

12. The Phases in Circuit Accelerations. On combining equations (31) and (32) and again equations (33) and (34) one obtains -

$$D^2E'/DE' = dP'/P' + dQ'/Q' \quad (35)$$

$$D^2E''/DE'' = dP''/P'' + dQ''/Q'' \quad (36)$$

so that, apart from price level variations, DE' varies with Q' and DE'' varies with Q'' . The question arises, To what extent does price level variation offset or reinforce the concomitance of DE' with Q' and DE'' with Q'' .

In the first place, variations in P' and P'' will not be equal and opposite to variations in Q' and Q'' to leave DE' and DE'' constant. This is evident from the nature of the expressions, dP'/P' and dP''/P'' . When Q' or Q'' are increasing in geometrical progression, P' and P'' would have to be decreasing in geometrical progression. But it is normal for rates of production to increase in geometrical progression in a long-term acceleration: the greater the rate of production, the greater the capacity to increase that rate. On the other hand, falling prices are a signal for a slump. Prices falling in a geometrical progression would soon afflict enormous losses on every entrepreneur, for entrepreneurs would be making the main part of their outlays at the higher prices but collecting their receipts at the later lower prices. Under such circumstances, the long-term acceleration, if ever it began, would rapidly come to a sudden end. The fact illustrates the value of vulgar notions of money being sound because it is rigid.

In the second place, prices tend to move in the same direction as quantities. Prices rise in a boom, when quantities increase, to fall in a slump, when quantities decrease. However, the causes of such price

variation are of two kinds. There is the normal causality of increasing or decreasing scarcity. As rates of production increase, competitive demand for labour and for materials, as well as for general services such as power, transportation, credit, and so on, increase. Inversely, as rates of production decline, demand falls off. On this head one would expect price levels to mount increasingly as the expansion developed, that is, imperceptibly in the early period, in more marked fashion once expansion becomes generalized, and in a purely inflationary manner if the maximum rates of production possible were attained yet credit continued to be expanded. Thus, so far from cancelling the requirement that DE' vary with Q' and DE'' with Q'' , one may expect price levels to reinforce and augment such variation, though in different degrees as the pressure on general markets is slight, notable, or fatuous.

These variations in DE' and DE'' postulate, in turn, parallel variations in DI' and DI'' . The normal source of basic expenditure is basic income, and the normal source of surplus expenditure is surplus income. As was argued in section 9, a condition of successful circuit acceleration is that DO' , DI' , and DE' keep in step, that DO'' , DI'' , DE'' do likewise, that DD' , DD'' , and DG remain zero. Thus, the long-term acceleration of the productive process with its successive proportionate, surplus, and basic expansions can be executed successfully only if the variations in the rates of payment follow the phases of the productive cycle. There would be, for instance, a radical maladjustment between circuit and productive acceleration if when surplus rates of production were increasing more rapidly than basic, basic rates of income were increasing more rapidly than surplus. Then interval after interval, an increasingly excessive

amount of monetary income would be moving to the basic final market and there would follow a rise in prices quite different in kind from the normal rise resulting from increasing scarcity. Such a rise would not be an ordinary scarcity but at once a consequence and, as will appear, a corrective of a disproportion between monetary and real consumer income.

Not only is it true that this second type of price variation is different from the first, but also one must give it a different kind of attention. When prices rise because of real scarcity, one may speak of a requirement for variation in DE' and DE'' over and above the variation postulated by dQ'/Q' and dQ''/Q'' . But when prices rise or fall because the distribution of income has not anticipated these requirements correctly, then price variation is not a postulate for variation in DE' and DE'' but rather a spontaneous effort at adjusting what should already have been adjusted. Accordingly, such adjustment variations in prices will be ignored for the moment to be considered more in detail in the next section. Present concern will be for the type of adjustment that the successive phases of the pure cycle postulate.

The central adjustment is variation in the rate of saving. This rate may be defined, conveniently for present purposes, as the ratio of surplus income to total income. Assuming that the rate of saving will not differ appreciably because income is derived from basic or surplus outlay, we may denote this rate by the symbol, G , write

$$G = G' = 1 - G'' \quad (37, \text{ see } 8)$$

so that

$$G = DI''/(DI' + DI'') \quad (38, \text{ see } 2 \text{ \& } 10)$$

The condition that G is increasing, constant, or decreasing is that surplus income is increasing, in proportion to its size, more rapidly than basic, or at the same rate, or less rapidly. Symbolically, if one assumes a smooth trend and differentiates equation (38), the numerator on the right-hand side will be $D^2I''/DI'' - D^2I'/DI'$ which, as it is positive, zero, or negative, makes the differential of G positive, zero, or negative.

Now in a proportionate expansion dQ''/Q'' equals dQ'/Q' . If price levels are rising at all, one may expect both basic and surplus levels to be rising equally. Hence D^2E'/DE' should equal D^2E''/DE'' . Further, since rates of income should keep pace with rates of expenditure, D^2I''/DI'' should equal D^2I'/DI' . It follows that in the proportionate expansion, the rate of saving, G , should be constant.

Again, in the surplus expansion, dQ''/Q'' is greater than dQ'/Q' ; if there is any divergence in the variation of basic and surplus price levels, scarcity should be felt more in the surplus than in the basic stage of the process, so that any difference between dP''/P'' and dP'/P' would have a reinforcing and not a cancelling effect. It follows, as before, that D^2E''/DE'' should be greater than D^2E'/DE' , that D^2I''/DI'' should be greater than D^2I'/DI' , and so that the rate of saving, G , should be increasing.

Inversely, in the basic expansion, the preceding argument is turned around to give the conclusion that the rate of saving should be decreasing. Then dQ'/Q' is greater than dQ''/Q'' , prices varying from scarcity should, if anything, reinforce this difference, and so basic income and expenditure must be increasing more rapidly than surplus.

To conclude, the acceleration of the productive process, if it is to succeed and not be destroyed by circulation maladjustments, postulates that in a proportionate expansion the rate of saving be constant, that in a surplus expansion it increases, that in a basic expansion it decreases. The implications of this postulate will concern us in subsequent sections on the cycle of basic income, the cycle of pure surplus income, and the cycle of price spreads.

sale. The exact behaviour of the acceleration factors, however, introduces a new element for our consideration. Introducing the symbol, q' , as identical with $a'Q'$, and differentiating the consequently identity, one obtains,

$$da' = a'(dq'/q' - dQ'/Q') \quad (50)$$

and by changing (') to (") one has the parallel equation for da'' . Hence, for the acceleration factor, a' , to be increasing, it is necessary for da' to be positive and so for $(dq'/q' - dQ'/Q')$ to be positive.* This means that the acceleration factor can be positive only when the rate of current production of basic quantities is increasing more rapidly in proportion to its size than the rate of current sales of basic quantities is increasing in proportion to its size. Thus, if one supposes that q' moves ahead of Q' , the acceleration factor moves above unity; but as soon as the quantities under production reach the final market, Q' accelerates; if then, q' is accelerating at the higher rate proportionate to its greater size, a' will be at a maximum and remain constant as long as the acceleration of q' increases with a' ; but as soon as the acceleration of q' ceases to mount ever more rapidly, a' begins to fall. The same holds for the surplus acceleration factor, a'' . Evidently, the acceleration factors are magnificently unstable. The initial lag of quantities sold behind quantities produced enables them to rise above unity. But merely to keep them constant once quantities sold begin to mount means that quantities under production have to increase in a

* N.B. Q' , q' and a' are always positive.