15. The Cycle of the Aggregate Basic Price Spread.

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sense in which one may speak of the fraction of basic outlay that
moves to basic income as the "costs" of basic production. It is true
that that sense is not at all an accountant's sense of "costs": for
it would include among costs the standard of living of those who re-
ceive dividends but not the element of pure surplus in the salaries
of managers; worse, it would not include replacement costs, nor the
part of maintenance that is purchased at the surplus final market,
nor the accumulation for sinking funds which is a part of pure surplus
income. But however remote from the accountant's meaning of the term,
costs, it remains that there is an aggregate and functional sense in
which the fraction of basic outlay moving to basic income is an index
of costs. For the greater the fraction that basic income is of total
income (or total outlay), the less the remainder which constitutes
the aggregate possibility of profit. But what limits profit may be
termed cost. Hence we propose in the present section to speak of
$(1 - G')f0'$, and as well of $G''f0''$, as costs of basic production, having
warned the reader that the costs in question are aggregate and func-
tional costs in a sense analogous to that in which forced savings are
savings.

In any given interval, the rates of outlay, $f0'$ and $f0''$, are func-
tions, not of the indices of quantities sold at the final markets, Q'
and Q'', but of these indices corrected by the acceleration factors, a'
and a''. Thus, when the productive process is expanding or contracting,
$f0'$ is some price level index multiplied by $a'Q'$, and $f0''$ is some price
level index multiplied by $a''Q''$. In expansions a' and a'' are greater

than unity, since current production is for future greater sales; in contractions a' and a" are less than unity since then current production is for future reduced sales. Let us now introduce two cost price indices, p' and p", which are defined by the equations,

$$(1 - G')\emptyset' = p'a'Q' = \{ I'\rho' \tag{45}$$
$$G''\emptyset'' = p''a''Q'' = \{ I''\rho' \tag{46}$$

whence by equation (3)

$$\{I' = p'a'Q' + p''a''Q'' \tag{47}$$

Now, when $\{D'$ satisfies general conditions of circuit acceleration by being zero, so that $\{E'$ equals $\{I'$, then since $\{E'$ equals $P'Q'$ one may write

$$P'Q' = p'a'Q' + p''a''Q'' \tag{48}$$

Dividing through by p'Q' one may write

$$J = P'/p' = a' + a''R \tag{49}$$

where J is the basic price spread ratio, being the selling price index, P', divided by the cost price index, p', and R is the ratio of surplus to basic activity indicated by the fraction, $p''Q''/p'Q'$. It follows that the basic price spread ratio, J, is the sum of the basic acceleration factor, a', and of the product of the surplus acceleration factor, a", with the surplus-to-basic ratio, R.

Variations in R involve no new elements. At a first estimate R
will be increasing during the surplus expansion when Q"/Q' is increas-
ing, but decreasing during the basic expansion when Q"/Q' is decreasing.
Taking into account the further quotient, p"/p', one would expect it
to be constant, inasmuch as cost prices in basic and surplus units
have the same general determinants; and inasmuch as there arose any
divergence between p" and p', one would expect it to reinforce our
initial estimate; p"/p' would increase, if anything, in the surplus
expansion, but would decrease, if anything, in the basic expansion.

The influence of R on the aggregate basic price spread is obvious.
The greater the fraction of total basic income that is derived from
surplus outlay, the less the fraction of total basic income that is
derived from basic outlay. But total basic income becomes basic ex-
penditure and basic receipts. And the source of basic price spread
is the difference between basic receipts and the fraction of basic
outlay going to basic income. A very rough illustration may be had
if we identify basic income with aggregate wages and aggregate wages
with costs of all production and, as well, with the receipts of basic
sales. Then the greater surplus activity, the greater surplus aggre-
gate wages, the smaller the fraction of total wages paid by basic pro-
ducers, the smaller the fraction of total costs paid by basic producers,
the smaller the fraction of basic receipts required to meet basic costs.

The influence of the acceleration factors is also easily under-
stood. The greater current production relative to current final sales,
then the greater the price spread provided that all current income is
spent for the relatively smaller quantity that is finished and now on

geometrical progression for the rest of the expansion. Any failure to maintain this brilliant pace means that the acceleration factors and so the basic price spread, drop.

Now in any expansion it is inevitable that quantities under production run ahead of quantities sold. Current production is with reference to future sales and, if there is an expansion, then future sales are going to be greater than current sales. But in the free economies the acceleration factors are not held down to the minimum that results from this consideration. During the surplus expansion the basic price spread ratio, J, will increase from an increase of R, of a", and also of a'. The advance of the price spread ratio will work out through a rise of basic price level and selling prices generally will mount. Now when prices are rising and due to rise further, the thing to be done is to buy now when prices are low and sell later when they are high. There results a large amount of speculative liquid investment. Each producer orders more materials, more semi-finished goods, more finished goods, than he would otherwise. Moreover, he makes this speculative addition to a future demand estimated upon current orders received, so that the further back in the production series any producer is, the greater the speculative element contained in the objective evidence of current orders received, the more rosy the estimate of future demand, and the greater the speculative element he adds to this estimate when he places orders with a producer still further back in the series.

Thus, an initial rise in prices sets going a speculative expansion that makes the acceleration factors quite notable, expands the price

spread still more, and stimulates a pace of further acceleration that it will be quite impossible to maintain. Differentiating equation (49) one has

$$dJ = da' + Rda'' + a''dR \tag{51}$$

Here the cyclic factors are R and dR: in the surplus expansion R is increasing and dR is positive; in the basic expansion R is decreasing and dR is negative. R is a fractional quantity and dR the increment of a fraction. On the other hand, as long as expansion continues, the surplus acceleration factor, a'', will be greater than unity. Upon this background enters the performance of da' and da'', with the former preponderant since the coefficient of da'' is the fraction, R.

Now during initial proportionate expansion dR will be zero, but da' and da'' will be positive for a while as a short-term acceleration develops. At least in the basic stage it will prove impossible to maintain a generalized rate of expansion, ~~in a geometrical progression~~, so that da' will become negative. The event will probably take place when the surplus acceleration factor, a'', has reached a high level rate so that da'' is zero. It follows that dJ becomes negative with da' and in this dJ will be all the more negative if there is any faltering in the surplus stage to give a negative da'' as well. Thus, the price spread ratio, J, contracts; the basic price level falls; speculators are disillusioned. There is a minor crisis: first, speculative assets are frozen as every one wishes to sell before prices fall further and no one wishes to buy until they fall further; then there is a period of liquidation as liquid assets are sold for whatever price they will fetch. The gravity of this first crisis will depend exclusively upon

the magnitude of the speculative development; the solvency of specu-
lators, and their ability to weather the storm without liquidating
their stocks. Whether it is a squall or a tempest, the underlying
long-term development soon sets things right. For as the surplus
stage generalizes long-term acceleration, R increases and dR becomes
positive to expand again the price spread and to keep it expanding.
As this proceeds, there develops another speculative boom. The sur-
plus acceleration factor, a", mounts and remains constant at its maxi-
mum; the basic acceleration factor mounts and then contracts; previous
phenomena are repeated with the difference that the negative da' is
mitigated by a positive dR, and that throughout this crisis there is
at work a positive dR to bring things back to an even keel. When the
rate of expansion is restored, the basic stage will move into a general
long-term acceleration; for a while yet dR will remain positive and a
third speculative boom develops. This boom suffers no restrictions
from a limited potential for short-term acceleration, since both stages
are now expanding in long-term style. Both acceleration factors can
mount to that maxima and remain at the summits with da' and da" both
zero. Further variations of the price spread thus depend exclusively
upon dR, and this becomes negative as the surplus expansion gives
place to a basic expansion. When then prices begin to fall to effect
the continual reduction of the price spread, there follows sooner or
later the real and final crash. Speculative embarrassment makes both
da' and da" negative to augment the rate of contraction of the price
spread and intensify the embarrassment. Assets are frozen and then

liquidated in a great drop of prices. Worse, there is no recovery; for the remainder of the cycle should be a basic expansion which our ill-adapted economies transform into a depression.

It may be noted that the triple crisis per cycle may perhaps correspond to Prof. Schumpeter's combination of three small cycles named Kitchens in one larger cycle named a Juglar which has a ten-year period. The pattern of six Juglars in one sixty-year Kondratieff would seem to result from the quasi-logical connection between successive long-term accelerations. A fundamental transformation of the capital equipment of an economy needs preparatory long-term accelerations that open the way for it; and once the fundamental transformation is achieved, there are other subsidiary transformations that for the first time become concrete possibilities. Such a time series has more affinities with a philosophic theory of history than the merely mechanical structures that we have been examining. A theory of the Kondratieff is in terms of the precise nature of the fundamental transformation, e.g. railroads, but the theory of the Juglar and Kitchen that has been developed here depends solely upon the structure of the productive process and the measure of human adaptation to the requirements of an acceleration in that structure.

It is to be recalled that the account given of the cycle of the basic price spread ratio supposes $\int D'$ to be zero throughout. A speculative boom in the stock market which encourages basic spending may be represented by a positive $\int D'$: there is an excess release of money from the redistributional function to the basic demand function. Alternatively, it may be represented by an upward revision of the fractions, g_i, of total current income going to basic demand, while the

fact that the surplus final market suffers no contraction *that* then results from the excess of the rate of new fixed investment over the rate of pure surplus income, so that $\dot{f}D''$ is positive. In either case, a movement of this type with its basis in redistributional optimism will offset any tendency towards a contraction of the price spread and will reinforce any tendency of the price spread to expand. On the other hand, the subsequent stock market break intensifies the crisis of the circuits, removing the props that had hitherto swollen expansive tendencies, and leaving the system with a greater height from which to fall.