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PART TWO

TYPICAL CYCLE PATTERNS

Introduction

THE statistical record of business cycles, voluminous as it is, is still too incomplete to afford a systematic test of all the principal theories and the principal causal factors suggested by them. If we wish to test the theory of over-production in a literal form, the figures for stocks of goods are not sufficiently complete or systematic for the purpose; they merely afford suggestions. If we shift to the theory of under-consumption, figures of consumers' purchases are even more fragmentary.¹ If we go on to theories of under-saving or over-saving, or the theory of discrep-

¹ An adequate test of this theory would require other data also. But figures of consumers' purchases, if not alone sufficient for the purpose, are clearly necessary.

STRATEGIC FACTORS IN BUSINESS CYCLES

ancies between saving and investment, we find that real figures of savings are almost non-existent, since the data on savings bank deposits represent too small and too special a fraction of this flow to have great significance, and issues of new securities afford only indirect evidence. Data on the spending of savings for actual goods are also not sufficiently complete and detailed to be useful in checking any theory that rests upon a discrepancy between this very large flow and another about equally large. Figures of production are far more satisfactory, as are those on international trade and on banking, though in the latter the difficulty is one of interpretation, since credit issued for different purposes has very different meanings. It may be supporting a boom, or extending first aid to victims of a crisis. Hence any suggestions as to the more significant causal factors derived from the statistical records must not be regarded as exhaustive; one must expect rather that other factors will be added by the development of more complete records, if this development can outrun the impatience of industrial nations to do something decisive to remove or control the phenomenon under examination.

Another difficulty is that of establishing causal importance in a bare record of a sequence of events such as the one before us. Not only are no two cycles exactly alike; no two are alike in all but one probable causal factor; so that it is impossible to

TYPICAL CYCLE PATTERNS

establish the causal effect of any one factor exactly by the method of formal induction. And if it were possible, we should have only a record of this factor in connection with a particular combination of other factors; with a different combination its effect would in all probability be different. Hence the scrutiny of the record, by itself, will yield suggestions rather than proof.

Perhaps the chief evidence as to which are the disturbing factors in the record is presented by two characteristics of the series: their timing and their relative amplitude of fluctuation. Series whose up- and down-turns consistently precede those in other series are suspect as having some causal significance, if they are of such a character as to make this interpretation rational. And series that consistently fluctuate much more violently than the rest are similarly suspect, on the same terms. In addition, factors whose behavior is irregular are not to be ignored, if there is any basis for judging their effect.

Indeed, a study of business cycles may be divided into two inquiries: a search for the universal factors and another search for the occasional ones. Or we may search for the causes applicable to all cycles and then search separately for the factors responsible for the mildness of some and the severity of others. In advance, it is impossible to tell which inquiry is the more significant; but at any rate, the second is not to be ignored.

STRATEGIC FACTORS IN BUSINESS CYCLES

*The Factor of Timing: Introduction*²

In studying leads and lags, it is almost inevitable to use the general 'reference cycle', or period of expansion and contraction of general business conditions, as a common standard in terms of which to report the relative timing of the various series. But it is also necessary to remember that this 'reference cycle' is after all only a composite picture; and that in all strictness the significant factor is the relation of the timing of each series to that of all the other specific series with which it may have some fairly direct connection. A series with an unusually large lead, however, with respect to the reference cycle, by that fact must have a lead over most of the specific series that go to make it up.

In this study of timing one result which stands out is that, of the series presenting the movements in various forms of production, those whose timing agree most closely with that of the 'general business' cycle are, for the most part, the so-called 'basic industries'—pig iron, steel ingots, coke, machine-tool shipments and producers' goods in general. Production of consumers' goods shows more variation from

² In dealing with leads and lags, the writer has, with one exception, based his conclusions on the three-month periods marking the stages of recession and of recovery already referred to (see pp. 8ff. above). This was done in preference to using the highest and lowest single months, chiefly because the latter procedure involves difficulties with double peaks, and does not do justice to the difference between short, sharp peaks and lower but longer ones.

TYPICAL CYCLE PATTERNS

the general cycle, while the movements of agricultural production show little or no relation to it. This may, of course, be a comment on the importance attached to these 'basic industries' in fixing the dates of the general business cycle; but even so, the conclusion is, not that these basic industries are given undue weight, but rather that their fluctuations are so much more pronounced than the average that they, with other series moving in sympathy with them, tend to dominate those series whose timing is radically different. This conclusion is strengthened by the fact that they move in closer agreement with each other than do other series. They seem justly to assume a place of central importance in the general business cycle.

Timing: Construction

The largest and some of the most clearly prevailing leads are found in the construction industry, as exhibited in building permits issued and contracts let. Their movements are followed, with minor discrepancies, by the production of structural steel, Portland cement, oak flooring, baths and lavatories—in short, materials and products serving the construction industry.

The average cycle pattern for construction contracts awarded shows a clear lead of a quarter-cycle at down-turns and a larger lead at up-turns. There are, however, marked differences of behavior be-

STRATEGIC FACTORS IN BUSINESS CYCLES

tween different cycles, and between different sections of the industry. Industrial construction shows the most regular timing, most nearly synchronous with the general business cycle, and the largest amplitudes of fluctuation. It manifests a tendency to lead on the up-turn but not on the down-turn. Commercial construction also manifests no tendency to lead on the down-turn but shows an average lead of more than a quarter-cycle at the up-turn, of the three general business cycles in which commercial construction manifests a definite trough. In the last two cycles there is no trough deserving the name, one exhibiting almost continuous rise and the other almost continuous decline. Commercial construction is thus more irregular than industrial, showing less conformity to the general business cycle, and also has milder cyclical fluctuations. Public works and utilities (recorded for two cycles only) manifest no tendency to lead or lag.

Residential construction has the largest irregularities, particularly in the last two cycles, combined with a large average lead. In residential contracts awarded (value, recorded for five cycles, 1915-31) there seems to be a clear tendency to an average lead of a quarter-cycle, though with a considerable dispersion around this average. It is this tendency which is mainly responsible for the tendency of total construction to lead general business, and entirely responsible for the tendency to lead at the peak. In

TYPICAL CYCLE PATTERNS

the last cycle the curve of residential construction has no real peak, only a brief and slight interruption of its downward swing. It shares with commercial construction the responsibility for the peculiar behavior of the combined construction series in the last two cycles, the first showing an almost uninterrupted rise and the second an almost uninterrupted decline.

The grand resultant is a composite curve characterized by considerable irregularity. The behavior of total contracts awarded during the general business cycles of 1912-14 and 1915-19 is fairly regular, leading the curve of general business by a few months, and showing a rise in the final years which appears to record mainly the effect of the War on money values, rather than an increased physical volume. In the next cycle, that of 1919-21, construction has a double peak, better described as a plateau occupying the entire expansion and the down-turn stage of general business, the subsequent up-turns occurring mid-way of the general business contraction. The cycle of 1921-24 shows a mild peak or plateau occupying the latter part of the general business expansion, and a higher, briefer peak mid-way of the general business contraction. Of the last two cycles, 1924-27 and 1927-32, the former shows a rise throughout and the latter a decline throughout, both interrupted by a mild peak occurring at the same time as the down-turn of general business.

STRATEGIC FACTORS IN BUSINESS CYCLES

In the latter cycle, of course, these series do not show a definitive end of the phase of contraction.

To sum up: in two cycles construction reaches its peak some time before the peak in general business activity; in one there is a double peak or plateau extending over the entire business expansion; in one a mild peak somewhat before the peak in general business activity and a higher peak mid-way of general business contraction; and in the last two there are mild construction peaks at the peak of general business activity, superimposed upon a larger movement upward throughout the 1924-27 cycle and downward throughout the succeeding cycle. Thus construction reached a major peak during the very mild depression of general business that separated the last two cycles. The peak of construction and the trough of general business both appeared in mid-winter of 1927-28 (it must be remembered that these cyclical movements are reckoned after the seasonal fluctuation, with its pronounced winter decline in construction, has been eliminated). The unusual behavior of construction at this time may have been responsible for the fact that this depression of general business was so unusually mild. The typical pattern, barring the exceptional features of the last two cycles, shows a peak or plateau somewhere in the expansion phase of general business, and a lead of about a quarter-cycle on the subsequent up-turn.

TYPICAL CYCLE PATTERNS

In the total figures two features stand out. One is the tendency to lead, which would be more plainly evident if cyclical movements were measured as departures from secular trends. The other is the ten-year wave which dwarfs the three short-cycle movements from 1921 to 1931. This wave manifests itself in the fact that the various series of all sorts quite typically have a descending trend in this present cycle: a slight rise and a large drop; whereas they typically showed the reverse in the two preceding cycles: a large rise and a slight drop. Industrial construction, however, appears to be dominated by the short-cycle movements rather than by this ten-year wave. The irregular or random forces (from the standpoint of the short-cycle) would appear to have acted mainly on branches of construction other than industrial.

The behavior of production and sales of structural steel, Portland cement, oak flooring, baths and lavatories is consistent with that of building contracts, showing in general a considerable lead, and larger activity on the up-swing of the general cycle than on the down-swing. A tabulation of leads and lags as compared with what seems in each case the most relevant construction-series indicates a fairly normal distribution, with more than one-third of the down-turns and up-turns synchronous with those of the relevant construction series, and lags very

STRATEGIC FACTORS IN BUSINESS CYCLES

slightly more numerous than leads.⁸ A similar tabulation of leads and lags as compared with the general business cycle (omitting the two last cycles as abnormal) again shows more than one-third of the cases synchronous while in nearly all the rest the construction material leads. Again the tendency to lead is clear. Incidentally, these construction materials suggest the ramified effects of building activity.

To sum up, the large lead in construction activity suggests strongly that this industry has a peculiar causal significance. The irregularities of its behavior indicate that there are 'originating causes' at work, mainly outside the field of industrial construction. This last follows the timing of the general business curve more closely and regularly, but the great intensity of its fluctuations still indicates a peculiar causal importance (to be discussed in the following section). The lead it exhibits on the up-turn, though not on the down-turn, is also highly significant. And the peculiarities of the behavior of construction during the last three cycles, taken together, suggest that it may be one of the industries which, at times at least, follows longer cycles than those of general business and is only slightly modified by these shorter business cycles; and that in any case the variations

⁸ For example, Portland cement was correlated with public works and utilities, also with industrial construction; baths and lavatories were correlated with residential construction; structural steel with total construction.

TYPICAL CYCLE PATTERNS

in its behavior from one general business cycle to another may be one of the important influences determining the differences between these cycles themselves. It is worth noting also that residential construction—which is in the class of consumption goods—shows the largest and most frequent lead, as well as the greatest irregularity, so that the evidence of an originating causal role—so far as we can speak of such a matter in this connection—is strongest for this section of the industry.

This pattern of behavior is not difficult to rationalize on theoretical grounds. It is a phase of the general principle of intensified fluctuations of derived demand for durable goods. That is, demand for new supplies of durable goods fluctuates more intensely than demand for the current services these durable goods render. This principle we shall encounter at several points in the following discussion and it is therefore worth stating with some fullness.

The basic force at work can best be seen in a simplified example.⁴ If there is a stock of 100,000 units of some durable commodity with a life of twenty years and a secular rate of increase of 4 per

⁴The writer has developed this principle in *Business Acceleration and the Law of Demand*, *Journal of Political Economy*, XXV, 217-35, March, 1917; also in *Economics of Overhead Costs* (University of Chicago Press, 1923), pp. 389-94. Cf. also criticism by Ragnar Frisch, *Capital Production and Consumer-Taking* and subsequent discussion with the writer: *Journal of Political Economy*, October, December, 1931, April, 1932.

STRATEGIC FACTORS IN BUSINESS CYCLES

cent per year (figured in compound-interest fashion), then to maintain that rate of increase for the current year will require about 7,360 new units: about 3,360 for replacing those built twenty years previous and 4,000 to furnish the current year's increase. The previous year's output, on the same basis, would have been 7,077 units. Now if in the current year the stock increases by 8 instead of 4 per cent, current output will have to be 11,360, which is 54 per cent above the 7,360 which we may call 'normal' for the year, and 60 per cent above the previous year's output. On the other hand, if in the current year the stock increases, but by 3.717 per cent instead of 4 per cent, current output will not increase over that of the previous year. If the stock increases by a less amount, current output will decline. If the stock is barely maintained, current output will shrink to 3,360, which is 54 per cent below normal and $52\frac{1}{2}$ per cent below that of the previous year. If the stock is allowed to decrease 3.36 per cent by failure to make replacements, current output will shrink to zero. Evidently a change in the growth of the stock, representing a change in the growth of the rate of use, calls for a much more intense change in the current production of the commodity.

If the commodity is shorter-lived, like an automobile, and the element of replacement is correspondingly larger, the principle remains the same, but the quantities are different. If we have a stock of 100,000

TYPICAL CYCLE PATTERNS

automobiles in the hands of users, with a life of seven years and increasing at an annual rate of 10 per cent, then normal production for the current year is about 20,500; about 10,500 to replace those made seven years previous, and 10,000 to provide for normal increase. The previous year's normal production would have been something over 18,600. Then if the rate of increase of the stock rose to 20 per cent, the current output would rise to 30,500, which is 49 per cent above normal and 64 per cent above the previous year's output. If the rate of increase of the stock declines from 10 to 8.1 per cent, increase of current output will cease entirely. If the stock ceases to increase, current output will fall to 10,500 which is 49 per cent below normal and 44 per cent below the previous year's output. If the stock decreases 10.5 per cent through the cessation of all replacements, current output shrinks to zero. Here again fluctuations in the movement of the stock give rise to intensified fluctuations of current output, though the intensification is less marked.

One of the most significant features of this relationship is that it is not necessary for the stock of goods to decrease in order to bring about a decrease of current output. A moderate decrease in the rate of growth is sufficient.

The actual behavior of production as affected by this principle is complicated by several other factors. One thing which is likely to happen is a tem-

STRATEGIC FACTORS IN BUSINESS CYCLES

porary reduction in the rate of scrapping, because old units are kept in service longer. This means that the existing stock of goods suffers a decline in average quality because the average age of the units has increased. To the extent that retirements are postponed in dull times or speeded up in active times, the result is an even greater intensification in the movements of current output corresponding to given fluctuations in the number of units in service.

By way of illustrating the operation of these factors, the production of automobiles decreased from 5,621,715 in 1929 to 1,431,494 in 1932, while the number of registrations, taken as an indication of changes in number of cars in service (though slightly overstating the absolute numbers) declined from 26,545,281 to 24,136,879.⁵ Thus a decline of nearly 75 per cent in annual production corresponded to a decline of only a little over 9 per cent in total number in use. If figures were available showing the number of cars which merely stood unlicensed in the owners' garages or backyards, the total number might show no decrease at all, although production had gone on at a rate far below a normal replacement basis in 1931 and 1932.

Furthermore, while retirements of cars from use, as deduced from licenses taken out, did not actually

⁵ See *Facts and Figures of the Automobile Industry, 1933*, published by the National Automobile Chamber of Commerce.

TYPICAL CYCLE PATTERNS

decline during the depression years, they did fall far behind the rates of production recorded seven years previous, when the cars were being produced which would normally have been retired during 1930-32. During 1928 and 1929 the reverse was the case, retirements exceeding the production of seven years previous. Thus during the boom the average age of cars decreased somewhat through a relative speeding-up of retirements, while during the depression average age increased through an opposite movement. The same effect appears to a less extent in comparing retirements for 1924 and 1925. The essential figures are shown in the accompanying table.⁶

Another complication arises because fluctuations in demand for products or services are not instantly followed by the precisely appropriate fluctuations in stocks and current output of the durable goods required as means to make the products or render the services. There are lags, errors of estimate and competitive duplications of apparent demand, which play a role in the actual outcome, and the changes in demand are themselves complex, partly causes and partly results. They are partly matters of chang-

⁶ *Facts and Figures of the Automobile Industry, 1933*. An accurate estimate of normal retirements should, of course, be based on a distributed lag, rather than on production in one year only. This would not, however, change the essential showing on the point at issue, the chief effect being to make the comparison of retirements in 1924 and 1925 less striking.

STRATEGIC FACTORS IN BUSINESS CYCLES

PRODUCTION AND SCRAPPING OF AUTOMOBILES

	Production for domestic market	Total scrapped or replacements	Excess or deficiency of scrappings. Cf. production of 7th year previous
1917.....	1,793,792		
1918.....	1,123,515		
1919.....	1,850,982		
1920.....	2,051,164		
1921.....	1,555,984		
1922.....	2,417,587		
1923.....	3,799,788		
1924.....	3,310,018	1,151,381	-642,411
1925.....	3,837,841	1,670,337	+546,822
1926.....	3,908,854	1,824,230	-26,752
1927.....	2,935,577	2,110,214	+59,050
1928.....	3,776,583	2,516,868	+960,884
1929.....	4,625,354	2,772,838	+355,251
1930.....	2,950,980	2,884,228 *	-915,560
1931.....	2,148,917	2,904,262 *	-405,756
1932.....	1,251,205	2,900,000 *	-937,841

ing taste, but their cyclical fluctuations are mainly dependent on fluctuations in incomes, which in turn reflect fluctuations in productive activity, thus completing a vicious circle. The sensitiveness of different commodities to such changes in income depends partly on their durability and partly on the degree to which they represent necessities or luxuries.

Building construction, for example, is both a necessity and a luxury; but as there are always sufficient buildings to house the population in some fashion, current additions are concerned mainly with

* The compilers note that these figures may include cars merely stored.

TYPICAL CYCLE PATTERNS

the relative luxury element of more adequate and modern accommodations. And for the same reason the time when any given house-dweller enlarges his accommodations is peculiarly optional, liable to epidemics of postponement, or to concentrations which bring about particularly active seasons of building. A dwelling is also customarily rented or bought on credit; consequently the ability to pay an additional \$50 for rent this month, together with confidence in the continuation of this happy state, can give rise to a demand involving an immediate expenditure of, let us say, \$6,000 in construction. In fact, the increase in construction may be more than this, if we take into account the possibility of building in excess of demand, causing some of the older accommodations to stand vacant and making the total amount of additional investment in housing construction perhaps materially larger than the increase in capital cost or value of accommodations which tenants are actually occupying and paying rent on.

On the other hand, if there is at the moment an over-supply left from a recession immediately preceding, the first increase in demand may not absolutely necessitate any new building in order to satisfy it. However, even in such an event, the existing buildings will not be entirely up to date, and the demand for housing of this character will call for some new construction. It will also stimulate work of repair and remodelling as well as specula-

STRATEGIC FACTORS IN BUSINESS CYCLES

tive building in advance of demand, both of which tend to fall behind their normal condition in a depression. Moreover, the areas in which the recovery of demand is strongest are not likely to coincide exactly with those in which previous activity has left the largest over-supplies. Thus a revival of demand is likely to produce a considerable immediate effect on construction work, even though there may be in the aggregate a considerable amount of vacant space, and even though the full effect of the revival may not be felt until this over-supply has been considerably reduced.

Thus a given increase or decrease in consumer-demand for housing, measured by the income the consumer stands ready to devote currently to this purpose, naturally results under ordinary conditions in a much larger increase or decrease in volume of expenditures on the production of the goods that are to satisfy that demand. This outcome may, of course, be modified if reviving demand finds a considerable surplus already on hand. It naturally requires, further, that the construction industry shall have sources of funds to carry on the work: funds whose increase or decrease is not limited by the movements of consumers' income. This requisite is supplied by an elastic credit system. Easy credit, combined with an optimistic and speculative spirit, may tend to push expansion beyond its logical proportions as dictated by actual demand.

TYPICAL CYCLE PATTERNS

Finally, as partial explanation of the *lead* in construction work, we should note that the demand for construction in excess of replacements is logically the heaviest, not when consumers' incomes are the largest, but somewhere near the time when they are *increasing fastest*. Thus a lead of approximately a quarter-cycle in construction work, as compared with the general course of consumers' incomes, is logical even if construction does not anticipate the growth of demand but merely synchronizes with it. Even if it really lags a trifle behind its logical timing, it can still show a substantial lead in its actual peaks and troughs. Thus a boom in construction may be at one and the same time a result of recovery in consumers' incomes from a low point and a cause of further recovery through the increased spending power arising from the increased volume of work done. This does not preclude, of course, the possibility of increased construction work being undertaken as a result of optimism and a general speculative spirit, giving rise to a greater readiness to build ahead of current requirements. The same considerations apply, in the reverse direction, to the process of recession.

This principle, as already noted, is a general one applying, *mutatis mutandis*, to all durable goods and to capital equipment. In the latter case, however, another step is involved. An increase in output of consumers' goods has, in addition to the work of

STRATEGIC FACTORS IN BUSINESS CYCLES

making them, a further effect in the shape of a demand for more capital equipment, if existing equipment is not in every way adequate. This demand for capital equipment fluctuates more intensely than the output of the goods it serves to produce; but the total amount involved is likely to be much smaller; the average annual expenditures for replacement and extension of capital equipment are likely to be not more than, for example, 10 to 20 per cent of the annual output of the goods they serve to make.⁷ A change from a 3 to a 6 per cent annual increase in the output of the commodity might cause as much as a 40 or 50 per cent increase in the smaller figure representing the requirements for production of capital equipment, and a change from a 6 to a 3 per cent annual increase in the commodity might cause a corresponding decline in the requirements for output of durable means of production. In the case of capital equipment, also, the existence of excess capacity at the moment when revival begins is likely to have more effect in retarding the revival of the derived demand than in the case of residential construction. Equipment can often produce up-to-date goods even though it is not itself completely up to date, or can do so with minor changes. Production of goods entering into general capital equipment, as

⁷ The precise figure is not essential. The ratio between total output of capital goods and consumers' goods clearly falls between these limits.

TYPICAL CYCLE PATTERNS

we shall see, shows the phenomenon of intensified fluctuation but not the large lead that characterizes construction work.

A further and very significant feature of this principle is that it does not require, to bring it into operation, that the original movements of ultimate consumers' demand shall be actual alternations of rise and fall. Fluctuations in the rate of growth are sufficient to start the process of intensification. These may then cause absolute rises and falls in the work of supplying the demand, or of supplying the durable equipment needed. And these in turn naturally bring about absolute rises and falls in total consumers' purchasing power, with resulting rises and falls in the actual observed demand for commodities in general. Thus this principle is of peculiar strategic importance in explaining how alternate rises and falls can be generated out of tendencies whose original form and character need not contain any positive shift from upward to downward movements. It may also be of some help in explaining the duration of the swings, in view of the time required for equipment to catch up with growing demand, or for demand to catch up with equipment. This matter of duration will be left for further study, when we shall be in a position to build this principle, as one element, into a more rounded theory. It does not in itself suffice to explain all the observed move-

STRATEGIC FACTORS IN BUSINESS CYCLES
ments, and its action is clearly modified by other factors.

Timing: Durable Luxury Goods

Another class of goods exhibiting some lead as compared to the general business cycle is that of durable luxury goods. For the purpose in hand this group may be broadened to include goods which may not in themselves be clearly luxuries, but which are of such a character that the buying of a new one at a given time to replace an old one which could be made to serve longer might fairly be classed as a luxury purchase in a considerable proportion of cases. The dominant commodity of this class is passenger automobiles, for the production of which monthly data are available. Some slight indications, however, point to the conclusion that fur coats and some other goods of this class behave in a somewhat similar way. However, not all these other commodities are bought on the installment plan to the extent that automobiles are, and hence effective demand is not so free to expand beyond present realized income. A given increase in consumers' current willingness to pay does not have the opportunity to cause to the same degree an intensified increase in gross production and sales of the goods themselves.

Passenger automobiles, like houses, are both a luxury and a necessity, though the luxury element

TYPICAL CYCLE PATTERNS

is presumably larger. The high-priced car is clearly a luxury; but so also are many replacements of moderate-priced cars, when made earlier than necessary. One would normally expect hard times to bring about a shift of demand from higher-priced to cheaper cars, coupled with a general postponing of replacements and new purchases. The purchase of a car is postponable; probably to a greater degree even than the provision of housing space. Most new cars are bought to replace used cars which still have a considerable amount of wear left in them. And if the car is a first purchase, the owner could usually get on a while longer as he had previously, without a car.

Furthermore, the credit system of purchase may bring it about that a given increase in consumers' monthly income devoted to this purpose can furnish the basis for a much larger immediate increase in effective demand for the product. This may ramify into a further increase in consumers' incomes before the original purchaser has liquidated his original obligation. If demand were steady, of course, the monthly flow of income into the payment of installments due would balance the monthly volume of new sales; but any fluctuation brings about a discrepancy, and the essence of this problem is fluctuations, especially the way in which initial fluctuations—which may arise from an indefinite variety of causes—produce cumulative effects which may bring about consistently repeated cycles of general busi-

STRATEGIC FACTORS IN BUSINESS CYCLES

ness activity. If the volume of installment credit is increasing, purchases are exceeding the volume of income currently absorbed by them; and *vice versa*, when outstanding installment credit is being liquidated. And either condition tends to give rise to a self-reinforcing movement. Purchases in excess of income tend to increase income somewhere in the economic system, via increasing production, while if purchases fall short of income, this tends to reduce income somewhere in the system by reducing production.

In any case, production and sales of passenger automobiles show not only fluctuations decidedly more intense than the average, but also a decided lead as compared with the general business cycle. The average lead is 3.8 months at the peak and 3.3 months at the trough, but in one cycle out of four recorded there is a lag of 7 months at the peak. Trucks show still more violent fluctuations and a decidedly smaller lead, especially at the peak. Here the prior impulse seems to come from consumers' goods.

The principle of a derived demand dependent on the *rate of growth* of the primary demand applies here as in housing, though to a less extent, since the stabilizing element of need for replacements is a larger part of the picture. Automobiles, being shorter-lived than houses, come that much nearer the type of currently consumed goods, and the ele-

TYPICAL CYCLE PATTERNS

ments of lead, and of intensification of fluctuations, would therefore both logically be less marked.

Timing: Consumers' Goods in General

Evidences of leads and lags as between consumers' and producers' goods in general are probably too slight to support conclusions as to definitely established patterns of behavior; but they do point in certain directions. The Standard Statistics Corporation's index of general industrial production shows a lead at the down-turn in two out of five cycles, as compared with the general business cycle, and a lead at the up-turn, also in two cycles out of five, while the various samples of retail sales point, on the whole, to a slight tendency to lag. Wholesale trade, with some irregularities, seems on the whole to move a trifle more promptly than retail trade; while the volume of production of consumers' goods shows some indications of moving more promptly than either wholesale trade or the production of producers' goods. It exhibits a clear lead of several months in the series compiled by Dr. Leong and this is quite consistent from cycle to cycle.⁸ To repeat, these indications are too slight and characterized by too many irregularities to afford a basis for definitive conclusions.

⁸ See "A Comparative Study of the Indexes of Production," *Journal of the American Statistical Association*, September, 1932, pp. 256-69, for a published version of this study, which version is not, however, put into the form of 'reference cycles' and 'specific cycles'.

STRATEGIC FACTORS IN BUSINESS CYCLES

These observations, as far as they go, tend to the conclusion that general consumer demand does not lead, but follows the movements in production of consumers' goods—that it moves up or down mainly because changes in the rate of production have increased or decreased the current purchasing power of the workers. This would leave the causes of the movements of production still to be explained. There is also clear indication that the relations of retail to wholesale trade, and of wholesale trade to production of the goods dealt in, are affected by fluctuations in dealers' stocks, and that dealers begin to go cautiously before the actual down-turn of consumers' buying. This is adequate to explain the lead shown by production of consumers' goods; and would also tend logically to make production fluctuate somewhat more than retail sales. But in view of the irregularities in the series, the inference that this happens in every cycle would be, to say the least, premature.

Production of producers' goods might logically show a similar lead but does not. This may be taken to indicate that the tendency to lead is neutralized by the lag due to the time required to finance and carry through capital expansions, and to carry output to completion.

It seems clear that we have at least two forces at work at the same time, playing into each other's hands, so to speak, and modifying or reinforcing each

TYPICAL CYCLE PATTERNS

other's action. Consumers' buying power depends on the rate of production: this is an ever-present and dominant factor from which there is no escape. Movements of dealers' stocks are less certain and regular. They may strengthen this major force or may partly neutralize it, but on the whole it seems probable that their effect tends to increase disturbances. When dealers buy faster than they sell, production tends to move faster than retail sales, and this is likely to mean that people are receiving more income than they are spending, and can promptly increase their expenditures, with cumulative effects.

Neither the records of consumers' income nor those of retail purchases are sufficiently complete to make possible a conclusion as to whether either leads the other. Movements of industrial payrolls seem to synchronize quite closely with those of retail sales. Industrial payrolls may be presumed to be more prompt in their movements than salaries or interest and dividend disbursements; and on this ground it might be presumed that total consumers' income lags somewhat behind the movements of retail sales, rather than leading them. But this would be conjecture, rather than a definitely indicated conclusion. Expenditure of income from speculative dealings in securities might well reverse it. Verification must await more complete figures. Of the fig-

STRATEGIC FACTORS IN BUSINESS CYCLES

ures available, many cover too few cycles to be very significant.

Timing: Industrial Production and Prices, Employment and Payrolls

Physical production of consumers' goods appears to reach its peaks and troughs ahead of the corresponding movements of prices. Producers' goods do not exhibit this phenomenon in unmistakable form, but they have another characteristic which bears a close family relationship to a lead. Physical production has its most rapid increase in the first part of the up-swing, the rate slowing down before the peak is reached, while the financial volume of production is swollen by rising prices at a fairly uniform rate throughout the rise. Not all producers' goods show this phenomenon; bituminous coal production increases more rapidly in the final phases of the up-swing, anthracite coal shows an even rate of increase throughout, and coke shows only a mildly greater rise in the early phases of the up-turn than in the later. Zinc shows an even rate of increase, lead behaves rather ambiguously, while oak flooring, lavatories and baths show a lead at peak and trough rather than any changes in the rates of increase or decrease during expansion or contraction. Pig iron production (observed for 13 cycles), steel ingots (3 cycles), copper (8 cycles), Portland cement (3 cycles), and machine-tool shipments (4 specific cycles

TYPICAL CYCLE PATTERNS

covering 5 reference cycles) all show a more rapid increase in the earlier stages of the expansion period. Fabricated structural steel shows both a lead and a more rapid increase in the early stages of the expansion period. The general curve of industrial production also shows a definite tendency toward a greater rise in the early stages of the expansion period.

Figures of factory employment seem to show a similar tendency toward greater increase in the early phases of the expansion in the average cycle pattern, except for the Federal Reserve Board's series, covering only three cycles. But this behavior is not consistent from cycle to cycle, and hence cannot be regarded as a well-established feature of the typical cycle. One might anticipate a less marked tendency in this direction in these employment series, presumably because they include consumers' goods. Payrolls, on the other hand, show on the whole the opposite tendency; that is, they increase slightly more rapidly in the later stages of expansion, and decrease slightly more rapidly in the later stages of contraction. These tendencies do not appear in all cases. But in the New York State factory employment and payroll indexes, where the figures are presumably comparable, covering the same four cycles, employment shows a large and definite tendency to rise more rapidly in the early phases of expansion, and payrolls a small but definite tendency to rise more

STRATEGIC FACTORS IN BUSINESS CYCLES

rapidly in the later phases of expansion, indicating probably a considerable lag in the response of wage rates. This is complicated, however, by the factor of part-time and over-time. A more widespread policy of splitting up employment by shortened work-days in dull times might alter the character of this curve. Numbers employed would be prevented from falling so low in mid-depression; and hence would naturally not rise so steeply in the early stages of expansion. Thus the shape of the curve might be reversed. But this policy does not seem to have been carried far enough to transform the curve, in the recorded cycles.

This behavior of payrolls sheds some light on the theory that depressions are due to a failure of industry to increase its distribution of incomes as fast as its output of consumers' goods. Apparently there is such a discrepancy during the up-swing of the business cycle, but it is on the whole slightly greater during the early part of the rise than during the later part. If this is an important factor in bringing on the recession it must be delayed in its action, being temporarily neutralized perhaps by expansion of stocks and perhaps by expansion of credit, so that its effect comes to a head when these neutralizing factors have exhausted themselves.

The question arises: do these facts indicate that producers' goods have greater initiatory importance than consumers' goods, since it is in producers' goods

TYPICAL CYCLE PATTERNS

that a preliminary tapering-off of rates of growth manifests itself before the general recession? The inference seems natural, but against it stands the fact that this tapering-off is on the average slight, and the further fact that it does not affect payrolls and hence involves no corresponding tapering-off of personal incomes. Nor does it govern the movement of prices. It is an interesting symptom, but the evidence at hand does not prove that it is in itself an important causal factor in the typical cycle pattern. In this respect the lead in physical production of consumers' goods is probably more significant. But it does seem significant that, for a given class of goods, it is at the stage farther removed from the consumer that the initiatory movement takes place—that is, at the stage of production rather than retail selling—if the available figures are representative.

Stocks of Goods

The story told by stocks of goods is decidedly confused. In a general way, those nearer the consumer tend toward a positive correlation, rising as business rises and falling as business falls, while those nearer the source of production show the opposite tendency. In the first group may be named department store stocks, cotton at mills (with a large lag) and steel sheets, while in the second group are petroleum, cement, iron at furnaces, sugar and refined copper. The line of division is none too clear, and some

STRATEGIC FACTORS IN BUSINESS CYCLES

stocks follow a more complicated pattern. Cotton in warehouses fluctuates far more than cotton at mills, and as compared with the latter may about equally well be regarded as an inverse cycle with a large lead or a positive cycle with an equally large lag. As compared with cotton consumption, cotton in warehouses shows an inverse cycle with a definite lead. The inverse cycle is natural, since the growing of cotton does not follow the cycles of manufacturing activity that govern its consumption; hence active manufacturing tends to draw down the stocks. The apparent lead may point to a delayed reaction of manufacturing activity on cotton growing. A depression may lead to reduced cotton-planting which would not take effect on the crop until near the peak of the next expansion.

In the cycle culminating in 1929, stocks of goods seemed on the whole to show positive cycles, indicating a behavior tending to intensify fluctuations of consumers' demand in the process of passing them on to the producers of goods and materials. That is, in the boom, producers were working not only to supply an active consumer demand, but to increase stocks also. This may further indicate an unusual piling-up of unsalable stocks in the prosperity phase of the cycle: in other words, literal 'over-production' such as is not commonly found. If this behavior were more marked in this most recent cycle than in previous cycles, this fact would constitute one factor

TYPICAL CYCLE PATTERNS

contributing to its unusual violence and persistence. Stocks which show a negative correlation would seem to have the opposite effect: that is, they would seem to be used to make ultimate production more stable than volume of consumers' purchases. They would indicate that producers work to stock when demand is slack and so maintain employment. In few instances do stocks appear to be so handled as to produce a genuine stabilizing effect of this sort for an industry as a whole, whatever single enterprises may do. The movements of stocks thus seem to have, on the whole, an unstabilizing influence, tending to intensify fluctuations of business activity. This is an influence responding to business moods and susceptible of control by business policy, not wholly governed by physical forces. But the total volume of stocks, at those points where they show a positive correlation with production, is typically not large; so that there may well be doubt whether their fluctuations, when compared with the annual output, produce a decided effect on the typical business cycle.

Some effect there probably is, but the data do not suffice for an estimate of its importance in quantitative terms. Statistics on stocks need to be fuller and especially to be more differentiated, so as to show separately stocks of materials in the hands of those who are waiting to sell them, and in the hands of those who have bought them and are waiting to use

STRATEGIC FACTORS IN BUSINESS CYCLES

them in further production; also stocks of intermediate products and finished goods classified on similar principles, distinguishing, so far as possible, finished products in the hands of manufacturers, wholesalers and retailers. If possible, a line should be drawn between stocks whose amount registers a willingness to buy and those whose amount reflects inability to sell. The 'consumer's inventory' of durable goods is not to be ignored but will be difficult to reach statistically.

Timing: Dealings in Securities

The stock market is generally credited with being one of the leading forces of disturbance, and if priority of movement is the criterion the evidence of its complicity is strong. In this field data are available for systematic analysis of a larger number of cycles than is possible for many other classes of data, and the type of behavior indicated may be regarded as correspondingly well established. It is a pattern with considerable diversities of timing; but not sufficient to destroy the well-marked type-form.

Volume of sales of stocks exhibits, on the average, about a quarter-cycle lead as compared with the general business cycle. This means that on the average sales reach their maximum mid-way in the up-swing of the general cycle; but in point of fact, this peak sometimes occurs near the beginning of the general up-swing, sometimes near the end, and in

TYPICAL CYCLE PATTERNS

1929 it occurred a few months after the down-turn of general business. This last, however, was exceptional behavior, characterizing a very exceptional cycle. Dealings in bonds show an even greater lead.⁹

Prices of securities lag behind volumes of sales, but lead as compared with the general business cycle. Prices of preferred stocks and of bonds (the latter taken as the inverse of bond yields) show approximately a quarter-cycle lead; those of common stocks a smaller lead. In other words, the volume of sales runs high during the boom that carries prices up to their top level. The lag of common stocks as compared with bonds records the well-known shift from the less speculative to the more speculative securities as the boom proceeds, and the return to more conservative issues as depression deepens.

The large lead exhibited by dealings in stocks places them in a class with construction and the various special series directly related to it. There is, in particular, a rather remarkable and suggestive similarity between the average cycle pattern for sales of stocks and of fabricated structural steel. In both cases there is a lead of about a quarter-cycle as com-

⁹ This series may also be represented as an inverse cycle with a short lag, though this would tend to obscure the relationship between the movements of bond and stock sales. In the separate cycles the typical behavior (about one-third of total cases) is a lead of one cycle-stage in bond sales as compared with stocks (each cycle being divided into eight stages). About an equal number of cases show a larger lead, and almost none show an unmistakable lag.

STRATEGIC FACTORS IN BUSINESS CYCLES

pared to the general business cycle. In both cases the peak regularly comes at some time during the up-swing of general business, but at different times in different cycles, with the result that the composite picture (the average cycle pattern) shows a plateau instead of a peak. In both cases the trough comes, on the average, about midway of the down-swing of general business. And in both cases there is one cycle showing an exceptional behavior. In the 1921-24 cycle fabricated structural steel shows a double peak, the higher one occurring midway of the down-swing of general business. The inference is that special conditions during our immediate post-War reconstruction lent greater persistence to the upward movement, much as special conditions in 1927-29 prolonged the stock market boom past the peak of general business, contrary to the usual behavior of stock exchange trading. If priority of sequence is valid evidence of causal responsibility, the case against stock speculation is strong.

The *rationale* of the connection between stock speculation and the general business cycle may seem self-evident, but it is not utterly simple. Stock speculation, like other things, may appear as both cause and effect. And for at least one essential feature of the story factual evidence is badly needed. A revival in the securities markets has been construed as a direct result of business depression, in that business has so little need or productive use for funds that

TYPICAL CYCLE PATTERNS

they flow into the market for securities already outstanding—first favoring the least speculative issues, as befits the mood of the moment. Money at such times is cheap. This condition implies that savings are in excess of investment, in the Keynes terminology. This is not because savings have increased, but because investment has fallen off so much more sharply.

The upward movement of securities tends, of course, toward revival of business confidence, and is in turn stimulated further by such a revival. As it continues, it produces several effects. The strengthening market makes the issuance of new securities more attractive, at the same time that reviving confidence and business activity increases the desire and need of corporations to obtain increased capital by new issues. Possibly the time this process requires may be one reason why the forces of supply and demand in this case, instead of working toward an equilibrium, operate with an initial inertia and a final momentum that regularly bring about over-swings.

The growing speculative demand for securities operates with borrowed funds to a far larger extent than the original conservative demand for the less speculative securities. It is the stock-speculator who deals on margin more than the bond-investor. Thus the demand for securities is one of the growing group of demands which tends to outrun the volume of

STRATEGIC FACTORS IN BUSINESS CYCLES

funds taken currently for the purpose from the personal incomes of the purchasers. Business and the stock market are now competing for funds, and money rates rise, but the profits of a rising stock market are so attractive that the rising money rates do not promptly check the speculative demand, though ultimately they may help to do so if the movement is of the ordinary sort and has not gone beyond the control of the forces of reason as did the boom of 1928-29. Call money rates seem to be highest typically after the peak of stock prices and on the decline, and often register the urgency of threatened speculators struggling to hold on.

To use the concepts employed by Keynes, a rising stock market is initiated in a period in which savings almost certainly exceed investment: the same condition that, in his theory, brings about a low general price level.¹⁰ And the reaction occurs at a time when investments presumably exceed savings: the condition which, according to the Keynes theory, brings about high general prices. This latter discrepancy is probably intensified by the use of some part of the stock market profits to purchase consumers' goods; though there are no data to test whether such a movement exists, or how great it may be.

The behavior of the stock market in the last cycle

¹⁰ See pp. 88, 91 for discussion of the probabilities as to the relative behavior of savings and investment. The writer's conclusion on this point does not rest on statistical evidences, for he has found no adequate evidence bearing on the question.

TYPICAL CYCLE PATTERNS

was out of the ordinary in that the stock market boom went to fantastic and irrational heights in 1929, and continued extraordinarily long. Instead of beginning to subside well before the general business peak, it continued upward, tending presumably to reinforce the peak of general business, and did not reach its peak until several months after signs of a down-turn in general business were recorded. Thus, so far as speculation is a causal factor, it did its utmost to make the last cycle unusually violent.

Timing: Agricultural Production and Prices

The timing of agricultural activity is markedly different from that of industry and trade; and while it shows no regular leads or lags it should be treated in connection with the general subject of timing, especially as various theories have traced the origins of the business cycle to agricultural fluctuations. Agriculture appears to have its own cycles, whose timing has no clear or regular relation to the cycles of general business. This is true whether we consider physical production, prices at the farm, or the product of the two, which may be taken to measure the total purchasing power which agriculture generates and has to offer in the general market. Agriculture sometimes moves in harmony with the general business cycle, sometimes in the reverse direction and sometimes in quite an unrelated way. One writer has added a third element to the analysis

STRATEGIC FACTORS IN BUSINESS CYCLES

by calculating the total purchasing power of agriculture *in terms of non-agricultural products*; and with the help of this quantity has attempted to establish an Agricultural Theory of Business Cycles.¹¹ But the correlations remain fragmentary and unconvincing.

This does not mean that agriculture has no effect on the business cycle, or no responsibility for its occurrence; far from it. It simply means that agriculture is not a regularly acting force, tending typically and regularly to help initiate the recovery, or stimulate the revival, or in any other way to play habitually the same role in at least a predominant number of cycles.

But a theory of business cycles must be concerned not merely with forces arising within the cycle itself, or in regular timing with it, but also with forces arising outside the regular course of the general business cycle and of a random character in respect of timing relative to the phenomenon we are studying at present. We live in an economy exposed to such 'random' forces; and one in which many kinds of disturbance tend not to be self-limiting at once, but to act in a cumulative and self-reinforcing way for a considerable time and until the movement has gone so far that a return swing naturally follows. Without this characteristic of our economic system,

¹¹ See an article under that title by M. D. Anderson, *American Economic Review*, September, 1931, pp. 427-49.

TYPICAL CYCLE PATTERNS

there would in all probability be no cycles, but merely random fluctuations. If, being what it is, the system were exposed to no 'external' or 'random' disturbances, it might in time reach a state of equilibrium in which again there would be no business cycles. This last is an unprovable conjecture; but whether true or not, the cycle as we know it is the resultant of the combination of random disturbances and an economic system which transmits their effects cumulatively. There may also be forces which do not fit well into this twofold classification; but in any case, both the 'random' and the strictly cyclical forces are to be regarded as of the essence of the actual phenomenon. The random forces are not to be disregarded merely because there is no discernible correlation between their timing and that of the business cycle itself.

They may, indeed, include those causes which have the most obvious claim to be regarded as originative in character; though this means little more than that they originate outside the endless circle of causes and effects set in motion by the business cycle itself. They are presumably originative only from the standpoint of our somewhat arbitrarily delimited problem. In their own nature they are no more aboriginal than any other forces we can discover—they in turn have their causes.

There are perhaps two main ways in which agricultural fluctuations may logically be supposed to

STRATEGIC FACTORS IN BUSINESS CYCLES influence the general course of business. One is that plentiful and cheap raw products are a stimulus to the activity, or at least to the profitableness, of the industries using them. Among the relationships of this sort which could be traced are those between wheat and flour milling, meat animals and slaughtering and meat packing, wool and woolen manufacturing, hides and leather products, cotton and cotton textiles. However, the cyclical fluctuations of factory employment in food products are so very slight that apparently the total disturbing influence that can be traced to agriculture in this branch of manufacturing, at least, is of superficially negligible magnitude. It is, of course, conceivable that outside disturbances of tiny magnitude are all that is required by the type of business cycle theory indicated above.

The other way in which agriculture would logically be expected to influence general industrial and commercial activity is by means of the greater or less purchasing power that it throws into the market for consumers' goods and farm equipment. The effects of this element in the total flow of purchasing power are not easy to isolate. Production and sales of farm equipment might be segregated, and general retail sales in rural districts would throw light on the matter. Mail-order sales, supposed to go largely to farmers, are apparently more influenced by the general business cycle than by agricultural conditions,

TYPICAL CYCLE PATTERNS

though analysis of these sales by districts might reveal a more positive dependence on the prosperity of the farmer. In any case, this theory of the effect of agricultural purchasing power is somewhat discounted by the possibility that the increase in farmers' purchasing power is partly at the expense of that of other groups. This is especially probable so far as farmers gain through increased prices of their products. Agricultural prosperity is likely, however, to increase the power of farmers to buy equipment on credit without subtracting an equal amount from the corresponding power of other groups. And we must remember that small impulses of this sort may still be important. To sum up: the influence of agriculture on general business is not traced in the data so far analyzed but may be susceptible of some degree of tracing by additional studies.

Timing: Foreign Trade

Foreign trade in relation to American business cycles contains elements of both cause and effect. Our imports respond quite closely to our domestic business cycles. Increased industrial activity here augments demand for raw materials from abroad, while the resulting prosperity enhances our buying power, part of which flows to imported products. Capital funds might naturally be expected to flow increasingly to this country when it is in a business

STRATEGIC FACTORS IN BUSINESS CYCLES

boom, thus balancing and making possible an increase of commodity imports, relative to exports.

Exports are subject to a complex of forces arising both here and abroad and affecting different products differently. However, as might be expected, there is a considerable degree of general correspondence between the movements of our exports and the course of general business cycles in the importing countries. These cycles are, as is well known, longer than ours and differently timed. Though major disturbances affect the entire industrial world to a considerable extent, still, seldom or never are all the main countries to which we export simultaneously in the same stage of their business cycles as we are in ours. And some of our largest exports are of a sort to be affected by our own agricultural productiveness as well as by changes in foreign demand. Hence it is natural that exports, while showing some slight correspondence with our business cycles, show a still larger measure of independent action.

Fluctuations in export demand, as distinct from fluctuations due to larger or smaller supplies of exportable products in this country, are an element in stimulating or depressing domestic production and trade. And they are, to a considerable extent, among the random or irregular forces. In the decade following the World War our balance of trade was subject to conditions which were not only radically different from those prevailing before the conflict, but also

TYPICAL CYCLE PATTERNS

decidedly abnormal in the sense that there is little or no possibility of their continuing and constituting a state of equilibrium, even of the moving variety. The sudden reversal of our position from a large debtor nation to a creditor nation, closely rivalling Great Britain, created a situation such that an export balance of commodities, to which our economy is accustomed and geared, was sustained only by continued and large exportation of capital funds, largely on what may fairly be called a distress basis. Europe was not borrowing on the normal basis of increasing productivity in an economy sound and solvent to start with, which could therefore make its borrowing self-sustaining with no ill effects.

This condition could not, in the nature of the case, go on indefinitely. Either foreign borrowing power would become exhausted or the amounts due us on interest account would pile up to a point at which our export balance of goods would be cut down, and ultimately be turned into an import balance. In fact, a sharp break was brought about as a result of our own exaggerated stock market boom, which attracted funds into our stock market both from this country and from abroad. This weakened the financial structure abroad, already working on too slim a gold margin; and brought into the foreground the disturbing fact that foreign countries owed amounts on short time which, if called in, could not be paid and could wreck their financial

STRATEGIC FACTORS IN BUSINESS CYCLES structures completely. While this was the more serious effect, a more immediate one was the cutting down of our exports of goods. This movement occurred prior to the decline of imports and of business in general; and this order of sequence was unusual, since our imports usually move more sharply than exports in response to our domestic state of expansion or recession. This initiatory decline of exports must be reckoned a special contributing factor in the present depression.

Timing: Banking

In the field of banking, clearings and the volume of deposits show a lead in the average cycle pattern, as is natural in view of the large part the stock market plays in the demand for credit and in the volume of payments in large clearing centers. Interest rates, on the other hand, tend to lag, especially at the downturn of the general business cycle. It is perhaps significant that loans and discounts in general show a lead as compared with interest rates. One conclusion that may be drawn is that interest rates are more a passive than an active or originating factor, though it is pertinent to add that high interest rates at the peak and just after may have some effect in starting trade downward, while easy money in the early stages of a revival may be an important facilitating cause.

In the last cycle, the timing was different from this general type. Interest rates led general business

TYPICAL CYCLE PATTERNS

slightly on the 1927-28 up-turn and on the 1929 down-turn, while loans and discounts showed no lead on the up-turn and lagged on the down-turn. Thus interest rates in this case led loans and discounts. The fact that they were declining sharply before the peak of the stock market boom indicates that the repressive force of the credit system was relaxed rather than tightened at the point where expansion was becoming critical. Funds from non-banking sources were pouring into the call-loan market in ways which the bankers felt themselves unable to control.

Corporate Incomes

Net earnings of corporations are available for five cycles, not counting that beginning in 1928, but two are disturbed by the War and the immediate post-War deflation. Of these, the cycle of 1914-19 shows a rise in net earnings throughout the course of the general business cycle, while that of 1919-21 shows a decline throughout, both for the totals and for most of the separate industrial groups. Of the other three cycles, all exhibit quite normal behavior, except that in one case—in 1912—this series lags behind the down-turn of general business. Corporate incomes fluctuate with the general business cycle, but much more intensely, the slump from the peak of 1929 being especially cataclysmic. All this is natural and well known. The chief peculiarity of the post-War

STRATEGIC FACTORS IN BUSINESS CYCLES

period is revealed in the record of the construction industry, where corporate incomes showed an uninterrupted rise through the two cycles 1921-24 and 1924-27, and then declined almost throughout the succeeding cycle. In other words, this industry, as we have already seen, rolled three cycles into one, with a length of ten years or more. The non-availability of monthly figures of corporate incomes is undoubtedly responsible for the fact that they do not show the short-cycle movements which appear as slight interruptions of this long-cycle swing in the figures for contracts awarded.

The behavior during the War period serves to indicate that corporate incomes are affected by price movements as well as by the fluctuations of trade activity: that is, by those larger price movements which go beyond the very moderate cyclical ups and downs. The latter amount to about ten per cent on the average. The up-swing of prices from 1919 to 1920 brought no corresponding rise in corporate incomes, possibly in part because of an unusually large rise in wages.

Dividend and interest disbursements, as is well known, are far steadier than corporate incomes, surplus and undivided profits being so used as to act as equalizers. Of the last thirteen general business cycles (omitting that beginning in 1928) four do not appear at all in the dividend records, indicating that reserves are sufficient to iron out minor depressions

TYPICAL CYCLE PATTERNS

completely. Dividends show a marked cyclical lag (as might be expected) and also a strong up-trend. In the last depression they actually increased for a short time after the general business curve had started downward, and maintained themselves for well over half a year before the depletion of reserves forced them to follow the general downward swing. While these figures may not be highly accurate, the character of the story they tell is so strongly marked that it can hardly fail to reflect the general run of the facts.

General Conclusions as to Timing of Series

Some general conclusions may at least tentatively be drawn from the timing of the various series. Some of the apparently conflicting tendencies may be partly reconciled by the proposition that, as between goods of similar durability, consumers' goods tend to move more promptly. But as between long-lived and perishable goods, the long-lived goods appear to take the lead. Construction, especially residential construction, shows a great lead. Automobiles, especially passenger cars, show a lead. Production of consumers' goods appears to move ahead of sales for consumption, and there are some indications that wholesale trade leads retail. Thus there is some ground for a tentative conclusion that, as between the same goods at successive stages of production and distribution, the stages farther removed from con-

STRATEGIC FACTORS IN BUSINESS CYCLES

sumption show the prompter movements. This proposition, however, is not to be regarded as definitively established. Movements in purchases for consumption are, in the nature of the case, a dominant force; but we have seen that even if impulses originate here, the relation between consumers' purchases and the production of goods is such that the resulting movements in the production of goods to meet the purchases may behave in the way described as 'leading', the effect appearing to precede the cause. But this productive activity also governs consumers' incomes, becoming in turn a cause returning on itself with intensifying force. The actual expansions and contractions of consumers' purchases are largely results of changes in productive activity.

Another indication is that bank rates are acted upon more than acting, with a possible exception in the last cycle. Movements in volume of bank credit initiate the conditions bringing about changes in the rates. These movements in volume of credit may at times act as initiating forces, as when idle funds tend to stimulate the markets for securities, but it is not so clear that they act in this way directly on the actual work of producing and selling commodities. Here the volume of credit seems to respond in the main to the demands of the volume of trade. It is an important enabling cause or condition, but hardly an initiating one in the typical case. And experience points to the conclusion that the power of

TYPICAL CYCLE PATTERNS

bank rates, and indeed of other banking weapons of control, is rather limited in face of the large task of stimulating business when it is depressed, or repressing it when it is stimulated.

Some still more general points may be noted. Physical production series of the more general sort show a very widespread tendency to a short lead on the up-turn of the general business cycle, with a very slight rise toward the end of the cycle.

Series for prices and sales show only slight and spasmodic traces of this feature, except for commodities already noted as having a special tendency to lead. And series representing incomes, payrolls and dividend and interest disbursements do not show it at all. Whatever the impulse to revival in the general economic field, it seems to appear earliest in physical production.

Further development of some of these points may wait until we have examined the evidence that may be drawn from the amplitudes of the fluctuations, as distinct from their timing.

Amplitudes of Fluctuations: Production

In production three groups stand out: construction and related industries, automobiles and producers' goods in general. In these three groups are to be found the great bulk of the fluctuations in production that are above the average in amplitude. Professor Mitchell has estimated that about one-

STRATEGIC FACTORS IN BUSINESS CYCLES

sixth of our normal national income goes into the production of producers' goods (capital equipment and non-residential construction, including public works). The addition of residential housing construction and automobiles would bring the fraction up to the neighborhood of one-fourth.

The average cyclical fluctuations of these series as a group can best be judged from their behavior during different stages of the 'reference cycle' or general business cycle, since in some of these branches of production their own individual cycles show considerable irregularities of timing. On this basis they consistently show fluctuations well above the average for all branches of production, and they contain among them (along with closely related series) substantially all the production series that show such exceptionally large fluctuations. This last fact, together with the further fact that these series contain some of those most consistent in their timing, tends to the conclusion that the aggregate impact of the fluctuations of these groups is of peculiar weight and importance. Indeed, if one adds its secondary and tertiary effects, ramifying through the business system, it may well dominate the general movement.

Accurate measurement of the aggregate fluctuations of this group of series would require the construction of special indices for the purpose. Such analysis as the present writer has been able to make, using the existing series, leads to the conclusion that

TYPICAL CYCLE PATTERNS

the aggregate fluctuations of this group, conservatively estimated, are certainly not less than 30 per cent on the average of the upward and downward movement.¹² This in itself would account for a fluctuation of 6 to 7 per cent in the national dividend, in commodity terms; without taking account of its secondary reactions on the production of other types of goods.

In striking contrast to these large disturbances are the very moderate fluctuations in the physical volume of retail trade. Copeland's index of retail trade for the three cycles 1919-27, deflated by a cost-of-living index number, indicates fluctuations of approximately 7 per cent, 5 per cent and virtually zero, or an average of a little over 4 per cent. As indicated by Dr. Kuznets' study¹³, the physical volume of wholesale trade probably fluctuates more than this. In view of the pitfalls involved in measuring physical production by deflated dollar values, no great importance should be attached to these precise figures; but the general range of magnitudes they indicate is clear. Production of producers' goods fluctuates vastly more than retail trade.

But when we turn to the estimates of physical volume of production made by the National Bureau

¹² For details of this analysis, see the Appendix at the end of this volume.

¹³ Simon Kuznets, *Cyclical Fluctuations: Retail and Wholesale Trade, United States, 1919-25* (New York, Adelphi, 1926).

STRATEGIC FACTORS IN BUSINESS CYCLES

of Economic Research, classified into consumers' goods: durable, semi-durable and non-durable; and producers' goods: capital equipment, durable goods and non-durable goods, we find that the intensity of cyclical fluctuations apparently depends not so much on whether the goods are for consumers or for producers, as upon their durability. The figures cover the period 1922-29, by whole years. While they are not comparable with the more elaborately analyzed cyclical series, they show that durable goods in both major groups, including capital equipment, experienced cyclical fluctuations several times as great as non-durable and semi-durable goods.

The conclusion that a major part of the responsibility for the business cycle focuses in this group of industries does not mean, of course, that the impulses responsible for movements necessarily originate there; for the chain of causes is endless. But if in any way this group of productive activities could be regularized, it would seem that the business cycle would be reduced to proportions that would no longer constitute a major evil in our economic system.

Any attempt to deal with these disturbing elements must take account of the conditioning factors of credit and capital funds which furnish the purchasing power to sustain these movements, and of the corresponding movements of prices for the particular commodities making up these groups. In

TYPICAL CYCLE PATTERNS

general, the movements of volume of security trading, of prices of securities, and of new securities issued, are such as would be expected, showing large positive fluctuations, with volume of security trading showing a large lead and security prices a smaller one. Available data on new securities issued indicate an exceedingly strong cyclical movement. As to prices of commodities, parallel tables of prices and of physical volumes of production, made up of identical commodities, would make possible interesting comparisons, which would reveal whether prices of the various types of goods move in harmony with physical volumes of production. They might also throw some light on the question whether the movements of prices are obstructed in some instances by artificial policies of stabilization, and whether prices are thus stabilized at the cost of allowing a greater fluctuation of output than would take place if prices were allowed to move in a more natural way as demand fluctuates. Competent observers have no doubt that this has been happening during the recent great decline in business.

The reasons why the group of products with which we are dealing shows more violent fluctuations than the average have already been dealt with. They rest mainly on the durability of these classes of goods and secondarily on the fact that wherever the volume of durable producers' goods increases in response to an increasing demand from consumers, it requires

STRATEGIC FACTORS IN BUSINESS CYCLES

a larger percentage increase in the immediate flow of production of new producers' goods to bring about a smaller percentage increase in the total volume of such goods in the hands of those who use them. For the same reason the current production of durable producers' goods ordinarily increases by a larger percentage than the flow of products to the ultimate consumer. The total effect is summed up in saying that fluctuations in consumption, or in consumers' current expenditures, are passed on in the form of more intense fluctuations in the producers' expenditures on the durable means of gratifying these consumers' demands; and even changes in the rate of growth of consumption may bring about positive ups and downs in the resulting expenditures of producers. Since each expenditure constitutes someone else's income, the result is a widespread fluctuation of incomes and a corresponding fluctuation in consumers' subsequent expenses. Thus slight disturbances are self-multiplying.

On the side of the supply of funds to finance the expansion of producers' goods, there is the probability—which may be taken as a moral certainty—that as the national income increases in the up-swing of the business cycle, consumers' expenditures increase less rapidly than the total income, and savings available for expenditures on producers' goods (or for advances on the making of durable consumers' goods) increase more rapidly. But the most decisive

TYPICAL CYCLE PATTERNS

factor on the side of purchasing power is the elasticity of the credit system, since it makes possible increased expenditures for producers' goods without correspondingly limited outlays for consumption—in short, an increase in total expenditures not limited to income derived from previous production. When credit contracts, the opposite effect is produced. The importance of this factor cannot be overestimated as an essential link in the chain of causes bringing about cyclical expansions and contractions of general business.

Thus the intensified fluctuations in these groups of goods are susceptible of rational explanation. And this machinery of intensification may be regarded as one of the primary causes of the character of the typical business cycle.

Amplitudes of Fluctuations: Incomes

Contributory to this whole situation is the fact that wages and salaries fluctuate less than the total national income, and profits more. Thus in a time of great activity, wages and salaries constitute a smaller fraction of the increased national income than in a time of depression. And while an increased part of the profits is put into reserves in prosperous times, even this is not hoarded as cash, but is invested—in equipment, inventory or securities. It constitutes a part of the disproportionate flow of social

STRATEGIC FACTORS IN BUSINESS CYCLES

income into producers' goods which takes place in the period of prosperity.

These reserves furnish a margin which makes possible the stabilization of dividends, and their intensified fluctuations constitute the reverse side of the stable-dividend policy. And it is evident that the result is not to stabilize total purchasing power, but rather to concentrate the fluctuations on the kinds of things corporate surpluses are spent on, or invested in. In the first instance, the income distributed to consumers in the form of dividends is stabilized; but, as we have seen, the unstabilized activity in the creation of producers' goods results in violent ups and downs in the incomes of a quite different group of consumers. So the total of consumers' income in the nation still fluctuates. And the total flow of purchasing power into goods of all sorts may conceivably fluctuate quite as much as if there were no such attempt at stabilizing that part which flows through the channel of dividend payments.

These are factors the relative amplitudes of whose fluctuations would tell us far more than we now know, if only we could measure them with sufficient comprehensiveness and precision. Do consumers' expenditures fluctuate more or less than personal incomes? Do savings and expenditures for producers' goods follow a parallel course, or are there important discrepancies? Do savings exceed expenditures for producers' goods during recession and depression,

TYPICAL CYCLE PATTERNS

and do expenditures for producers' goods exceed savings during expansion and prosperity? To these questions no exact statistical answer can be given.

In the first place, production of goods fluctuates more than incomes disbursed to individuals. This class of income (estimated by years only) appears to fluctuate approximately as much as retail sales, though the lack of monthly figures of income makes a close comparison impossible. However, there is *a priori* reason for believing that consumers' expenditures on the whole fluctuate slightly less than personal incomes and that savings fluctuate more, while expenditures on capital fluctuate more than savings, and total expenditures of all sorts fluctuate more than income. This last proposition is supported by the way in which credit expands in boom times, indicating an increase of actively used purchasing power in excess of income. But the question is complicated by the ambiguous character of purely speculative gains, which should probably be reckoned by themselves as a kind of income separate from that derived directly from the processes of production. As to the greater steadiness of consumers' expenses, the conclusion is supported by the general fact that the production of consumers' goods fluctuates less than the comprehensive index which includes both consumers' and producers' goods, while retail prices of consumers' goods fluctuate less than the average of all prices.

STRATEGIC FACTORS IN BUSINESS CYCLES

But there are cross-currents and eddies in the movement. Some with a liberal margin of income may spend pretty much according to their desires and let the fluctuations of their income show mainly in their savings; and others with no margin at all may be forced to draw down their savings or buy groceries on credit, or both, as soon as depression reduces their income. All these are spending more steadily than they are earning.

At the same time others are accused of hoarding or are said to be skimping consumption during the depression and saving to the utmost while they still have jobs, because they do not know how soon they may join the ranks of those without incomes. And others are tempted into bargain hunting in the security markets. Still others are making the payments due on goods bought in better times on the installment plan, and making no new installment purchases. These are all spending less steadily than they are earning, increasing their savings or reducing their indebtedness at just the time when incomes are falling off.

There seems little doubt that the main current is made up of those who spend more steadily than they earn, and that those who earn more steadily than they spend constitute an eddy or group of eddies not sufficient to neutralize the main drift. There may be an initial stage in a depression in which consumers' purchases of postponable goods and luxuries

TYPICAL CYCLE PATTERNS

shrink more than their incomes, and this stage may be important.¹⁴ But once the depression is well under way, incomes in general shrink more than the possible amount of these easy economies in luxury buying. The funds free for investment bargain hunting are scant, as witnessed by the continued low prices of securities; and as for hoarding by those who still fear to lose their jobs, they have little enough money free for that. Funds free for reducing installment indebtedness are also necessarily limited. Hence, in default of fuller and more accurate statistics we may provisionally assume that consumption (or rather consumers' current expenditures for consumption goods) is steadier than personal income.

The statistics further bear out the logical conclusion that this relative steadiness is mostly found in the realm of necessary and perishable goods. Durable goods, and moderately durable goods in the luxury class, show great fluctuations. These are the goods in which a shrinkage of income causes the heaviest contractions of expenditure. In fact, goods may be divided into two classes: those in which expenditures are steadier than income and those in which they

¹⁴ Dr. W. I. King considers this the dominant movement, holding that expenditures fluctuate vastly more than incomes and that this is the chief 'immediate cause' of business cycles. (*Proceedings, American Statistical Association*, March, 1932, especially pp. 222-4.) It is unfortunate that there is not adequate statistical evidence to test either this proposition or the other which seems to the present writer more probable.

STRATEGIC FACTORS IN BUSINESS CYCLES

are less steady. The second class includes capital goods as well as durable consumers' goods and luxuries. If all goods were in the first class, business cycles would be, at most, mild affairs. The conclusion seems inevitable that the main responsibility centers in the second class of goods.

They are also (as already noted) the goods in which a loss of confidence, or a weakening of the mood of optimism characteristic of a boom period, may cause a contraction of expenditures even before incomes have actually begun to decline. To this extent they may be regarded as active or initiating factors in the movements of general business activity. Even at this point in the cycle, however, though some consumers may decrease their purchases of some commodities before their individual incomes begin to shrink, there is likely to be some prior shrinkage of production and income in those branches of business which show the greatest lead in the average business cycle pattern.

The fact—if it be a fact—that expenditure for consumption is steadier than production and income may represent one of the forces setting limits on the cumulative effects of disturbances, which have been noted as one of the central causes of the cyclical behavior of business. If every reduction of productive activity at any point caused an equal reduction of expenditures, diffused throughout the economic system, resulting in a further reduction of

TYPICAL CYCLE PATTERNS

production and so on, there would be no logically assignable limits to the lengths to which such contraction could go, short of a breaking-away from the profit system and a shift to one of self-sufficing production or barter. It is significant, indeed, that precisely this has happened, locally and on a small scale, in the present emergency.

But if a reduction of production, and of income, is followed by a *smaller* reduction of expenditures, then the series of derived effects is a dwindling series of the type which should have a finite, not an infinite sum. If, for instance, a contraction of production were followed by a contraction of expenditures only one-half as great, then the sum of an infinite series of such reductions would result only in doubling the amount of the original contraction. And if we imagine business at any moment suffering from the first phase of one original contraction, plus the second phase of an earlier one, plus the third phase of a still earlier one, and so on, the result would be the same: the original contraction would be doubled and no more. Or if the derived contractions were three-fourths of the original ones, the total effect would be larger, but still limited. What probably happens is that the fraction representing the dwindling of the derived effects is variable from one phase of the cycle to another.¹⁵

¹⁵ Since writing the above, my attention has been called by Mr. M. C. Rorty to a paper by R. F. Kahn entitled "Public Works and Inflation",

STRATEGIC FACTORS IN BUSINESS CYCLES

This same feature of the greater steadiness of expenditures as compared with incomes plays an important part in Dr. Warren M. Persons' theory as one of the forces tending to bring depression to an end, and initiate the resumption of activity.¹⁶ Excess inventories are reduced by the purchases of consumers who are drawing on their savings or credit, with the result that purchases by dealers revive.

It is obviously a necessary condition of this process that excess inventories should be cleared before these consumers' savings, or their credit resources, are exhausted. And it seems quite possible that if the depression, with its cutting down of incomes and its frozen inventories, is unusually severe, the savings and credit resources may be exhausted first. If this should happen, it seems only natural that the depression would fail to be checked in the usual time, but would go on into a deeper and more prolonged phase, waiting the coming of other forces of revival. In such an event, the strain might be

Journal of American Statistical Association, Supplement, March, 1933, which applies the idea of a dwindling series of finite sum to the secondary effects of a public-works program, taking account of various elements responsible for the 'leakage'. He estimates the additional secondary or induced expansion of employment, for Great Britain, on various bases, at $\frac{3}{4}$, 1 and 2 times the number directly employed. For the United States he considers the induced employment would be larger.

¹⁶ See *Forecasting Business Cycles* (New York, Wiley, 1931), Chapter II, especially pp. 22-5.

TYPICAL CYCLE PATTERNS

said to have exceeded the limits of the normal elasticity of the business structure and become a thing of a different sort—as indeed seems to be the case today. When this happens, revival may wait for some other force of recovery—perhaps for a slower process whereby the shrunken volume of savings of the relatively well-to-do, exceeding the still-more-shrunken volume of capital expenditures, finally produces an upward turn in the securities markets. This may revive confidence and lead to increased expenditures by producers and consumers alike. Or recovery may wait upon some outside originating force or forces of a favorable nature.

Another factor which must not be forgotten in seeking for causes of the cumulative expansions and contractions, as well as of the limits set upon them, is the elasticity of credit. As we have seen, it is mainly this factor which makes it possible for total expenditures to move independently of total incomes previously received, and thus to initiate and strengthen these cumulative movements. Expansion of credit makes it possible for expenditures to increase beyond incomes already realized, and so to lead to an increase of production, leading in turn to a subsequent increase of incomes. This is clearly very different from what could happen if the expenditures which limit production were themselves limited to income derived from prior production. Limits on the expansion of credit presumably bear a share of

STRATEGIC FACTORS IN BUSINESS CYCLES

responsibility for setting limits on the resulting industrial expansion. And contraction of credit means that expenditures are smaller than incomes already realized, with the result that subsequent incomes are smaller. In this case, while the contraction of credit may to some extent be the moving cause of the contraction in expenditures, it seems more likely to be a result, taking up the slack as expenditures shrink. This is partly borne out by the fact that bank credit frequently shows no absolute contraction in a business recession.

Statistics seem to afford no way of testing the causal importance of this element. As an enabling cause of rapid expansion, if other forces are working in that direction, it appears to be of vital importance: an essential element. But as an independent moving factor, the writer is inclined to assign it mainly a contributory influence, only occasionally rising to first-rate significance. Easy money enables people to obey the impulse to buy more goods and securities, but does not seem likely in most instances to furnish the moving impulse if there are no other circumstances tending to create it.

The business cycle is a vicious circle with no beginning this side of the origin of capitalistic production and no end until a way is found of breaking into the circle at some point and controlling its hitherto-endless sequence. Perhaps the chief reason for not regarding consumers' expenditures as con-

TYPICAL CYCLE PATTERNS

stituting the factor of most strategic importance is that they do not seem to afford the most promising point for breaking into the circle with measures of control. Consumers' income is a more promising lever to work with, but even here crude efforts might easily neutralize themselves or worse.

Amplitudes of Fluctuations: Prices

One of the well-known discrepancies in the business cycle is constituted by the greater fluctuations in wholesale prices than in retail prices or costs of living. Is this of important causal significance? Does it, for instance, bring about automatically a discrepancy between production and purchasing power such as many theorists take to be the central cause of the whole phenomenon? The fact might be urged that during a recession this discrepancy in price movements brings about a shrinkage in the money incomes derived from the earlier stages of production, while the prices that have to be paid when these incomes are spent for consumers' goods show no corresponding shrinkage. Thus the purchasing power of incomes is automatically reduced.¹⁷ The reverse happens during business expansion. It appears that the effect of this discrepancy in price movements is disturbing.

The causal problem remains untouched. What

¹⁷ Income in this case must probably be taken to include individual business profits.

STRATEGIC FACTORS IN BUSINESS CYCLES

causes the decline in wholesale prices at the beginning of a depression, or what causes the previous rise? Furthermore, this series of movements cannot be realistically discussed apart from the movements in volume of trade which go with them. Prices decline because demand has weakened; and weakening demand commonly manifests itself first in a falling-off in volume of sales. This falling-off in sales is commonly a proximate cause of the decline in prices.

It is also one of the keys to understanding the effects of the price-deflation. It operates in conjunction with losses due to depreciation of inventories bought at earlier and higher prices; and serves to aggravate this element by forcing dealers to hold their inventories longer. Another element is the fact that many wholesale deliveries are made, not at current market prices but at prices fixed in earlier contracts. Thus, when the wholesale market falls, the average price governing actual transfers of goods does not fall as far or as promptly as the open-market price. No one of these factors would perhaps be sufficient to answer the question why dealers do not make profits instead of losses when the wholesale prices they have to pay decline so very much more than the retail prices they receive. Taken all together, however, they suffice to explain the outcome.

The discrepancy between the movements of wholesale and retail prices is a result and symptom of the fact that the depression strikes hardest at the

TYPICAL CYCLE PATTERNS

points farther removed from the ultimate consumer; and it becomes, of course, part of the mechanism by which the effects are transmitted and their incidence apportioned among different groups. But it is hardly in itself an initiating cause.

Amplitudes of Fluctuations: Profits

The intensified fluctuations of profits constitute another obvious and significant factor, closely related to the movements of prices. The traditional function of profits and losses is to direct economic resources into the creation of the goods that are most in demand, and to bring about the absorption of business by the most competent producers and the weeding-out of the incompetent. A marked increase of profits over the entire business field is, from this standpoint, a curious phenomenon, seeming to imply that commodities in general are more in demand than before, or that the supply is short. As human needs remain about the same from prosperity to depression, and as the general increase in prices and profits occurs at precisely the times when goods are plentiful rather than scarce, this curiosity gains the character of an anomaly. High prices and high profits are an index, not of general scarcity but of general plenty. They serve to urge the producer to increase his production to the utmost at precisely the time when he is already turning out more than can, in the nature of the case, be continuously absorbed. It seems evident that the

STRATEGIC FACTORS IN BUSINESS CYCLES

function of profits is suffering some sort of a perversion, and that this is one of the central and strategically important factors in the business cycle.

One cause of such a perversion is to be found in the movements of prices, together with movements of costs which do not keep pace. Interest burdens are fixed by contracts, many of which run for long terms of years, while even on the shorter ones the rates of interest do not rise and fall sufficiently to compensate for the effect of changing prices. Wage rates are also sluggish in their responses—earnings, of course, move with the volume of employment. Furthermore, since much indirect labor is of a character that does not vary proportionately with fluctuations of output, an increase of production carries with it a less than proportionate increase in the number of labor-hours necessary to turn it out. Hence an increase of output, if not neutralized by an actual fall in prices, has of itself the effect of increasing profits; and this is precisely the signal which business is accustomed to interpret as a sign that conditions are such as to justify further expansion. Thus profits fall in the class of cumulative, rather than self-limiting, forces; and this fact tends to destroy their value as a governor of general business expansion. If an expansion is indicated, and business responds to the signal, the signal does not grow weaker as the presumed need is met, but stronger.

This is not the place to attempt to elaborate pro-

TYPICAL CYCLE PATTERNS

posals for dealing with these matters; we seek merely to establish the practical and strategic importance of this set of causal factors by showing that they can be reached by things men can do to modify their action. Something can be done about them. Moreover, in devising policies it is essential to distinguish sharply between the 'internal economies' of full utilization, which depend on the principles of overhead costs and not on changes in the market rates of wages or prices of materials, and the external forces arising in the general market. It is probably useful to have producers under a spur to operate their individual plants at full capacity in order to derive the economies of full operation. An economy where plants operate reasonably close to capacity is not necessarily an economy in which markets are chronically glutted. This incentive to full operation may be so handled, it is true, as to work towards increased instability; but probably it can also be so conditioned as to work towards greater stability.

Business men may simply regard the peak periods as their sources of greatest profits, and subordinate other things to the attempt to do as large a volume of business as possible at those times, living through the dull periods as best they can. This attitude tends to perpetuate instability. A truer reckoning would indicate that the burden of idle overhead through the dull periods is chargeable to the peak business as a cost of standing ready to handle it when it comes;

STRATEGIC FACTORS IN BUSINESS CYCLES

and this burden makes the peak business very expensive, even casts some doubt on its real profitability. When this is realized, the business interest in stabilization becomes clear.

But this interest is still not fully reflected in the methods of accounting appropriate to separate enterprises. This is chiefly because individual businesses may also shift a considerable burden of idle overhead to other businesses by curtailing their purchases. The cost of goods and materials is a direct and variable cost to them, but it contains a large element of overhead cost for the businesses which make the goods and materials. A consolidated income account for business as a whole would have a larger proportion of constant or overhead costs than do the separate accounts of the individual businesses, and when business thinks in terms of its fortunes as a whole it will have a correspondingly greater interest in stabilization than is apparent on the surface of the ordinary methods of cost reckoning.¹⁸

Thus the fact that the profits of a business show an intensified increase in response to an increase in the output of that business constitutes a force which may work toward stability or toward instability. The outcome depends on whether business thinks and acts in old-fashioned individualistic terms or in terms

¹⁸ The writer has dealt with this question at more length in his volume, *The Economics of Overhead Costs*.

TYPICAL CYCLE PATTERNS

of its long-run and collective interests. But there seems to be no ambiguity as to the effect of a condition in which the market behaves in such a way as to increase one producer's profits by reason of the fact that *all the other producers* are expanding their operations. This almost certainly makes for instability and cumulative intensification of movements.