Hicks and the Real Cycle

The theory of business cycles has been in a peculiarly unsettled position since Keynes' *General Theory* first appeared. The older students of the subject were, as a rule, concerned with the fluctuations in business activity at large—not with the movements of a particular economic factor such as production, employment, prices, or incomes. Keynes shifted the emphasis violently in two directions. First, he made the level of employment his major interest. Second, he concentrated on the factors that tend to make this level at one time higher or lower than at another. Thus the fundamental unit of analysis became the 'volume of employment at any time' rather than 'the business cycle.' This shift of emphasis was well suited to the thirties, when unemployment overshadowed every other economic and political problem. Before long Keynes' theory was eagerly embraced and ingeniously simplified. Not only business cycle theory but the theory of value itself fell for a time by the wayside. For if Keynes was able to explain what determines the volume of employment without troubling much about the cost-price structure, some of his followers could do so without troubling about it at all.

But economic life does not stand still, and every change in its underlying conditions sooner or later stimulates fresh economic thinking. Under the impact of war and inflation during the forties, theoretical interest in the behavior of prices, production, efficiency, and the business cycle has slowly reemerged. Hicks' recent book on the 'trade cycle' is a significant expression of renewed concern with the cycle, in contrast to the level of employment.[1] A fundamental task of modern economics, as Hicks sees it, is to pass from the Keynesian theory of employment to a theory of business cycles. And that is what he has set out to do. "It is . . . a mistake," he tells us, "to begin one's investigation with a definition of the kind of fluctuation which one is going to regard as basic—deciding whether one is going to regard the cycle as being fundamentally a fluctuation in employment, or output, or prices, or interest rates, or money supplies. It is better to allow the definition to emerge as the theory develops" (p. 2). This suggests that the interdependence of the money supply, costs, prices, profits, income disburse-

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[1] J. R. Hicks, *A Contribution to the Theory of the Trade Cycle* (Oxford: Clarendon Press, 1950).

ments, consumer spending, investment, employment, and other economic factors will be fully displayed in unfolding the drama of the cycle. And if this suggestion carries a promise of useful achievement, so too does Hicks' awareness of the hard road that must be traveled in building knowledge. For while he believes he has found the "main part of the answer" to the puzzle of business cycles, he candidly describes his work as "little more than an untested hypothesis" which will need to be tested "against the facts" before it can be accepted as a basis for prescriptions of policy (p. v).

I

The literature on business cycles is rich in formal models. That is hardly surprising in view of the widespread tendency to theorize about the cycle with little regard for the facts of experience. Any competent logician, especially if he has the command of mathematics, can select a set of simplified conditions and deduce a cyclical path from what he has assumed. Hicks recognizes that such a theory cannot be a "true theory" unless one can show that the causes it isolates "are actually those which are the most important in practice" (p. 83). His objective is not a formal model of the cycle but one that will enable us to make sense of our concrete experiences. Hence, as he puts it, "it is . . . wise to begin by attempting to explain what has been experienced; anything else must be a matter of prophecy, or at any rate, extrapolation" (p. 8).

But what precisely *are* the business cycles of experience in which Hicks' interest centers? And to what features or aspects of that experience is his explanation directed? Early in his book (p. 2) he notes that "the economic history of the last 150 years organizes itself . . . easily into a series of 7- to 10-year cycles." On page 57 he states that a 3 per cent annual "trend rate of growth . . . seems to have been characteristic of the nineteenth century." On page 89 he suggests that a perfectly uniform cycle superimposed on an exponential trend "is extraordinarily like the cyclical oscillation for which we are looking"—that is, like the cycle "we find in reality" during the past "two centuries." On page 2 he records that business cycles "differ among themselves quite considerably; but there can surely be no doubt of their family likeness." On pages 108-109, on the other hand, he remarks that "certainly the cycles of reality do not repeat each other; they have, at the most, a family likeness." On page 3 he speaks of the "underlying repetitiveness" of the business cycle; and on page 123 he suggests that the cycle is marked

by a "fundamental regularity" on which "superficial irregularities" are "superimposed."

These remarks, and others like them, fail to convey a clear idea of the economic nature or the historical range or the geographic scope of the actual phenomenon or phenomena that Hicks is trying to explain. Nor is it possible to infer with complete confidence the temporal or spatial boundaries of the alleged cycles from the institutions analyzed by Hicks, since his theory moves on an extremely abstract level. Hicks treats the real output of any period as uniquely determined, except for a portion constituting "autonomous investment," by the outputs of past periods. This, in a sentence, is the essence of his theory of output; and his theory of the business cycle is simply a theory of the cycle in output, despite the wider scope suggested by the passage I have previously quoted. Now a fixed link between past and current outputs, if it exists at all, is no more a property of the economy of modern England than of the economy of the modern Ukraine (or, for that matter, the economy of Adam and Eve after they had strayed from virtue), and it is not entirely clear that Hicks would be averse to lumping them. To justify his assumption of a closed economy, he observes that "after all, the world as a whole is a closed economy; and the processes which the real theory studies are not made different in character by the fact that they extend across national frontiers" (p. 155). But if Hicks' theoretical arm really aims to stretch across the world, I am not at all sure, judging from some long-range production indexes I have seen, whether it could reach any actual cycle in world output. One need not go back very far to find agriculture dominant in the world economy and its fluctuations in different areas offsetting one another in the earthly aggregate. Such offsetting is considerable even in industrial output and down to the current day; though I have no doubt that an occasional catastrophe, like that of the 1930's, leaves its imprint on world output.

My main purpose in making these realistic observations is to bring out the abstract character and limited objective of Hicks' inquiry. Unless that is understood, a fair appraisal of his work is impossible. It is no part of Hicks' problem whether business cycles are five or ten or twenty years long, whether the amplitude of the cycles is large or small, whether the cycles are of national or international scope, whether they extend over all or only a few of the economic activities of a nation. We should not expect him to explain why business cycles in the United States have been shorter than in England or more violent than in Germany, or why the

United States and England experienced a cyclical downswing in 1920-1921 and 1937-1938 while Germany did not, or why the amplitude of a cyclical expansion in aggregate activity is rather closely correlated with the amplitude of the preceding but not of the following contraction, or why stock financing usually moves with the cycle in aggregate activity while bond financing moves contracyclically, or why the ratio of the change in inventory investment to the change in gross investment during a cyclical phase tends to vary inversely with the length of the phase—or to explain any of a hundred other features of the business cycles of experience. The essential object of Hicks' inquiry is the cycle in output rather than the cycle in business activity as a whole; and this object is sufficiently defined for his purpose by the generally familiar facts that the aggregate production of industrialized nations has fluctuated along a rising trend and that these fluctuations do not look at all like random movements.

To explain the fluctuations in real output (or income), Hicks makes effective use of the principles of the 'multiplier' and the 'accelerator,' as these terms have come to be used in recent literature. The 'multiplier mechanism' shapes the movements of consumption in his model, while the 'accelerator' shapes the movements of investment—except for a certain autonomous part. Hence "the theory of the multiplier and the theory of the accelerator are the two sides of the theory of fluctuations, just as the theory of demand and the theory of supply are the two sides of the theory of value" (p. 38). As these remarks may suggest, Hicks' theory has severe modern lines, runs in terms of very broad aggregates, stresses technical connections between them, and reaches its goal with only incidental reference to costs, prices, profits, or human motivation. To evaluate Hicks' ingenious theoretical construction, it is necessary to examine with some care its two main pillars—the theory of the multiplier and the acceleration principle.

II

The theory of the multiplier goes back to Kahn and Keynes. In earlier economic literature, we do not find any explicit 'consumption function,' or a 'marginal propensity to consume' of less than unity, or an 'investment multiplier' in the guise of a reciprocal of 'the marginal propensity to save.' All these are innovations of modern theory, principally associated with the name of Keynes. The older economists were, of course, more or less aware of the

processes which the theory of the multiplier condenses into a formula. They realized that an increase in investment would tend to increase the flow of incomes, that the spending of all or a part of the newly received income by the public would tend to generate new income, and that investment therefore has a multiplier effect on consumption and national income. They did not, however, attach mechanically the dollars spent on 'consumption' to the prior receipt of income any more than they attached the dollars spent on 'investment' to any category of prior receipts. They did not think of the multiplier as a determinate number which summed up the effects of successive respendings of income, or which defined a new equilibrium via a change in investment. Confronted with the modern theory, they would have acknowledged the processes telescoped in the multiplier, though they would have expressed skepticism concerning the stability of the consumption function and concerning a marginal propensity to consume that is always less than unity. This, in any case—and here I can be definite—was the position of Mitchell and Schumpeter. Nor do I suppose that Keynes would have seriously disagreed with them in the precise context of the theory of the cycle rather than of the general level of employment. It is well to recall that in his famous letter to Elizabeth Gilboy he explained that the assumption of a marginal propensity to consume of less than unity was not a necessary premise of his theory of employment; for, if the assumption were not valid, it would merely follow that the economic system is inherently unstable.[2] And, of course, Keynes explained in *The General Theory* that consumption was a function of several variables beside income (Chap. VIII), and actually developed some reasons (Chap. XXII, "Notes on the Trade Cycle") why the propensity to consume out of a given income would shift in the course of a business cycle.

But the most striking and novel part of Keynes' work was the formal theory of underemployment equilibrium, and here he permitted himself to treat consumption as a numerically unique and invariant implicate of income. It was, of course, this feature of Keynes' work that caught the fancy of economists. For, if the step was legitimate, economics was on the threshold of becoming an engineering science. In the years immediately following publication of *The General Theory* the belief was widely held that, once the desired level of income or employment was specified, the economist could tell to a good approximation what amount of invest-

[2] *Quarterly Journal of Economics*, Vol. LIII (August 1939), p. 634.

ment—or of some practical equivalent—would bring that income or employment into being. But, if the economist was to function as an engineer, he needed good empirical estimates of the consumption function. Thus under Keynes' influence extensive research on the relation between consumer spending and national income got under way. At first the results looked very promising, for the correlation between consumption and income turned out to be remarkably high. As the research moved forward, it appeared however that the computed value of the marginal propensity to consume was sensitive to comparatively slight shifts in the character of the underlying data, to slight shifts in the period covered by the statistics, and to shifts from annual data to quarterly or vice versa. Not only that, but it became increasingly plain that the critical matter for purposes of control on Keynesian lines was the savings function rather than the consumption function, and that the correlation between savings and income was decidedly lower than between consumption and income. Under the pressure of empirical studies, faith in an early engineering science of economics perceptibly weakened. Numerous investigators left Keynes' precise formulations behind them, and immersed themselves in exploring the facts of consumption and disentangling the numerous forces that influence the spending of consumers and the saving of individuals and business firms.

But, while many took the path of empirical inquiry, others devoted themselves to refining Keynes' consumption function and elaborating its theoretical implications. Hicks' contribution clearly belongs in this compartment. His consumption function links consumption exclusively to aggregate income as does Keynes', but the relation is not the same. Keynes' consumption and income are expressed in a wage unit, while Hicks' are expressed in an output unit. Keynes' income is gross of depreciation allowances, while Hicks' is net. Keynes' income is current income, while Hicks' is a set of past and current incomes. The first of Hicks' modifications is capable of leading to analysis of productivity as well as employment changes, and Hicks rightly attaches importance to this. The second modification seems less fortunate from the viewpoint of realistic analysis; for in the Keynesian version a change in gross investment will tend to generate a change in consumption and net income even if net investment is constant, while this cannot happen in Hicks' version. However, both the one modification and the other have merely formal consequences within the range of Hicks' inquiry. What does make a substantial difference is the

consumption lag. At this point Hicks' work links up with the empirical branch of post-Keynesian investigation—as represented, for example, by the researches of Ezekiel, Duesenberry, Modigliani, and Ruth Mack, who have stressed the influence of past income on current consumption.[3] It appears, therefore, that there is good empirical justification for Hicks' twist to the consumption function; and it also opens the road to process analysis—a road that every student of business cycles must sooner or later follow.

To show how the 'multiplier mechanism' shapes the movements of consumption, it is necessary to have in mind some rule about investment. Hicks explores whole families of such rules. Thus he allows investment to shift from one steady level to another, and shows how—under various assumptions about the consumption lag—consumption and income will adjust to the investment path. Consider the following elementary case. Consumption in any 'period' is, say, nine-tenths of the income (or output) of the preceding period; in period 0 current output is in 'equilibrium' with investment at 5 and consumption at 45; then, for some reason, investment in period 1 shifts to 10, and this level of investment is maintained in later periods. It follows, as a matter of arithmetic, that consumption in periods 1, 2, 3, etc., will be 45, 49.5, 53.55, etc., converging to a value of 90; that the corresponding series for output will be 55, 59.5, 63.55, etc., converging to a value of 100; that the increase in consumption ultimately becomes 45, or nine times as much as the increase of investment, while the increase in output ultimately becomes 50, or ten times as much as the increase of investment. This, or course, is the Kahn theory of the multiplier; but Hicks generalizes it to cover consumption lags of any degree of complexity. Besides, he shows with exemplary skill how consumption and income will respond when investment follows a more complicated path—as when it expands progressively, contracts progressively, or undergoes periodic fluctuations. The result is a very elegant generalization of the multiplier theory.

Hicks' lucid prose enables even the nonmathematical reader to see that, as he moves from one situation to the next, the multiplier

[3] M. Ezekiel, "Statistical Investigations of Saving, Consumption, and Investment," *American Economic Review*, Vol. XXXII (March 1942); F. Modigliani, "Fluctuations in the Savings-Income Ratio," in Vol. XI of *Studies in Income and Wealth* by the Conference on Research in Income and Wealth (National Bureau of Economic Research, 1949); Ruth Mack, "The Direction of Change in Income and the Consumption Function," *Review of Economics and Statistics*, Vol. XXX (November 1948); J. S. Duesenberry, *Income, Saving and the Theory of Consumer Behavior* (Harvard University Press, 1949).

mechanism keeps ticking away without pause or misadventure. It always includes two 'parts'—a rigid consumption function, some rule about investment, and nothing else. It is well to stop and examine each part because in Hicks' theory the multiplier mechanism is not a mere tool of analysis but the whole—or at least the preponderant part—of what needs to be understood about the economics of consumption in the cycle of experience. With respect to the first part of the mechanism, it may be asked what basis Hicks has for treating consumer spending as if it were a purely passive response to past and current income. Is it proper, to be more specific, to ignore the influence of changes in income distribution on consumer spending? Hicks disposes of this question by remarking (p. 36) that his consumption lag already allows for a changing income distribution, but he does not supply any reasons to bolster the naked assertion. Again, is it proper to ignore the vicissitudes of corporate and other nonpersonal saving in formulating the relation of consumer spending to total national income? Hicks apparently feels that the consumption lag also disposes in principle of this complication, the reason being that "undistributed profits are in principle temporary" (p. 22). Surely, when he writes in this vein, Hicks cannot be thinking of the financial processes whereby small firms in this country or England have grown large. And what of the other factors that have been troubling empirical investigators of the consumption function? How and in what degree is consumption influenced by movements of the price level? by changes in relative prices? by capital gains or losses? by the stock of liquid assets or other accumulation from past effort? by the terms on which consumer credit is extended? by expectations concerning income or price changes in the near future? by the rate at which new families are being formed and other demographic variables? If national output equals the sum of consumption and investment, are government expenditures on currently produced commodities and services to be split in some fashion between consumption and investment? If so, is consumption still to be expressed as a simple function of past and current income? Hicks does not comment on these issues. I assume his position is that, while they may need to be considered in examining long periods, they can be safely ignored over the period of a business cycle. But, if that were the case, one should be able to make a good short-run forecast of savings from a consumption function of Hicks' type. To my knowledge the statistical literature on the consumption function, which already includes some experiments

on Hicks' lines, does not justify a strong faith in that possibility.[4] I find it difficult to suppress the feeling that Hicks' theory of consumption is quite inadequate and that this part of his multiplier mechanism limps as a consequence.

But what of the second part of the mechanism? This, it will be recalled, is the rule about investment; and here the basic question is what economic forces can be relied on to maintain any particular rule and how they do so. Surely, some theory of production is implicit in the multiplier mechanism, but Hicks does not tell what it might be. To go back to our preceding illustration, what are the economic incentives or pressures that will keep real investment at the assumed figure of 10? Or, to put the same question another way, how is it possible for real output to exceed real consumption, period after period, by the exact figure of 10? It seems clear that the multiplier theory requires that an increase or decrease in demand during any period be precisely matched by an adjustment of supply; but how is this adjustment achieved? Are we to assume that every firm has a perfectly elastic supply schedule until the 'ceiling' to output is reached? That monopoly is absent or that its presence can make no difference to the process of adjusting supply to demand? That no businessman ever makes a mistake or that errors and other obstacles to proper adjustment cancel out? Until the theory of production secreted in the multiplier mechanism is made explicit, there is bound to be a lingering suspicion that the mechanism is merely a stimulating suggestion of how the arithmetic of certain economic quantities may work out. Unless I have missed something vital in Hicks' theory of the multiplier, that is the point at which he leaves it. To be sure, in his model of the cycle the rule about investment flows from a theory of investment process; but, as we shall see, this theory is confined to the demand side of investment and takes for granted conditions of supply except for the recognition of a 'ceiling' to output and a 'floor' to investment.

III

The theory of the multiplier is "only a half-theory" (p. 38) in Hicks' system. The other and accented half is the acceleration

[4] A careful statistical analysis of how well various consumption and savings functions have fared as forecasting devices has been made by Robert E. Ferber, "A Study in Aggregate Consumption Functions" (unpublished University of Chicago dissertation, 1951). [A revised version was published by the National Bureau as *Technical Paper 8*, 1953.]

principle. So strong is this emphasis that at times the multiplier seems to fade out. For example, we read that "the multiplier theory does in itself offer no shadow of an explanation why fluctuations occur" (p. 31)—which is true only if we treat consumption as a rigid function of income and interpret fluctuations to mean reversals in direction. Again, we read that, when "the multiplier mechanism . . . is analyzed completely," it "proves . . . to be a stabilizing influence; its general tendency is to diminish the propensity to fluctuate" (p. 37). This suggests that, if consumption were entirely independent of income, the economy would undergo larger absolute fluctuations than it does in fact; but Hicks cannot mean that. Probably all that he wishes to convey is, first, that the rise or fall in consumption resulting from the multiplier mechanism is not so large in the presence of a consumption lag as it would be in its absence; second, that "the fluctuations in consumption . . . can at the most only reflect *initiating* fluctuations in investment" (p. 37; my italics). But how do the fluctuations in investment arise? Hicks' answer is that they are in part autonomous but primarily a response to the rate of change in total output. Hence the big half of the theory of the cycle is the acceleration principle.

It is necessary to pin down the meaning of the acceleration principle, for shades of difference in its interpretation can make a good deal of difference in one's judgment of what the principle contributes to the explanation of business cycles. Everyone appreciates that, if the output of a firm grows substantially, it may find that its 'fixed plant' is cramped and that beyond a certain point production cannot increase at all unless the plant is expanded. It is equally clear that, if production is sharply reduced on account of a drop in sales, the firm will have 'surplus capacity' on its hands and there will be no immediate technical reason for adding to its plant. If the acceleration principle meant no more than this, there would be no reason to doubt its validity. Everyone could agree that it has some bearing on investment and that no explanation of the cycle which ignored it could possibly be complete.

Doubt enters the moment the acceleration principle becomes more imperial than this, and there has been a certain tendency on the part of economic theorists to make it both imperial and mechanical by postulating a fixed ratio between the stock of real capital and current real output. On this interpretation the curve of net investment[5] becomes, except for a multiplicative factor ('the investment coefficient') and a possible lag, a replica of the curve

[5] I assume here, for simplicity, that replacement equals depreciation.

of the rate of change in output. Thus put, the acceleration principle is still capable of interpreting broad secular changes in real investment, especially when industrial techniques change slightly and gradually. For while the durability of capital goods—such as factories, office buildings, machinery, and other equipment—may make their stock inelastic on the side of decrease, and the heavy cost of additions may make the stock inelastic on the side of increase, these are limitations of the short run. Let enough time pass and a plant that is poorly adapted to the average run of output will shrink or grow; so that, in the absence of a great change in technology, the stock of capital will tend to correspond, more or less, to the *trend* of output.

The question from the viewpoint of the business cycle is whether the adjustment of capital to output can be at all effective in the short run. Here we bump on two critical facts. First, the rate of utilization of industrial capacity, and therefore the extent of surplus capacity, is itself a cyclical phenomenon. Second, cyclical expansions or contractions in over-all economic activity rarely last longer than two or three years. Over periods of this brief duration an improvement in the ratio of output to 'capacity' cannot well come from a diminution of capital; it must come principally from an increase of output. New additions to effective capacity do not cease when a cyclical expansion of output stops. On the contrary, they are apt to continue increasing, since some time must elapse before investment expenditures materialize in installations. To be sure, the existing stock of capital deteriorates through use and obsolescence, but this is a slow process and not one to be counted on to offset the new installations. As an empirical matter, we know that the stock of capital in the United States, if not also in other countries, has as a rule continued to grow even in periods of depression. It would seem, therefore, that a theory which presupposes a fixed ratio of net investment in fixed capital to the rate of change in output—whether as an approximation to industrial fact or to entrepreneurial design—may well miss the forces that, over the short run, dominate such investment.

Hicks is aware of this difficulty, and he attempts to meet it by immobilizing the acceleration principle over a part of the cycle. He not only recognizes, but formally incorporates into the structure of his model "the fact that falls in output cannot induce disinvestment in the same way as rises in output induce investment" (p. 83); that is, if output shrinks, gross investment in fixed capital can at the most fall to zero, and while net investment may become

negative, it can do so only to the extent of the depreciation charges. Hence, except for inventories, Hicks restricts the acceleration principle to a stretch of the cycle—the latter stages of expansion and the beginning of contraction. Over this part of the cycle the accelerator is assumed to work on the plan made familiar by the mathematical theorists; but even here Hicks attends explicitly to the factor of time. His position is that, if output increases, "investment will not take place all at once—it will be spread over a certain length of time, partly because businessmen will not react at once to the need for new capital goods, partly because the process of making the new capital goods itself takes time" (p. 40). Suppose that output moves from 100 in period 0 to 110 in period 1 and that this development occurs at a time when the capital of the economy is not "in excess of requirements" (p. 105). The increase in output will then induce new investment of $10x$, where x is the investment coefficient. This investment will not be made in period 1; it will come in period 2, or perhaps in 3, or perhaps partly in 2 and partly in 3, or in some other period or set of periods; in other words, the investment lag may be simple or complex.[6] But, whatever the lag, Hicks assumes it to remain unchanged over intervals relevant to the cycle, just as he assumes the investment coefficient to be constant.

The economic system that emerges from Hicks' theory is therefore governed by a fixed investment function as well as by a fixed consumption function. The consumption function—and hence the multiplier—is operative throughout the cycle. The investment function—and hence the accelerator—is dormant during part of the cycle. Nevertheless, the accelerator is the chief cycle-maker in Hicks' theory. The business cycle, "regarded as a periodical fluctuation in output, can be explained," he holds, "in terms of simple reactions, by entrepreneurs and by consumers, which are not in any mysterious sense psychological, but are based upon the technical necessities of a capital-using economy" (p. 117). The general meaning of this central proposition seems unmistakable. "The technical necessities of a capital-using economy" are its need to enlarge or diminish the stock of real capital as output changes; net investment is the actual change in the stock of capital; the

[6] In Hicks' mathematical appendix current consumption depends on past outputs, not on current output; his literary exposition stresses current output as much as past outputs. In his appendix current investment depends on the change in past outputs, not on the change in current output; and (except at one point, p. 61) this is also true of his literary exposition. I therefore follow Hicks' appendix on the theory of investment and his text on the theory of consumption.

rate of change in output induces the investment or disinvestment; variations in consumption reflect the variations in investment; the "technical necessities" of the economy thus propel its movements; and the acceleration principle rationalizes the "technical necessities." In Hicks' language: "The main cause of fluctuations is to be found in the effect of changes in output (or income) on investment. There is nothing new in this contention; it is . . . nothing else but the familiar 'Acceleration Principle' which already has a long history. But it does not seem . . . that the consequences of this principle have hitherto been developed in a completely convincing manner" (p. 37).

Hicks has surely made the acceleration principle more convincing by allowing for the phenomenon of surplus capacity. This bold step in the direction of realistic cycle analysis is blunted, however, by the aggregative character of his adjustment. The change in output that counts in his theory is the change in aggregate output, regardless of the mixture of pluses and minuses in individual sectors of the economy. But since, as he has properly argued, "falls in output cannot induce disinvestment in the same way as rises in output induce investment" (p. 83), it is wrong to allow a plus to be annihilated by a minus. Imagine two industries of about the same size whose respective outputs trace out an identical cyclical path. Let A be a single-firm industry all of whose plants are geographically bunched, while B numbers a thousand scattered firms operating on competitive lines. Assume, further, that every firm adjusts its investment in plant and equipment according to the rate of change in its output as long as its stock of capital is not in "excess of requirements." If A happens to be operating at 50 per cent of capacity, no new investment need or will be undertaken. But the same figure for B is merely a statistical average derived from the percentages for a thousand firms, some of which may be as low as zero and others as high as 100. The firms that have forged ahead in the competitive struggle may be operating at or close to "full capacity," and the low industry average will be no bar to launching extensions of their individual producing capacities. Suppose that six months later the ratio of output to capacity rises from 50 to 75 per cent in both A and B. Then the number of B firms operating at or close to full capacity may well be higher and the investment undertaken in the industry larger, while investment in A continues at a standstill. It is clear, therefore, that both the timing and the volume of investment may be very different in two industries, although their ag-

gregate outputs move similarly and everyone's investment is in line with Hicks' version of the acceleration principle. It follows that the curve of "induced investment," which Hicks derives from the aggregate output of the economy, bears no determinate relation to the desired curve, which can be gotten only by going to the outputs of individual sectors.

Hicks' handling of the acceleration principle would be free from this defect if the individual outputs all moved in the same direction, or if there were full mobility of capital from one sector to another. In the latter case there would even be no need for concern over the size of the capital-output ratio. Of course, the real world is nothing like that. The ratio of capital to output is somewhat higher in agriculture than in manufacturing, is very much larger for public utilities than for manufacturing, and varies extensively over the field of manufactures. Since the distribution of investment among industries varies considerably both within a cycle and from one cycle to another, there is no empirical justification for Hicks' constant investment coefficient. Nor is there any empirical warrant for treating aggregate output as if it summarized a set of individual outputs always keeping the same direction. Even during the catastrophe of the early 1930's the outputs of a not inconsiderable number of American products increased in volume.[7] In general, the milder the cyclical phase, the more extensive is the crisscrossing of individual sectors; but, whatever the amplitude of the cycle, the crisscrossing of individual outputs is itself a cyclical phenomenon. "Whereas the proportion of expanding activities moves in the same direction as the aggregate in the early stages of a business cycle expansion or contraction, it moves in the opposite direction in later stages. The proportion of expanding activities is already declining months before aggregate activity reaches a peak, and is already rising months before the aggregate reaches its trough."[8] To reckon with these facts, Hicks would need to activate the accelerator, though in shifting degree, over the entire cycle—instead of releasing it fully over one stretch of the cycle and immobilizing it over another.

A revision of Hicks' accelerator along these lines, while it would deepen his theory of the cycle, would not necessarily change the

[7] There is an interesting tabulation of the rates of change in output of 407 commodities from 1929 to 1933 and 1933 to 1937 in Appendix E of the Temporary National Economic Committee's *The Structure of Industry*, Monograph No. 27.

[8] A. F. Burns, "New Facts on Business Cycles," *Thirtieth Annual Report of the National Bureau of Economic Research* (1950), p. 11. [The essay is reprinted above, pp. 107-134.]

broad conclusions. Under certain simple assumptions concerning the distribution of a change in aggregate output among individual sectors, it can be shown that my reformulation of Hicks' accelerator actually strengthens its cyclical power at downturns and gives it an active role even at recoveries—a stage where his accelerator is found hibernating. It might be interesting, and perhaps instructive, to develop these theoretical implications. For present purposes, however, it is more important to see that Hicks' acceleration principle, even after adjusting it to allow for declines in individual outputs, remains a rigidly technological theory of investment; and that, unless good evidence is brought in its support, it may misdirect our thinking about the short-term changes that are the essence of the business cycle. Hicks' principal justification of the acceleration principle seems to be that, unless the capital stock is expanded to accommodate an increase in output, it will be necessary to use the existing "capital equipment at more than its optimum intensity" (p. 39). Reasoning along these lines may justify faith in the acceleration principle as an explanation of long-run tendency. But the accelerator of Hicks' model is supposed to do its work in successive short periods, and I do not think it can be trusted for this purpose.

The capital goods that count in modern business—factories, power plants, shipyards, dwellings, locomotives, large machinery, and the like—ordinarily take months or years to produce. They are costly and, once acquired, may last a decade, a generation, or still longer. A decision to invest in goods of this character is much too important to be left to routine or some mechanical rule, like the rate of change in output. If an increase in output occurs, no one can be sure whether it represents a transitory or a permanent change in business conditions. No one can therefore be sure whether an addition to the capital stock is justifiable. A decision to make or not to make a new investment in capital is reached through the exercise of business judgment—that subtle and as yet little understood process whereby a businessman combines his knowledge of what seems to be the relevant past with his estimates of the present and his hopes, fears, and dreams of the future. One firm may respond to the increase in output by ordering promptly an expansion of capital facilities; another may decide to wait and see. For the time being both will have to get on with the existing plant and put up with marginal costs that may have become uncomfortably high. If the increase in output proves 'transitory,' the first firm will be saddled with the cost of maintaining an ex-

cessive plant. If the increase proves 'permanent,' the second firm will miss the opportunity of participating adequately in the advance of prosperity and will perhaps do a year or two later what, in the absence of uncertainty, it would have done sooner. But no firm is likely to deem it worth while to reappraise its capital stock in the light of every change in output. For, in the first place, the rate of change in output—whether taken by the month, or quarter, or year—moves rather erratically in practice. And, in the second place, instruments of production are divisible only to a limited degree. A ship, turbine, or locomotive, a new factory, or a wing added to an old factory can vary in size considerably; but unless each conforms to some rough standard of efficiency, it becomes a toy, not an instrument of production.

In view of the imperfect divisibility of industrial facilities and their long period of gestation, the additions to fixed capital made by the individual firm come in substantial lumps.[9] May it not be, however, that the discontinuities, deflections, and irregular lags of the individual case tend to iron out when aggregates are struck, so that aggregate investment corresponds fairly closely to the rate of change in aggregate output? In other words, may not the acceleration principle fit badly the investment behavior of individuals and yet fit neatly investment in the aggregate? This result is conceivable. But the theorists who emphasize the acceleration principle—Hicks among them—have not addressed themselves to the question of how such a result may be brought about. In any event, it seems doubtful if a question of this sort can be handled with much assurance on a speculative plane alone. The problem must be settled, if it can be settled at all, by seeing what the facts show.

This matter has received some attention from empirical investigators—notably Kuznets, Tinbergen, and Hultgren.[10] I think it is fair to say that they have not found any substantial statistical support for the acceleration principle, taken as a general theory of investment in fixed capital over the business cycle. My own statistical searchings, which have covered a fair time span and

[9] See below, Sec. v, for a further analysis of the investment process and of the limitations of the acceleration principle.

[10] Simon Kuznets, "Relation between Capital Goods and Finished Products in the Business Cycle," in *Economic Essays in Honor of Wesley Clair Mitchell* (Columbia University Press, 1935); J. Tinbergen, *Statistical Testing of Business-Cycle Theories: A Method and Its Application to Investment Activity* (Geneva: League of Nations, 1939); Thor Hultgren, *American Transportation in Prosperity and Depression* (National Bureau of Economic Research, 1948), Chap. VI.

range of industries, have led me to the conclusion that the cyclical movements of this type of investment are rather closely geared to the output of an industry but not to the rate of change in its output. None of these statistical results, however, is decisive from the viewpoint of Hicks' version of the acceleration principle. To test that version faithfully it would be necessary to convert his "period" into a unit (perhaps a changing unit) of calendrical time, to translate the unspecified structure of his investment lag into some concrete equivalent, and to delimit the historical intervals within which the acceleration principle is supposed to be active and those within which it is supposed to be dormant. These are formidable difficulties; but they are minor compared with still another hurdle that the statistician would need to overcome—namely, to separate out the "induced" part of investment from the "autonomous" part.

It will be recalled that Hicks does not attribute all investment to the rate of change in output. This distinction belongs solely to induced investment, to which autonomous investment must be added to get the whole of investment. But how is induced investment to be identified in the course of an empirical test of the acceleration principle? It would obviously not do to estimate it from the rate of change in output and to call the rest of investment "autonomous." This would be traveling in a circle. But if we start at the other end and seek to estimate autonomous investment directly, we are handicapped by the lack of a definition. Hicks' "autonomous investment is only autonomous with respect to the multiplier and accelerator mechanism" (p. 120), but this merely tells us what autonomous investment is not. His only positive identification is through the medium of illustrations: "Public investment, investment which occurs in direct response to inventions, and much of the 'long-range' investment . . . which is only expected to pay for itself over a long period, all of these can be regarded as *Autonomous Investment* for our purposes" (p. 59). This leaves us uncertain what kind or how much of the long-range investment is autonomous; whether the installation of *improved* machinery, if it happens to follow an expansion of output, belongs to the induced or autonomous category; and whether investment associated with railroading, mining coal, distributing mail, etc. is to be counted as autonomous when conducted by a public enterprise but as induced when conducted by a private enterprise. And while Hicks is to be commended for returning to realism at the close of his book, he seems to whittle his own distinction away when he

declares that "by the exercise of foresight, investment which would naturally have been of the induced type . . . can be transferred to a time at which it is more convenient" and that "by this means induced investment is, in effect, converted into autonomous investment" (p. 168).

It is precisely the element of foresight that to me seems decisive in the short-run variations of investment,[11] in contrast to Hicks' "technical rigidities" (p. 49). A new invention, a change in relative prices, an expansion in output, or some other factor or combination of factors may stimulate a decision to invest, but there is always some technical as well as business leeway in the timing of the investment. Investment in plant and equipment is governed, in the short run, by foresight, not by technical rigidities; practically all of it is "autonomous," practically none of it is "induced"—if we are to use Hicks' terminology. The "technical necessities" that Hicks sees in the acceleration principle are undoubtedly significant to the economist in analyzing secular trends of investment; also in connection with the long swings lasting from about fifteen to twenty-five years—such as have characterized residential construction in our own and other countries. Even over the short periods of the business cycles these technical necessities help to explain the behavior of certain categories of inventory investment—particularly, of goods in process.[12] Thus a mechanical acceleration principle has its place in economic analysis; but its role in the business cycle of experience is much more modest than in Hicks' model.[13]

IV

"The crucial question which a theory of the cycle has to ask," as Hicks sees it, "is whether fluctuations are possible, and if so, how they are possible, in the absence of exogenous disturbances" (p. 63). From the viewpoint of this question it need not much matter how long the cycles in output may actually be, or how far back they go in history, or in what parts of the world they may be found, or what shape they characteristically assume, or in what degree different industries participate in the successive stages of the over-all cycle, or how the cycle in output may be related to

[11] Cf. J. S. Duesenberry, "Hicks on the Trade Cycle," *Quarterly Journal of Economics*, Vol. LXIV (August 1950), pp. 473-475.

[12] See M. Abramovitz, *Inventories and Business Cycles, with Special Reference to Manufacturers' Inventories* (National Bureau of Economic Research, 1950), Chaps. VIII and XVI.

[13] See Sec. V, below.

prices, profits, employment, or other economic factors. But Hicks appreciates that what he regards as the "crucial question" is by no means the only question which a theory of the cycle has to ask. Necessary though it be to develop "some reasons why the economic system may be liable to cyclical fluctuations," the fact of fluctuations must yet be traced to the causes "which are the most important in practice" (p. 83); in other words, it must be dependably linked to other facts.

In his quest for an explanation Hicks passes from the general behavior of output to the special case of a cycle in output, first through a model that allows output to move freely, then through a model that constrains the movements of output. I shall not attempt to sketch the details of the theory, or to show how much and how ingeniously Hicks has added to the work of other theorists who have concerned themselves with the interaction of the multiplier and acceleration principles—notably, Harrod and Samuelson.[14] For present purposes it will suffice to convey the general character of Hicks' theory and to show why he concludes that "in the real theory it is the accelerator which is ultimately responsible for producing the cycle" (pp. 136-137).

Let us suppose that the economic system is in stationary equilibrium, with consumption at 100 and net investment at zero. Assume also that the consumption of any period depends on the income (or output) of the preceding period; that the investment of any period depends on the change in output during the preceding period; that the marginal propensity to consume from the income of the previous period is 0.9; and that the investment coefficient is 0.2. Let the equilibrium now be disrupted through an autonomous investment of 5, which comes in period 1 and never turns up again. What will be the consequences of this solitary disturbance? In period 1 consumption remains at its equilibrium value of 100; and, since autonomous investment is 5, total output is 105. In period 2 consumption becomes 104.5; autonomous investment is zero; but, since output has increased by 5 from period 0 to period 1, there is now an induced investment of 5×0.2; hence total output is 105.5. In period 3 consumption rises to 104.95; induced investment falls to 0.1 and total output to 105.05. In period 4 consumption falls to 104.545; induced investment becomes a negative quantity, —0.09, and total output

[14] R. F. Harrod, *The Trade Cycle* (Oxford: Clarendon Press, 1936); Paul A. Samuelson, "Interactions between the Multiplier Analysis and the Principle of Acceleration," *Review of Economic Statistics*, Vol. XXI (May 1939).

104.455. In later periods output continues to decline but approaches more and more closely its equilibrium value of 100. Thus, after an initial kickup, the system converges to equilibrium. But if we had allowed the investment coefficient to be 0.6 instead of 0.2, other things remaining the same, the result would be quite different. Output would first rise for a time, then decline below the equilibrium value of 100, later rise again but to a lower peak, fall again but a to higher trough, and so on; thus equilibrium would be approached only after a series of oscillations. If the investment coefficient were as high as 1, the system would convert the initial disturbance into a cycle of constant amplitude around the initial equilibrium value. If the coefficient were somewhat higher, cycles of progressively increasing amplitude would emerge; and if the coefficient became sufficiently high (i.e., if it exceeded 1.73), the system would move "relentlessly away from equilibrium" (p. 71)—upward if the solitary disturbance were positive, as in our illustration; downward if the disturbance were negative. It seems clear therefore that, "even if there are no exogenous causes making for fluctuations" (p. 84), a cycle may be generated by the multiplier-accelerator mechanism.

But Hicks wishes to portray cycles against a rising trend of output, since "the cycles which have been experienced have all of them taken place against a background of secular expansion" (p. 8). With this in mind, he proceeds to show that "the deviations of actual output from equilibrium output have exactly the same properties" (p. 86) if a progressive equilibrium is disrupted as when a stationary equilibrium is disrupted. That is, the character of the response of a "regularly progressive economy" (in which autonomous investment and equilibrium income are both rising at the same, constant percentage rate) to a solitary deviation of autonomous investment from its normal path depends on the marginal propensity to consume and the investment coefficient—just as in the case of stationary equilibrium which we just examined. It therefore seems natural to inquire which of the various possibilities turned up by theory "is most likely to correspond with actual experience, and which of them could be an element in the explanation of a cycle such as we find in reality" (p. 89).

It appears that, once the rate of growth of the system is given, an investment coefficient of a particular size will yield a perfectly regular cycle. Hicks rejects this possibility because it seems rather unlikely that the "world . . . had got stuck for two centuries with an investment coefficient" (p. 89) of this precise value. Another

hypothesis is that, given the marginal propensity to consume, the investment coefficient has been such as to yield damped oscillations. In this case, of course, "a single disturbance cannot produce the fairly regular cycle which has been experienced" (p. 89); but may not a stream of disturbances following thickly on one another keep the cycle from vanishing? Hicks feels that this "theory of damped fluctuations and erratic shocks" (p. 91) is also unconvincing. The hypothesis he embraces is that the marginal propensity to consume and the investment coefficient are of such size as to generate "explosive cycles" or even outright "explosions." At first blush this seems utterly implausible, and so it would be if Hicks stopped here. But Hicks goes on to impose limits on output—something I failed to do in tracing the consequences of a disturbance of stationary equilibrium. The upper limit is fixed by the "scarcity of employable resources" (p. 95), so that there is a "full employment ceiling" (p. 96). Although there is no direct lower limit on output, one is indirectly provided by the fact that "disinvestment in fixed capital can only take place by a cessation of gross investment" (p. 101). This hypothesis of "constrained explosion," Hicks feels, "is the one which really fits the facts" (p. 92).

To see how the model works, it is simpler to take his stationary than his progressive equilibrium as a point of departure. Let us therefore revert to our preceding illustration with its solitary burst of autonomous investment. The consumption function we can leave unchanged; but we must now raise the investment coefficient to suit its "explosive" mission, and we must also put limits on output. Let us say that the investment coefficient is 2, that the ceiling to output in any period is 130, and that disinvestment in any period cannot exceed 6. In period 1 total output and its components are now the same as in the previous illustration. In period 2 consumption is again 104.5; but the induced investment is 10 and total output 114.5. In period 3 consumption is 113.05; the required investment is 19; but, since output cannot exceed 130, investment is only 16.95. In period 4 consumption is 127, and the output ceiling keeps investment down to 3. In period 5 consumption remains at 127, since output in period 4 is the same as in period 3; for the same reason induced investment is zero, and the expansion in output is not only halted but converted into a decline. In period 6 consumption, reflecting the lower output in period 5, falls to 124.3; induced investment becomes —6 and total output 118.3. In the next period the required disinvestment is 17.4; but, since disinvestment cannot be more than 6, surplus

capacity emerges, which will have to be worked off in later periods. The accelerator mechanism is now suspended, and the multiplier carries on by itself. Total output keeps declining, period after period, but the decreases in output become progressively smaller. If the disinvestment continued at 6, a new equilibrium output of 40 would be gradually approached. However, as the change in output becomes smaller, so too does the required disinvestment. When the change in output is numerically smaller than -3, the disinvestment required in any period can already be carried out in that period. For a time, however, the disinvestment must remain at 6 to allow the unfulfilled disinvestments of earlier periods to be consummated. Once this process is completed, the accelerator goes into action again; the disinvestment now becomes smaller than 6, and before long the decline in disinvestment more than offsets the decline in consumption; in other words, total output again rises. From this point consumption as well as investment must increase; both advance energetically until the ceiling is hit, which chokes off the accelerator and sets off a fresh decline.

In this model the expansion of output is carried forward by the combined action of the multiplier and accelerator mechanisms. The expansion cannot taper off into a plateau, with output remaining at the ceiling level, because the decline in the rate of increase in output generates an absolute decline of investment. When output bumps along the ceiling, the induced investment must soon be zero; and the decline of investment cannot be offset by a rise of consumption, since consumption is determined by earlier outputs and the output along the ceiling is not rising. Thus the cyclical downturn of output is fundamentally due to a retardation in the growth of output itself, and the ceiling is sufficient to produce the retardation. So it is also in Hicks' regularly progressive economy, where the ceiling keeps rising but only at the moderate rate at which autonomous investment is rising. In both the stationary and the regularly progressive models the multiplier mechanism is responsible for the protracted contraction of output. But, whereas in the former model there cannot be a resumption of the expansion until excess capital has been worked off, in the latter model the continued growth of autonomous investment will check the decline of output and enable it to rise again before the surplus capacity has been eliminated; the resumption of a rise in output hastens the adjustment of the stock of ordinary capital to output; and, when this adjustment is completed, induced investment adds its strength to that of autonomous

investment in driving the economy forward. Thus, in the regularly progressive economy the accelerator is suspended, not only during practically the whole of contraction as in the stationary economy, but also during the early part of the expansion. But the intermittent activity of the accelerator should not mislead us concerning its role as a cycle maker. If the accelerator failed to function at all, there would be no cycle in the model; on the other hand, a multiplier of unity would not alone suffice to obliterate the fluctuations. Thus it is permissible to say, in the interest of brevity, that induced investment or the accelerator is principally responsible for the cycle.

This, as I read Hicks, is the essence of his theory. To be sure, the theory has more flexibility than my sketch conveys. Hicks recognizes that there is no technical limit on disinvestment in inventories, such as characterizes fixed capital. However, in line with the general drift of his argument, which rather minimizes the part of inventories,[15] he feels that "the accelerator, in the form in which it persists into the slump, is a mere ghost of what it was in the Boom" (p. 104). He recognizes that autonomous investment cannot be expected to follow a regularly rising path in actual life and that "it must experience autonomous fluctuations on its own account" (p. 120); but he regards these fluctuations as "superimposed upon the cycle" (p. 121) of a regularly progressive economy. He does not insist that the boom is always killed off by hitting the ceiling; on the contrary he shows that the investment coefficient may be "explosive" and yet generate a decline before the ceiling is struck—though here, too, the retarded growth of output is responsible for the decline in investment and the eventual downturn of output. Again, Hicks' theory requires uniformity in the consumption and investment functions over any one cycle, but not from one cycle to the next. Nor does the theory necessarily depend on the simple lags of my exposition.[16] These various elements of flexibility leave, as Hicks sees it, "plenty of room for those divergences from a standard model which are needed in order to cover the historical facts" (p. 3).

As a result of his inquiry Hicks deems it possible to point to "a short list of fundamental facts which are sufficient to account for the cycle" (p. 3). Let us assemble this list of "facts" or "assump-

[15] See the authoritative study of Abramovitz (*op.cit.*), which goes a considerable distance towards establishing the highly significant role of inventories in the business cycle.

[16] However, certain types of lag may cause serious embarrassment, as Hicks recognizes, though perhaps insufficiently.

tions" (pp. 2, 83, 92, 95): (1) Consumption is a lagged function of income; induced investment is a lagged function of the change in income; and these functions are such that "an upward displacement from the equilibrium path will tend to cause a movement away from equilibrium." (2) The system has an upward trend of output geared to autonomous investment. (3) "Output is not indefinitely extensible against an increase in effective demand." (4) "Falls in output cannot induce disinvestment in the same way as rises in output induce investment." From such a list of "assumptions," Hicks concludes, it is possible to show that "a cyclical sequence, which is (to say the least) remarkably similar to that which is experienced in practice, is *inevitable*" (p. 2; Hicks' italics).

This conclusion suggests more than Hicks has proved. By what is "experienced in practice" Hicks cannot mean more than the abstraction I previously delineated (Sec. I); which still leaves, even if his theory turned out to be right, work for other times and other hands. His argument concerning consumption, induced investment, even autonomous investment, runs in terms of effective demand. On the processes whereby supply is adjusted to demand his list of assumptions is distressingly inarticulate. It seems impossible to me to make a useful pronouncement about what is or is not *inevitable* in Hicks' world until the tacit assumptions concerning conditions of supply, apart from the ceiling to output and floor of investment, have been spelled out. Aside from this, the cycle in Hicks' expanding economy is, strictly speaking, a cycle in *deviations* from an "equilibrium rate of growth," as he himself elsewhere recognizes (p. 101). Hence his assumptions do not necessarily lead to an expansion of output followed by an *absolute* decline of output; nor—therefore—necessarily to the sort of cycle which has bothered the practical world.

But I do not wish to multiply doubts along these lines. From the viewpoint of a theory which aims to be something more than an exercise in logic, the important issues, as I see them, lie elsewhere. The foundation stones of Hicks' theory are the multiplier and accelerator. These are the matters on which I have dwelt in earlier parts of this paper. And if what I have said on these subjects is at all valid, it will not do to treat consumption as a technical echo of output; it will not do to treat investment as a technical echo of the changes in past output; it will not do to treat the business cycle as a reflex of any "technical necessities of a capital-using economy." To come to grips with the economic realities of a capitalistic system, which is a capital-using economy of

a very particular sort, it is necessary to give far greater scope to market phenomena—the movements of costs, prices, profits, credit, and business sentiment itself—than one finds in Hicks.

V

The process of investing in fixed capital, which plays the key role in Hicks' theory of the cycle, cannot be understood outside its business setting. I have already commented on the imperfect divisibility of industrial facilities and their long period of gestation. In view of these characteristics of investments goods, a business firm will normally seek to have a margin of plant capacity to take care of contingencies, both such as may be foreseen and such as cannot, just as it normally carries a reserve of raw materials and finished wares in its inventories. Seasonal maxima—which sometimes exceed the average for a year by more than cyclical maxima exceed the average for a cycle—will be realized by working the plant more intensively, not by varying its scale. So also will the responses to sudden and irregular flutterings of demand, which are an ever present feature of business life and sometimes strong enough to leave their impress on fairly comprehensive economic aggregates. And the firm will look to the future, not only to the past—as in Hicks' model. There the increase in output comes first; the "investment in new capital to support that increased output" (p. 43) comes later. But in a growing economy a firm relies on "increased output" to support "investment in new capital" just as it relies on "investment in new capital" to support "increased output."

A new business commonly begins operations with a modest plant. As sales expand, all sorts of inconvenience and waste are suffered for a time. A year or two later better equipment may be added and perhaps a site acquired to accommodate a larger plant in case that proves necessary. As sales keep mounting, a new factory is built or a substantial addition made to the old. This may come soon or years later, but in either event the plant is expanded with an eye to what output may be several years hence as well as to its current level. In time the business becomes cramped for space once again, and the cycle of development is repeated. This, or something like it, is typically the investment path of a small business as it grows up. In a stationary firm or one that grows very slowly, the intervals between capital expenditures will of course be longer than in a rapidly growing business. And what is true of a manufacturing concern is equally true of farming, mining, com-

mercial, or financial enterprises. Thus, investment in plant and equipment on the part of a small or medium-sized business comes in substantial lumps, discontinuously. And while the investment of large firms seems continuous by comparison, this merely reflects the overlapping of many processes of the same kind, going on in various sections of the firm, combined with the fact that the projects undertaken are apt to be much larger and therefore remain longer in the stage separating the investment decision and the final installation.

In the actual world, therefore, the stock of capital in the individual firm cannot well move in any close adjustment to its output in the short run. If we broaden our view over the whole of an industry, we encounter a fresh impediment to the acceleration principle in the formation of new firms, which undertake new investment although they are still innocent of any past output. And if the economic process as a whole comes into view, the linkage between current investment and the rate of change in output seems to vanish in a cloud. One railroad is built by a dreamer who sees bustling centers of industry and commerce when he looks at pasture and forest. Another is built by a wily promoter who sees an opportunity to embarrass a rival railroad or to appease the public's hunger for securities. One firm builds a factory to incorporate a new technical process, another to make a new product, a third because it is cramped for space, or because it has new business in prospect, or because it wishes to acquire a 'new look,' or because a new location promises lower taxes or a cheaper labor supply. One independent builder 'sees' a housing shortage and lays down a score of new dwellings. At the same time a colleague 'sees' that the residential market is overbuilt but nevertheless puts up a house or two to keep his organization intact; while a third, who shares the somber vision of the second, adds liberally to the supply of houses because he can borrow from his banker as much or more than what it costs him to build.

There is no need to enlarge on these remarks. It is clear that numerous influences play on investment and that one or another special influence is sometimes decisive in the individual case. This suffices to show why hardly a day passes in a large country without bringing forth a new crop of investment projects and why their volume must vary over time. But the special influences do not explain the heavy bunching of investment projects at certain times, their sparse numbers at other times, the fairly regular ascent from small numbers to large and the fairly regular descent from large

numbers to small—in short, why there is a *cyclical* movement in investment. To explain this feature of investment, it is necessary to abstract from the multitude of special influences and to analyze the forces that govern fairly homogeneous sections of the investment market—such as free versus controlled industries, large- versus small-scale industries, new versus old enterprises, housing versus business enterprises, private versus governmental agencies, and so on. Once separate generalizations have been framed for the leading parts of the investment market, it becomes possible to determine with assurance how the broad forces of the market—principally, the movement of the national income and its distribution, the movement of building and equipment costs, and the movements of 'finance'—impinge on investment at large. All these matters still require empirical investigation; but enough is already known to make it fairly clear that it is the pervasive forces of the market, rather than Hicks' mechanical accelerator, that give rise to fluctuations in a community's outlays on fixed capital.

Suppose, for example, that an expansion in aggregate output and employment has for some reason gotten under way. Then the income of individuals and business firms will expand also. Since the community as a whole is better off, spending on consumption goods rises; and so too does spending on investment goods—many of which seemed "necessary" months or years earlier but which were not acquired earlier because of financial stringency or business uncertainty. As spending expands, new 'shortages' appear, and men's minds turn to ways of meeting them. The spread of expansion gradually generates in people a feeling of security, later a mood of optimism. Many who have been eager to carry out new investments, and yet have postponed action because uncertain whether the time is 'right,' decide to go ahead now, while construction and equipment costs are still close to the level reached during the preceding slump. The new spirit of enterprise fosters all sorts of projects that are related very loosely, if at all, to the shortages of facilities which keep arising here and there or to the improved ability of investors to pay for new facilities. Individual dishoarding is now easier to rationalize, credit is easier to get, and equity capital easier to attract. Many families that in the past have dreamed about building a home 'decide' to build one, in some cases because their income is larger, in others because they feel more secure about their income or because lenders feel this way about them, in still others because they look forward confidently to still better times. Business firms brush up their long-range plans

costs will be reduced before long from the abnormal level to which they have been pushed by prosperity.

It is along lines such as these, I believe, that the cyclical downturns of investment in fixed capital are to be explained, if we hold in view an economy organized predominantly on the basis of free private enterprise. In Hicks' system the expansion of investment is brought to a halt and reversed by a mere retardation in the growth of physical output. But I do not know of any evidence that a declining rate of growth has generally characterized the closing stages of actual expansions in aggregate output[18] or that investment expenditure has been at all closely geared to the actual rate of growth of output. Even if empirical evidence fitted in more congenially with Hicks' theory of the downturn, it would still be wise for the economist, when in search for the causes of the breakdown of an investment boom, to look in the direction of business life, including the government once it has become a major factor in the economy, rather than in the direction of Hicks' hypothetical technology. And it is to the processes of business life that Hicks himself seems to turn when he comes to the case of an upturn in investment. That depends in his system on the continued advance or spurt of autonomous investment; and while his autonomous investment merits another name and more analysis than it receives, it at least opens the route along which business processes might be seen.

VI

Hicks' slight of psychological and pecuniary factors is deliberate. At the opening of his penultimate chapter he states plainly: "It has been one of the main objects of this work to show that the main features of the cycle can be adequately explained in real terms" (p. 136). In line with this resolution there is hardly a mention of the price or monetary systems in the first eight of his twelve chapters. In Chapter IX Hicks concedes that "it is very possible that some important aspects of the actual cycle can only be explained" by the aid of "the price-mechanism and the monetary mechanism" (p. 117). In Chapter X he examines the consequences of a supposed cyclical movement in the ratio of investment goods prices to consumption goods prices; but the only result derived is a blurring "at the edges" of the previous argument

[18] See the study of this subject by Abramovitz, *op.cit.*, Chap. xv. On the technical difficulties in ascertaining rates of change over a cycle, see A. F. Burns and W. C. Mitchell, *Measuring Business Cycles* (National Bureau of Economic Research, 1946), Chap. viii.

(p. 133). The last two chapters are devoted to the "monetary factor," which he regards as a "secondary force" whose effects are "superimposed" on the "*main* cycle" (p. 3; Hicks' italics). I shall say nothing of this interesting monetary supplement. To examine it at all adequately would require not much less space than I have already taken; and it is perhaps just as well to leave the emphasis where Hicks himself has put it.

This emphasis on the 'technical' or 'real' aspects of economic life is not peculiar to Hicks' new book. It has been characteristic of a good part of recent economic theory, just as it was characteristic of a good part of classical political economy in its formative phase. The emphasis is an understandable and, to a considerable degree, a justifiable reaction against the price and monetary theorizing which flourished before the 1930's and which was found so seriously wanting when the Great Depression struck. In the midst of the confusion and despondency of the day, Keynes articulated a new theoretical system, couched in a wonderful language, from which governmental policies seemed to peel off as simply and naturally as skin from an onion. He saw in a business depression, not any maladjustment of costs and prices, but a deficiency in spending, which he attributed principally to a deficiency in investment. The latter he analyzed in terms of the supply of money, liquidity preference, the supply price of investment goods, and the expectations of the business community concerning the future earnings stream from new investment. He put the emphasis on the expected earnings stream in his theory of investment, just as he put the emphasis on actual income in his theory of consumption. He saw in investment the great driving force of employment, but one that a modern society could not safely leave to the unrestrained impulses of private enterprise. These teachings of Keynes paved the way for drastic simplifications by later economists. Before long a literature arose in which costs, prices, and profits were pushed aside, sometimes completely ignored. Consumption emerged as a passive response to income, without any link to the system of prices or the range of economic choice. Investment became an exogenous variable—a mere technical datum for the economist, like the consumption function. Investment opportunity itself became a sort of physical fact; and not a few economists formed the habit of speaking of investment outlets as if they were some objective quantity, independent of the dreams of men, their hopes and fears about governmental policy, or their expectations about costs, prices, and profits.

for expansion, promoters push projects that will exploit new products or techniques, new firms are organized to share in the growing markets for standard commodities, and legislatures authorize improvements worthy of an 'era of prosperity.' Thus, as everyone knows, a rising national income and the state of exaltation that accompanies it pile up decisions to invest; and investment expenditures follow suit—though with an irregular lag and diminished amplitude.

But why does not the expansion of investment continue more or less indefinitely? By what processes is the upward movement of investment brought to a halt and its direction reversed? Here two facts are vital. First, the rise in construction and financing costs generated by the expansion itself. In thinking of the investment process, it is essential to keep in mind that a 'decision to invest' is one thing and a 'decision to invest *now*' is quite another. Investors generally realize that building a new house, factory, or power plant is not the same thing as purchasing a hat or even an automobile. They know that when investment judgment proves bad, the penalty is severe. In reaching a 'decision to invest,' they may have given little or no conscious attention to the protracted increase that has already occurred in construction and financing costs. But this decision must be followed by another, whether to carry out the project now or later. At this stage investors are likely to consider very carefully the economic outlook in the months immediately ahead. They know that they may have the new plant or equipment on their hands for a generation and that the annual carrying charges with which they saddle themselves depend a good deal on the cost of construction, if not also on the rate of interest. They have gotten along thus far without the desired investment and in any event will have to manage without it for months or years—for as yet the investment good is only an amorphous wish or a sketch on a piece of paper. In some cases a postponement will clearly bring hardship or a business loss, and the interval between the 'decision to invest' and the start of investment expenditure will be governed entirely by technical factors—such as surveying, acquiring a site, designing plans, securing loans, contracting out the job, etc. In many other cases investors, who judge that they can let the construction job and finance it on appreciably better terms six months or a year later, will bide their time. And not a few of those who are eager to move promptly will have a chance to reconsider their 'decision to invest' in the light

of market prospects, for the arrangements preparatory to investment expenditure are often very time-consuming.

The rise in construction and financing costs during an expansion impinges broadly on the investing class and would check the investment boom sooner or later even if prosperity diffused itself uniformly over the economic community. But this does not happen, and the uneven spread of expansion is our second vital fact. True, business conditions are generally good and improving; yet some firms and even entire industries are unable to expand their sales, and others find it hard to advance their selling prices. At the same time unit costs of production are already rising over the range of business enterprise—first here and there, then on a broad front, despite improvements of technique and fuller utilization of facilities. At every stage of the business cycle there are bound to be some firms whose profits are declining or whose losses are increasing. But these firms are not a steady fraction of the business population; and after a business expansion has continued for some time there are various reasons for expecting their numbers to multiply. As a mounting optimism infects a widening circle of businessmen, errors concerning the sales that can be made at profitable prices tend to pile up. Supply 'bottlenecks' keep developing, now in one locality or industry, then in others; in consequence the output of numerous enterprises—particularly those suffering from a shift in demand or an outworn technology—is restricted. Business custom, long-term contracts, or governmental regulation make it difficult or inexpedient for many firms to raise their prices; and, as the rise in unit costs continues, more and more of them are apt to find their profits diminishing. We therefore find in experience, as we may reasonably expect, that "after a business expansion has run for some time, the proportion of firms experiencing rising profits begins to shrink, although the profits of business in the aggregate continue to climb."[17] This development adds to the mood of hesitation that is already emerging among investors generally, on account of the protracted rise in construction and financing costs. The firms whose fortunes are waning are likely to be among the first to reduce investment expenditure, and their curtailments will spread doubt among others whose profits are still rising, but many of which have come to feel that investment

[17] [See *New Facts on Business Cycles*, above, pp. 107-134]; and Thor Hultgren, *Cyclical Diversities in the Fortunes of Industrial Corporations*, National Bureau Occasional Paper 32 (1950).

It is against this background that I see Hicks' book on the business cycle. It is based on a profound appreciation of the work of Keynes, yet consciously departs from Keynes' doctrines at numerous points. It is written in a scholarly spirit and is devoted to scientific issues, not to questions of immediate policy. It is a sophisticated work, not to be confused with vulgar Keynesianism. It shares, however, the aggregative, mechanical, 'real' slant of much of the recent literature on economic theory. It stresses the role of effective demand but has practically nothing to say about the organization and conditions of effective supply. It sees investment as an addition to output but overlooks its part in modifying the state and intensity of competition in the business world. It restores investment to an endogenous role, which it had long played in earlier economic theory, including that of Keynes; but the restoration is carried out through a theorem of impersonal technology, not of human conduct in a business environment. The sophistication of Hicks' work derives from the pressures of a subtle and inquiring mind, not from a large knowledge of practical affairs or the teachings of history and statistics. The result is a closely reasoned[19] and attractively written essay about a possible cycle, but—as far as I can see—a dubious aid to students seriously concerned with the actual alternations of good and bad trade to which the Western world has been subject in modern times.

[19] Although the book sets a very high standard in this respect, a professional logician might yet have something to say about Hicks' method of arriving at what is or is not "probable" both in his explicitly supposititious world and in the alleged real one.