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AGGREGATE FLUCTUATIONS OF

PRODUCERS' GOODS, RESIDENTIAL

HOUSING AND AUTOMOBILES

THE aggregate movement of a group of such diverse series as here considered is not easy to estimate, in view of their differences of timing. The diversities of one series from cycle to cycle can be overcome by taking its average pattern through the successive stages of the cycle of general business. But this average pattern still differs in timing from one series to another. In meeting this difficulty, the fluctuations of these series will be presented in two ways; first, the fluctuations in the average general-cycle pattern of each series between the high and low points of its individual average movements; and second, an attempt will be made to estimate roughly the stages of the general business cycle which mark the high and low points of this group of series as an aggregate; and the fluctuation of each series between these points will be noted. These fluctuations will be stated as averages of the upward and downward movements, an

upward movement of 60 per cent and a downward movement of 40 per cent appearing as an average movement of 50 per cent. The percentage is in each case a percentage of the average value of the series for the cycle in question.

The average cyclical movements of the series representing the groups in question are shown below, with the stages [1] of the general business cycle in which their high and low points occur and notes as to their general conformity. As already observed in the text, a pattern whose low point occurs in the eighth stage of the general cycle instead of the ninth is sufficiently typical of production series to be regarded as representing perfect conformity for series of this sort.

SERIES	STAGES OF GENERAL BUSINESS CYCLE MARKING HIGH AND LOW POINTS OF AVER-AGE-CYCLE PATTERN OF SPECIFIC SERIES	AVERAGE MOVE-MENT (PER CENT)	CONFORMITY TO TIMING OF GENERAL BUSINESS CYCLE
Producers' goods, physical production (Leong's study), 1919-27, 3 cycles..	5, 8	27	Virtually perfect; one-stage lead on upturn.
Manufacture of basic materials (Harvard series adjusted), 1919-27, 3 cycles	5, 8	28	Virtually perfect.

[1] See text, p. 9 for description of method of dividing the cycle into nine stages for purposes of comparing cycles of different length.

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Passenger cars, physical production, 1914-27, 4 cycles	4, 6	43	Three - stage lead on up-turn, one-stage lead on down - turn, some irregularity.
Trucks, physical production, 1914-27, 4 reference cycles, 3 specific cycles...	5, 8	58	Virtually perfect.
Construction contracts awarded, total 1912-24, 4 cycles	4, 7	52	Two - stage lead on up-turn, one-stage lead on down-turn. This series might reasonably be lagged one stage, resulting in more perfect conformity.

A selected list of producers' goods could be made up which would show far more than 27 per cent fluctuations, and might well account for the major part of the excess of this group above the average for all branches of production, at least in the 'industrial' class. Some of the items would be the following:

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SERIES	STAGES MARKING HIGH AND LOW POINTS OF AVERAGE-CYCLE PATTERN OF SERIES	AVERAGE MOVE-MENT (PER CENT)	CONFORMITY TO TIMING OF GENERAL BUSINESS CYCLE
Pig iron, 1885-1927, 13 cycles	5, 8	40	Virtually perfect.
Steel ingots, 1919-27, 3 cycles	5, 8	48	Extremely close.
Coke, 1912-27, 5 cycles..	5, 9	46	Perfect.
Machine-tool shipments (yearly basis), 1904-21, 5 reference cycles, 4 specific cycles	5, 9 (Stages 2, 4, 6 and 8 lacking)	52.5	Virtually perfect. Monthly figures would show larger fluctuations.
Fabricated structural steel sales, 1915-24, 3 cycles...	3, 7	80	Two-stage lead.

All but the last of these series conform so closely in their average pattern to the general business cycle and to one another, that their aggregate fluctuations, taken as a group, would be very nearly as great as that of a properly weighted average of their individual fluctuations for the same succession of cycles. Thus the aggregate impact of these products on the economic system is extremely heavy. For purposes of comparison, the following series might be used.

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SERIES	STAGES MARKING HIGH AND LOW POINTS OF AVERAGE-CYCLE PATTERN	AVERAGE MOVEMENT (PER CENT)	CONFORMITY TO TIMING OF GENERAL BUSINESS CYCLE
Physical production of consumers' goods excluding automobiles (Leong's study), 1919-27, 3 cycles..	4, 8	12	Lead, good conformity but some irregularities.
Industrial production, (Standard Statistics Company's index), 1912-27, 5 cycles	5, 9	24	Perfect.
Basic industries, (Federal Reserve Board index), 1919-27, 3 cycles	5, 8	23	Almost perfect.

It would be possible to determine the aggregate fluctuation of the group including producers' goods, construction and automobiles, by building up an inclusive series, properly weighted: but in this there would be one difficulty. What is the real meaning of the differences in timing between 'construction contracts awarded' and 'production of producers' goods'? Should the lead of the construction series be taken at its full face value? The one series records the completion of work, the other a preparatory stage in work which typically takes some months to complete. Thus it is reasonable to suppose that the timing of the actual work involved in construction might be better represented if the series were lagged, let us say, three months or even more.

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STRATEGIC FACTORS IN BUSINESS CYCLES

In dealing with series already divided into 'stages', it has seemed legitimate to lag the series of construction contracts by one stage, always recognizing that this is a very rough and ready procedure.

If this is done, it seems fairly clear that the high and low points of the aggregate movement of the group will occur in the fifth and eighth periods. If the average movement of each series, then, be taken between these two periods, the result will be a series of percentages which, if properly averaged, would give a fairly true measure of the aggregate movement of the group. Since the behavior of the construction series is regarded as abnormal for the last two cycles, and two of the other series go no further back than 1919, completely comparable series are available for only two cycles: 1919-24. Most of the series are available, however, for three cycles: 1915-24. The following evidence may, then, be used.

SERIES	AVERAGE MOVEMENT, STAGES 8-5-8 (PER CENT)	REMARKS
Producers' goods, physical production (Leong's study), 1919-24, 2 cycles	32	
Manufacture of basic materials (Harvard series adjusted), 1919-24, 2 cycles	34	
Passenger cars, physical production, 1915-24, 3 cycles	18	Peak in stage 4; sharp drop to stage 5.
Trucks, physical production, 1915-24, 3 cycles	69	

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Construction contracts awarded 1915-24, 3 cycles (lagged one stage)	44

Further evidence afforded by these same series taken for a longer period where available, together with other particular series of the same character (involving some overlapping) is as follows:

SERIES	AVERAGE MOVEMENT, STAGES 8-5-8 (PER CENT)	REMARKS
Producers' goods, physical production (Leong's study), 1919-27, 3 cycles	27	
Manufacture of basic materials (Harvard series adjusted), 1919-27, 3 cycles	28	
Passenger cars, physical production, 1915-27, 4 cycles	19	
Trucks, physical production, 1915-27, 4 cycles	58	
Construction contracts awarded, 1912-27, 5 cycles ...	32	
Same series, lagged one stage	52	
Pig iron, 1885-1927, 13 cycles	40	
Steel ingots, 1919-27, 3 cycles	48	

Coke, 1912-27, 5 cycles   37

Machine-tool shipments(yearly basis, 1904-21, 5 reference cycles, 4 specific cycles	52.5	(Stage 8 lacking. Monthly figures would show larger fluctuations)

Fabricated structural steel,
sales, 1915-24, 3 cycles 71.8

One must allow for the fact that construction contracts are reported in money terms, thus exaggerating the actual physical movement, and for the further fact that the diffused effects of construction work are somewhat distributed in time. Taking these facts into consideration, it may very roughly be estimated that the aggregate fluctuation of this entire group in an average cycle could be not less than about 30 per cent.