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DISTRIBUTION AND GROWTH AFTER KEYNES

A Post-Keynesian Guide

(Edward Elgar 2014)

CHAPTER 4

‘POST-KEYNESIAN DISTRIBUTION AND GROWTH THEORIES I: KALDOR, PASINETTI, THIRLWALL AND ROBINSON’
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4.2 Kaldor’s, Pasinetti’s and Thirlwall’s Contributions to Post-Keynesian Distribution and Growth Theories
4.2.1 Introduction to Kaldor’s approach

Two different types of Kaldorian approaches

   - Formal full employment distribution and growth models

“(…) the problem of reconciling the two growth potentials – the ‘warranted’ rate of capital accumulation and the ‘natural’ rate of growth in the effective labour force [that is the growth rate of the labour force plus the growth rate of productivity, E.H.] – appeared as the ‘basic’ dynamic problem.” (Kaldor 1980, p. xxii)

„Our model thus relates to a capitalist economy which is sufficiently highly developed for wages to be above subsistence level and sufficiently competitive at the same time to generate adequate demand to secure full employment.“ (Kaldor 1957, S. 609)

- Kaldor’s applied economics of growth: sectoral and regional differences and divergences, dynamic returns to scale, cumulative causation and path dependence
4.2.2 Kaldor’s Keynesian theory of distribution

• Full employment and flexible prices: How can saving adjust to investment in the long run?

➢ change in income distribution (related to Keynes’s Treatise on Money)

\[(4.1)\quad pY = W + \Pi\]

\[p: \text{price level, } Y: \text{real income, } W: \text{wages, } \Pi: \text{profits}\]

\[(4.2)\quad S = S_W + S_\Pi\]

\[S: \text{saving, } S_W: \text{saving out of wages, } S_\Pi: \text{saving out of profits}\]

\(S_\Pi\) includes retained earnings
\[ S = s_w W + s_\Pi \Pi, \quad s_w < s_\Pi \]

\( s_w \): propensity to save out of wages, \( s_\Pi \): propensity to save out of profits

\[ s = \frac{S}{pY} = s_w \frac{W}{pY} + s_\Pi \frac{\Pi}{pY} \]

\( s \): propensity to save out of income
Goods market equilibrium

(4.5) \( pI = S \)

Inserting (4.3) into (4.5):

\[
pI = s_w W + s_\Pi \Pi,
\]

(4.6) \( pI = s_w (pY - \Pi) + s_\Pi \Pi, \)

\( pI = s_w pY + (s_\Pi - s_w) \Pi. \)

Dividing by \( pY \):

(4.7) \[ \frac{pI}{pY} = \frac{S}{pY} = s_w + (s_\Pi - s_w) \frac{Y}{pY} \]

Determination of the profit share:

(4.8) \[ h^* = \frac{\Pi}{pY} = \frac{1}{s_\Pi - s_w} \frac{I}{Y} - \frac{s_w}{s_\Pi - s_w}, \quad 0 \leq s_w < s_\Pi \leq 1 \]
The investment-income ratio:

- exogenous and given by the natural rate of growth ($g_n$)

\[
(4.9) \quad \frac{I}{Y} = \frac{I}{K} \frac{K}{Y} \quad \Rightarrow \quad \frac{I}{Y} = g_n \frac{v}{Y}
\]

From equations (4.7) and (4.9):

\[
(4.10) \quad g_n = g_w = \frac{s}{v} = \frac{s_w + (s_{\Pi} - s_w)h}{v}
\]
“Hence the ‘warranted’ and the ‘natural’ rates of growth are not independent of one another; if profit margins are flexible, the former will adjust itself to the latter through a consequential change in P/Y [the profit share in Kaldor’s notation, E.H].”

(Kaldor 1955/56, p. 97)
Figure 4.1 Investment share, saving share and profit share in national income
Limitations to the Kaldorian adjustment mechanism

Absolute limits: \( s_w \leq \left( \frac{I}{Y} \right) \leq s_{II} \)

Economic limits:

\[(4.12) \quad h_{\text{max}} : \quad w^r \geq w^r_{\text{min}} \quad \Rightarrow \quad h \leq \frac{Y - w^r_{\text{min}}L}{Y} \]

\[(4.13) \quad h_{\text{min}} : \quad r \geq r_{\text{min}} \quad \Rightarrow \quad h \geq r_{\text{min}} \frac{K}{Y} \]

- If \( w^r < w^r_{\text{min}} \): Marxian situation: capital accumulation is limited by the surplus production over wages
- If \( r < r_{\text{min}} \): Keynesian situation: investment is too low to sustain full employment → stagnation
Multiplying equation (4.8) by $Y/K$:

\[(4.14) \quad \left( \frac{\Pi}{pK} \right)^* = \frac{1}{s_\Pi - s_w} \frac{I}{K} - \frac{s_w}{s_\Pi - s_w} \frac{Y}{K} \Rightarrow r^* = \frac{g - s_w}{s_\Pi - s_w}, \quad 0 \leq s_w < s_\Pi \leq 1, v = \bar{v} \]

$g$: rate of capital accumulation, $v$: capital-output ratio

Assume $s_w = 0$

\[(4.15) \quad h^* = \frac{\Pi}{pY} = \frac{1}{s_\Pi} \frac{I}{Y} \]

\[(4.16) \quad r^* = \frac{\Pi}{pK} = \frac{1}{s_\Pi} \frac{I}{K} = \frac{g}{s_\Pi} \]

- Cambridge equation
4.2.3 Pasinetti’s contributions and further developments: Pasinetti and neo-Pasinetti theorems

• Kaldor’s distribution theory is related to income categories, not to social classes. (Kaldor’s justification: retained earnings)

• With positive workers’ saving, the equilibrium rate of profit depends on technology (v) and on propensities to save out of wages (sw) and profits (sΠ). When workers save they will accumulate wealth (capital), and will therefore obtain profits, too.

• Pasinetti (1962) theorem shows that workers’ households’ decisions to save out of their wage and profit incomes (SWH = ΔpKWH) will have no effect on long-run equilibrium.
“I should look, therefore, at the previous analysis simply and more generally as a logical framework to answer interesting questions about what ought to happen if full employment is to be kept over time, more than as a behavioural theory expressing what actually happens.”
(Pasinetti 1974, p. 119, emphasis in the original)
(4.17) \[ S_{WH} = dpK_{WH} \]

\( S_{WH} \): saving of workers’ households out of wages and profits,
\( K_{WH} \): capital stock owned by workers, \( p \): general price level

(4.18) \[ S_C = dpK_C \]

\( S_C \): saving of capitalists out of profits, \( K_c \): capital stock owned by capitalists

(4.19) \[ \frac{K_C}{K} = \text{constant}, \quad \frac{K_{WH}}{K} = \text{constant} \]

(4.20) \[ \hat{K} = \hat{K}_{WH} = \hat{K}_C = g \]

\( g \): rate of capital accumulation
From equations (4.17), (4.18) and (4.20):

\[
(4.21) \quad g = \frac{S_{WH}}{pK_{WH}} = \frac{S_C}{pK_C} = \frac{s_C \Pi_C}{pK_C} = s_C r_C
\]

\(\Pi_C\): capitalists’ profits, \(s\): capitalists’ propensity to save out of profits, \(r_C\): capitalists’ rate of profit

Since in long-run equilibrium it has to hold:

\[
(4.22) \quad r = \frac{\Pi}{pK} = r_C = \frac{\Pi_C}{pK_C} = r_{WH} = \frac{\Pi_{WH}}{pK_{WH}}
\]
It follows:

\[ (4.23) \quad r^* = \frac{g}{s_C} \]

- The rate of profit in the very long-run equilibrium is determined only by factors under control of the capitalists. Technology and workers’ households’ saving have no effects.

“Savings out of wages always turn out to be equal to workers’ extra consumption out of profits (extra consumption meaning consumption in excess of what the capitalists would have consumed if those profits remained to them).”

(Pasinetti 1974, p. 111)
If $s_c = 1$:

(4.24) $r^* = g$

If the rate of return on workers’ capital ($i = r_{WH}$) falls short of the rate of return on capitalists’ capital:

(4.25) $r = r_c \frac{K_c}{K} + i \frac{K_{WH}}{K}$

➢ rate of interest affects general rate of profit
Kaldor’s Neo-Pasinetti theorem

- Corporations and households
- One asset: shares issued by corporations and held by households
- Investment in capital stock at current prices \( pI = dpK = gpK \) is financed by retained earnings, given by the retention ratio \( s_c \) and total profits \( \Pi \), and by shares issued by the corporations as a fixed proportion \( f \) of total investment:

\[
(4.26) \quad dpK = s_c \Pi + fgK
\]

Dividing by \( pK \) and noting that the rate of profit is \( r = \Pi/(pK) \):

\[
(4.27) \quad r^* = \frac{(1-f)g}{s_c}
\]

- In Kaldor’s ‘neo-Pasinetti theorem’ the decision of the household sector has no effect whatsoever on income distribution
• Net saving is the difference between households’ saving from wages, given by the households’ propensity to save from wages ($s_w$) and the sum of wages (W), and households’ consumption from capital gains, determined by their propensity to consume (c) and their capital gains ($G_K$).

• Equilibrium in the market for shares:

$$f_{gpK} = s_w W - c G_K$$  \hspace{1cm} (4.28)

• Valuation ratio: ‘relation of the market value of shares to the capital employed by corporations (or the ‘book value’ of assets)’

$$G_K = q_{gpK} - f_{gpK} = \left( q - f \right) g_{pK}$$  \hspace{1cm} (4.29)
If $q > 1$: market value exceeds the book value
   $\rightarrow$ positive capital gains

If $q < 1$: market value falls short of the book value
   $\rightarrow$ capital losses

Inserting (4.29) and (4.28) we obtain:

(4.30) $fgpK = s_w W - c(q - f)gpK$
Valuation ration in the long-run equilibrium:

\[
q^* = \frac{1}{c} \left[ \frac{s_w}{g} \frac{Y}{K} - \frac{s_w}{s_c} \left( 1 - f \right) - f \left( 1 - c \right) \right]
\]

“Consumption out of capital or capital gains is an offset to personal savings, and in [...] the ‘Neo-Pasinetti Theorem’ I attempted to show how the level of share prices in the capital market will tend to generate a ‘valuation ratio’ for shares at which the net savings of individuals equals the proportion of business investment which enterprises decide to finance through the issue of new securities. This leads to results similar to Dr. Pasinetti’s, but by a different route [...].”

(Kaldor 1978, p. xvii)
Problems

Exclusion of any quantity adjustments in long period analysis, and the exclusive reliance on (relative) price adjustments leading towards the long-period equilibrium:

- The general price level in the goods market relative to the nominal wage rate in the labour market, i.e. functional income distribution
- And/or the price level in financial markets relative to the price level in the goods market, i.e. the value ratio
- Full employment models
- Lack of investment function
- Lack of other assets (money) (Davidson 1978)

4.2.4 Growth, technical progress and distribution in Kaldor’s approach

Kaldor (1961, pp. 178-179): six ‘stylized facts’ as a starting point for constructing theoretical models:

1. a steady trend rate of output and labour productivity growth,

2. continued increase in the capital-labour ratio,

3. a steady rate of profit on capital in the developed capitalist economies, which is substantially higher than the ‘pure’ long-term rate of interest,

4. steady capital-output ratios over long periods,
5. a steady share of profits in income and a high correlation with the share of investment in output, which implies a steady share of wages in output, too, and thus real wages increasing with labour productivity, and

6. appreciable differences in the rate of growth of labour productivity and of output in different societies, which are associated with corresponding variations in the investment-output ratios and in the profit shares.
A simplified model

Assume constant labour force, adaptive monetary system

Accumulation function:

\[(4.32) \quad g = g\left(r^e\right)\]

Expected rate of profit \(r^e\):

\[(4.33) \quad r_t^e = r_{t-1} = \frac{\left(\frac{\Pi}{pY}\right)_{t-1}}{\left(\frac{K}{Y}\right)_{t-1}} = \frac{h_{t-1}}{v_{t-1}}\]
Decomposition of the capital-output ratio (v):

\[
(4.34) \quad v = \frac{K}{Y} = \frac{L}{Y} = \frac{k}{y}
\]

\[
(4.35) \quad \hat{v} = \hat{k} - \hat{y}
\]

\[
(4.36) \quad \hat{k} = \hat{y} \quad \Rightarrow \quad \hat{v} = 0
\]

\[
(4.37) \quad \hat{y} = \hat{y}(g)
\]
Figure 4.2 Kaldor’s technical progress function

\[ \hat{y} \]

\[ \hat{y}^* \]

\[ 45^\circ \]

\[ \hat{k}^* \]

TPF
1. If \( g = \hat{k} > \hat{k}^* \rightarrow \hat{k} > \hat{y} \rightarrow v \) is rising \( \rightarrow r^e \) is falling
\[ g = \hat{k} \] falls towards equilibrium level (accelerated by falling \( h \))

2. If \( g = \hat{k} < \hat{k}^* \rightarrow \hat{k} < \hat{y} \rightarrow v \) is falling \( \rightarrow r^e \) is rising
\[ g = \hat{k} \] rises towards equilibrium level (accelerated by rising \( h \))

Results:

- Long-run equilibrium determined by technical progress function (\( P \)) is stable
- Constant capital-output ratio, profit share, profit rate, output and productivity growth
- Stable growth at full employment possible
- Natural rate of growth and warranted rate of growth are endogenous
“Hence, whether the increase in output will be more or less than proportionate to the increase in capital will depend, not on the state of knowledge or rate of progress in knowledge, but on the speed with which capital is accumulated, relatively to the capacity to innovate and to infuse innovations into the economic system. The more ‘dynamic’ are the people in control of production, the keener they are in search of improvements, and the readier they are to adopt new ideas and to introduce new ways of doing things, the faster production (per man) will rise, and the higher is the rate of accumulation of capital that can be profitably maintained.”
(Kaldor 1961, p. 207, emphasis in original)
“It follows that any sharp or clear-cut distinction between the movement *along* a ‘production function’ with a given state of knowledge, and a *shift* in the ‘production function’ caused by a change in the state of knowledge, is arbitrary and artificial.”

(Kaldor 1957, p. 596, emphasis in the original)

“In a world in which technology is embodied in capital equipment and where both the improvement of knowledge and the production of new capital goods are continuous, it is impossible to isolate the productivity growth which is due to capital accumulation *as such* from the productivity growth which is due to improvements of technical knowledge.”

(Kaldor 1978, p. ix, emphasis in the original)
“In fact, the implication of our model in terms of Mr. Harrod’s terminology could be summed up by saying that the system tends towards an equilibrium rate of growth at which the ‘natural’ and the ‘warranted’ rates are equal, since any divergence between the two will set up forces tending to eliminate the difference; and these forces act partly through an adjustment of the ‘natural’ rate, and partly through an adjustment of the ‘warranted’ rate.”

(Kaldor 1957, p. 612)
4.2.5 Assessing the Kaldor-Pasinetti approach to steady growth and distribution

- Assumption of full employment and full utilisation of capital stock (‘Jean Baptiste‘ Kaldor).
- Prices in goods market have to be more flexible than long-run flexible nominal wages in labour markets.
- Workers have to accept redistribution at their expense (at full employment) if capital accumulation or capitalist consumption increase. Price-wage-price spiral (inflation barrier) is excluded.
- Decrease in capital accumulation or in capitalist consumption has to trigger falling prices but no change in capacity utilisation, employment or nominal wages.
- No integration of investment finance and finance costs (interest).
4.2.6 Kaldor’s applied economics of growth, cumulative causation export-led growth and Thirlwall’s balance-of-payments-constrained growth rate

- Demand constrained economies with hidden and disguised unemployment, increasing returns, endogenous technological progress, path dependency and the historical specificity of economic development

‘Kaldor growth laws’

1. Manufacturing is the ‘engine of growth’
2. Verdoorn’s law: positive effect of output growth on productivity growth in manufacturing
3. That faster the growth of manufacturing, the faster will be the rate of labour transfer from agriculture or other non-manufacturing sectors towards manufacturing, which will feed back positively on overall productivity growth in the economy
“Manufacturing growth is the engine of GDP growth. The higher the rate of manufacturing growth the faster the overall rate of productivity growth. Labour is necessary for growth to take place, but manufacturing output is not constrained by it because there are more fundamental demand constraints which operate long before supply constraints bite. Labour is very adaptable and elastic, and even in mature economies more labour used in manufacturing need not be at the expense of growth elsewhere. The fundamental demand constraint on the growth of output in an open economy is the balance of payments.”

(Thirlwall 1987, p. 195)
Kaldor (1970) ‘The case for regional policies’

Thirlwall (1987, pp. 196-199; 2002, chap. 4) export-led growth model

\[ \hat{Y} = \lambda \hat{X}, \quad \lambda > 0 \]

Y: real domestic output, X: exports, \( \lambda \): dynamic foreign trade multiplier

- The variable \( \lambda \) denotes the dynamic foreign trade multiplier. Exports are determined by foreign GDP and price competitiveness of domestic producers as follows:

\[ X = Q \left( \frac{p}{p_f e} \right)^{\eta} Y_f^\varepsilon, \quad \eta < 0, \varepsilon > 0 \]

p: domestic prices, \( p_f \): foreign prices in foreign currency, Q: constant e: exchange rate, \( Y_f \): foreign income, \( \eta \): price elasticity of demand for exports, \( \varepsilon \): foreign income elasticity of demand for exports
\[
\hat{X} = \eta (\hat{p} - \hat{p}_f - \hat{e}) + \epsilon \hat{Y}_f
\]

(4.41) \[ p = \left(1 + m\right) \frac{w}{y}, \quad m > 0 \]

\[ m: \text{firm’s mark-up, } w: \text{wage rate, } y: \text{labour productivity} \]

(4.42) \[ \hat{p} = \left(1 + m\right) + \hat{w} - \hat{y} \]
Verdoorn’s law:

(4.43) \( \hat{y} = \hat{y}_a + \rho \hat{Y} \), \( \rho > 0 \)

\( \rho \): Verdoorn coefficient, \( y_a \): autonomous productivity growth

➢ key to cumulative causation or virtuous circle

Substituting equations (4.43), (4.42) and (4.40) into (4.38):

\[
\hat{y}^* = \lambda \frac{\eta (1 + m) + \hat{w} - \hat{y}_a - \hat{p}_f - \hat{e}}{1 + \lambda \eta \rho} + \varepsilon \hat{Y}_f
\]

(4.44)
• If relative prices and exchange rates are held constant and the feedback mechanism via the Verdoorn coefficient is switched off, equation (4.44) simplifies to:

\[(4.45) \hat{Y}^* = \lambda \varepsilon \hat{Y}_f\]

“Growth rates between countries differ not because we observe countries in the process of divergence but because the equilibrium growth rates differ, associated mainly with differences in the income elasticity of demand for exports.”
(Thirlwall 2002, p. 59)
The balance-of-payments-constrained growth model (Thirlwall 1979)

“The central tenet of the balance-of-payments-constrained growth model is that a country cannot run a balance-of-payments deficit for any length of time that has to be financed by short-term capital flows and which results in an increasing net foreign-debt-to-GDP ratio. If a country attempts to do this, the operation of the international financial markets will lead to increasing downward pressure on the currency, with the danger of a collapse in the exchange rate and the risk of a resulting depreciation/inflation spiral. There is also the possibility that the country’s international credit rating will be downgraded. Consequently, in the long run, the basic balance (current account plus long-term capital flows) has to be in equilibrium. An implication of this approach is that there is nothing that guarantees that this rate will be the one consistent with the full employment of resources or the growth of productive potential.”

(McCombie 2012, pp. 19-20)
• Current account equilibrium, disregarding the flow of factor incomes between countries:

\[ pX = p_f eM \]  \hspace{1cm} (4.46)\]

\[ M: \text{imports} \]

\[ \hat{p} + \hat{X} = \hat{p}_f + \hat{e} + \hat{M} \]  \hspace{1cm} (4.47)\]

\[ M = R \left( \frac{p_f e}{p} \right)^\psi Y^\pi, \quad \psi < 0, \pi > 0 \]  \hspace{1cm} (4.48)\]

\[ R: \text{constant, } \psi: \text{price elasticity of demand for imports, } \pi: \text{income elasticity of demand for imports} \]

\[ \hat{M} = \psi \left( \hat{p}_f + \hat{e} - \hat{p} \right) + \pi \hat{Y} \]  \hspace{1cm} (4.49)\]
Substituting equations (49) and (40) into equation (47) yields the domestic rate of growth which is consistent with a current account equilibrium or the balance-of-payments-constrained growth rate ($\hat{Y}^b$):

\[
\hat{Y}^b = \frac{(1 + \eta + \psi)(\hat{p} - \hat{p}_e - \hat{e}) + \varepsilon \hat{Y}_f}{\pi}
\]

In the long run, the main determinants of the balance-of-payments-constrained growth rate are foreign GDP growth and the income elasticities of exports and imports:

\[
\hat{Y}^b = \frac{\varepsilon \hat{Y}_f}{\pi} = \frac{\hat{X}}{\pi}
\]

The multiplier effect of export growth on domestic GDP growth is the reciprocal of the income elasticity of imports ($\lambda = 1/\pi$) if a balance-of-payments constraint is introduced into the model.
Figure 4.3 The balance-of-payments-constrained growth rate
“The only sure and long-term solution to raising a country’s growth rate consistent with balance of payments equilibrium on current account is structural change to raise $\varepsilon$ and to reduce $\pi$.”

(Thirlwall 2002, p. 78)
4.3 JOAN ROBINSON’S REJECTION OF THE STEADY STATE GROWTH EQUILIBRIUM APPROACH
4.3.1 Introduction to Robinson’s approach

Robinson (1956; 1962)

➢ Critical of the use of equilibrium models in economics, but aware of the usefulness of aggregation and abstract modelling:

“A model which took account of all the variegation of reality would be of no more use than a map at the scale of one to one.”

(Robinson 1962, p. 33)
Logical vs. historical time

“In a model depicting equilibrium positions there is no causation. It consists of a closed circle of simultaneous equations. The value of each element is entailed by the values of the rest. At any moment in *logical time*, the past is determined just as much as the future. In an *historical model*, causal relations have to be specified. Today is a break in time between an unknown future and an irrevocable past. What happens next will be the result from the interactions of the behaviour of human beings within the economy. Movement can only be forward.”

(Robinson 1962, p. 26, my emphasis)
“There is much to be learned from *a priori* comparisons of equilibrium positions, but they must be kept in their logical place. They cannot be applied to actual situations; it is a mortal certainty that any particular actual situation which we want to discuss is not in equilibrium. Observed history cannot be interpreted in terms of a movement along an equilibrium path nor adduced as evidence to support any proposition drawn from it.”

(Robinson 1962, p. 25, emphasis in the original)
“(…) in most economic reactions the path the market follows, while it is adapting itself to a change, has a long-persisting effect upon the position that it reaches”

(Robinson 1956, p. 58).

➢ „path dependence“
4.3.2 Accumulation and the rate of profit

“The Keynesian models (including our own) are designed to project into the long period the central thesis of the General Theory, that firms are free, within wide limits, to accumulate as they please, and that the rate of saving of the economy as a whole accommodates itself to the rate of investment that they decree.”

(Robinson 1962, pp. 82-83)
Determinants of equilibrium


1. Technical conditions of production,
2. investment policy,
3. thriftiness conditions,
4. competitive conditions,
5. the wage bargain,
6. financial conditions, and
7. the initial stock of capital goods and the state of expectations determined by past experience.
• Firm sector producing investment and consumption goods
• Rentiers’ households receiving distributed profits in terms interest and dividend payments (R)
• Workers’ households receiving wages
• Firms retain a part of total profits (Π) and distribute the rest to rentiers, who spend part of their income for consumption goods and save the rest (S_R)
• Rentiers hold their wealth in obligations issued by the firm sector and/or in bank deposits
• Workers as a social class are assumed not to save but spend their wages completely on consumption goods
“The normal proportion of total profits saved, then depends upon two factors – the proportion of profits distributed by the firms and the proportion of their receipts that rentiers save”

(Robinson 1962, p. 39)
Firms’ retention ratio: \( s_C = (\Pi - R) / \Pi \),
and rentiers’ propensity to save: \( s_R = S_R / R \) are given:

\[
(4.54) \quad s_{\Pi} = \frac{S_\Pi}{\Pi} = \frac{\Pi - R + s_R R}{\Pi} = s_C + s_R \left( 1 - s_C \right)
\]

\[
(4.55) \quad \sigma = \frac{S}{pK} = \frac{S_\Pi}{pK} = \frac{s_{\Pi} \Pi}{pK} = s_{\Pi} r
\]

\( \sigma \): saving rate, \( S \): total saving, \( pK \): nominal capital stock,
\( r \): profit rate
Valuation of the capital stock

“Economies with different rates of profit must exist either at different dates or in different regions. Between two dates technical knowledge has altered. Between two regions there are differences in natural and human resources. The comparison of different economies with the same technical possibilities and different rates of profits is an exercise in pure economic logic, without application to reality.

In an historical model, the stock of capital goods at some base date is taken to be simply whatever it happens to be. It can be valued at historic costs or at current reproduction cost, or in terms of its prospective earning power discounted at whatever is considered to be the appropriate rate of interest.”

(Robinson 1962, pp. 32-33)
In our model, profits are desired for the sake of growth rather than growth for the sake of profits [...]”
(Robinson 1962, p. 45)

In equilibrium, the rate of profit included in equation (4.55) has to be equal to the rate of profit inducing capital accumulation in equation (4.56).

\[(4.56) \quad g = g(r^e)\]

\[(4.57) \quad g \left( r^* \right) = \sigma \left( r^* \right) \quad \Rightarrow \quad r^* = \frac{g(r^*)}{s_\Pi}\]
Figure 4.4 Rate of capital accumulation and rate of profit
Point A describes the “desired rate of accumulation, in the sense that it is the rate which makes the firms satisfied with the situation in which they find themselves.” (Robinson 1962, p. 49)

Equilibrium effects of

- Change in animal spirits?
- Change in the saving ratio?
  → ‘Paradox of thrift’?

Persistence of equilibrium over time?

- Time lags in the distribution of profits
- Uneven vintage structure of capital stock
- Innovations
“The model is inherently unstable and fluctuates even in otherwise tranquil condition.”
(Robinson 1962, p. 67)

“[…] investment takes place in a series of rushes, each of which leaves behind traces which affect the conditions in which the next occurs”
(Robinson 1962, p. 69)
4.3.3 Possible growth path

- Potential rate of growth is endogenous

- No adjustment of equilibrium growth path to potential growth rate

- Infinite number of potential equilibrium accumulation paths

- Historically open approach
**Golden age**

- Full employment of workers
- Structurally steady growth
- Harrod-neutral technological progress
- Equal productivity growth in all sectors
- Growth rate of the real wage corresponding to the productivity growth rate
- Constant rate of profit and constant profit and wage shares

“mythical state of affairs not likely to obtain in any actual economy”

(Robinson 1956, p. 99)
‘limping golden age’
- Desired rate of capital accumulation, due to a lack of ‘animal spirits’, is too low to provide full employment.

‘restrained golden age’
- Desired accumulation rate exceeds the maxim possible accumulation rate

‘bastard golden age’
- Organised workers resist a reduction of their real wage rates during a rise of the desired accumulation rate, so that the equilibrium profit rate cannot be obtained. Therefore, the system hits the ‘inflation barrier’
Perspectives of 'near golden age' (Robinson 1962, pp. 76-78)

Inherent tendency towards stagnation

- First, technological change leads to an increase in the minimum size of the firm and a higher degree of specialisation, which each increases the riskiness of investment and thus dampens ‘animal spirits’
- Second, with increasing size, power and maturity of the firms, the motivation to accumulate and to cut unit costs is weakened
- Third, economic concentration will increase, and oligopolies and price leadership will become more dominant, increase in mark-up and decrease in the wage share
- Fourth, with rising average income per household there may be a behavioural tendency of the overall propensity to consume to decline and the propensity to save to rise.
4.4 A KALDOR–ROBINSON MODEL
4.4.1 Presentation of the model

- Closed economy without a government sector
- Two classes: workers and capitalists
- Workers receive wages and don’t save
- Excess labour supply
- Capitalists own MoP and receive profits which are partly consumed partly saved
- Capitalists decide about investment in capital stock
- Fixed coefficient technology, no technical progress
- No depreciations
- No overhead labour
Rate of profit:

\[
(4.58) \quad r = \frac{\Pi}{pK} = \frac{\Pi}{pY} \frac{Y}{Y_p} \frac{Y_p}{K} = \frac{pY - wL}{pY} \frac{Y}{Y_p} \frac{Y_p}{K} = \frac{Y - w^rL}{Y} \frac{Y}{Y_p} \frac{Y_p}{K} = (1 - w^r a) u \frac{1}{v}
\]

\(Y_p\): potential output, \(w^r\): real wage rate, \(r\): profit rate, \(u\): capacity utilization, \(a, v\): production coefficients

Capital-output ratio and labour-output ratio are constant

Full or normal utilization of potential output given by the capital stock:

\[
(4.59) \quad u^* = u_n = 1
\]

\[
(4.60) \quad r = (1 - w^r a) \frac{1}{v}
\]
Classical saving hypothesis:

\[(4.61) \quad \sigma = \frac{S}{pK} = \frac{s_{\Pi} \Pi}{pK} = s_{\Pi} r, \quad 0 < s_{\Pi} \leq 1\]

Capital accumulation is determined by ‘animal spirits’ (\(\alpha\)) and rate of profit

\[(4.62) \quad g = \frac{pI}{pK} = \alpha + \beta r^e, \quad \alpha, \beta > 0\]

- In each period, saving rate adjusts to accumulation rate by means of a change in the rate of profit

Long-run goods market equilibrium:

\[(4.63) \quad r^* = r_t = r^e_t = r_{t-1}\]
From equation (4.61) and (4.62):

(4.64) \[ g \left( r^* \right) = \sigma \left( r^* \right) \quad \Rightarrow \quad r^* = \frac{\alpha}{s_\Pi - \beta} \]

Equilibrium accumulation rate from (4.61) or (4.62):

(4.65) \[ g^* = \sigma^* = \frac{s_\Pi \alpha}{s_\Pi - \beta} \]

Stability condition

(4.66) \[ \frac{\partial \sigma}{\partial r} - \frac{\partial g}{\partial r} > 0 \quad \Rightarrow \quad s_\Pi - \beta > 0 \]
Figure 4.5 The accumulation equilibrium in the Kaldor – Robinson model
Saving paradox, from equation (4.64) and (4.65)

\[(4.64a)\] \[\frac{\partial r^*}{\partial s_\Pi} = \frac{-\alpha}{(s_\Pi - \beta)^2} < 0\]

\[(4.65a)\] \[\frac{\partial g^*}{\partial s_\Pi} = \frac{-\alpha \beta}{(s_\Pi - \beta)^2} < 0\]
Figure 4.6 The paradox of saving in the Kaldor – Robinson model
Figure 4.7 An increase of the propensity to accumulate in the Kaldor – Robinson model
Figure 4.8 The inflation barrier in the Kaldor – Robinson model
• Inflation barrier requires lower investment or higher propensity to save

“When it is the real wage (whether at a miserable or a comfortable level) which limits the rate of growth, greater thriftiness makes more investment possible in a perfectly straightforward and unambiguous sense.”

(Robinson 1962, p. 63)

But: Does inflation barrier always mean accelerating inflation?

➢ Marglin (1984): model of equilibrium inflation which, however, has to rely on very specific reaction functions of nominal wages and prices
Figure 4.9 Accumulation and growth equilibrium in Maglin’s model
4.4.2 Problems of the Kaldor-Robinson model of distribution and growth

1. Real wage rate as a residual variable. Distribution conflict does not matter, apart from inflation barrier.

2. Long-run normal (full) utilisation of the capital stock implies strictly inverse relationship between real wage rate and the rate of profit. No adjustment via capacity utilisation.

3. Simple accumulation function which does not explicitly capture the effects on the rate of profit (unit labour costs + capacity utilisation)