Volume Title: What Happens During Business Cycles: A Progress Report

Volume Author/Editor: Wesley Clair Mitchell

Volume Publisher: NBER

Volume ISBN: 0-870-14088-4

Volume URL: http://www.nber.org/books/mitc51-1

Publication Date: 1951

Chapter Title: Front matter, What Happens During Business Cycles

Chapter Author: Wesley Clair Mitchell

Chapter URL: http://www.nber.org/chapters/c3163

Chapter pages in book: (p. -32 - 0)

NATIONAL BUREAU OF ECONOMIC RESEARCH

Studies in Business Cycles

No. 5

What Happens During Business Cycles

A PROGRESS REPORT

Relation of the Directors to the Work and Publications of the National Bureau of Economic Research

1. The object of the National Bureau of Economic Research is to ascertain and to present to the public important economic facts and their interpretation in a scientific and impartial manner. The Board of Directors is charged with the responsibility of ensuring that the work of the National Bureau is carried on in strict conformity with this object.

2. To this end the Board of Directors shall appoint one or more Directors of Research.

3. The Director or Directors of Research shall submit to the members of the Board, or to its Executive Committee, for their formal adoption, all specific proposals concerning researches to be instituted.

4. No report shall be published until the Director or Directors of Research shall have submitted to the Board a summary drawing attention to the character of the data and their utilization in the report, the nature and treatment of the problems involved, the main conclusions and such other information as in their opinion would serve to determine the suitability of the report for publication in accordance with the principles of the Bureau.

5. A copy of any manuscript proposed for publication shall also be submitted to each member of the Board. For each manuscript to be so submitted a special committee shall be appointed by the President, or at his designation by the Executive Director, consisting of three Directors selected as nearly as may be one from each general division of the Board. The names of the special manuscript committee shall be stated to each Director when the summary and report described in paragraph (4) are sent to him. It shall be the duty of each member of the committee to read the manuscript. If each member of the special committee signifies his approval within thirty days, the manuscript may be published. If each member of the special committee has not signified his approval within thirty days of the transmittal of the report and manuscript, the Director of Research shall then notify each member of the Board, requesting approval or disapproval of publication, and thirty additional days shall be granted for this purpose. The manuscript shall then not be published unless at least a majority of the entire Board and a two-thirds majority of those members of the Board who shall have voted on the proposal within the time fixed for the receipt of votes on the publication proposed shall have approved.

6. No manuscript may be published, though approved by each member of the special committee, until forty-five days have elapsed from the transmittal of the summary and report. The interval is allowed for the receipt of any memorandum of dissent or reservation, together with a brief statement of his reasons, that any member may wish to express; and such memorandum of dissent or reservation shall be published with the manuscript if he so desires. Publication does not, however, imply that each member of the Board has read the manuscript, or that either members of the Board in general, or of the special committee, have passed upon its validity in every detail.

7. A copy of this resolution shall, unless otherwise determined by the Board, be printed in each copy of every National Bureau book.

(Resolution adopted October 25, 1926 and revised February 6, 1933 and February 24, 1941)

Studies in Business Cycles

1 *Business Cycles: The Problem and Its Setting*
(originally published as No. 10 in the General Series)
By Wesley C. Mitchell

2 *Measuring Business Cycles*
By Arthur F. Burns and Wesley C. Mitchell

3 *American Transportation in Prosperity and Depression*
By Thor Hultgren

4 *Inventories and Business Cycles, with Special Reference to Manufacturers' Inventories*
By Moses Abramovitz

5 *What Happens during Business Cycles: A Progress Report*
By Wesley C. Mitchell

What Happens During Business Cycles

A Progress Report

WESLEY C. MITCHELL

National Bureau of Economic Research, Inc.

DISTRIBUTED BY

Columbia University Press, New York and London

Printed in the United States of America

Introduction

Shortly before his death Wesley Mitchell put in my care the completed parts of the "progress report" he was preparing on his long and elaborate investigation of "what happens during business cycles". This book is substantially the document he left behind. I have felt free to make numerous changes of detail, but I have not interfered with the design, nor attempted to complete the narrative. The work of a major scientist, even if not half done, deserves a life of its own, unencumbered by the hand or voice of another. So it is especially when, as in the present case, the fragment has well defined contours, balance, and direction. But for the guidance of students who may take up the book for the first time, I shall put down a few remarks about Mitchell's objectives and what he accomplished.

I

Business cycles are not merely fluctuations in aggregate economic activity. The critical feature that distinguishes them from the commercial convulsions of earlier centuries or from the seasonal and other short-term variations of our own age is that the fluctuations are widely diffused over the economy—its industry, its commercial dealings, and its tangles of finance. The economy of the western world is a system of closely interrelated parts. He who would understand business cycles must master the workings of an economic system organized largely in a network of free enterprises searching for profit. The problem of how business cycles come about is therefore inseparable from the problem of how a capitalist economy functions.

This conception governs Mitchell's posthumous book, as it does his earlier writings. Mitchell was not content to focus analysis on the fluctuations of one or two great variables, such

as production or employment. His concern was with *business* cycles and he therefore sought to interpret the system of business as a whole—the formation of firms and their disappearance, prices as well as output, the employment of labor and other resources, the flow of incomes to and from the public, costs and profits, savings and investments, the merchandising of securities as well as commodities, the money supply, its turnover, and the fiscal operations of government. Not only that, but he sought to penetrate the facade of business aggregates and trace the detailed processes—psychological, institutional, and technological—by which they are fashioned and linked together.

Thus Mitchell took as his scientific province a terrain as far-flung and intricate as Walras' and Marshall's. But he explored more fully than his predecessors the obstacles to the mutual adjustment of economic quantities in a disturbed environment. "Time . . . is the centre of the chief difficulty of almost every economic problem." [1] Pursuing this Marshallian theme through uncharted jungles of statistics, Mitchell detected systematic differences in the rates of movement of economic variables, and arrived at an early stage of his scientific work at the conception that our economic system of interdependent parts generates a cyclical path instead of moving toward an equilibrium position. This fateful twist aside, Mitchell's economic outlook was thoroughly Marshallian. Had he lived to finish this book, he would have inscribed on its title page Marshall's motto: "The many in the one, the one in the many."

The hypothesis that each stage of the business situation tends to develop out of the preceding stage and to grow into the next in a cyclical pattern poses two major questions: Does economic life actually proceed in recurrent fluctuations having similar characteristics? If so, by what processes are continuous and repetitive movements of this character brought about? In a search for definite and dependable answers, Mitchell examined "facts on a wholesale scale", as had Darwin before him in a related field, and Lyell before Darwin. "My success as a man of science", wrote Darwin, "has been deter-

[1] Alfred Marshall, Preface to the first edition of his *Principles*.

mined . . . by complex and diversified mental qualities and conditions. Of these, the most important have been—the love of science—unbounded patience in long reflecting over any subject—industry in observing and collecting facts—and a fair share of invention as well as of common sense."[2] These, too, were the sources of Mitchell's scientific strength. In his quarto on *Business Cycles*, published in 1913, he anchored a theory of fluctuations to an array of empirical observations unprecedentedly full for its time. But Mitchell was not content with this achievement. World War I had ushered in a new era of economic statistics, able theorists were elaborating new hypotheses, and statistical analysts were rapidly fashioning new devices for disentangling economic movements. Eager to exploit the new materials for research, Mitchell launched in 1922 a fresh investigation of business cycles.

II

The science of economic fluctuations is only beginning to pass into an inductive stage. Even today the descriptions of business cycles by economists often resemble the descriptions of plant life by writers of antiquity, who commonly relied on "casual observations, no experiments and much speculative thinking".[3] If later botanists often "could not identify the plants by the descriptions", so it has also been in economics. As long as investigators worked by themselves, they could not very well "collect the masses of raw data pertinent to the study of cyclical behavior, segregate the cyclical components from movements of other sorts, and assemble the findings to form a realistic model of business cycles by which explanations could be judged".[4] In recent decades the organization of scientific

[2] Charles Darwin, "Autobiography", in *Life and Letters*, edited by Francis Darwin (D. Appleton & Co., 1888), Vol. I, pp. 68, 85-6.

[3] William Crocker, "Botany of the Future", *Science*, Oct. 28, 1938, pp. 387, 388.

[4] Mitchell, *infra*, p. 4. All other page references, unless otherwise indicated, are to the text.

institutes has greatly enlarged the possibilities of empirical research in economics. Mitchell made the most of the opportunity afforded by the resources of the National Bureau. Taking his own and others' explanations of business cycles as "guides to research, not objects of research" (p. 5), he delved deeply into the facts of cyclical behavior and the relationships among them. The wish to contribute to economic policy was strong in Mitchell. Stronger still was his conviction that intelligent control of business cycles depends upon sound theoretical understanding, which requires tolerably full and accurate knowledge of what the business cycles of experience have been like.

Business Cycles: The Problem and Its Setting, the first major instalment of Mitchell's investigation, was published in 1927. The second appeared in 1946 under the title *Measuring Business Cycles*. In the meantime numerous studies of special aspects of cyclical fluctuations were prepared by the Bureau's staff, and a small group was steadily engaged in analyzing the cyclical behavior of economic processes.[5] It was Mitchell's hope to integrate the findings of his collaborators with his own and other investigators' results; that is, to develop a model of business cycles from carefully screened observations, to use it in explaining how the cycles of experience are typically propagated, and then press on to account for the outstanding differences among them.[6] But he would have fallen short of the goal even if he had lived to complete the present book. Many of the needed materials—especially for foreign countries—were not in shape for use, and the subject of business-cycle differences required systematic investigations yet to be undertaken. As it stands, Mitchell's report barely covers the first three of the seven parts he had planned. Part I sets out his aims, methods, and materials. Part II deals with the great variety of cyclical movements characteristic of individual economic ac-

[5] See the list of publications on business cycles at the end of this volume.

[6] For a fuller account, see "Wesley Mitchell and the National Bureau", in the Bureau's *Twenty-Ninth Annual Report*.

tivities. Part III, not fully completed, shows how the cyclical movements of different parts of the American economy fit together into business cycles, and paves the way for analyzing the processes of expansion, recession, contraction, and revival, to which the last four parts were to be devoted.

Thus the book is a 'progress report', both in the sense in which Mitchell intended the phrase and in the poignant sense forced by his death. Yet no existing publication elucidates so fully or so authoritatively what happens during business cycles as Mitchell's fragment. The accent of the book is on characteristic behavior, formalized in the concept of a 'typical cycle'. "The only normal condition" of business, as Mitchell once expressed it, "is a state of change";[7] but some states of change are 'normal' and others 'abnormal', and Mitchell's 'typical cycle' is designed to take account of such differences. Hence, this concept is similar in some respects to the classicists' 'normal'. The role of each is to segregate the effects of complex causes: both are devices of abstraction: both are tools for analyzing new, concrete situations. Mitchell was keenly concerned about the wide variations among the business cycles of experience and eager to press investigations of them. But he deemed it essential, as a first step, to lay bare the typical characteristics of the alternating waves of prosperity and depression that have swept the economic world in modern times. In this emphasis he conformed to the usual practice of business-cycle theorists. He broke with tradition, however, by extracting what is 'typical' or 'aberrant' from mass observations, and thus substituting fact and measure, as well as may be, for the impressionistic judgments that have ruled business-cycle literature.

III

Mitchell begins his survey of what happens during business cycles by illustrating the varieties of behavior characteristic of economic activities in the United States. Some of the figures

[7] *Business Cycles: The Problem and Its Setting*, p. 376.

in his introductory chart merely confirm common knowledge. For example, commodity prices generally rise and fall with the tides in production; business failures increase during contractions of aggregate economic activity and diminish during expansions; the output of durables fluctuates more widely than the output of perishables; and prices are more stable at retail than at wholesale. It is less generally known, however, that crop production moves rather independently of business cycles, or that production typically fluctuates over a much wider range than prices, that the liabilities of business failures usually turn down months before economic recovery becomes general and turn up months before recession, that both durables and perishables experience their most vigorous decline well before the end of contraction, and that retail prices characteristically move later as well as less than wholesale prices.

Students who will take the trouble to ponder these facts are not likely to leave Mitchell's chart quickly. They will notice that orders for investment goods tend to lead the tides in aggregate activity, that private construction is more closely related to business cycles than public construction, that call money rates or even commercial paper rates greatly overstate the fluctuations in the rates of interest at which bank customers ordinarily borrow, that interest rates in New York tend to move before and more widely than in the interior, that the number of business failures lags behind the liabilities, that bond prices tend to lead stock prices which themselves lead the turns in aggregate activity, that bank deposits appear to be comparatively steady during depressions, that imports conform closely to business cycles while exports do not, that grocery sales fail to show the regular response to business cycles characteristic of retail trade at large, etc. And if the reader looks beyond the large processes that have dominated theoretical literature, he will see how peculiar the cyclical behavior of smaller sectors of activity can be. For example, cattle slaughter tends to move with the tides in aggregate activity while hog slaughter moves inversely; the dollar volume of residential construction contracts fluctuates less, not more, than

the physical volume; cotton stocks held at mills run parallel with mill production, while stocks in public storage move inversely.

Thus business cycles are complex phenomena—far more so than has been commonly supposed. The sales of a large firm may be dominated by the tides in aggregate activity; the fortunes of a small firm are rather at the mercy of personal factors and conditions peculiar to the trade or locality. Some activities, like local transit or net gold movements between the United States and Great Britain, are apparently free from cyclical fluctuations. Others, notably farming, undergo cyclical movements, but they have little or no relation in time to business cycles. And these irregular responses, passed over lightly by theoretical writers, accord with reason:

> We cannot expect any activity to respond regularly to business cycles unless it is subject to man's control within the periods occupied by cyclical phases, and unless this control is swayed, consciously or not, by short-period economic considerations. The domination of harvests by weather, the 'migratory property' of petroleum underground, the mixed motives of governments in undertaking construction work, the long-range planning that weighs with many men in a position to set 'administered prices', the time-consuming negotiations that prevent prompt adjustments of certain other prices and many wage rates, the existence of long-term contracts, the years required to complete some large undertakings—these are concrete examples of the multifarious obstacles that interfere with prompt and regular response to the cyclical tides (p. 95).

The processes that fail to bear the imprint of business cycles are nevertheless a minority. Almost nine-tenths of Mitchell's basic sample of approximately 800 time series fluctuate in sympathy with the tides in aggregate activity, but the movements of this imposing majority are far from uniform. Between the cyclical recalcitrants like farming and the cyclical regulars like factory employment, there is a continuous gradation. Coal and iron production conform more closely to the tides in aggregate activity than the production of textiles or gasoline. The prices of industrial commodities do not conform as well as their production, while the opposite relation rules in farming. Employment conforms better than wage rates, bank loans than invest-

ments, open-market interest rates than customer rates, stock prices than bond prices, etc. Some conforming processes move early in the cyclical procession; for example, orders for investment goods. Others, like interest rates, are laggards.

Of course, most processes respond to the tides in aggregate activity by rising during expansions and declining during contractions, though they may do so with a lead or lag. But business cycles also generate countercyclical movements:

> Brisk business increases the domestic demand for textile goods and so diminishes the exports of raw cotton; it increases the sale of fresh milk and so restricts the production of butter; it increases the volume of coin and paper money held by the public and stimulates borrowing from the banks, thereby enlarging demand liabilities and tending to impair reserve ratios; it leads department stores to carry larger stocks of merchandise and lowers the piles of iron ore at blast furnaces; it activates share transactions on stock exchanges and discourages transactions in bonds. The declines in this list, and many others, are as characteristic a feature of business cycles as the advances (p. 66).

However, the processes that run counter to business cycles do so, by and large, with less regularity than those that respond positively. An expansion of money incomes stimulates a general increase in buying, and this influence may obscure the concomitant impulse to shift demand away from inferior articles to goods of higher quality. As it turns out, purchases of staples such as pork, flour, coffee, and potatoes frequently decline during expansion, but their inverted response is less regular than the positive response of more costly articles.

> In general, influences that tend to repress an activity in expansion encounter more opposition than influences favoring an increase, and when repressing influences win out, their victories are less regular from cycle to cycle than the victories won by influences that push forward. *Mutatis mutandis,* the like holds true in contraction (p. 96).

Large as are the variations in the cyclical timing of economic processes, the differences in amplitude of fluctuation are more impressive still. In high grade bond yields, for example, the cyclical wanderings are confined to a narrow range; the total rise and fall is typically only about 10 percent of their average value during a business cycle. The amplitude of the overall

index of wholesale prices, excluding war episodes, is nearly twice as large; the amplitude of factory employment four or five times as large, of private construction contracts over ten times and of machine tool orders over twenty times as large. On the other hand, stocks of industrial equipment are remarkably steady, expanding usually during contractions as well as expansions of business cycles. The proportions among economic quantities keep changing so systematically over a business cycle that the

> very essence of the phenomenon is omitted unless the chart of business cycles contains numerous lines that indicate the wide differences among the rates at which, and also some of the differences in the times at which, various elements in the economy expand and contract. For, unless these divergencies in cyclical behavior are pictured by fit symbols, we have no suggestion of the basic business-cycle problem: how an economic system of interrelated parts develops internal stresses during expansions, stresses that bring on recessions, and how the uneven contractions of its varied parts pave the way for revivals (p. 295).

IV

So much for the varieties of cyclical behavior that come to the surface once the lid is lifted from aggregate activity. What sort of whole do the parts make up? When the individual pieces are put together it appears that every month some activities reach cyclical peaks and others decline to their troughs; so that expansion and contraction run side by side all the time. But the peaks tend to come in bunches and likewise the troughs. Hence, when troughs gain on the peaks, expansions grow more numerous and in time dominate the economy. Their supremacy is short lived, however, and gradually gives way to the encroachments of contraction. The business cycle of experience is the alternating succession of these sustained majorities—first of individual expansions, next of contractions, then of expansions once again, and so on.

> Business cycles consist not only of roughly synchronous expansions in many activities, followed by roughly synchronous contractions in a slightly smaller number; they consist also of numerous contractions while expansion is dominant, and numerous expansions while contraction is dominant (p. 79).

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

Series	Expansion: *Trough to first third*	Expansion: *First to middle third*	Expansion: *Middle to last third*	Expansion: *Last third to peak*	Contraction: *Peak to first third*	Contraction: *First to middle third*	Contraction: *Middle to last third*	Contraction: *Last third to trough*	No. of Business Cycles Covered	% of Conforming Movements during Span of Stages in Which Series Is Said to *Rise*	% of Conforming Movements during Span of Stages in Which Series Is Said to *Fall*
Bonds sold, N. Y. Stock Exchange	+	−	−	−	−	−	+	+	14	86	79
R.R. bond prices	+	+	−	−	−	+	+	+	19	65	74
Business failures, liabilities, *inv.*	+	+	+	−	−	−	+	+	14	86	100
Common stock prices	+	+	+	−	−	−	−	+	16	94	82
Shares sold, N. Y. Stock Exchange	+	+	+	−	−	−	−	+	16	94	88
Corporate security issues	+	+	+	−	−	−	−	+	8	100	75
Construction contracts, value	+	+	+	−	−	−	−	+	7	86	75
Deposits activity	+	+	+	−	−	−	−	+	16	94	88
Bank clearings or debits, N.Y.C.	+	+	+	−	−	−	−	+	18	100	89
Incorporations, no.	+	+	+	+	−	−	−	+	19	84	80
Bank clearings or debits, outside N.Y.C.	+	+	+	+	−	−	−	+	14	100	79
Bank clearings or debits, total	+	+	+	+	−	−	−	+	14	100	93
Imports, value	+	+	+	+	−	−	−	+	16	94	75
Industrial production, total	+	+	+	+	−	−	−	−	5	100	100
Fuel & electricity production	+	+	+	+	−	−	−	−	5	100	100
Pig iron production	+	+	+	+	−	−	−	−	16	100	100
R.R. freight ton miles	+	+	+	+	−	−	−	−	9	100	89
Factory employment	+	+	+	+	−	−	−	−	6	100	100
Factory payrolls	+	+	+	+	−	−	−	−	5	100	100
Income payments, total	+	+	+	+	−	−	−	−	4	100	50
Corporate profits	+	+	+	+	−	−	−	−	4	100	100
Business failures, no., *inv.*	+	+	+	+	−	−	−	−	16	75	88
Department store sales, deflated	+	+	+	+	−	−	−	−	4	100	75
Wholesale trade sales, value	+	+	+	+	−	−	−	−	3	100	100
Wholesale commodity prices	+	+	+	+	−	−	−	−	11	82	91
R.R. bond yields	−	−	+	+	+	−	−	-	19	74	65

[a] Derived from Table 31, Sec. A. A plus denotes rise, a minus denotes fall. The two series on failures are inverted here. Bond prices are treated as the inverted replica of bond yields; see Table 31, note *e*, concerning their sign in the second segment of contraction.

According as the expansions or contractions of individual activities dominate, the aggregate activity of the economy surges forward or recedes. And when economic crosscurrents are at or near their maximum, the direction of aggregate activity is reversed: it begins to rise if it has been falling, or to fall if it has been rising.

The turmoil that goes on within the cycles in aggregate activity has a systematic core. A highly simplified picture of the system is afforded by the accompanying table, which condenses Mitchell's analysis of "comprehensive series" in Chapter 10. The table shows directions of movement during a typical business cycle—here divided into eight segments, four each for expansion and contraction. Of course, each segment includes 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 crosscurrents that would appear in less comprehensive series, and 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 gives an effective glimpse of the typical round of developments that constitute a business cycle.[8]

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

[8] This and the three following paragraphs are adapted from the National Bureau's *Thirtieth Annual Report.*

prices move downward; the liabilities of business failures, which hitherto have been receding, move up again; security issues and construction contracts drop; the turnover of bank deposits slackens; and bank debits 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 trip around the business cycle started.

Of course, this recital delineates characteristic movements during business cycles, not invariant sequences. That the description fits imperfectly individual business cycles is apparent from the conformity percentages in the table. Yet these percentages also suggest that the deviations from type are not so numerous as to destroy the value of a generalized sketch. And if this much is 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 espe-

cially early in financial processes and activities preparatory to investment expenditure.

The contraction phase of business cycles is not, however, the precise counterpart of expansion. This is clear from the table and becomes clearer still when numerical values are attached to its signs and intervals. The arrays of individual turning points at business-cycle troughs "are more dispersed and skewed toward leads" than are the arrays at peaks. Expansions of aggregate activity average longer than contractions. They are also more vigorous, so that the trough from which a given expansion starts is ordinarily above the level from which the preceding expansion started. In the first segment of expansion the rate of improvement "is more rapid than at any other stage of the cycle". A "sharp and general retardation" of the advance occurs in the next segment. In the third, while "reacceleration is the rule", the advance "does not regain the speed" it had at the beginning of expansion. In the final stage of expansion "the business tide . . . becomes fuller of eddies". Contractions follow a different pattern. "The fall accelerates somewhat in the second segment of contraction, whereas the rise is much retarded in the second segment of expansion." The next stage "brings a moderate retardation" of the decline, whereas it "brought a moderate reacceleration" of the advance. The closing stages of expansion and contraction are similar "in that the rate of change becomes slower; but this retardation is much more marked at the end of contraction than at the end of expansion".[9]

Thus the notions often suggested by the picturesque phrasing beloved of writers upon 'booms and busts'—that prosperity grows at a dizzier pace the longer it lasts, and that slumps gather momentum as they proceed—are wrong if our measures are right. Scarcely less misleading are the implications of the mathematical constructions often used to represent business cycles. A set of straight lines sloping upward to represent expansion, connected at a sharp peak with downward sloping straight lines to represent contraction, misrepresents the facts. . . . Sine curves are not less objectionable. . . . What our observations suggest is that the shapes of business cycles are phenomena *sui generis* (p. 300).

[9] See pp. 75, 299-305.

V

These, then, are some of the broad results that emerge from Mitchell's examination of the cyclical process of the American economy. The full range of the book, its suggestions for further research, and its exemplary scientific care await the reader. Economists anxious to wield a simple formula of the causes of business cycles or the means of controlling them will not find Mitchell's fragment to their liking. Those willing to take conclusions on faith may chafe at its patient elaboration of evidence. But men who seek so earnestly to understand how our economic organization works that they insist on judging evidence for themselves are more likely to lament that too much detail has been suppressed. Scholars will respect Mitchell's pronouncement that his report on findings, after many years of research, is "ill proportioned, tentative, and subject to change as the investigation proceeds" (p.5).

This book is not easy and everyone will save time by a careful reading of Part I which, besides outlining aims and methods, provides the modicum of technical vocabulary required for comprehending what follows. Economic theorists are likely to find especially suggestive Chapter 7, which sets out the facts and inquires into the causes of the changing proportions among economic quantities in the course of a business cycle; also Part III, which centers on the consensus of fluctuations in leading sectors of the economy. Chapter 8 is a useful reminder to all that, despite their persistent traits, business cycles are changing phenomena; and that just as each new member of a group has traits of his own, which cannot be inferred from knowledge of the 'average man', so each business situation must be judged in the light of its own circumstances as well as according to historical patterns. The bulk of this chapter is devoted to technical problems in the decomposition of time series, and only specialists will want to study it fully. Readers pressed for time might move lightly through Chapters 5 and 6 also, except for the closing sections which will repay careful reading.

The modern theory of employment, which for a time pushed aside both value and business-cycle theory, is now slowly being fitted into older economic knowledge. The younger economists are rediscovering that cost-price relations play a significant role in shaping the national income and its movements, that the 'consumption function' itself moves cyclically, that investment is not an autonomous variable, that price inflation does not wait for full employment, and that both investment and consumption are heterogeneous aggregates that cannot be understood without separate analysis of their parts. If our harassed generation can win the opportunity to pursue the arts of peace, the fruit and example of Mitchell's work will have their quiet but decisive part over the years in bringing the theory of fluctuations into ever closer contact with the ebb and flow of experience.

Arthur F. Burns

August 1950

Acknowledgments

My task as editor has been greatly lightened by Millard Hastay, who helped me verify factual details and took charge of the preparation of the appendices. Geoffrey H. Moore also put his knowledge at my disposal. Both Moore and Hastay had worked very closely with Wesley Mitchell and he records in the text his indebtedness to them on special points. It is only proper to add here that Geoffrey Moore participated over a long period in the planning and execution of the statistical compilations of this book, and that Millard Hastay's participation was especially extensive in the closing stages of Mitchell's work. A committee of the Board of Directors, consisting of Gottfried Haberler, C. Reinold Noyes, and George Soule, read the manuscript with critical care. So also did Moses Abramovitz, Daniel Creamer, and Ruth Mack of the research staff. Of the many others who have made a contribution to this book, either by serving at one time or another as Mitchell's assistants or aiding me at the editing stage, I wish to mention particularly Martha Anderson, Cicely Applebaum, Florence Cohen, Dorothy Cook, Sally Edwards, Harry Eisenpress, Frances Goldberg, H. Irving Forman, Simon Kuznets, Karl Laubenstein, Sophie Sakowitz, Regina S. Sands, Julius Shiskin, Johanna Stern, and the late Denis Volkenau.

A. F. B.

CONTENTS

PAGE

INTRODUCTION, by Arthur F. Burns vii

Part I

Aims, Methods, and Materials

Chapter 1
THE TASK ESSAYED BY THE NATIONAL BUREAU 3

Chapter 2
OUR BASIC CONCEPT 6

Chapter 3
OUR METHODS OF MEASURING CYCLICAL BEHAVIOR 9

I Specific Cycles 9
II Relation of Specific to Business Cycles 10
III Reference Dates 10
IV Reference-Cycle Bases and Relatives 13
V Treatment of Secular Movements 13
VI Reference-Cycle Patterns 14
VII Average Rates of Rise or Fall per Month 15
VIII Indexes of Conformity 15
IX Our Use of Averages 18
X Tests of Consilience 22
XI Our Sample of Time Series 23

Part II

Varieties of Cyclical Behavior

Chapter 4 PAGE

A Sample of Reference-Cycle Patterns 29

Chapter 5

Varieties of Cyclical Timing 51

I Our Measures of Cyclical Timing 51
II Irregular Timing 56
III Inverted Timing 61
IV Neutral Timing 66
V Positive Timing 67
VI Leads and Lags 68
VII Summary, Doubts, and the Next Step 75

Chapter 6

Degrees of Conformity to Business Cycles 80

I Numerical Values of the Conformity Indexes ... 80
II The Problem of Bias in the Indexes 83
III What Activities Conform Well and What Ill 91
IV Factors Influencing Degree of Conformity 95

Chapter 7

Varieties of Reference-Cycle Amplitude 100

I Range and Distribution of Amplitudes 100
II The Problem of Bias 101
III Amplitudes in Various Sectors of the Economy .. 104
IV Factors That Influence Amplitudes 105
A Relations between specific- and reference-cycle amplitudes 105
B Relations between specific and business cycles 110
C Cyclical fluctuations in consumers' purchases 114
D Cyclical fluctuations in producers' purchases 120

PAGE

E Cyclical fluctuations in employment of resources 128
1 Land 128
2 Labor 130
3 Capital 137
F Cyclical amplitudes of prices and production 170

V The Problem of Comparing and Combining Reference-Cycle Amplitudes 175
A Amplitudes of comprehensive series and their components 175
B Amplitudes of paired series and full samples 177
C The amplitudes of business cycles..... 182

Chapter 8

CYCLE-BY-CYCLE VARIABILITY IN CYCLICAL BEHAVIOR.. 185

I Problems Raised by Cycle-by-Cycle Variability 185

II Cycle-by-Cycle Variability within Series..... 186
A Components of average deviations..... 186
B Contribution of irregular movements..... 189
C Contribution of secular movements..... 196
D Contribution of cyclical movements..... 199
E Statistical tests 200
F Decomposition of average deviations..... 204
G Estimates of components..... 207
H Some conclusions 209
I Average deviations of reference-cycle amplitudes 216

III Cycle-by-Cycle Variability among Series..... 218
A Influence of average amplitudes..... 219
B Influence of regularity in cyclical timing.. 220
C Statistical tests 224

IV The Representative Value of Cyclical Patterns.. 227

Technical Note I..... 231
Technical Note II..... 236
Technical Note III 246

Part III

The Consensus of Cyclical Behavior

Chapter 9 PAGE

THE AIM OF PART III 251

Chapter 10

THE EVIDENCE OF COMPREHENSIVE SERIES 255

I A Statistical Summary 255

II Scope and Adequacy of Comprehensive Series .. 255

III Typical Behavior of Comprehensive Series during Business Cycles 277

A Cyclical timing 277

B Conformity to business cycles 281

C Reference-cycle amplitudes 282

D Reference-cycle patterns 288

E Rates of change during successive segments of reference cycles 296

F Cycle-by-cycle differences 305

Appendix A

SUPPLEMENT OF REFERENCE-CYCLE MEASURES 311

Appendix B

SOURCES OF DATA 329

Index 363

List of Tables

TABLE		PAGE
1	Tentative Reference Dates of Business Cycles in the United States	12
2	Specimen Indexes of Conformity	17
3	Basic Sample of 794 Monthly or Quarterly Series for the United States Used in Later Tables	24
4	Distribution of 794 Monthly or Quarterly Series According to Their Characteristic Cyclical Timing	52
5	Economic Character of Series That Lead or Lag at Reference-Cycle Troughs and Peaks	70
6	Two Summaries of the Numerical Values of Conformity Indexes of 794 Monthly or Quarterly Series	81
7	Series with Business-Cycle Conformity Indexes of ±100, 0, and Intermediate Values Classified by the Number of Business Cycles They Cover	85
8	Groups of Series Ranked According to Their Indexes of Conformity to Business Cycles	92
9	Average Conformity of Groups of Series Compared with Conformity of Inclusive Indexes or Aggregates	97
10	Summaries of Average Reference-Cycle Amplitudes of 794 Monthly or Quarterly Series	102
11	Groups of Series Ranked According to Their Average Reference-Cycle Amplitudes	106
12	Average Reference-Cycle Amplitudes at Successive Links in the Shoe-Leather-Hide Chain of Supply	125
13	Reference-Cycle Timing, Conformity, and Amplitude of 'Comprehensive' Series on Employment	

TABLE		PAGE
	and Related Factors in Four Business Cycles, 1921-1938	134
14	Range of Variation of Balance-Sheet Ratios among Minor Industrial Divisions, 1937	139
15	Reference-Cycle Bases, Timing, Conformity, and Amplitude of Kuznets' Estimates of Capital Formation, Savings, and Related Magnitudes, at Current Prices, Four Business Cycles, 1921-1938	154
16	Reference-Cycle Timing, Conformity, and Amplitude of Selected Series Relating to Investment	159
17	Reference-Cycle Conformity and Amplitude of Series on Prices and Production	173
18	Analysis of Differences between Mean Reference-Cycle Amplitudes of Full Samples and Paired Series in Table 17	179
19	Effects of Smoothing Four Monthly Series upon Their Average Reference-Cycle Patterns and the Average Deviations from Them	191
20	Mean Average Deviations from Average Reference-Cycle Patterns, by Groups of Series	202
21	Mean Average Deviations from Average Reference-Cycle Patterns of Full Sample, and Theoretical Expectations concerning Stage-by-Stage Changes in Their Components	204
22	Estimates of the Secular, Cyclical, and Irregular Components in Mean Average Deviations from Average Reference-Cycle Patterns of Full Sample	209
23	Ratios of Mean Average Deviations at Reference Peaks to Mean Average Deviations at Reference Troughs, by Groups of Series	212
24	Average Deviations from Average Reference-Cycle Amplitudes of Seven Series Computed Directly and Indirectly	217
25	Mean Average Deviations from Average Reference-Cycle Patterns of Three Groups of Series Having Virtually Identical Reference-Cycle Amplitudes and Conformity	223

TABLE		PAGE
26	Summary of Relations among Average Deviations of Reference-Cycle Patterns, Average Amplitudes, and Regularity of Cyclical Timing in 29 Groups of Series	226
A	Weights Implied by Macaulay's 43-Term Approximately 5th-Degree Parabolic Graduation Formula	233
B	Variance and Lagged Covariances of a Smoothed Series Derived by Graduating a Purely Random Series of Unit Variance with Macaulay's 43-Term Formula	233
C	Variances of Original and Smoothed Time Series and of Averages of Successive Items from Them	234
D	Percentage Reduction of Standard Deviation Due to Averaging	235
27	Changes in the Reference-Cycle Bases of Pig Iron Production Before and After Adjustment for Secular Trend	239
28	Average Deviations from Average Reference-Cycle Patterns of Nine Series Before and After Adjustment for Secular Trend	242
29	Effect of Shift from T-T to P-P Analysis upon Average Deviations from Average Reference-Cycle Patterns of Seven Series	244
30	Illustrations of Relations between Standings at Stages IX and I of Adjacent Reference Cycles in Shares Traded on New York Stock Exchange	245
31	Typical Behavior of Comprehensive American Series with Respect to Business Cycles	256
32	Summary of Typical Movements of 34 Monthly or Quarterly Comprehensive Series in Successive Reference-Cycle Stages	279
33	Summaries of Numerical Values of Conformity Indexes of 34 Comprehensive Series and of Full Sample of Monthly or Quarterly Series	283

TABLE		PAGE
34	Summaries of Reference-Cycle Amplitudes of 34 Comprehensive Series and of Full Sample of Monthly or Quarterly Series	284
35	Array of Average Reference-Cycle Amplitudes of Comprehensive Series	286
36	Stage-by-Stage Distribution of Average Reference-Cycle Standings of 34 Monthly or Quarterly Comprehensive Series	289
37	Comprehensive Series Having Very Low, Middle, and Very High Average Standings at the Nine Stages of Reference Cycles	292
38	Stages in Which Comprehensive Series Haxe Extreme and Middle Standings	294
39	Segment-by-Segment Distribution of Average Rates of Change in 34 Monthly or Quarterly Comprehensive Series	298
40	Change from Segment to Segment of Reference Cycles in the Typical Direction and Rate of Movement of 34 Monthly or Quarterly Comprehensive Series	301
41	Three Sets of Observations upon Consensus in the Movements of 34 Monthly or Quarterly Comprehensive Series during Successive Segments of Reference Cycles	307
42	Reference-Cycle Measures of Series in Chart 1	312
43	Supplement to Table 31 and Chart 7	326

List of Charts

CHART		PAGE
1	Average Reference-Cycle Patterns of a Sample of American Series	32
2	Percentage Distribution of 794 Series According to Their Characteristic Cyclical Timing	54
3	Percentage Distribution of 794 Series According to the Numerical Value of Their Indexes of Conformity to Business Cycles	82
4	Percentage Distribution of 184 Series Covering 10 or More Cycles According to the Numerical Value of Their Indexes of Conformity to Business Cycles	87
5	Percentage Distribution of 794 Series According to the Numerical Value of Their Average Reference-Cycle Amplitudes	101
6	Average Reference-Cycle Patterns of Raw and Smoothed Data of Four Series	190
7	Average Reference-Cycle Patterns of American Comprehensive Series	264