in the liquidity of the assets held by cooperatives, reflecting the large volume of business and high prices characteristic of World War II and the postponement, despite the accumulation of depreciation reserves, of replacement and expansion expenditures on facilities. A draft of the manuscript should be ready for circulation by summer.

The study of 'Credit in Relation to Land Tenure' is in abeyance. When the authors have an opportunity to revise the manuscript, it will be mimeographed for preliminary circulation.

The collaborative summary study which I have planned with R. J. Saulnier will be continued and it is hoped that a manuscript will be available early in 1951.

F. F. Hill

CORPORATE BOND RESEARCH

The basic tables for the Corporate Bond Research Project will be prepared for publication this year. They will be presented, together with analyses of the chief findings, in the three major studies of the project: 'The Volume of Corporate Bond Financing, 1900-1943', 'The Changing Pattern of Corporate Bond Financ-

ing, 1900-1943', and 'Statistical Measures of Corporate Bond Experience, 1900-1943'.

The first should be ready for staff criticism in a few months. Giving the over-all dimensions of the corporate bond market as reflected in estimates of total offerings, extinguishments, changes in net credit, and outstandings since 1900, it provides an integrated set of monthly corporate debt statistics. But it goes beyond the measurement of the debt *per se* in that it gives statistics on cash flow to and from the corporate sector via the bond market. The annual cash flow series carries back to 1900 a series beginning in 1933 that is now being prepared by the Securities and Exchange Commission. All figures are divided into their broad industrial components and the debt figures are further classified by default status and size of issue. We are investigating the secular, cyclical, and seasonal behavior of the data within each of these major areas.

The second study, which is planned for late summer or early autumn, will present materials not hitherto available on the quality and size distribution of corporate bonds, their marketability features, etc. These materials, covering a large sample of corporate bonds, are being adjusted to the universe totals presented in the first monograph. The emphasis here, however, will be on the measurement and analysis of shifts in the various types of securities outstanding and on the changing pattern of the new offerings available as outlets for savings. Particular attention is being given the important group of quality issues, that is, issues on the legal lists or judged to be high grade by the rating agencies and the market. Changes in the volume of high-grades and in the legal definitions of what is in this class govern the volume of securities available as outlets for the funds of financial intermediaries. Our figures on the volume of securities meeting various standards of quality reveal marked differences of opinion, both at particular points in time and over time, as to what constitutes a high-grade investment. Moreover, the volume of high-grade corporates has not kept pace with the funds flowing toward financial intermediaries.

The third study will contain summary data on default and loss rates, and promised and realized yields for selected portfolios of corporate bonds. The analytical work is somewhat heavier than for the other two studies, and it is not in as advanced a stage. It is hoped, however, that a draft can be made ready by the end of the year.

W. B. Hickman

CARRY-OVER RESEARCH ACTIVITIES

Avram Kisselgoff's analysis of the factors affecting demand for consumer instalment sales credit, showing the predominating influence of consumer income and the lesser, but nevertheless important, influence of credit terms and the prices at which consumer durable goods are sold, is being reviewed by the staff.

Wilson Payne's monograph on the various methods of tracing the flow of funds through the economy was circulated late last summer and is being revised. Howard Greenbaum's application of this method to materials on mutual savings banks in New York State will serve as a useful basis for the study of certain aspects of the problem of capital requirements of the American economy.

Sergei Dobrovolsky's manuscript on 'Corporate Income Retention, 1915-43' has been revised and will soon be ready for review by the Directors.

R. J. Saulnier

See also Kuznets' report on the study of capital requirements (Sec. 1) and Friedman's report on the cyclical behavior of the money supply (Sec. 4).

6 FISCAL STUDIES

CAPITAL GAINS AND LOSSES

The manuscript embodying the results of the investigation into the nature and tax treatment of capital gains and losses has been reviewed by a staff committee and revision should be completed soon.

Lawrence H. Seltzer

THE INDIVIDUAL INCOME TAX

A considerable body of data has been assembled on various aspects of the individual income tax in the United States since 1913, and I plan to prepare one or more *Occasional Papers* on the subject during the year.

The income tax on individuals has become the chief revenue source of the federal government, accounting for $21 billion or 45 per cent of total budget receipts in 1948.

This development has not been gradual. Prior to 1940, even

under the high tax rates of World War I, the annual yield never reached $1.5 billion. It averaged well under $1 billion during the prosperous decade of the 'twenties, and fell to less than one-half of that amount in several years of the 1930's. An abrupt change accompanied American rearmament for and participation in World War II. Steep increases in tax rates were applied to the rapidly expanding personal incomes resulting from fuller employment and rising wages and profits. The total individual income tax liability of $2.9 billion in 1941 grew to $8.9 billion in 1942, $14.6 billion in 1943, and $17.2 billion in 1945.

In most years before 1940 only one person in twenty-five or more of all those 15 or older paid any federal income tax. The proportion ranged from 1.7 per cent in 1931 to 7.6 per cent in 1920. By 1941 it had risen to 17.6, and by 1944, to 41 per cent.

The wider coverage and enlarged yield of the income tax since 1940 have been accompanied by a pronounced shift in the relative contributions of the higher and lower income groups to the aggregate income tax revenues. Before 1941 individuals with net incomes of $25,000 or more accounted for the greater part of the total individual income tax liability in every year, their proportion ranging from 93 per cent in 1929 to 59 per cent in 1920. In contrast, their proportion fell to 42 per cent in 1941, and to less than 30 per cent in each of the succeeding years.

<div style="text-align: right">Lawrence H. Seltzer</div>

TAXATION OF CORPORATE EARNINGS VIEWED AS PERSONAL INCOME
My project has two starting points, both of which lead to the same type of attack: first, the frequent contention that corporate earnings are taxed more heavily than other types of income; secondly, the idea that corporate earnings, attributed to the owners of the corporation, should be a factor entering into the determination of individual ability to pay for income tax assessment purposes.

The study adopts the conceptual implication of both viewpoints by fitting federal corporation income taxes and corporation earnings into a personal income framework. Then the relative weight of taxation on the personal income share composed of corporate earnings can be estimated and compared with the tax treatment of other components of personal incomes. The same can be done for total income including and excluding corporate earnings. Each comparison will be made by income classes and for several years. Since the net result in any one year depends upon many diverse factors, we shall attempt to carry the computations back as far as 1922. Limitations of concept and data preclude numerically precise results, but the relevant orders of magnitude can be determined. While planned as a separate undertaking, my investigation complements a part of Lawrence Seltzer's analysis of the federal personal income tax.

<div style="text-align: right">Daniel M. Holland</div>

TAX EXEMPTION OF GOVERNMENT SECURITIES
The postwar expansion of state and municipal borrowing has aroused considerable interest in this sector of the capital market. Since municipal bonds now constitute perhaps the major source of tax free investment, the implications of the supply of these securities in the light of federal tax policy are especially significant. The constitutional history of tax exemption doctrine has been reviewed many times but historical analysis of the economic effects of tax exemption policy has been largely neglected.

It is planned to study the economic effects of federal tax policy on the volume of tax-exempt securities and the distribution of their ownership since the institution of the present federal income tax in 1913. This class of securities has included issues of not only state and local governments but also of the federal government and of the federal farm loan system. The reciprocal influence of the volume of tax-exempt securities on federal tax policy will also be examined.

Work is progressing in estimating the trends in the ownership of tax-exempt securities by the chief classes of institutional investors and individuals. Since 1936 the contraction in the supply of wholly tax-exempt securities, in conjunction with much higher federal tax rates, has had significant repercussions on the market for these bonds. Yields on municipals have been greatly reduced, particularly during the war. Adequate measurement of the yield differentials of tax exempt bonds with respect to yields of comparable taxable investments presents a formidable problem. The complex factors determining these yield differentials will be analyzed and their effects on the financial policy of state and local governments, the supply of equity capital, and possible diversion of investment studied.

<div style="text-align: right">George E. Lent</div>

FEDERAL GRANTS-IN-AID AND BUSINESS CYCLES

A revised manuscript has been circulated. It is expected that the study will be completed this summer.

Federal grants in 1948 were given to forty-odd programs and accounted for almost 9 per cent of state-local government expenditure. Since 1929, when the figure was only 1.5 per cent, a great growth has occurred. During the mid-1930's, however, grants were 20-30 per cent of state-local expenditures because of emergency programs which terminated with World War II. This absolute and relative growth in federal grants during the great depression reflected a decline in the ability of state and local governments to render certain governmental services at a time when the need for these services had increased.

The two major grant programs which have shown marked cyclical variation are those for public assistance and for construction. Expenditure for public assistance is for both categorical relief and general assistance, the former being in receipt of federal grants and the latter at present being wholly a state-local responsibility. Expenditure for categorical relief shows little, while that for general assistance shows a great deal of cyclical variation. An attempt is made to appraise major proposals for reforming the public assistance program with particular attention to their cyclical implications.

Analysis of the cyclical behavior of expenditure for construction, 1929-48, forms another part of my study. The factors influencing the timing of public works are examined in an effort to determine the limitations of countercyclical spending and also the conditions requisite for its success.

James A. Maxwell

THE OUTLOOK FOR THE FEDERAL BUDGET

This study is being made by W. L. Crum and myself. Last spring and summer data were compiled on the historical trends of federal expenditures and on the increases emerging after wars. Corrections were made for changes in the prices of commodities and in wage rates.

The strongly upward movement of federal expenditures over time is demonstrated in charts recording the annual totals and the components (corrected) since 1855. Comparisons of expenditures during and after each of the four major wars in our history disclose striking similarities. Perhaps the most important conclusion to be derived from this exploration of experience is that the higher level of federal expenditures now as compared with immediately before World War II is not significantly, if at all, out of line with historical patterns.

Some changes were made in the assumptions of the study. New elements in the outlook for the decade ahead were recognized in the treatment. The manuscript in which these additions and alterations were incorporated has been mimeographed and circulated for criticism.

M. Slade Kendrick

See also Fabricant's report in Section 2.

7 International Economic Relations

FOREIGN TRADE

In the light of Phyllis Wallace's exploration of data on the commodity imports and exports of the United States since 1866, it seems feasible to pursue some of the statistical jobs suggested in last year's report. To begin with, we expect to prepare a series of tables showing, for every decennial census year since 1869, the total shipments of each major industry group divided into exports and domestic sales, and correspondingly the total materials consumed by each major industry group divided into imports and purchases from domestic producers. Where suitable, we shall use the work already done by W. H. Shaw at the National Bureau, by Wassily Leontief at Harvard, and by the Bureau of Labor Statistics, the Bureau of the Census, and the Tariff Commission. If all goes well, we may attempt to cover inter-decennial census years, especially since 1919. Such a set of tables would constitute a major step toward reclassifying into significant groupings the annual values of imports and exports, and useful information for deciding how far to go in reclassifying the monthly or quarterly values. It should also facilitate the construction of physical volume indexes of foreign trade, if we find that necessary after reviewing the several existing indexes.

Solomon Fabricant

Common observation suggests that in many fields not only the quantity but also the quality of new investments fluctuates over time, and particularly that quality sometimes declines as cyclical expansion proceeds. I am attempting to investigate empirically fluctuations in the quality of foreign government bonds floated in the United States, 1920-30. Current judgments about the 'lending of the 'twenties' may be refined and corrected if it is found that major changes took place. In addition to their bearing on foreign loans, fluctuations in investment quality are of general interest as a feature of business cycles.

As a crude measure of bond quality I use the ratio of the amount of bonds issued in a given quarter that subsequently defaulted to the amount of all bonds issued in the quarter. This default index shows, indeed, a sharp rise in the 'twenties. Dividing the period into its earlier and later half, we find that 18 per cent of all loans issued from 1920 to 1924 were issued by governmental units that subsequently defaulted; the corresponding figure for 1925-29 was 50 per cent. Since the factors commonly regarded as responsible for the widespread defaults on foreign bonds affected issues of earlier years as much as those of later ones, the major upswing in American financial activity may be held responsible for this steep decline in loan quality.

More detailed analysis supports these results. Whether loans are classified by the geographic location of the borrower or by issuing banking houses, deterioration is found in every subdivision. Moreover, yield differentials between foreign and high grade domestic bonds not only did not rise when loan quality declined but even declined slightly when bond quality was deteriorating most.

A byproduct of this analysis is the finding that although foreign bond flotations increased hugely during the major upswing of the 'twenties, they were closely related, inversely, to the shorter business cycles of the 'twenties. Their relation to American business cycles is even closer than that of domestic bond issues, though one might have expected differently timed foreign business cycles to interfere in their case. The quantity as well as the quality of these foreign loans appear to have been largely determined by the state of the American economy at the time of lending.

Ilse Mintz

My part in this project is limited to a technical question: to ascertain whether the statistics of migration and the census counts of the foreign born since 1870 are consistent.

An analysis by decades has been completed for 1900-40, utilizing the recorded migration data, the census counts of the foreign-born white, and the mortality rates of the foreign-born white based on the registration areas. The procedure was to start from a specific census and take into account how migration and mortality in the next ten years affected the size and composition of the foreign-born population. Comparison of the resulting estimates of the foreign-born population with the decennial count indicated rather close consistency. The differences between the estimated and census totals and between the estimated and enumerated ages as indicated by the median age are small, and the variation between the sex ratios is likewise inconsequential. For specific age groups the differences, however, are considerable, partly because of the nature of the data and the limitations of the method.

After similar work has been done on the census counts and migration data for 1870-1900, a comprehensive report covering the entire period 1870-1940 will be prepared. The methods will be described fully and the migration, census, and mortality data as well as the derived mortality tables of the foreign-born white will be presented.

Ernest Rubin

See also Long's report in Section 3 and Morgenstern's and Creamer's reports in Section 4.

NATIONAL BUREAU PUBLICATIONS ON
BUSINESS CYCLES

I Books on Business Cycles

*Business Cycles and Unemployment (1923)   448 pp., $4.10
Committee on Unemployment and Business Cycles of the
President's Conference on Unemployment, and a Special
Staff of the National Bureau

*Employment, Hours and Earnings in Prosperity and De-
pression, United States, 1920-1922 (1923)   150 pp., 3.10
W. I. King

*Business Annals (1926)   382 pp., 2.50
W. L. Thorp, with an introductory chapter, Business Cycles
as Revealed by Business Annals, by Wesley C. Mitchell

Migration and Business Cycles (1926)   258 pp., 2.50
Harry Jerome

Business Cycles: The Problem and Its Setting (1927)   514 pp., 5.00
Wesley C. Mitchell

*Planning and Control of Public Works (1930)   292 pp., 2.50
Leo Wolman

*The Smoothing of Time Series (1931)   174 pp., 2.00
F. R. Macaulay

Strategic Factors in Business Cycles (1934)   256 pp., 1.50
J. M. Clark

German Business Cycles, 1924-1933 (1934)   308 pp., 2.50
C. T. Schmidt

Public Works in Prosperity and Depression (1935)   482 pp., 3.00
A. D. Gayer

Prices in Recession and Recovery (1936)   602 pp., 4.00
Frederick C. Mills

Some Theoretical Problems Suggested by the Movements of
Interest Rates, Bond Yields and Stock Prices in the United
States since 1856 (1938)   612 pp., 5.00
F. R. Macaulay

*Consumer Instalment Credit and Economic Fluctuations
(1942)   262 pp., 2.50
Gottfried Haberler

Measuring Business Cycles (1946)   592 pp., 5.00
A. F. Burns and Wesley C. Mitchell

Cyclical Diversities in the Fortunes of Industrial Corporations (Occasional Paper 32, 1950) .50
Thor Hultgren

New Facts on Business Cycles (Thirtieth Annual Report, May 1950)
Arthur F. Burns

Out of print.

SOME OTHER NATIONAL BUREAU PUBLICATIONS

The Statistical Agencies of the Federal Government: A Report to the Commission on Organization of the Executive Branch of the Government (1949)   224 pp., $2.00
F. C. Mills and C. D. Long

Taxable and Business Income (1949)   368 pp., 4.00
Dan T. Smith and J. Keith Butters

Urban Mortgage Lending by Life Insurance Companies (1950)   192 pp., 2.50
R. J. Saulnier

Cost Behavior and Price Policy (1943)   356 pp., 3.00
By the Committee on Price Determination

Business Finance and Banking (1947)   261 pp., 3.50
Neil H. Jacoby and R. J. Saulnier

Impact of Government on Real Estate Finance in the United States   (in press)
Miles L. Colean

Studies In Income and Wealth
11 (1949)   464 pp., 6.00
Six papers on the industrial distribution of manpower, real incomes in dissimilar geographic areas, national income forecasting, and the saving-income ratio.

12 (1950)   608 pp., 6.00
Thirteen papers on national wealth.

OCCASIONAL PAPERS

30 *Costs and Returns on Farm Mortgage Lending by Life Insurance Companies, 1945-1947* (1949) $1.00
R. J. Saulnier

33 *Employment and Compensation in Education* (1950)   1.00
George J. Stigler

ANNUAL REPORTS

25 *The National Bureau's First Quarter-Century* (May 1945)
Wesley C. Mitchell

28 *The Cumulation of Economic Knowledge* (May 1948)
Arthur F. Burns

29 *Wesley Mitchell and the National Bureau* (May 1949)
Arthur F. Burns