
Schumpeter's Business Cycles

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SCHUMPETER'S BUSINESS CYCLES¹

The scope of this monumental treatise may be indicated by a brief review of its chapters, classified here, with some violence to the unity and interpenetration of approaches in the book itself, as introductory, theoretical, historical, and statistical. The introductory chapter discusses business situations as they are apprehended by the business-man; distinguishes groups of external factors that affect economic change; lists the statistical series that may be used advantageously in continuous observation of the business conjuncture; and ends with the expected conclusion that empirical linking of factors and symptoms, as reflected in time series and other data, is insufficient for the understanding of economic change, since observation of actual economic processes cannot distinguish between interwoven causes and effects. To make causal analyses a theoretical apparatus is indispensable.

This theoretical apparatus is presented in chapters 2 through 4. Chapter 2 deals with equilibrium and the theoretical norm, *i.e.*, with the stationary economy. Chapter 3 presents the entrepreneur, the innovation, and the banking system—the triple alliance that contributes a strategic impetus to economic evolution. Chapter 4 comprises the crux of Professor Schumpeter's theory of business cycles, indicating how the behavior of entrepreneurs provides the primary model for use in the study of business cycles; how this primary model is complicated by consideration of secondary factors (errors, propagation through the credit system, etc.), and of the various types of cycles to which the primary and secondary factors give rise. These three chapters are to a large extent a summary of Professor Schumpeter's earlier writings on the nature of a stationary economy and the theory of economic change. But in chapter 2 comments on imperfect competition take account of recent developments in the field; and in chapter 4 business-cycle theory is expanded and extended materially beyond the somewhat bare statement of it in Professor Schumpeter's earlier writings.

Chapter 5 in Volume I discusses the bearing of the theoretical model upon the measurement of cycles in time series. Chapters 8 through 13 in Volume II deal with the behavior of various economic quantities in Great Britain, the United States, and Germany, for the pre-war period as represented by annual data. The successive chapters discuss the general price level, physical quantities (total) and employment, prices and quantities of individual commodities, expenditures and wages, the rate of interest, the central credit market and the stock exchange. These chapters may be termed statistical, although this does not mean that they present a detailed statistical analysis of cycles in the various aspects of the economic system. In these chapters there is more of theoretical and qualitative dis-

¹ *Business Cycles: A Theoretical, Historical, and Statistical Analysis of the Capitalist Process*, by JOSEPH A. SCHUMPETER. Vols. I and II. (New York: McGraw-Hill. 1939. Pp. xvi, 448; ix, 647. \$10.00.)

cussion than of quantitative analysis; and they may be classified as statistical only by comparison with the other parts of the treatise.

Chapters 6 and 7 in Volume I present historical outlines of economic change in the three countries mentioned, for the years from 1787 to 1913—outlines concerned with the dating of two of the three cycle types that are distinguished on the basis of historical evidence, and with the recording of the more outstanding innovations with which the cycles are associated. Chapters 14 and 15 in Volume II contain a detailed discussion of economic changes from 1919 to date. These four chapters may be characterized as historical, although the last two, which deal with recent years, may be alternatively viewed as an application of all three types of approach to the post-war decades. The recent years are discussed much more intensively and comprehensively than pre-war years, the last two chapters accounting for 300 of the 1,000 pages in the two volumes.

This outline of the scope of the treatise suggests that any thorough summary of its contents would exceed the limits of the present review. Such a summary would be exceedingly difficult because of the character of Professor Schumpeter's discussion. Some of the chapters, as already indicated, are themselves summaries of the author's earlier writings, and would need expansion rather than condensation. Other parts, especially those classified above as historical, are running commentaries upon specific situations, with a wealth of allusions, incisive sidelights, references to existing literature, and theoretical suggestions. Such discussion cannot be summarized effectively. In still other parts, the author's meaning is elusive in that the reader is uncertain what limits of confidence Professor Schumpeter assigns to his statements and what in detail is the basis upon which they are made—a comment of particular application to the discussion of the dating of cycles and the presence or absence of cycles in a given series.

One must therefore select for review only a few of the numerous problems treated in the two volumes. The presentation below deals with three topics that seem to the writer to be of wide bearing and to call for critical evaluation: (a) the relation between distribution of entrepreneurial ability and the cyclical character of economic change; (b) the four-phase scheme of the business cycle and its bearing upon statistical analysis; (c) the three types of cycles distinguished. I shall first attempt to present Professor Schumpeter's view on these three topics, and then formulate the questions which, in my view, are raised by his discussion.

To Professor Schumpeter, business cycles are pulsations of the rate of economic evolution. Economic change in general is attributed to three groups of forces: external factors, for example, the demand of governments for new military weapons; the factor of growth, by which the author

means the continuous gradual changes in population and in the volume of savings and accumulation, changes that do not require drastic shifts in the combination of productive factors and thus may be attained by the ordinary, run of the mill economic agent addicted to an habitual and adaptive type of activity; and innovations which represent material changes (or as Professor Schumpeter defines them, changes of first order) in the production functions. It is innovations that are of strategic importance in the evolution of capitalist economy, innovations that are usually introduced by new rather than by old firms, by new men rather than by those who already occupy prominent niches in the functioning system.

Business cycles are recurrent fluctuations in the rate at which innovations are introduced into the economy, in the intensity with which entrepreneurs exercise their *sui generis* function of overcoming obstacles to new combinations. The reason for this discontinuity in the rate of innovations and in the intensity of entrepreneurial endeavor, of the bunching of innovations at one time and their comparative scarcity at others, lies in the distribution of entrepreneurial ability. This ability to dare, to initiate, to overcome obstacles to innovations is, like many other abilities, distributed along a curve which suggests that there are few individuals endowed with such ability to any great degree and many who are equipped only to initiate and follow the pioneering efforts of the few. If then we envisage, in a state of equilibrium, the action of the first entrepreneur, one of high ability, we shall see that his action will be followed by a swarm of imitations, increasing in volume as time passes and as the innovation becomes a more and more accepted pattern of action.

This uprush of innovation, accompanied by expanding credit, rising prices, rising interest rates, a relatively constant volume of total output but usually a shift in favor of producers' goods, constitutes the period of rise in the first approximation to the business cycle. It terminates as soon as the disturbance of the equilibrium has proceeded far enough to upset the existing relations of prices, costs and quantities, thus making it impossible to formulate rationally calculated plans for the future. This terminus is reached all the sooner because innovations are usually concentrated at any given time in one or few industrial areas, and the increase in risk and uncertainty is made more effective by the exhaustion of innovation opportunities. At the turn, the rate of innovation slackens and a period of readjustment ensues in which entrepreneurs take stock and the economy recedes to a new equilibrium level, a level which both growth and innovations make higher than that from which the expansion started. During this period of recession credit volumes, prices and interest rates decline but total output is likely to average larger than the preceding prosperity.

This first approximation, the primary model, thus accounts for a two-phase cycle, a departure upward from equilibrium level and a recession

to a new equilibrium level. But conditions under which entrepreneurial activity takes place in reality must next be considered: the errors of forecast; the speculative tendencies of individuals; the thousand and one peculiarities of economic institutions that are likely to prolong and exaggerate a movement once initiated. These surface factors, which, in Professor Schumpeter's view, often claim the attention of business-cycle students to the exclusion of the fundamental process of innovation, may and do intensify the rise during the prosperity phase beyond the level to which it would have been carried by the stream of innovations proper; and during recession they reënforce the deflation, carrying it often below the equilibrium level into depression. When this occurs, the economy returns to equilibrium whenever the forces of depression spend themselves, a point determined largely by the peculiarities of the secondary factors that produce the abnormal contraction. But the equilibrium reached by recovery is not necessarily identical with that which would have been attained had the depression not taken place.

The combination of the first and second approximations yields a four-phase cycle of prosperity, recession, depression, and revival. The upper turning point is determined essentially by the primary model, whereas the revival point is determined largely by secondary factors. But whatever the difference in the causation of prosperity and recession as over against depression and revival, the four-phase model of the cycle must constitute the paramount guide in the statistical study of time series. Cyclical units should be defined not from trough to trough or peak to peak but from the beginning of prosperity, the point where the series begins to rise above the normal level to the end of revival, the point where the series again reaches the new normal. Professor Schumpeter dates the terminal points of the cycles that he distinguishes in accordance with this rule, and advocates for time-series analysis a method, originally proposed by Ragnar Frisch, that calls for establishing points of inflection. Under certain conditions these points of inflection are in the neighborhood of equilibrium levels and their establishment will thus serve to ascertain the terminal dates of the cycles, if not the turning points that divide prosperity from recession and depression from revival. Since inflection points suggest equilibrium levels in cyclical movements only if the rate of cyclical rise or decline diminishes as the curve pulls away from the equilibrium line, Professor Schumpeter accepts this condition as consonant with the theoretical significance of normal levels.

Neither the primary, nor the secondary, model implies necessarily one type of cycle only, *i.e.*, a cycle of approximately the same duration and intensity. On the contrary, differences in the magnitude of various innovations suggest that there may be several kinds of cycles differing in duration and in amplitude as the innovations with which they are associated differ

in magnitude and the time they require to attain their proper place in the economy. Presumably the same is true of the secondary factors: they may and do differ with reference to the span of time during which they produce their exaggerating effect upon expansion and liquidation. It is thus theoretically plausible to expect cycles of varying duration and intensity, their types and their interrelations to be determined largely by observation.

Professor Schumpeter finds that in order to account for the cycles that can be observed historically and statistically during the last century and a half three types of cycles should be distinguished: long waves of about fifty years in duration (Kondratieffs); intermediate waves of about eight to nine years in duration (Juglars); and short waves of about forty months in duration (Kitchins). Unfortunately nowhere in the two volumes is there a combined chronology stating the terminal dates of the various types of cycles distinguished by Professor Schumpeter for the three countries with which he deals in his historical and statistical sections. But the historical outlines in Volume I are concerned with establishing the Kondratieffs and the Juglars in the three countries before the World War; and in the detailed discussion of the years since 1919 there are a few specific indications of the dates of some Kitchins.²

The concurrence of these three types of cycles, each christened by the name of the economist who was chiefly responsible for claiming validity for it, accounts, according to Professor Schumpeter, for the diversity in the duration and amplitude of cycles observed in time series; and it explains why some "depressions," such as those of 1825-30, 1873-78, and 1929-34, were so long and so deep—a result of coincidence in phase of at least two of the three types of cycles. But all three types of cycles are due to the same fundamental set of causes, described by the primary model; in all we should expect four or two phases as the secondary factors are or are not sufficiently

² I have attempted to construct a chronology of the Kondratieffs with the following results:

Prosperity	Recession	Depression	Revival
<i>Industrial Revolution Kondratieff, 1787-1842: Cotton Textile, Iron, Steam Power</i>			
1787-1800	1801-1813	1814-1827	1828-1842
<i>Bourgeois Kondratieff, 1842-1897: Railroadization</i>			
1843-1857	1858-1869	1870-1884-5	1886-1897
<i>Neo-Mercantilist Kondratieff, 1897 to date: Electricity, Automobile</i>			
1898-1911	1912-1924-5	1925-6-1939	

The dates of the first and second Kondratieff are established from the discussion for Great Britain; that of the third from the discussion for the United States. The specific dates for the three countries are presumably somewhat different, but the differences are likely to be minor. It should also be noted that Professor Schumpeter considers that the first Kondratieff is not very clearly shown in Germany. This table above was checked by Professor Schumpeter who has kindly suggested a few changes in its original version.

Professor Schumpeter also provides dates for Juglars. They are presented as roughly corresponding to the dates in Thorp's *Business Annals*, with due allowance for the difference in terminology.

effective to produce depressions and revivals. As to the relations among these three types of cycles, two observations are made by Professor Schumpeter. First, the theoretical model requires that "each Kondratieff should contain an integral number of Juglars and each Juglar an integral number of Kitchins" (p. 172). The immediate consequence of this is that the first years in the prosperity phase of each Kondratieff coincide with Juglar and Kitchin prosperities; and the same is true of the immediately preceding revivals. Second, "barring very few cases in which difficulties arise, it is possible to count off, historically as well as statistically, six Juglars to a Kondratieff and three Kitchins to a Juglar—not as an average but in every individual case" (p. 174). This empirical conclusion, however, is not called for by the theoretical scheme; indeed the latter would lead us to expect irregularity in the number of the shorter type cycles comprised within each cyclical unit of longer duration.

This summary, bare and oversimplified as it is, reveals the significance of Professor Schumpeter's theoretical scheme and empirical findings. The close connection in this scheme between business cycles and the general process of evolution of capitalist economy; the direct bearing of the theoretical model of the cycle, with its equilibrium levels and its four phases, upon the statistical analysis of time series; the specificity of the three-cycle scheme, in the duration, interrelation and concurrence of the three cycle-types—all contribute to an impression of a well integrated intellectual structure that elegantly spans the gap between controlled imagination and diversified reality.

But further reflection and even a partial scrutiny of the evidence presented in the two volumes raise a host of crucial questions and disturbing doubts. In selecting some of these for discussion, we may begin with the association claimed to exist between the distribution of entrepreneurial ability and discontinuity in the making of innovations—in other words, their "bunching." What precisely is the necessary connection between scarcity at any given time of high entrepreneurial ability (and the plenitude of imitators) and the bunching of innovations? Given an infinite supply of possible innovations (inventions and other new combinations), why need entrepreneurial genius defer the next pioneering step until his preceding one has been so imitated and expanded that the upsetting of the equilibrium stops even him in his tracks? If imitators are ready to follow as soon as the entrepreneurial genius has proved that the innovation is successful, the disturbance of equilibrium at that time is certainly not sufficient to bar this genius from turning to new feats and thus initiating an uprush in another industry. Why should we not conceive these applications of high entrepreneurial ability, whether represented by one man or several, as

flowing in a continuous stream, a stream magnified in a constant proportion by the efforts of the imitators?

A close reading of Professor Schumpeter's text, both in this book and in his earlier treatise on the *Theory of Economic Development*, indicates that he expects high entrepreneurial ability to pause after the innovation and descend to the lower level of its imitators. The theory definitely calls for discontinuity *over time* in the operation of entrepreneurial ability. But such discontinuity cannot be derived from a distribution of entrepreneurial ability *at any given moment of time*, except on one assumption—namely, that the ability called for is so scarce that it may be completely absent during some periods of time while present at others. But this implies cycles in the supply of entrepreneurial ability, whether the supply be conceived in terms of individuals or of phases in the life of various individuals. I am not sure that Professor Schumpeter would view this assumption as valid.

Further reading and reflection suggest two possible alternative explanations of the bunching of innovations. The first is that *by definition* an innovation so disturbs existing economic relations that its introduction on a significant scale (*i.e.*, by the first entrepreneur plus the imitators) will necessarily prevent any other innovation from being successful so long as a process of readjustment has not taken place. This answer means, of course, that an innovation, by definition, is tantamount to a two-phase cycle, *i.e.*, it is defined as the kind of change that produces, upon its introduction, a phase of prosperity and of recession. And correspondingly, an entrepreneur *sui generis* is one who by definition introduces innovations that by definition result in a two-phase cycle. Hence by definition there is a necessary association between two-phase cycles and the *existence* of entrepreneurs. This, however, is such an obvious tautology as to be unacceptable as a significant interpretation or extension of Professor Schumpeter's position.

The second answer, suggested by Professor Schumpeter's references to the concentration of innovations in restricted industrial areas and by the emphasis in his historical discussion of technological changes, is that the discontinuity or bunching in the rate of innovation rests essentially upon discontinuity or bunching in the supply of possible new combinations, particularly of technological inventions. This, in essence, assumes cyclical fluctuations in the rate at which producers of the technical basis for innovations contribute to the stock of possible new combinations from which entrepreneurs can choose. Thus, it may be said that in the last quarter of the eighteenth century in England there were several major inventions (cotton textiles, iron and steel, steam engine); that thereafter it was not until the 30's of the nineteenth century that another big group of inventions, connected with steam railroads, became accessible to the entrepreneur; and that as a result we have a two-phase cycle of prosperity in the last

quarter of the eighteenth century and of recession in the next quarter.

Whether or not this be a proper extension of Professor Schumpeter's theory, the argument that technological and other opportunities for economic innovation are not necessarily continuous over time has some plausibility. There may be periods of hiatus with no big potential change on hand to stimulate and motivate the driving power of entrepreneurial genius. But this generalization, viewed as a basis for a primary model of business cycles, is subject to severe qualifications. Discontinuity of opportunity can be assumed only with reference to the most momentous innovations such as steam power, electricity, etc., *i.e.*, innovations that bear upon Kondratieff cycles. We can hardly expect significant fluctuations in the stock of innovation opportunities of the type that are associated with the Juglar or the Kitchin cycles. Furthermore, even with reference to the major innovations that may be associated with fifty-year spans, there is some indication that the long lapse between the appearance of the inventions is itself partly conditioned by the functioning of the economic system. For example, we may say that electricity did not become available sooner because it had to wait until the potentialities of steam power were exhausted by the economic system and until the attention of inventors and engineers was ready to be diverted to the problems of electricity. If this is so, there may be discontinuity in the *appearance* of inventions, but there is no necessary time lag between those major inventions as sources of significant economic innovations. Thus, even for application to a primary model of the Kondratieff cycle the assumption of discontinuity of technical opportunities would have to be closely scrutinized in the light of historical evidence.

The queries raised above should not be interpreted as denying the importance of entrepreneurial genius or the jerky character of economic evolution. They stem from a critical consideration of one point only, the association between distribution of entrepreneurial ability and cyclical fluctuations in the rate of innovation, an association that appears crucial in Professor Schumpeter's business-cycle theory. Nor need it be emphasized that the discussion above applies exclusively to the first approximation, the primary model, and neglects completely the secondary factors. It is the former that Professor Schumpeter stresses as providing the fundamental explanation of business cycles, and it is the former that contains his specific contribution. The term "secondary factors" subsumes the variety of forces treated in many other business-cycle theories, and there is a tendency in Professor Schumpeter's treatise to slight them, considering them at best as influences inferior to the factors cited in the first approximation.

We may pass now to a consideration of the four-phase model of a cycle conceived in terms of departures from an equilibrium line, and the bearing of this model upon statistical analysis of time series. The procedure

preferred by Professor Schumpeter involves establishing points of inflection, first in the original series, then in the line that passes through the first series of inflection points and so on, successively decomposing the total series into several cyclical lines. Professor Schumpeter himself recognizes the difficulties involved in the application of this procedure (see page 211, vol. I). There is first the delicate problem of smoothing the series so as to eliminate the effect of erratic fluctuations on the second order differences used to establish inflection points. A more serious difficulty arises because the assumption that the inflection points are in the neighborhood of equilibrium levels implies a specific pattern of cyclical movements; and there is no ground for expecting cyclical fluctuations in actual series to conform to this pattern.

For these reasons Professor Schumpeter does not recommend the method for general application and recognizes it only as a first approximation and a far from infallible guide. He presents applications of this method in his book to just two series: one used for purely illustrative purposes in chapter 5, a monthly series on revenue freight loadings from 1918-1930 (Chart III, page 218) and the other used for analytical purposes in chapter 8 (Chart IX, page 469), an annual series of wholesale prices in the United States from 1790 to 1930. For the rest, statistical analysis is confined to a graphic portrayal of the series, sometimes reduced to successive rates of percentage change, sometimes smoothed by a simple moving average, and in one case with a fitted trend curve and fitted cycles. The preponderant number of series are, however, left in their original form and the statistical analysis for almost all of them is in the form of qualitative statements of quantitative import, based upon observation of the charts.

The difficulties encountered in the matter of inflection points and the paucity of formal statistical analysis in the treatise lead to a doubt whether Professor Schumpeter's concept of equilibrium and of the four-phase model of business cycles are such as to permit of application to statistical analysis. This doubt is strengthened when it is considered that the concept calls for segregating movements of the equilibrium line caused by external factors and growth from movements caused by innovations. Hence the usual lines of secular trend, drawn so as to bisect the area of cyclical fluctuations, are not acceptable from the viewpoint of Professor Schumpeter's theoretical model. This model requires, as I see it, that the line underlying any given cycle should express at any given time only the level that can be maintained by the activity of the inert adaptive character not properly dignified by the term entrepreneurial. To segregate this level from the slant given to the line by the cumulation of innovations is indeed difficult.

By refusing to deal with secular trend lines based upon formal characteristics (irreversibility, smoothness, etc.) Professor Schumpeter sacrifices the possibility of basing the distinction between long-term movements and

cyclical variations upon observable criteria. By refusing to accept peaks and troughs as guides in the determination of cycles he scorns the help provided by that statistical characteristic of cycles in time series. One cannot well escape the impression that Professor Schumpeter's theoretical model in its present state cannot be linked directly and clearly with statistically observed realities; that the extreme paucity of statistical analysis in the treatise is an inevitable result of the type of theoretical model adopted; and that the great reliance upon historical outlines and qualitative discussion is a consequence of the difficulty of devising statistical procedures that would correspond to the theoretical model.

The validity of the three-cycle schema, the last topic under discussion, hinges largely on the nature of the historical evidence and qualitative analysis. As already indicated, Professor Schumpeter does not claim for the Kondratieff-Juglar-Kitchin combination any necessary connection with his theoretical model. But he does present it as a schema called for by historical reality, as a classification fully justified by the way it describes successive business cycles since the last quarter of the eighteenth century in the three countries under observation. Yet, in spite of numerous references to this classification in the historical outlines, in spite of the determinate way in which its validity is claimed in the treatise, there remain serious doubts that such validity has been demonstrated or could be demonstrated with the type of materials and analysis employed by Professor Schumpeter.

The cycle is essentially a quantitative concept. All its characteristics such as duration, amplitude, phases, etc., can be conceived only as measurable aspects, and can be properly measured only with the help of quantitative data. Furthermore, the distinction between cycles and irregular movements traceable to external factors can be made at all adequately only if the successive cycles are measured and averages are struck in which the influence of external factors can be reduced, if not eliminated. This does not mean that observation of cycles on the basis of qualitative information is neither possible nor valuable. For whatever quantities reflect cyclical changes, these changes result from discrete acts by individuals or non-personal units in the social system. Some of these discrete acts may be recorded singly and separately in historical records; of others a crude count or impression can be derived from contemporary qualitative reports. The study of such qualitative data in conjunction with statistics is indispensable for a close analysis of the latter. And the former without the assistance of the latter can often give a crude idea of the succession of cyclical phases and of very striking differences in amplitude between one cycle and another. But it is difficult to see how qualitative records can yield much beyond a suggestion of dates of peaks and troughs of a single type of cycle; how

one could, on the basis of historical records alone, distinguish the dating and phases of several concurrently existing cycle types.

The question raised bears most upon the establishment of the Kondratieff cycles. To establish the existence of cycles of a given type requires first a demonstration that fluctuations of that approximate duration recur, with fair simultaneity, in the movements of various significant aspects of economic life (production and employment in various industries, prices of various groups of goods, interest rates, volumes of trade, flow of credit, etc.); and second, an indication of what external factors or peculiarities of the economic system proper account for such recurrent fluctuations. Unless the former basis is laid, the cycle type distinguished cannot be accepted as affecting economic life at large—it may be specific to a limited part of the country's economic system. Unless the second, theoretical, basis is established there is no link that connects findings relating to empirical observations of a given type of cycles in a given country over a given period of time with the broader realm of already established knowledge.

Neither of these bases has ever been satisfactorily laid for the Kondratieff cycles. Kondratieff's own statistical analysis refers largely to price indexes, interest rates, or volumes of activity in current prices—series necessarily dominated by the price peaks of the Napoleonic wars, of the 1870's (not unconnected with the Civil War in this country), and of the World War. The prevalence of such fifty-year cycles in volumes of production, either total or for important branches of activity, in employment, in physical volume of trade, has not been demonstrated; nor has the presumed existence of these cycles been reconciled with those of a duration from 18 to 25 years established for a number of production series in this and other countries. Nor has a satisfactory theory been advanced as to why these 50-year swings should recur: the explanations tend to emphasize external factors (inventions, wars, etc.) without demonstrating their cyclical character in their tendency to recur as a result of an underlying mechanism or as effects of another group of external factors of proven "cyclicity."

These doubts as to the validity of the Kondratieff cycles are not dispelled by the evidence Professor Schumpeter submits. The part of his discussion that deals with qualitative, historical evidence leaves unanswered two crucial questions. The first refers to the particular aspect of activity that is considered as revealing the Kondratieff cycles and is thus observed to establish the dates. Such observation obviously cannot relate to economic activity at large, for qualitative data on the course of general economic activity necessarily deal with short-term changes and would not serve to differentiate the underlying Kondratieffs from the much more clearly marked shorter cyclical swings. One must, therefore, in order to set the dates of Kondratieffs, choose some activity particularly sensitive to these long swings.

The natural choice would be the economic innovations whose introduction forms the substance of Kondratieff prosperities. But as Professor Schumpeter observes, such innovations usually make their appearance before the Kondratieff that is associated with them. Thus steam railroads began to be constructed before the railroadization Kondratieff (*i.e.*, before 1843); and electricity was well known before the Kondratieff associated with it began in 1898. One then tends to infer that a Kondratieff begins when the underlying major innovation is being introduced on a large scale and at a rapid rate. But does this mean that the prosperity of a Kondratieff is the period at which the introduction of the innovation displays the maximum absolute or percentage rate of increase?³ One searches in vain for a definite formulation of the criterion by which historical evidence is analyzed to distinguish the Kondratieff cycles from the Juglars and used to establish for the former the terminal dates and also those of the four phases.

The second question raised by the discussion of the Kondratieffs in the light of historical evidence refers to the treatment of "accidental" external factors and of transient secondary influences. As Professor Schumpeter himself recognizes, any given cyclical turn, in any observable type of cycle, can be attributed to one or several specific historical events, *i.e.*, to some transient accidental circumstances in the neighborhood of the turn. And yet it should be possible in the analysis to distinguish between these accidental concomitants and the underlying cyclical swings. As already indicated, this segregation is accomplished in statistical analysis by averaging or similar devices. In the treatment of qualitative, historical evidence the task is more difficult. It might be facilitated by a classification of various types of factors that would distinguish in advance cyclical factors from others; but even then the concurrence in historical reality of accidental and cyclical factors might necessitate what is essentially a quantitative analysis. It is not clear how Professor Schumpeter deals with the problem. In some cases he recognizes an "accidental" disturbance that produces what appears to be a cyclical turn, but does not disregard this turn as conforming with his schema. In other cases he attributes the departure of reality from the hypothesis to accidental historical conditions (notably in explaining why prices continued to decline in the United States after 1842 when there was supposedly a Kondratieff prosperity). The opportunity in such treatment for personal judgment is perhaps inevitable in the use of qualitative data; but the unfortunate consequences for the effort to establish the validity of the Kondratieff cycles and their dates are not diminished thereby.

As to the statistical basis for the recognition of Kondratieff cycles, Professor Schumpeter's approach, for reasons already indicated, can yield little

³ This criterion would not fit experience in the United States, since the percentage rate of growth in the additions to railroad mileage was at its maximum before 1842; and the absolute rate of addition was at its maximum long after 1860.

of value. The failure to follow articulate methods of time series analysis reduces the statistical methods to a mere recording of impressions of charts, impressions with which it is often difficult to agree. To quote but two instances. (1) In Charts XII and XIII (pp. 486 and 487) Professor Schumpeter presents data on pig iron consumption (annual) for the United States, the United Kingdom and Germany for the period roughly from 1857 to 1913; and comments that the lines reflect "all three cycles . . . very well" (p. 485). But I, for one, cannot detect any traces of Kondratieffs in the lines either for Germany or for the United Kingdom; and would record two long cycles in the American series, one from 1857 to 1875 and the other from 1875 to 1895, rather than a single Kondratieff swing. (2) Chart XLII presents a monthly index of industrial production for the United States from 1897 to 1935. Professor Schumpeter then comments that the movement during 1898-1912 shows a rate of increase lower than that from 1922 to 1929; and this is cited to support the existence of a Kondratieff prosperity (1898-1912), as contrasted with a subsequent Kondratieff recession that is assumed to terminate in 1925.⁴ But a glance at the chart suggests to me that the line from 1898 to 1912 is appreciably steeper than the line that would characterize the post-war decade; and that any higher rate that might be shown by a line drawn from 1922 to 1929 would be due exclusively to the position of the terminal years in the shorter-term cycles. Whichever of these judgments of the charts is correct, the ease of disagreement, of which there are many other instances, is an eloquent testimony to the insufficiency of the crude statistical procedures followed in the treatise to provide a basis for establishing cycle types of so elusive a character as the Kondratieffs.

The Kitchins are too short and perhaps too mild to be discernible with the available qualitative historical evidence, especially for the years before 1919. Hence the distinction between the Juglars and the Kitchins is based in the treatise largely upon statistical evidence, *i.e.*, again largely upon the impression conveyed by the charts. The series used for the pre-war years are almost exclusively annual, and the comments refer to the existence of the Kitchins rather than to their dates. Only for the years since 1919 do the plenitude of quantitative and detailed data and the emphasis that Professor Schumpeter places upon a thorough discussion of changes during these recent two decades, lead him to date the Kitchins and use them together with the Kondratieffs and Juglars to explain the successive economic conjunctures in the three countries under his observation.

The evidence brought together in the two volumes, and still more other available measures of cyclical behavior, suggest with some plausibility the

⁴To be sure, Professor Schumpeter deprecates the significance of this chart as evidence of Kondratieff phases; but the statistical evidence that he submits for Kondratieffs consists essentially of similar items, each of them qualified.

desirability of distinguishing more than one type of cycle, or recognizing in addition to the shortest unit of cyclical swing observable in the economic system others appreciably longer. But whether the distinction should be drawn in the specific form suggested by Professor Schumpeter is still an unanswered question. Annual series provide too crude a guide for establishing cycles as short as the Kitchins. A mere observation of "notches" on the surface of Juglars, or even of prominent short-term oscillations would not suffice: either result could be produced by random variations, and these short-term variations would have to be analyzed to demonstrate that they could not be due to mere chance. Hence only monthly series could be used as statistical evidence of Kitchins. But the series presented in the treatise cover too short a period to provide sufficient basis for the generalization that Kitchins existed in the past.⁵ And no direct evidence seems to be presented to confirm the generalization so explicitly made that it is possible to count three Kitchins for every Juglar.

The critical evaluation above of what appear to be important elements in Professor Schumpeter's conclusions, viewed as a systematic and tested exposition of business cycles, yields disturbingly destructive results. The association between the distribution of entrepreneurial ability and the cyclical character of economic activity needs further proof. The theoretical model of the four-phase cycle about the equilibrium level does not yield a serviceable statistical approach. The three-cycle schema and the rather rigid relationship claimed to have been established among the three groups of cycles cannot be considered, on the basis of the evidence submitted, even tolerably valid; nor could such validity be established without a serviceable statistical procedure. The core of the difficulty seems to lie in the failure to forge the necessary links between the primary factors and concepts (entrepreneur, innovation, equilibrium line) and the observable cyclical fluctuations in economic activity.

And yet this evaluation does injustice to the treatise, for it stresses the weaknesses of the discussion and overlooks almost completely its strength. Granted that the book does not present a fully articulated and tested business-cycle theory; that it does not actually demonstrate the intimate connection between economic evolution and business cycles; that no proper link is established between the theoretical model and statistical procedure; that historical evidence is not used in a fashion that limits the area of personal judgment; or that the validity of three types of cycles is not estab-

⁵ It is also to be noted that for recent years economic conditions in this country dominated those of Europe to an extent much greater than before the war. It is also in this country that the cycle in general business conditions was observed to be shorter than in England or Germany. Hence an analysis, confined to only the recent decades, would run the danger of ignoring the possible absence of Kitchins in England and Germany during the nineteenth century.

lished. Yet it is a cardinal merit of the treatise that it raises all these questions; that it emphasizes the importance of relating the study of business cycles to a study of the underlying long-term movements; that it calls for emphasis on the factors that determine the rate and tempo of entrepreneurial activity; that it demands a statistical procedure based upon a clearly formulated concept of the business cycle; and that it valiantly attempts to use historical evidence. In all these respects the volumes offer favorable contrast with many a book published in recent years on business cycles, whether of the type in which abstract reasoning is unsullied by contact with observable reality or of the opposite category in which mechanical dissection of statistical series is the sum total of the author's achievement.

Furthermore, both the summary and the critical discussion above necessarily fail to show the achievements of the treatise in providing illuminating interpretations of historical developments; incisive comments on the analysis of cyclical fluctuations in various aspects of economic activity; revealing references to an extraordinarily wide variety of publications in directly and indirectly related fields; thought-provoking judgments concerning the general course of capitalist evolution. It is difficult to convey the flavor of the book except by saying that in many of its parts it reads like an intellectual diary, a record of Professor Schumpeter's journey through the realm of business cycles and capitalist evolution, a journal of his encounters there with numerous hypotheses, diverse historical facts, and statistical experiments. And Professor Schumpeter is a widely experienced traveller, whose comments reveal insight combined with a sense of reality; of wide background against which to judge the intellectual constructs of men and the vagaries of a changing social order.

Thus, whatever the shortcomings of the book as an exposition of a systematic and tested theory of business cycles, these shortcomings are relative to a lofty conception of the requirements such theory should meet. It is the cognizance of these requirements that makes the book valuable even to one who may not be interested in the author's comments on the various and sundry historical, statistical and theoretical matters. But these comments are of high suggestive value and should, if given circulation, prove effective stimuli for further theoretical, historical and statistical study of business cycles and economic evolution. It is my sincere hope that Professor Schumpeter's labor embodied in the treatise will be repaid by an extensive utilization of it by students in the field, aware though they may be of the tentative character of his conclusions and of the personal element in some of his comments and evaluations.

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