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The Kaleckian Distribution and Growth Model

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Lectures 1-2 at Vienna University
26 – 27 November 2010

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Literature:

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- *Blecker, R.A. (2002): Distribution, demand and growth in neo-Kaleckian macro-models, in: Setterfield, M. (ed.), The Economics of Demand-Led Growth, Cheltenham: Edward Elgar.
- Dutt, A.K. (1984): Stagnation, income distribution and monopoly power, Cambridge Journal of Economics, 8: 25-40.
- *Hein, E. (2004): Verteilung und Wachstum. Eine paradigmenorientierte Einführung unter besonderer Berücksichtigung der post-keynesianischen Theorie, Marburg: Metropolis, Kapitel 8: Post-Keynesianische Theorie III: Mark-up Preissetzung und variabler Auslastungsgrad in kaleckianischen Verteilungs- und Wachstumsmodellen.
- *Hein, E., Tarassow, A. (2010): Distribution, aggregate demand and productivity growth – theory and empirical results for six OECD countries based on a Post-Kaleckian model, Cambridge Journal of Economics, 34: 727-754.
- Hein, E., Vogel, L. (2008): Distribution and growth reconsidered – empirical results for six OECD countries, Cambridge Journal of Economics, 32: 479-511.
- Rowthorn, R. (1981): Demand, real wages and economic growth, Thames Papers in Political Economy, Autumn.

Relationship between wages, employment, distribution and growth:

- New Consensus Macroeconomics and New Growth Theory: real wages affect employment inversely in the long run, employment determines growth (together with endogenous technical progress)
  ➔ ‚structural reforms' and real wage restraint promote employment and growth
- Post-Keynesian, demand-led growth models by Kaldor and Robinson: Capital accumulation and growth are affected by firms' ‚animal spirits' and expected profitability, but there is still an inverse relationship between capital accumulation and the real wage rate or the wage share, because of full utilisation of capital stock.
- Kaleckian models: variable rate of capacity utilisation also in the medium to long run + mark-up pricing
- ‚Underconsumptionist' models: Increasing wage share has a unique positive effect on capacity utilisation, employment and growth
- Bhaduri/Marglin-model (1990): Different accumulation regimes are possible. A change in the wage share implies increasing demand and capacity utilisation, on the one hand, but decreasing unit profits, on the other hand
  ➔ wage-led or profit-led demand and growth regimes (to be determined empirically)
  ➔ wage-led regime becomes less likely in open economy

Kalecki:

- Theory of effective demand based on Marx‘s Schemes of Reproduction
- Theory of prices:
  - demand determined prices in primary sector
  - cost determined prices in industrial sector
  ➔ constant marginal and average variable costs
  ➔ mark-up pricing in oligopolistic markets
  ➔ underutilisation of productive capacities
  ➔ changes in demand trigger changes in output and not in prices

2. Pricing and distribution

Kalecki (1954)

Mark-up pricing determined by the ‚degree of monopoly'

Determinants of the degree of monopoly:

- concentration in goods market
- relevance of price competition as compared to other parameters
- overheads
- bargaining power of trade unions

Components of prices in industrial sector j:

(1) $$p_j = \left(\frac{W}{x}\right)_j + \left(\frac{M}{x}\right)_j + \left(\frac{\Pi}{x}\right)_j$$

p: price, x: output, W: wages, M: material costs, Π: gross profits

Mark-up (m) pricing in sector j:

(2) $$p_j = (1 + m_j)\left(\frac{W}{x} + \frac{M}{x}\right)_j, \qquad m_j > 0$$

Mark-up determines profits over variable costs:

(3) $$m_j = \frac{\Pi_j}{W_j + M_j}$$

Profit share (h) is determined by average mark-up and by M/W:

(4) $$h = \frac{\Pi}{pY} = 1 - \frac{W}{pY} = 1 - \frac{W}{W + \Pi} = 1 - \frac{W}{W + m(W + M)} = 1 - \frac{1}{1 + m\left(1 + \frac{M}{W}\right)}$$

Determinants of the profit share in a closed economy:

1. Degree of monopoly ➔ mark-up
    a) degree of concentration
    b) relevance of price competition
    c) overhead costs
    d) bargaining power of trade unions
2. Material costs – labour costs ratio
3. Composition of industries

➔ no reason to assume long-run constant functional income distribution

What determines the sum of profits?

(5) $pY = W + \Pi = C_W + C_\Pi + I$

(6) $W = C_W$ ➔ workers spend what they earn

(7) $\Pi = C_\Pi + I$ ➔ capitalists earn what they spend

(8) $C_\Pi = c_\Pi \Pi, \quad \text{mit} \quad 0 \leq c_\Pi < 1$

(9) $\Pi = \frac{1}{1 - c_\Pi} I = \frac{1}{s_\Pi} I$

➔ exogenous investment and capitalists propensity to consume determine profits

(10) $S = S_\Pi = s_\Pi \Pi = s_\Pi \frac{\Pi}{pY} pY = s_\Pi h pY$

(11) $pY = \frac{1}{s_\Pi h} I$

➔ investment, capitalists propensity to consume and profit share determine income

Further developments of Kalecki's mark-up pricing theory

1. Eichner (1976), Wood (1975), Harcourt/Kenyon (1976):

- incompletely competitive financial markets (Kalecki's principle of increasing risk)
- mark-up is determined by firms' internal finance requirements for investment purposes

➔ planned investment has a positive effect on the mark-up

2. Sylos-Labini (1969):

- firms hold excess capacity to be able to supply fluctuating demand and to deter market entry
- firms set prices in order to allow for minimum target rate of profit which is too low to attract competitors with a higher fixed capital burden

➔ entry-preventing pricing

3. Distribution and growth

3.1 The basic model

- long-run unemployment ➔ no scarcity of labour

- income distribution determined by mark-up pricing

- capacity utilisation is usually below full utilisation in the long run

➔ endogenous variable also in the long run

"Even on the average the degree of utilization throughout the business cycle will be substantially below the maximum reached during the boom. Fluctuations in the utilization of available labour parallel those in the utilization of equipment. Not only is there mass unemployment in the slump, but average employment throughout the cycle is considerably below the peak reached in the boom. The reserve of capital equipment and the reserve army of unemployed are typical features of capitalist economy at least throughout a considerable part of the cycle." (Kalecki 1971, p. 137)

Steindl (1976), Sylos-Labini (1969):

- firms hold excess capacity to supply fluctuating demand and to prevent competitors from market entry

Lavoie (1992):

- excess capacity does not contradict minimisation of costs

➔ firms use some factories at an optimal degree of utilisation and others are not used at all

Dutt (2009):

- normal/optimal rate of utilisation cannot be precisely determined in a world of uncertainty but is rather a range

Dallery/van Treeck (2010):

- firms have multiple goals and accept variations in capacity utililsation and hence deviations from target or normal rate

One-sector-model, closed economy without state, no technical progress, no overhead labor, no depreciations, no intermediate products

$$(12)\quad r = \frac{\Pi}{pK} = \frac{\Pi}{pY}\frac{Y}{Y^v}\frac{Y^v}{K} = \frac{Y - w^r L}{Y}\frac{Y}{Y^v}\frac{Y^v}{K} = (1 - w^r l)u\frac{1}{v} = hu\frac{1}{v}$$

r: rate of profit, u: rate of capacity utilisation, l: labour output ratio, v: capital potential-output ratio,

Mark-up pricing on unit labour costs

$$(13)\quad p = (1+m)\frac{W}{Y} = (1+m)wl, \qquad m > 0$$

$$(14)\quad w^r = \frac{w}{p} = \frac{1}{(1+m)l}$$

$$(15)\quad h = \frac{\Pi}{pY} = \frac{pY - W}{pY} = 1 - \frac{W}{(1+m)W} = 1 - \frac{1}{1+m}$$

➔ profit share depends on mark-up

Saving function:

$$(16)\quad \sigma = \frac{S}{pK} = \frac{s_{\Pi}\Pi}{pK} = s_{\Pi} r = s_{\Pi} hu \frac{1}{v}, \qquad 0 < s_{\Pi} \leq 1$$

Determinants of investment?

Kalecki's early work on the trade cycle

- profits have a positive effect, capital stock has a negative effect

➔ profit rate has a positive effect on investment decisions

Kalecki (1954)

- internal financial resources and sales expectations determine investment together with capital stock in existence

3.2 The Rowthorn-Dutt-model: stagnationism

Rowthorn (1981), Dutt (1984, 1987), Amadeo (1986a, 1986b, 1987), Taylor (1983)

(12) $r = hu\frac{1}{v}$

(15) $h = 1 - \frac{1}{1+m}$

(16) $\sigma = s_{\Pi} hu\frac{1}{v}$

(17) $g = \frac{I}{K} = \alpha + \beta u, \qquad \alpha, \beta > 0$

➔ capital accumulation is determined by animal spirits and capacity utilisation

Goods market equlibrium:

(18) $g = \sigma$

Stability condition:

(19) $\frac{\partial \sigma}{\partial u} - \frac{\partial g}{\partial u} > 0 \Rightarrow s_{\Pi} \frac{h}{v} - \beta > 0.$

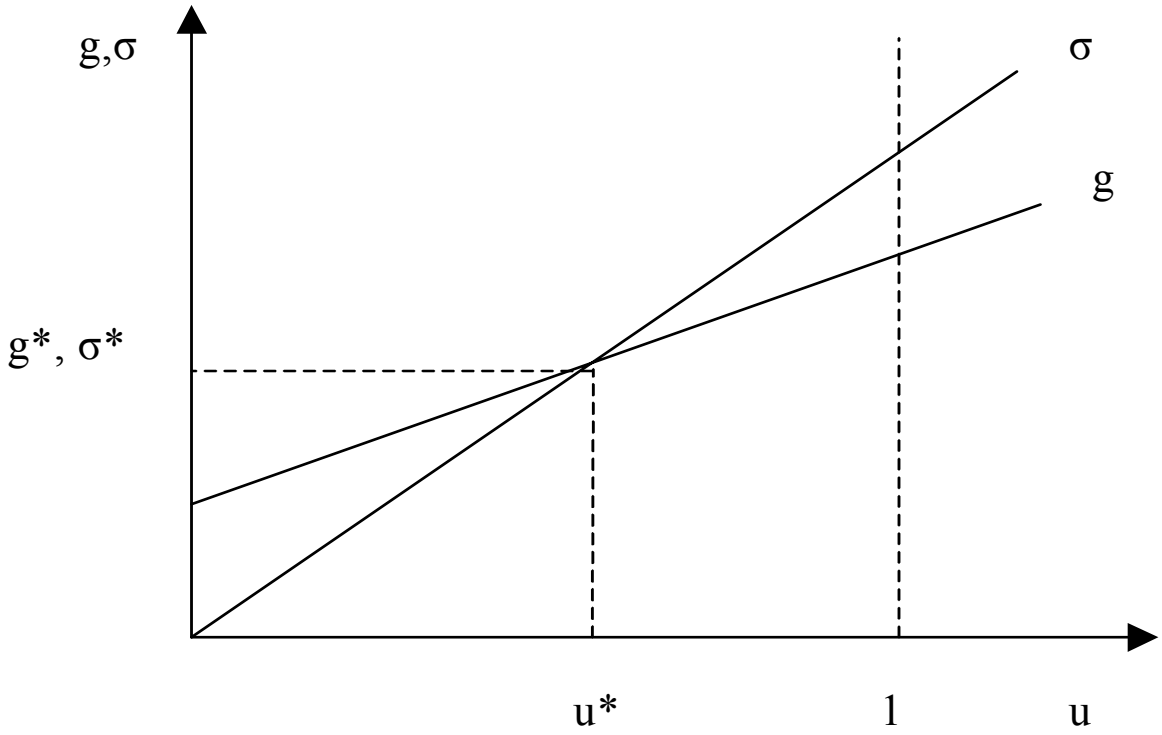
Equilibrium solution:

(20) $u^* = \frac{\alpha}{s_{\Pi} \frac{h}{v} - \beta}$

(21) $g^* = \sigma^* = \frac{s_{\Pi} \frac{h}{v} \alpha}{s_{\Pi} \frac{h}{v} - \beta}$

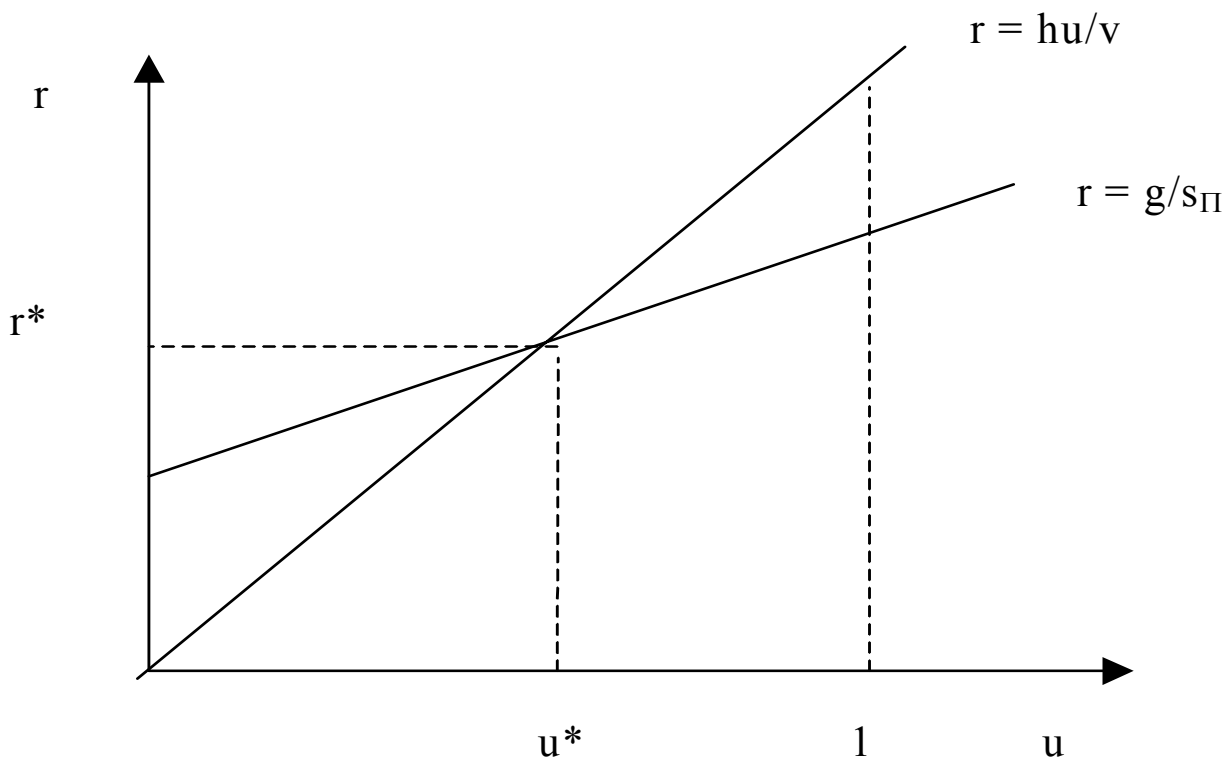
(22) $r^* = \frac{\frac{h}{v} \alpha}{s_{\Pi} \frac{h}{v} - \beta}$

Rate of capital accumulation and rate of capacity utilisation



from equations (16) and (17)

Rate of profit and rate of capacity utilisation



from equation (12) ➔ profits cost curve (Lavoie 1992)

and equations (16) and (18) ➔ effective demand curve (Lavoie 1992)

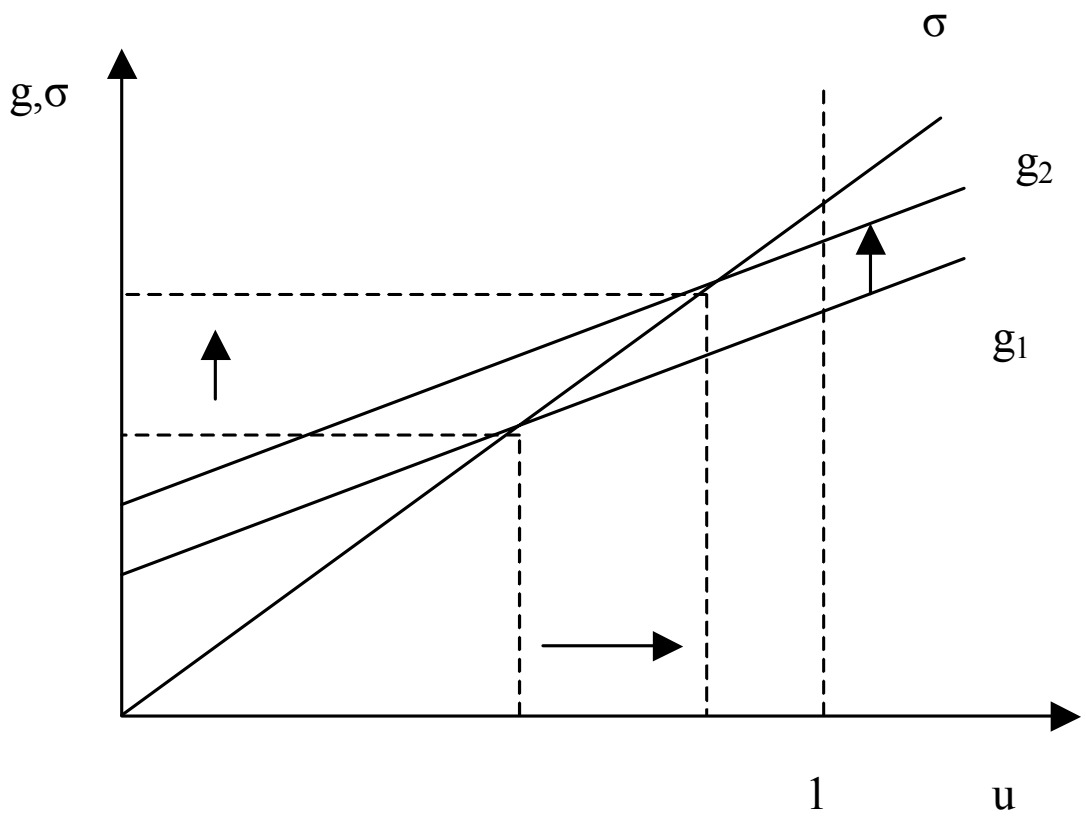
Increasing animal spirits

$$(23)\quad \frac{\partial u}{\partial \alpha} = \frac{1}{s_{\Pi}\frac{h}{v} - \beta} > 0$$

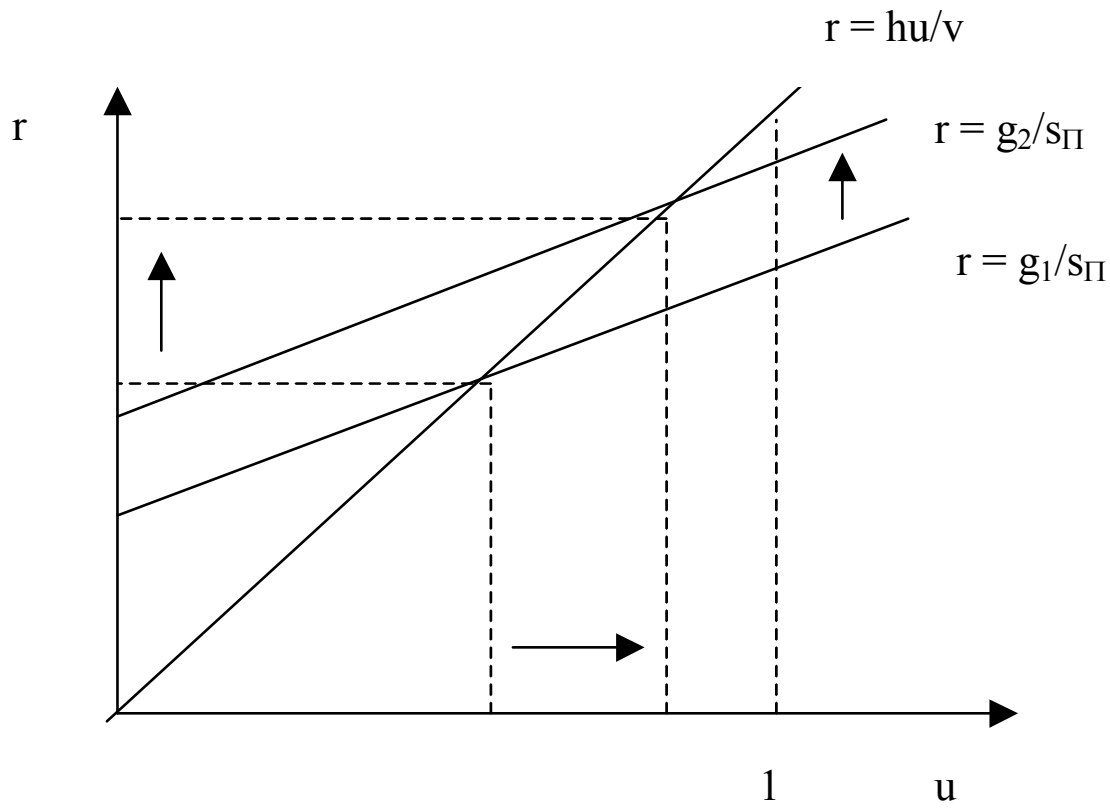
$$(24)\quad \frac{\partial g}{\partial \alpha} = \frac{s_{\Pi}\frac{h}{v}}{s_{\Pi}\frac{h}{v} - \beta} > 0$$

$$(25)\quad \frac{\partial r}{\partial \alpha} = \frac{\frac{h}{v}}{s_{\Pi}\frac{h}{v} - \beta} > 0$$

Rate of capital accumulation and rate of capacity utilisation: increasing animal spirits



Rate of profit and rate of capacity utilisation: increasing animal spirits



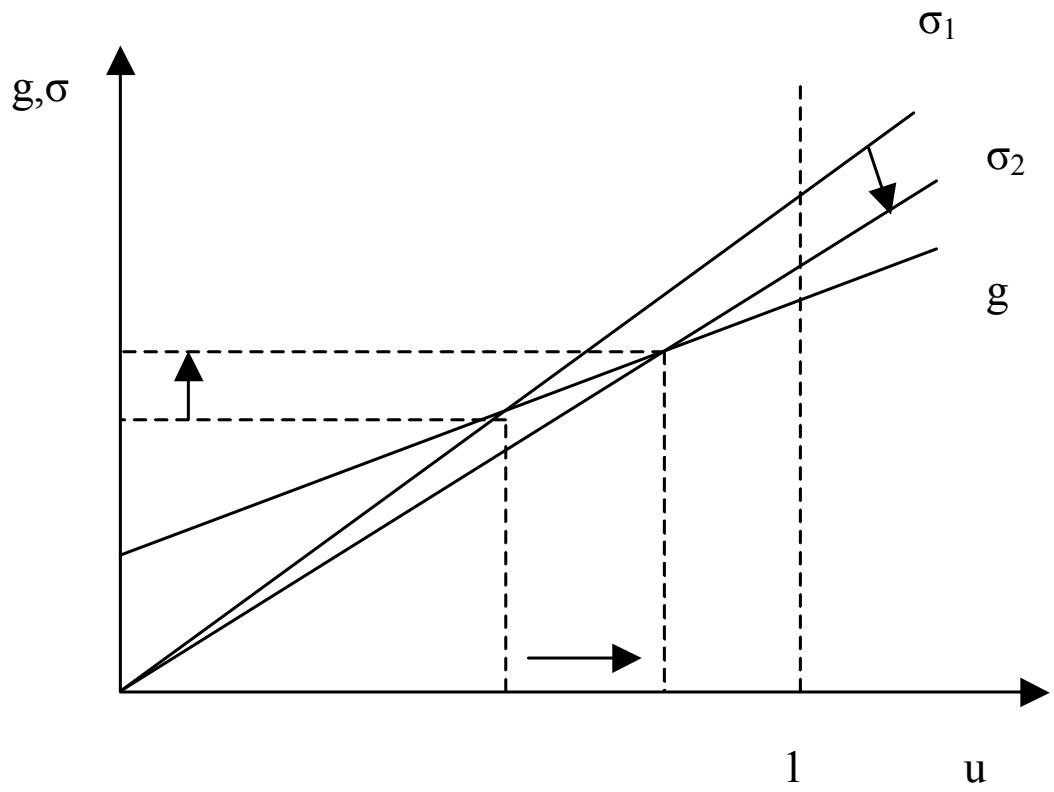
The paradox of saving

$$(26)\quad \frac{\partial u}{\partial s_{\Pi}} = \frac{-\alpha \frac{h}{v}}{(s_{\Pi} \frac{h}{v} - \beta)^2} < 0$$

$$(27)\quad \frac{\partial g}{\partial s_{\Pi}} = \frac{-\alpha\beta \frac{h}{v}}{(s_{\Pi} \frac{h}{v} - \beta)^2} < 0$$

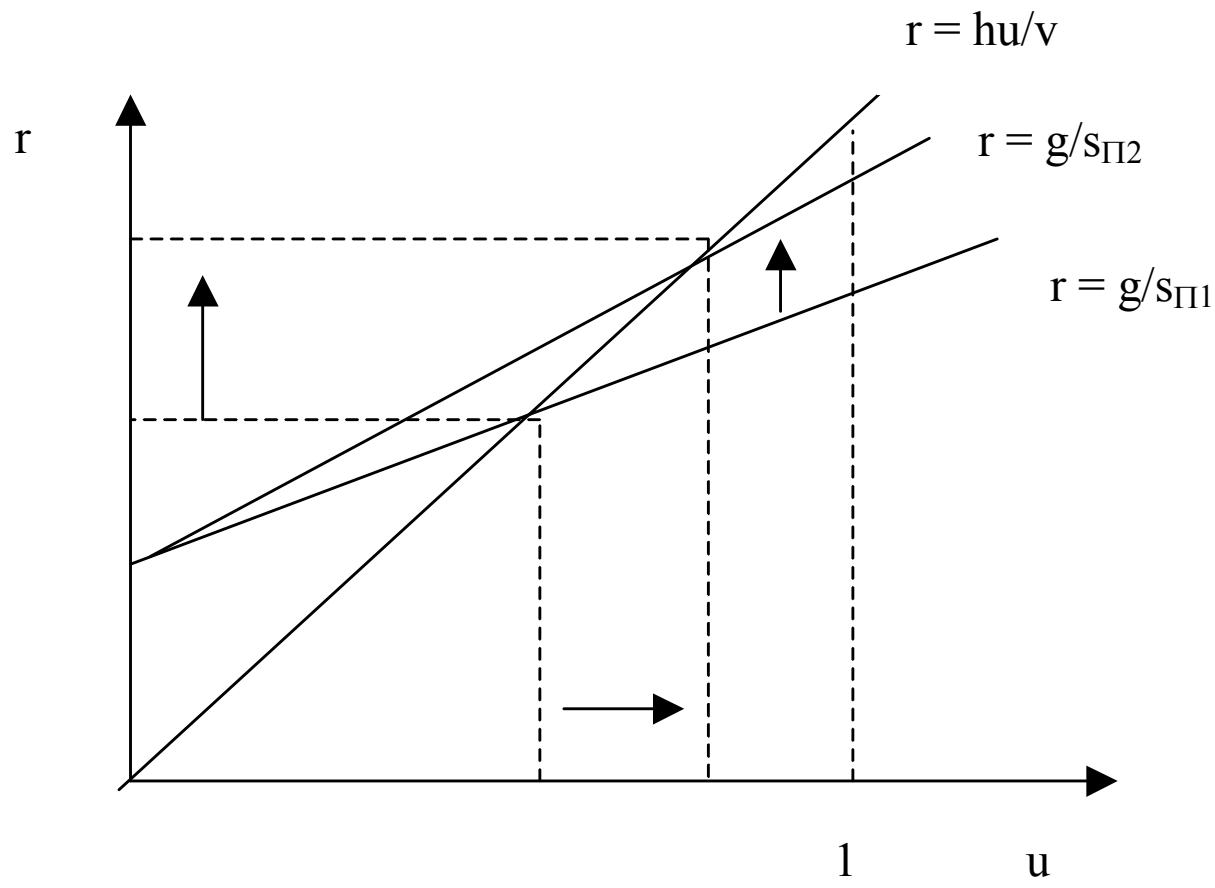
$$(28)\quad \frac{\partial r}{\partial s_{\Pi}} = \frac{-\alpha \frac{h^2}{v^2}}{(s_{\Pi} \frac{h}{v} - \beta)^2} < 0$$

Rate of capital accumulation and rate of capacity utilisation: decreasing propensity to save out of profits



Rate of profit and rate of capacity utilisation:

decreasing propensity to save out of profits



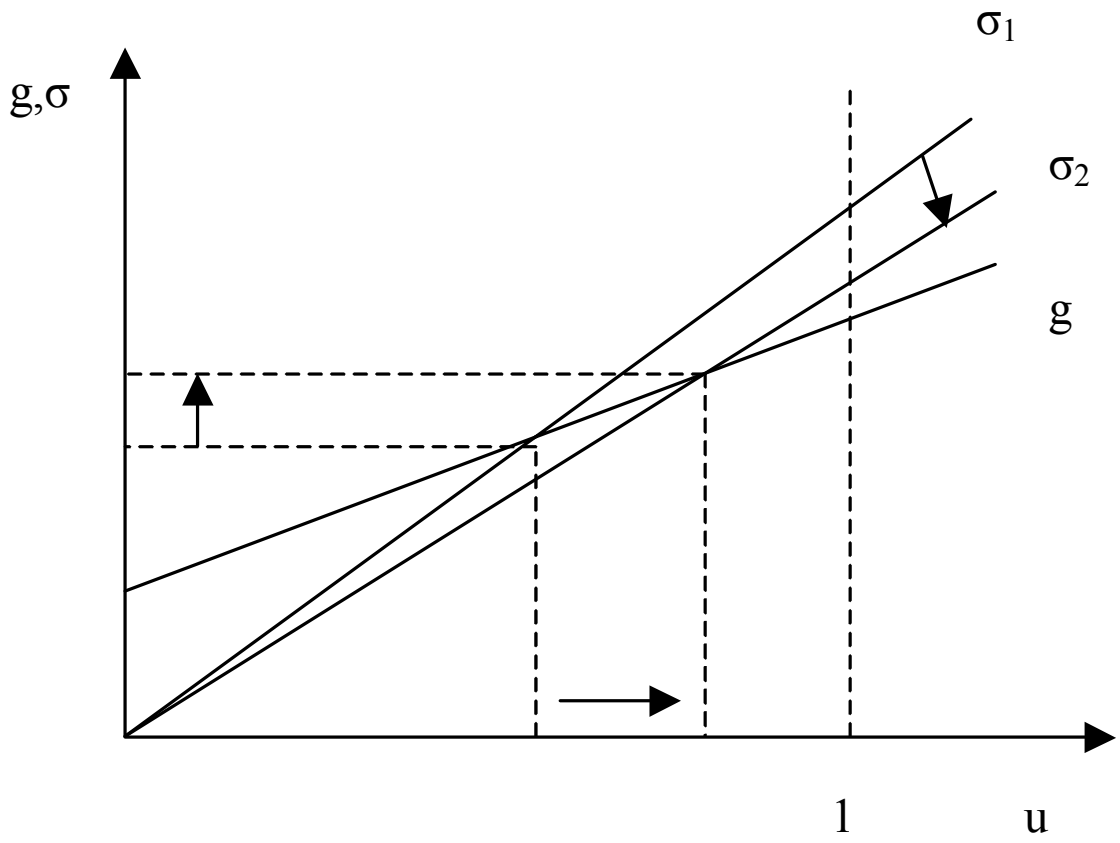
The paradox of costs

$$\frac{\partial u}{\partial h} = \frac{-\alpha s_{\Pi} \frac{1}{v}}{(s_{\Pi} \frac{h}{v} - \beta)^2} < 0 \quad (29)$$

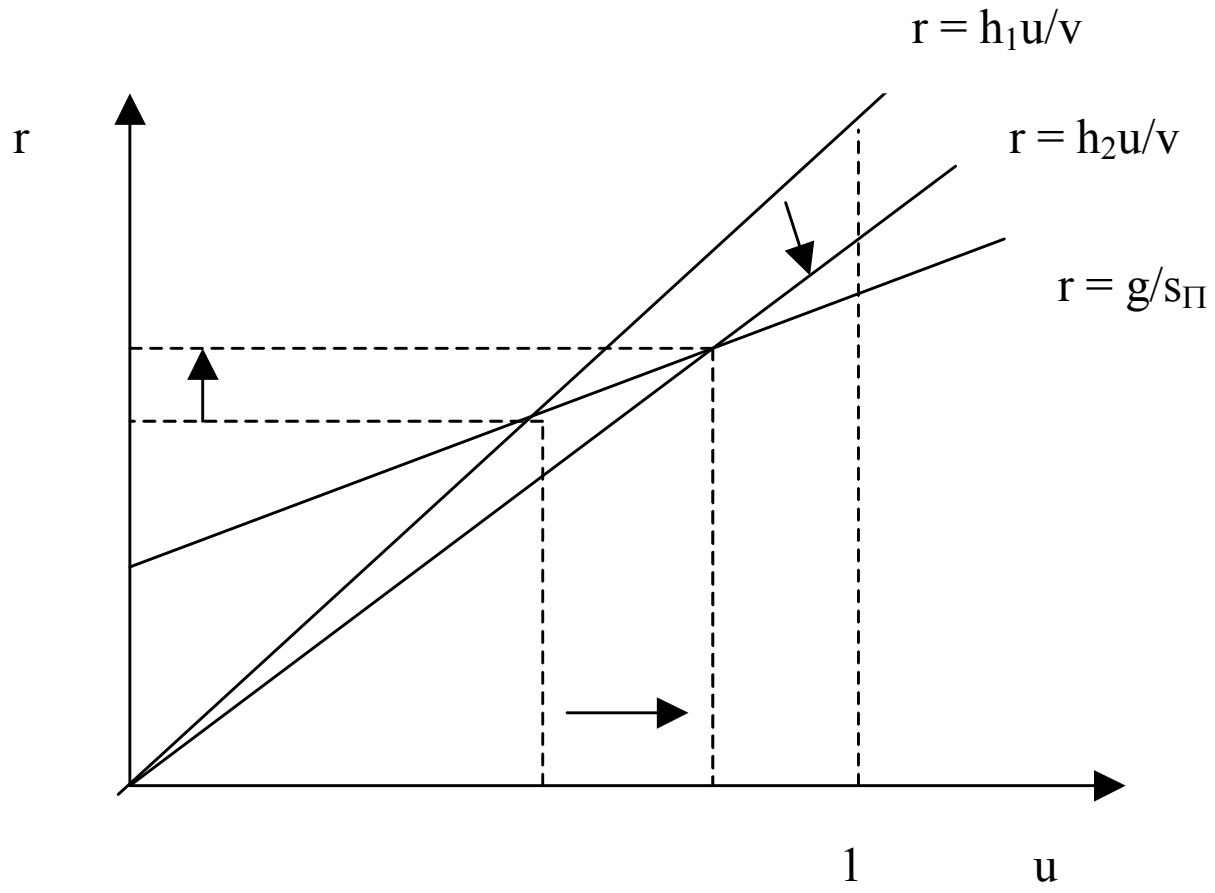
$$\frac{\partial g}{\partial h} = \frac{-\alpha\beta s_{\Pi} \frac{1}{v}}{(s_{\Pi} \frac{h}{v} - \beta)^2} < 0 \quad (30)$$

$$\frac{\partial r}{\partial h} = \frac{-\alpha\beta \frac{1}{v}}{(s_{\Pi} \frac{h}{v} - \beta)^2} < 0 \quad (31)$$

Rate of capital accumulation and rate of capacity utilisation: increasing wage share/decreasing profit share



Rate of profit and rate of capacity utilisation: increasing wage share/decreasing profit share



Paradox of costs gives rise to stagnation theory due to rising degree of monopoly

➔ Steindl (1952/1976)

➔ Baran/Sweezy (1966)

However, in Kalecki a rising degree of monopoly is not a sufficient condition for a rising profit share!

And investment function in the stagnationist model may be overly simplistic.

3.3 The Bhaduri/Marglin-model: different accumulation regimes

Bhaduri/Marglin (1990), Marglin/Bhaduri (1990, 1991)

„(...) a higher profit share and a higher rate of capacity utilization can each be argued to induce higher profit expectations, the first because the unit return goes up, the second because the likelihood of selling extra units of output increases.“ (Marglin/Bhaduri 1990, p. 163)

(12) $$r = hu\frac{1}{v}$$

(15) $$h = 1 - \frac{1}{1+m}$$

(16) $$\sigma = s_{\Pi} hu\frac{1}{v}$$

(32) $$g = \frac{I}{K} = \alpha + \beta u + \tau h, \qquad \alpha, \beta, \tau > 0$$

➔ investment decisions are determined by animal spirits, capacity utilisation and unit costs/unit profits/profit share

(18) $$g = \sigma$$

(19) $$\frac{\partial \sigma}{\partial u} - \frac{\partial g}{\partial u} > 0 \Rightarrow s_{\Pi}\frac{h}{v} - \beta > 0.$$

Equilibrium:

$$(33)\quad u^* = \frac{\alpha + \tau h}{s_{\Pi}\frac{h}{v} - \beta}$$

$$(34)\quad g^* = \sigma^* = \alpha + \beta\frac{\alpha + \tau h}{s_{\Pi}\frac{h}{v} - \beta} + \tau h = \frac{s_{\Pi}\frac{h}{v}(\alpha + \tau h)}{s_{\Pi}\frac{h}{v} - \beta}$$

$$(35)\quad r^* = \frac{\frac{h}{v}(\alpha + \tau h)}{s_{\Pi}\frac{h}{v} - \beta}$$

The paradox of saving

$$(36)\quad \frac{\partial u}{\partial s_{\Pi}} = \frac{-\frac{h}{v}(\alpha + \tau h)}{(s_{\Pi}\frac{h}{v} - \beta)^2} < 0$$

$$(37)\quad \frac{\partial g}{\partial s_{\Pi}} = \frac{-\frac{h}{v}\beta(\alpha + \tau h)}{(s_{\Pi}\frac{h}{v} - \beta)^2} < 0$$

$$(38)\quad \frac{\partial r}{\partial s_{\Pi}} = \frac{-\frac{h^2}{v^2}(\alpha + \tau h)}{(s_{\Pi}\frac{h}{v} - \beta)^2} < 0$$

An increasing profit share/decreasing wage share:

$$(39)\quad \frac{\partial u}{\partial h} = \frac{-\tau\beta - s_\Pi \frac{1}{v}\alpha}{(s_\Pi \frac{h}{v} - \beta)^2} < 0$$

➔ paradox of costs is valid for capacity utilisation

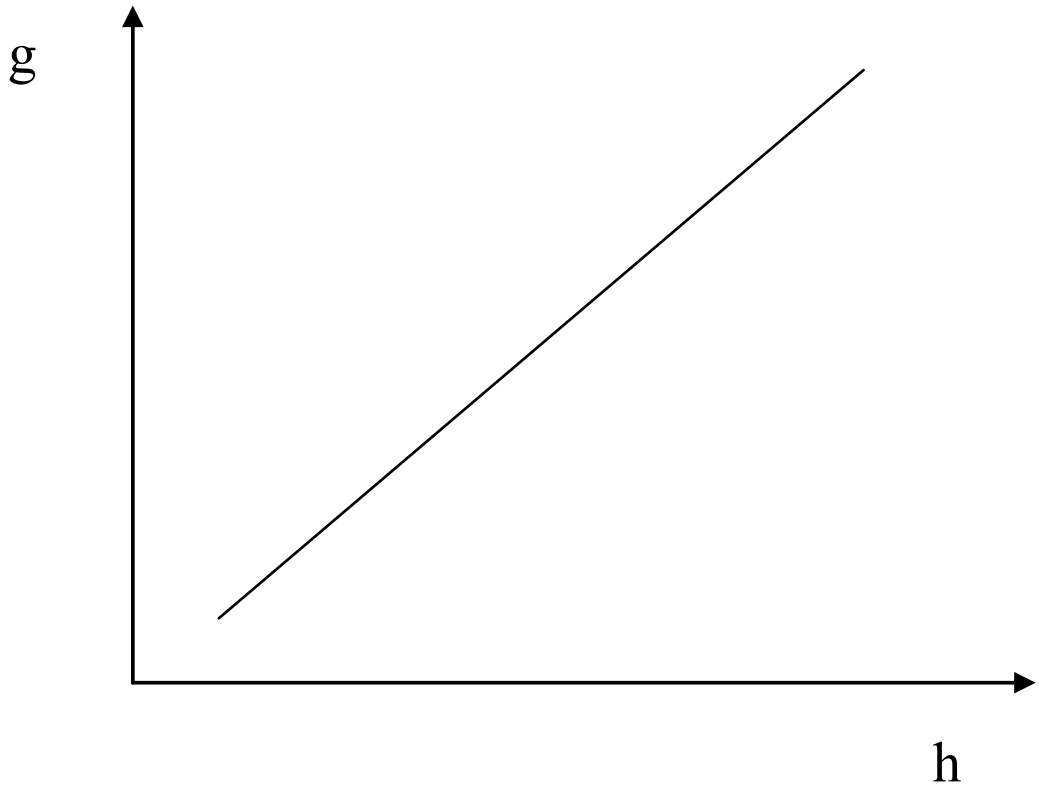
Bhaduri/Marglin (1990), however, obtain ‘stagnationist’ or ‘exhilarationist’ regime, because they use an implicit investment function: g [r(h, u)]

$$(40)\quad \frac{\partial g}{\partial h} = \beta \frac{-\tau\beta - s_\Pi \frac{1}{v}\alpha}{(s_\Pi \frac{h}{v} - \beta)^2} + \tau$$

➔ negative effect via capacity utilisation but positive effect via profit

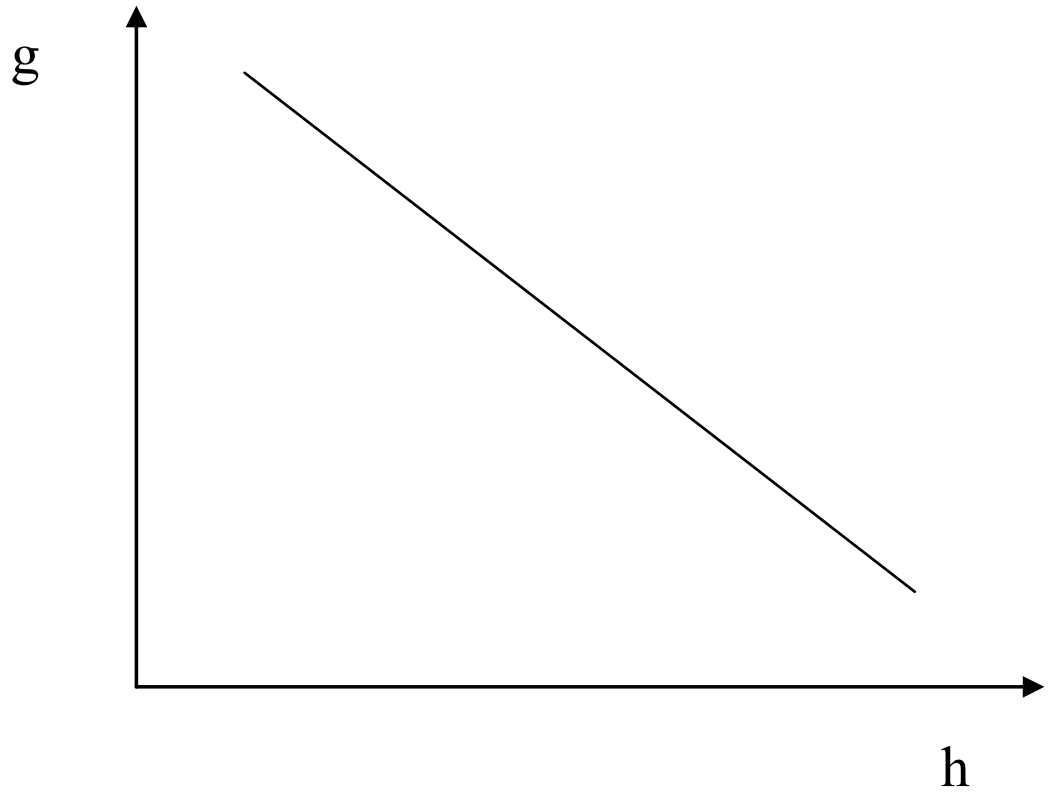
➔ overall effect remains undetermined

Profit-led accumulation/growth



➔ low propensity to save out of profits, weak effect of capacity utilisation on accumulation, strong effect of unit profits/unit wage costs on accumulation

Wage-led accumulation/growth



➔ high propensity to save out of profits, strong effect of capacity utilisation on accumulation, weak effect of unit profits/unit wage costs on accumulation

$$(41)\quad \frac{\partial r}{\partial h} = \frac{1}{v}\frac{(\alpha + \tau h)}{s_{\Pi}\frac{h}{v} - \beta} + \frac{h}{v}\frac{-\tau\beta - s_{\Pi}\frac{1}{v}\alpha}{(s_{\Pi}\frac{h}{v} - \beta)^2}$$

➔ positive direct effect of increasing profit share on the profit rate but negative indirect effect via capacity utilisation

➔ overall effect is not determined

„Particular models such as that of ‘cooperative capitalism’ enunciated by the left Keynesian social democrats, the Marxian model of ‘profit squeeze’ or even the conservative model relying on ‘supply-side’ stimulus through high profitability and a low real wage, fit into the more general Keynesian theoretical scheme. They become particular variants of the theoretical framework presented here.“ (Bhaduri/Marglin 1990, p. 388)

➔ demand and growth regimes may switch over time

➔ empirical research has to determine the prevailing demand and growth regime!

➔ Bowles/Boyer (1995), Hein/Vogel (2008), Naastepad/Storm (2007), Stockhammer with various co-authors

Estimation of demand regimes following Bowles/Boyer (1995):

Single equations estimation approaches:

$$\frac{\frac{\partial Y}{Y}}{\frac{\partial h}{h}} = \frac{\frac{\partial C}{Y}}{\frac{\partial h}{h}} + \frac{\frac{\partial I}{Y}}{\frac{\partial h}{h}} + \frac{\frac{\partial NX}{Y}}{\frac{\partial h}{h}}$$

$$\frac{\frac{\partial C}{Y}}{\frac{\partial h}{h}} < 0, \quad \frac{\frac{\partial I}{Y}}{\frac{\partial h}{h}} > 0, \quad \frac{\frac{\partial NX}{Y}}{\frac{\partial h}{h}} = ?,$$

$$\Rightarrow \quad \frac{\frac{\partial Y}{Y}}{\frac{\partial h}{h}} = ?.$$

Table 4: Demand regimes according to single equation estimation approaches											
	Period	**Aus-tria**	**Ger-many**	**Nether-lands**	**France**	**Italy**	**Spain**	**Euro area**	**UK**	**USA**	**Japan**
Bowles/ Boyer (1995)	1953/61 – 1987	…	profit-led	…	profit-led	…	…	…	wage-led	wage-led	profit-led
Gordon (1995)	1955 – 1988	…	…	…	…	…	…	…	…	profit-led	…
Naastepad (2006)	1960 – 2000	…	…	wage-led	…	…	…	…	…	…	…
Naastepad/ Storm (2007)	1960 – 2000	…	wage-led	wage-led	wage-led	wage-led	wage-led	…	wage-led	profit-led	profit-led
Ederer/ Stockhammer (2007)	1960 – 2004	…	…	…	profit-led	…	…	…	…	…	…
Stockhammer/ Ederer (2008)	1960 – 2005	profit-led	…	…	…	…	…	…	…	…	…
Ederer (2008)	1960 – 2005	…	…	wage-led	…	…	…	…	…	…	…
Hein/ Vogel (2008)	1960 – 2005	profit-led	wage-led	profit-led	wage-led	…	…	…	wage-led	wage-led	…
Hein/ Vogel (2009)	1960 – 2005	…	wage-led	…	wage-led	…	…	…	…	…	…
Stockhammer/ Onaran/ Ederer (2009)	1960 – 2005	…	…	…	…	…	…	wage-led	…	…	…
Stockhammer/ Hein/ Grafl (2011)	1970 – 2005	…	wage-led	…	…	…	…	…	…	…	…
Onaran/ Stockhammer/ Grafl (2009)	1962 – 2007	…	…	…	…	…	…	…	…	wage-led	…

5. Conclusions and outlook

- Kaleckian models allow for integrated treatment of distribution struggle and principle of effective demand
- Endogeneity of rate of capacity utilisation may be problematic and needs more careful treatment – issue of the ‚normal rate‘ of utilisation
- Extensions are required: productivity growth, money and finance, open economy, workers‘ saving, overhead labour, …