Chapter V: Dynamic Interrelation Between the Level and Distribution of Income: The Case of Increasing Returns with Time-Reversibility
In the proceeding chapters we examined some possible links between distribution of income and its level on some simplified assumptions. For this purpose two different routes were considered:

First, in the model in Chapter III we followed the simplest and most direct route. There we analyzed how profit share is determined at given labour productivity. With cost determined prices and constant proportional mark-up (See eqn. III.4, p.21) profit share is given by

\[ h = 1 - \frac{1}{m} = 1 - \frac{\left(\frac{w}{p}\right)}{x} \]

where \( x \) is labour productivity and is given

Any constant mark-up (m) at a given labour productivity entails constant real wage rate (see eqn. III.5). Then the variations in the real wage rate, due to parametric variation in the mark-up, solely determine the share of profits (h). Thus an exogenous fall in the real wage rate due to higher mark-up raises the share of profits at the given labour productivity (\( x \)).

In chapter IV, we analyzed how profit share could be determined through a different route. Here labour productivity is assumed to be an increasing function of capacity utilization (z) due to fixed overhead cost of non-operative labour (see eqn. IV.3, p.31). In this case profit share is determined as,

\[ h = 1 - \frac{\left(\frac{w}{x(z)}\right)}{p} \] (from equation IV.5)

Or

\[ h = 1 - \frac{\left[\frac{w}{x(z)}\right]}{p} \]
Thus, in this case of increasing returns due to fixed overhead wage bill of the non-operative labour, as capacity utilization \((z)\) increases labour productivity increases to bring about a fall in the unit variable cost \(\left(\frac{w}{x(z)}\right)\), which in turn would increase the share of profits \((h)\). This is the crux of the model in Chapter IV and the result concurs with the widely observed empirical fact of procyclical behaviour of profit share emphasized by Okun.¹

However note that unless we explicitly postulate how money wage rate \((w)\) changes and its consequence for unit prime cost \(\left(\frac{w}{x(z)}\right)\) and prices, the direction of change in profit share, under increasing returns regime remains ambiguous. Precisely this question would be examined in the following more complex model in this chapter. Thus, it will be shown in the following model that, postulating money wage as a function of the level of activity (capacity utilization) introduces new aspects, generating a richer and more complex model for the study of interrelation between income distribution and its level, where not only labour productivity but also wage responds to changes in the level of economic activity.

Definitionally the changes in profit share is brought about by money wage rate, labour productivity and price.

Or from the definition of share of wages

\[
1 - h = \frac{w}{p \cdot x}
\]

By log differentiation with respect to time

\[
\dot{h} = (1 - h) \left[ \frac{\dot{p}}{p} + \frac{\dot{x}}{x} - \frac{\dot{w}}{w} \right]
\]

or

\[
(1 - h) \left[ \frac{\dot{p}}{p} - \left( \frac{\dot{w}}{w} - \frac{\dot{x}}{x} \right) \right]
\]

¹ See Okun (1981) p. 16 and p.227
Here we assume that the money wage rate to be a function of capacity utilization because the bargaining power of the workers increase with the tightness of the labour market which in turn depends on the level of capacity utilization. This is postulated to be a simple linear relation\(^2\),

\[
w = v + \theta z, \quad v, \theta > 0
\]  

(V.2)

Since labour productivity is also an increasing function of capacity utilization due to increasing returns as defined in chapter IV (see equation IV.3),

\[
x = \frac{z}{\alpha + \beta z}
\]

(V.3)

where \( \alpha \) is the constant non-operative/overhead labour productivity coefficient and \( \beta \) is the constant labour productivity coefficient of operative/variable labour

the unit variable cost (UC) now becomes a more complex function of capacity utilization

i.e. \[
UC = \frac{w(z)}{x(z)}
\]

\[
= \frac{(v + \theta z)(\alpha + \beta z)}{z}
\]  

(V.4)

From the above equation (V.4), it can be seen that unit variable cost changes as capacity utilization changes according to,

\[
\frac{d(UC)}{dz} = \frac{\theta \beta z^2 - \nu \alpha}{z^2}
\]

\(^2\) Here we are defining a wage curve, which is similar but not identical in general with the Phillips curve in so far as it is not directly derivable by integration from the traditional Phillips curve. For instance \( \frac{u}{w} = H(u) \), (where \( u \) is the rate of unemployment) \( H' < 0 \) is the traditional Phillips curve.

Suppose if \( u = f(z) \) with \( f' < 0 \) then \( \frac{u}{w} = F(z) \), \( F' > 0 \)
Therefore, \( \frac{d(UC)}{dz} < 0 \) depending upon whether \( z > \frac{\nu.\alpha}{\theta.\beta} \)  \( (V.6)^3 \)

Consider for example the case when unit variable cost is increasing i.e. \( \frac{d(\frac{w}{w} - \frac{x}{x})}{dz} > 0 \)

The increase in the unit variable cost beyond a certain level of capacity utilization given by \( z > \frac{\nu.\alpha}{\sqrt{\theta.\beta}} \) represents the case of a sufficiently tight labour market, so that unit variable cost increases despite rising labour productivity (see eqn. V.3) with the consequence that, in a regime of cost determined prices, a rise in the unit variable cost would increase the price level. However with the assumption of constant proportional mark-up the condition for a consequent increase in profit share requires, from (V.1) that the percentage change in price \( \left( \frac{\dot{p}}{p} \right) \) to be sufficiently high to satisfy

\[
\left( \frac{\dot{p}}{p} \right) > \left( \frac{w}{w} - \frac{x}{x} \right)
\]

\( (V.7) \)

i.e. the rate of change in price is greater than the rate of change in unit variable cost.\( ^4 \)

However, when rising unit variable cost is not compensated by a corresponding rise in price (in percentage terms), i.e. the condition (V.7) is not satisfied, the profit share falls. Thus for

\[
1 > h > 0, \quad h < 0 \quad \text{if} \quad \left( \frac{\dot{p}}{p} \right) < \left( \frac{w}{w} - \frac{x}{x} \right)
\]

\(3\) Note \( 1 > z > 0 \) implies \( 1 > \frac{\nu.\alpha}{\theta.\beta} > 0 \) i.e. \( \theta > \nu.\alpha > 0 \)

\(4\) In this case, the extent of rise in unit variable cost is more than compensated by rising prices, presumably due to the greater monopoly power enjoyed by the price-setting firms.
For example, this could be the case where a more competitive market structure for products typically characterized by entry threat and oligopolistic rivalry rather than collusion restrains firms from raising prices. However, this has to be coupled with a monopsonistic labour market capable of rapid increase in money wages. Thus money wage would rise faster than price in percentage terms overcompensating the rise in labour productivity (i.e. \( \frac{\dot{w}}{w} > \frac{\dot{p}}{p} + \frac{\dot{x}}{x} \), \( \frac{\dot{x}}{x} > 0 \)). This is a case, which runs contrary Okun’s “law”, since profit share falls as capacity utilization (z) increases due to a more competitive product market coexisting with a monopsonistic labour market. Viewed this way, the two contrasting cases of rising and falling profit share in the course of expansion of economic activity can be seen as the interplay of the extent of monopoly power of the firms as price-setters and the extent of monopsony power of the trade unions of workers as wage-setters.

Both these cases might hold also when the unit variable cost falls i.e. \( \frac{d(w - x)}{dz} < 0 \) below a certain level of capacity utilization given by \( z < \frac{v \alpha}{\sqrt{\theta \beta}} \) from (V.6).

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5 In this model the concept of cost in question is average cost rather than marginal cost. However, in our formulation the condition for declining marginal cost i.e. MC < 0 is similar to that of average cost as given below.

The total cost is given by

\[ C = w \cdot L \]

where \( w \) is the money wage rate and \( L \) is the number of labour

Which can be expressed as

\[ C = w \cdot \frac{Y}{x} \]

where \( Y \) is the total output (actual) and \( x \) is the Output-Labour ratio.

\[ = \frac{w}{x} \cdot \frac{Y}{Y^*} \cdot Y^* \]

where \( Y^* \) is the potential output.

Normalizing with respect to \( Y^* \) we have,

\[ C = \frac{w}{x} \cdot z \]

Now \( \frac{dC}{dz} = \frac{w}{x} + z \cdot \left( \frac{x \cdot \frac{dw}{dz} - \frac{w}{x} \cdot \frac{dx}{dz}}{x^2} \right) \)
In this case productivity growth outweighs the sluggish change in money wage due to a slack labour market to effect a fall in the unit variable cost. Given that prices are cost determined and in this case of falling unit variable cost, the condition \((V.7)\) would imply a falling share of profits i.e. \(\left(\frac{P}{P}\right) > \left(\frac{W}{W}\right) - \left(\frac{x}{x}\right)\). This is again the case that contradicts Okun’s law where share of profits fall as capacity utilization increases. This may correspond to a more competitive product market, where the productivity gains are passed on to consumers and a slack labor market.

However in the same regime of falling unit variable cost violation of the condition \((V.7)\) implies a rising profit share i.e. \(1 > h > 0, \ h > 0\) if \(\left(\frac{P}{P}\right) < \left(\frac{W}{W}\right) - \left(\frac{x}{x}\right)\). This situation represents non-competitive business behaviour in the product market where the benefits of productivity gain are not fully passed on to consumers.

It is in this analytical background we study the interrelation between distribution of income and its level especially in an Exhilarationist regime (for explanation of this terminology, see footnote 12, p.33). We show that the dynamics of the interrelations between the various variables in such a regime generates non-linear oscillations in terms of the possibility of limit cycles.

These models also highlight a point made by Steindl (1952) in terms of the effect of technological gains on prices under different types of Business Behaviour. The Business behaviour of firms in setting the mark-up depends upon the overall structure of the industry, in which they form a part. In this context Steindl discusses two types of market structures viz., competitive and non-competitive or monopolistically competitive market structures. In the non-competitive industry, where firms have considerable monopoly

\[
\begin{align*}
\frac{dC}{dz} &= \frac{w}{x} \left\{ - \left( e_{x,z} - e_{w,z} \right) \right\} \\
\therefore \frac{dC}{dz} < 0 \text{ iff } \left( e_{x,z} - e_{w,z} \right) > 1
\end{align*}
\]

Hence for \(\frac{dC}{dz} < 0\) productivity must respond stronger than money wage for changes in capacity utilization.
power, the gains or benefits of higher productivity (technological advances) would tend
to be retained by firms through a higher mark-up thereby leaving price unchanged. In
contrast, in a more competitive industrial structure, where there is a threat of entry, the
benefits of higher productivity would be passed on to consumers in terms of lower level
of prices through a policy of fixed markup. In some ways, it also resembles Hick’s Fix-
price versus Flex price characterization. 6 Flex price case where a fall in the unit variable
cost due to higher productivity results in the fall in prices corresponds to Steindl’s
competitive industry case with a tendency towards fixed mark-up. 7

When mark-up tends to be fixed, it can be interpreted to mean that it is targeted at a
certain level to achieve a target profit share. This can be seen formally from the following
price adjustment equation

\[ \dot{p} = \lambda \left[ \frac{w(z)}{x(z)} - p \right] \quad \lambda > 0 \]  

(V.8)

Note that higher (lower) value of \( \lambda \) entails faster (slower) adjustment in price in response
to unit variable cost.

Or from the definition of wage share (1-h),

\[ \frac{\dot{p}}{p} = \lambda \left[ m.(1-h)-1 \right] \]

\[ = \lambda \left[ m \cdot m \cdot h - 1 \right] \]

\[ = \lambda \left[ (1-m) \cdot m \cdot h \right] \]

\[ = m \lambda \left[ \frac{(m-1)}{m} - h \right] \]  

(V.9)

6 See Hicks (1965)

7 In Hick’s Fix price case despite a fall in the unit variable cost there is no change in the price level
implying higher or variable mark-up. This is similar to Steindl’s non-competitive industry with flexible
mark-up. This is the case that corresponds to our model in Chapter IV, where a fall in the unit cost due to
higher productivity at given prices, directly affects the profit share through a higher level of mark-up (see
eqn. IV.5, p.32). In that model profit share directly changes as a consequence of a change in the unit
variable cost with price remaining constant.
For any given level of mark-up (m) the first component in equation (V.9) gives us the intended profit share. The second component (h) is the actual profit share. Changes in this component (h) are brought about by adjustment in price in relation to unit variable cost, where the latter varies with capacity utilization as shown by (V.8). Hence the absolute change in price is defined in terms of deviations from the actual profit share from the targeted profit share, and $\frac{\dot{p}}{p} = 0$ means that the actual profit share (h) is equal to the targeted profit share $(m-1)/m$, which is targeted through the mark-up (m) in this case.

With these postulates we are now in a position to outline a formal model capturing the dynamic interrelation between the level and class distribution of income in the course of changing price and unit variable cost under increasing returns and wage bargain by organized labour in accordance with (V.2).

The realized profit share equation is given definitionally from (V.1) as,

$$\dot{h} = (1 - h) \left[ \frac{\dot{p}}{p} \left( \frac{w}{w} - \frac{\dot{y}}{y} \right) \right]$$

Using equation (V.2), (V.3), (V.8) and (V.9) we have

$$\dot{h} = c.(1 - h) \left[ \lambda \left( m(1 - h) - 1 \right) + \left( \frac{\alpha \nu - \beta \theta z^2}{(\alpha + \beta z)(\nu + \theta z)} \right) \frac{1}{z} \right]$$

$$ \text{Let } g(z) = \left( \frac{\alpha \nu - \beta \theta z^2}{(\alpha + \beta z)(\nu + \theta z)} \right) \frac{1}{z} \text{ in equation (V.10)}$$

Now consider the rate of change in capacity utilization, which is governed by excess demand in the product market, i.e.

$$\dot{z} = a \left[ I(\cdot) - S(\cdot) \right]$$

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Here $I(.)$ is the investment function and is defined as $I = I(h,z)$, where $h$ is the profit share and $z$ is the capacity utilization ratio.\(^8\)

Saving function is defined as

$$S = s \pi,$$

where $s$ is the propensity to save out of profits ($\pi$) and $1 \geq s \geq 0$

This is further decomposed as

$$S = s \frac{\pi}{Y} Y^*,$$

where $Y$ is the actual output and $Y^*$ is the potential output.

Normalizing with respect to $Y^*$ we have\(^9\)

$$S = s \cdot h \cdot z$$  \hspace{1cm} (V.12)

Therefore equation (V.11) can be rewritten as

$$\dot{z} = a \left[ I(h,z) - s \cdot h \cdot z \right]$$  \hspace{1cm} (V.13)

Equations (V.10) and (V.13) characterize our coupled dynamical system

$$\dot{h} = c (1 - h) \left[ \lambda \left( m(1 - h) - 1 \right) + \frac{\alpha \cdot v - \beta \cdot h \cdot z^2}{(\alpha + \beta \cdot z)(\nu + \theta \cdot z)} \frac{1}{z} \cdot \dot{z} \right]$$

$$\dot{z} = a \left[ I(h,z) - s \cdot h \cdot z \right]$$

$a, c > 0$ are speed of adjustment parameters.

\(^8\) See Bhaduri and Marglin (1990, p.105) for details.

\(^9\) cf. Bhaduri and Marglin (1990)
0: In this system \([I_0: (h = 1, z)]\) is an Invariant subspace, i.e. any orbit belongs to \(I_0\) remains in \(I_0\). And no trajectory can cross \(I_0\).

1: There are two fixed points of the coupled dynamical system, an economically trivial one with zero wage share at \(h_1 = 1\) and the other at \(h_2 = 1 - \frac{1}{m}\), where \(m > 1\) by definition. That is, (i) \(\dot{z} = 0, h = 1\)

(ii) \(\dot{z} = 0, h = 1 - \frac{1}{m}\)

** Condition for the existence of the trivial fixed point at \((h_1 = 1, z_1 = z_1^*)\)

i.e., \(\dot{h} = 0, \dot{z} = 0\) at \((h_1 = 1, z_1 = z_1^*)\) is \(I(1, z_1^*) = s.z_1^*\)

** Condition for the existence of fixed point at \((h_2 = (1 - \frac{1}{m}), z_2 = z_2^*)\) is:

at \(h_2 = 1 - \frac{1}{m}\), for \(\dot{z} = 0\) we need \(I(z_2^*, 1 - \frac{1}{m}) = s.(1 - \frac{1}{m}).z_2^*\)

If we assume \(I = i.h + j.z\), here \(i\) and \(j\) are positive constants, then we have,

\[s.(1 - \frac{1}{m}).z_2^* = i.(1 - \frac{1}{m}) + j.z\]

\[\Rightarrow z_2^*[j - s.(1 - \frac{1}{m})] = a(\frac{1}{m} - 1)\]

Then for \(z_2^* > 0\) the condition is \(j < s.(1 - \frac{1}{m})\) \hspace{1cm} (V.A)

2: The Jacobian matrix of partial derivatives evaluated at trivial equilibrium, \(h=1\) is given as,

\[J \bigg|_{h=1, z=z_1^*} = \begin{bmatrix} a(I_z - s.h) & a(I_z - s.z) \\ 0 & \lambda.c \end{bmatrix}\]

Where Trace, \(T : a(I_z - s.h) + \lambda.c\) and

Deter min ant, \(D = a.c.\lambda.(I_z - s.h)\)

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Here if we assume \((I_z - s.h) < 0\), the usual stability criteria for one variable Keynesian model, then for trace \(T\) to be negative we should have \(a >> c > 0\), which is plausible in many circumstances. But here the determinant \(D < 0\). We shall discuss the nature of instability of this fixed point when we formally state the properties of the system (see p. 49).

3: The Jacobian matrix of partial derivatives evaluated at the other equilibrium \(h_z = 1 - \sqrt{m}\) is given as,

\[
J\Bigg|_{h_z=1-\frac{1}{m}, z_2 = z_2^*} = \begin{bmatrix}
  a(I_z - s.h) & a(I_h - s.z) \\
  c(1-h).g(z).(I_z - s.h) & c(1-h)[c(a.\lambda.m + g(z).(I_h - s.z)]
\end{bmatrix}
\]

\(T: a(I_z - s.h) - c.\lambda \left[1 + \frac{h}{\lambda} g(z). (I_h - s.z) \right] + c.g(z). (I_h - s.z) \quad (V.14)

\(D: -a.\lambda.(I_z - s.h) \quad (V.15)\)

Though we derive \((I_z - s.h) < 0\) assuming a linear investment function (see equation V.A), and would hold even if \(I(h,z)\) is a non-linear function. Nevertheless we still take this as an assumption for our subsequent analysis. This would imply \(D > 0\) (see V.15).

Here again, as in the previous model in Ch. IV, two possibilities exist depending on whether investment responds more or less strongly than saving with respect to changes in profit share.

Consider the case where investment responds relatively weakly compared to saving to changes in profit share. In this case, there is no ambiguity about the local stability of the system, because in this Stagnationist case (for explanation of this terminology, see fn.12, p.33) characterized by \((I_h - s.z) < 0\), local stability conditions hold as the trace is negative (see condition V.14) and determinant is positive (condition V.15) and therefore the system is locally asymptotically stable.
But in the other case, where investment responds relatively more strongly than saving to changes in profit share i.e. \((I_h - s.z) > 0\) the local stability analysis suggests wider possibilities with richer dynamics. The equilibrium will be locally asymptotically stable (unstable) when the trace is negative (positive). The negativity of the trace may be ensured here only if \(a\) is sufficiently greater than \(c\), represented by \(a \gg c > 0\). This implies that the speed of adjustment of the level of output or capacity utilization \((z)\) is much faster than the speed of adjustment of profit share \((h)\) or distribution of income, which is plausible in many circumstances. On the contrary the condition for trace \((T)\) to be positive can be derived from \((V.14)\) as,

\[
a(I_z - s.h) + c[- \lambda + (1 - h)(g(z), (I_h - s.z))] > 0
\]

or \(-a|I_z - s.h| + c[- \lambda + (1 - h)(g(z), (I_h - s.z))] > 0\)

\[\Rightarrow c[- \lambda + (1 - h)(g(z), (I_h - s.z))] > a|I_z - s.h|
\]

or \(\frac{c}{a} > \frac{|I_z - s.h|}{[- \lambda + (1 - h)(g(z), (I_h - s.z))]}
\]

\[(V.16)\]

The possibility of the trace \((T)\) changing sign suggests, by "Bendixson's Negative Criterion" (Bendixson, I (1901) and also Cesari, L (1971)) that limit cycles may arise in the case of the Exhilarationist regime. To see this in economic terms, consider the special case of an exhilarationist regime with a sufficiently strong effect of profitability on investment, and fixed (or nearly fixed) prices. At low level of capacity utilization (zone I in fig.V.1) with \(z < \sqrt{\frac{v.a}{\theta.\beta}}\) (see V.6), as investment and capacity utilization increases, the profit share also increases because unit variable cost is falling, while prices remain more or less fixed. Thus, investment increases unambiguously, because both the arguments of the investment function \(I(h, z)\) are increasing to influence it positively. As a result the economy enters a situation of high capacity utilization i.e. \(z > \sqrt{\frac{v.a}{\theta.\beta}}\) in zone II, where
profit share begins to fall as unit variable cost rises with fixed prices. Because the regime is exhilarationist by assumption, the negative impact of falling profit share on investment is stronger than that of the positive accelerationalist impact of high capacity utilization leading to a fall in both profit share and capacity utilization. The significance of the relative speeds of adjustment in both profit share and capacity utilization can be seen more clearly now. In the expansionist phase (zone I) both capacity utilization and profit share rise in unison so that the speeds of adjustment are not crucial. But in the contractionist phase (zone II) the relative speed of adjustment is crucial for the cycle to turn the cycle to zone III i.e. profit share has to fall much faster than increase in capacity utilization i.e. c>>a to bring the expansion in Investment and output to an end, until capacity utilization is low enough (i.e. \( z < \frac{\sqrt{v \cdot \alpha}}{\theta \cdot \beta} \)) to repeat the above process of dynamic oscillation of the economy.

We are now in a position to formalize the preceding economic argument.

If the dynamical system

\[
\dot{z} = a [I(h,z) - s \cdot h \cdot z]
\]

\[
\dot{h} = c (1 - h) \left[ \lambda (m(1 - h) - 1) + \left( \frac{\alpha \cdot v - \beta \cdot z^2}{(\alpha + z \cdot v + \theta \cdot z)} \right) \frac{1}{z} \right] a, c > 0
\]

has the following properties.

(i) \( I_s : (h=1,z) \) is an invariant subspace. Since any orbit which belongs to \( I_s \) remains in \( I_s \) and also no trajectory can cross \( I_s \), it implies that \( h=1 \) line is a natural boundary of this system.

(ii) \( I(.) \) and \( S(.) \) are continuously differentiable in the non-negative orthant \( \mathbb{R} \), with \( I_h, I_z, S_h, S_z > 0 \)
ii) There exists two unstable fixed points \( (h_1^*, z_1^*) \) and \( (h_2^*, z_2^*) \) in the positive orthant such that, the conditions for instability are given by

* Fixed point, say A, at \( (h_1 = 1, z_1 = z_1^*) \). From the Jacobian matrix of partial derivatives evaluated around this fixed point it clear that

\[
\frac{\partial \dot{z}}{\partial z} < 0 \text{ (given the assumption } (I - s.h) < 0 \text{) and} \\
\frac{\partial \dot{h}}{\partial h} > 0 \text{ (with both } c \text{ and } \lambda \text{ being positive)}
\]

This implies that this fixed point on the invariable subspace has one stable arm with respect to \( z \) axis and a transverse unstable arm with respect to \( h \) axis. (See fig. V.1)

* Fixed point, say B, at \( (h_2 = (1 - \frac{1}{m}), z_2 = z_2^*) \)

\[
> \quad \frac{c}{a} > \frac{|I_z - s.|}{[-\lambda + (1-h)g(z) (I_h - s.z)]}
\]

(iii) There exists a finite \( \bar{z} \), such that \( \forall z < \bar{z}, \quad I(h, z) > S(h, z) \). Furthermore \( \dot{z} \) need not be monotonically increasing throughout in \( (h, z) \) space.

iv) The system is stable in an appropriately chosen compact subset in \( R \). Since the area is bounded we conjuncture without proving, the possibility of finding a compact set in \( F = \{h, z|0,1] \times [0,1]\} \). If these conditions are satisfied, then every positive orbit starting in \( R \) approaches a limit cycle in \( R \).

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10 The assumption underlying this functional form is that for low values of \( z \), \( \dot{z} \) is positive i.e. the response of investment is higher than the response of saving for unit changes in capacity utilization. This is exactly opposite to the one Kaldor (1940, p.85) assumed to prove the persistence of cycles in his model. However note that this is only one of the plausible functional forms. See Appendix B in Bhaduri and Marglin (1990), for further discussion.
We may elaborate further the economic description of the cycle is along the lines discussed above, focusing now on the speed of price adjustment. At low level of capacity utilization, i.e. \( z < \frac{v_0}{\sqrt{\theta \beta}} \), the unit variable cost \( (\frac{w}{w} - \frac{x}{x}) \) falls. With prices remain fixed the falling unit variable cost implies a rise in the share of profits. In an exhilarationist regime with a sufficiently strong effect of profitability on investment, i.e. investment responding more than saving to changes in profit share, \( (I_h - s_z) > 0 \), investment increases unambiguously as both profitability effect and accelerationist effect being positive. As a result output expands in zone I and drives the cycle towards to zone II. As capacity utilization increases and reaches the critical value i.e. \( z > \frac{v_0}{\sqrt{\theta \beta}} \), the unit variable cost rises. Consequently, in zone II, profit share begins to fall as unit variable cost rises with fixed prices. Moreover, we can also see how profit share falls from the point of changes in price in response to changes in unit variable cost from condition (V.16).
For the right hand side in condition (V.16) to be positive, we require

\[-\lambda + (1 - h)\{g(z)(I_h - s.z)\}] > 0

which implies \( \lambda < (1 - h)\{g(z)(I_h - s.z)\} \)  

(V.17)

where as explained earlier \( \lambda \) is the speed of adjustment of price in response to unit variable cost (see eqn. V.8). Since \( \lambda < 1 \) in V.17, the adjustment in price is slower in response to adjustment in unit variable cost. In other words, in zone II, rising unit variable cost is not adequately compensated by a corresponding rise in price (percentage terms) implying a fall in the profit share. Because the regime is exhilarationist by assumption, the negative impact of falling profit share on investment is stronger than that of the positive effect of high capacity utilization. Hence in zone II at a peak of activity i.e. 

\[ z > \sqrt{\frac{v.\alpha}{\beta.\beta}} \]

the negative impact of profitability on investment outweighs the positive accelerationist impact of capacity utilization to bring the expansion in investment to an end and consequently capacity utilization and output also fall. This is the economic intuition for the cycle to turn towards zone III. In terms of mechanics of the cycle it is the condition (V.16), which is critical for dragging the cycle towards zone III, i.e. the condition that the speed of adjustment of profit share (distribution of income) is faster than the speed of adjustment of capacity utilization (level of output) that leads the cycle towards zone III.\(^{12}\) In zone III the falling share of profits feeds on to the output equation (see \( z \) equation of the system) resulting a fall in the latter, which is due to a more than offsetting fall in investment over any rise in consumption. Hence both profit share and capacity utilization fall to lead the cycle to zone IV. Consequently the expansion in both investment and capacity utilization comes to an end, until capacity utilization is again low enough \( (z < \sqrt{\frac{v.\alpha}{\beta.\beta}}) \) to make profit share rise and repeat this process of dynamic oscillation of the economy.

\(^{12}\) At the peak of activity, higher \( \lambda \) (with in its bound as given in V.17) implies a larger ratio of the relative speeds of adjustment (see V.16).
It is interesting to note that the coefficient \( g(z) \) (see equation V.10) acts as a ‘tuning’ parameter in terms of determining the direction and magnitude of direction of the cycle. In essence the fall in effective demand in this regime is due to a more than outweighing fall in investment demand than any rise in consumption demand. And the fall in investment demand is brought about by a fall in profit share at the peak of the cycle (activity), which is due to an upward pressure on unit variable cost from money wages. Falling profit share at the peak of activity in this regime stands somewhat in contrast to the widely observed empirical fact of procyclical behaviour of profit share. In this sense, it is the anti-Okun’s case that we had already referred to earlier in this chapter. It requires the percentage rise money wage rate to be strong enough to outweigh the advantages of higher labour productivity at higher capacity utilization, beyond a point. This may correspond to a case of “wage explosion” not entirely unknown in economic experiences. But this also requires a monopsonistic labour market coupled with a fairly competitive product market. The ‘anti-Okun’ case considered by us in theoretical terms, may perhaps be less frequently observed in practice because this combination of a monopsonistic labour market coupled with a near-competitive product market may not be that common.

In general, in this chapter, the dynamics of interrelation between income distribution and the level of income is analysed in a more complex model by assuming both money wage and productivity as increasing functions of capacity utilization. It is this explicit consideration of money wage and labour productivity as functions of capacity utilization that generates interesting dynamics capable of producing sustained non-linear oscillations in terms of limit cycles in some cases, where investment responds sufficiently strongly to profit share (i.e. the Exhilarationist regime). Nevertheless, fluctuations in the level of effective demand still remains the central point here in this model, under the assumptions of nearly fixed price and strong impact of profitability on investment (i.e. exhilarationist regime), generating in some cases oscillatory interaction between distribution of income and the level of output.