Distribution and Growth

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8th FMM International Summer School
Keynesian Macroeconomics and Macroeconomic Policies
Berlin, July 25-30, 2022

Plan of lecture

- Preliminaries: some basic terms and concepts
- A generic model
- Post-Keynesian variants
  - the neo-Keynesian model
  - the Kalecki-Steindl model
  - the Bhaduri-Marglin model
- Extensions and new developments
  - autonomous-demand-led exogenous growth
  - monetary and financial determinants of growth
  - debt-financed consumption spending and the accumulation of household debt
  - wage inequality
  - technical change and the supply side
- Summary and conclusions

Some preliminaries

- Distribution of *what*? – opportunity, wealth, **income**
- Among *whom*? – gender, race, **class**
- How *measured* – size distribution (Gini, Theil indices; Palma ratio etc.), **functional distribution (wages vs. profits)**

Some preliminaries (cont.)

Why study distribution and growth?

Predominant answer: role of distribution in growth process

- Endogenous (adjusting) variable) variable, that facilitates movement into steady-state equilibrium
  - neo-Keynesian models (Robinson, Kaldor, Pasinetti)
- Exogenous variable – determinant of steady-state equilibrium configuration
  - profit-led (classical PE)
  - wage-led (Kaleckian – Dutt, Lavoie)
  - wage- *or* profit-led (Bhaduri-Marglin)

Some preliminaries (cont.)

BUT:

- Distribution important in its own right
- Focus on growth process $\not\equiv$ advocacy of hyper-expansion
  - e.g., de-growth or zero growth – how achieved? Implications for distribution?

ALSO – doesn't growth affect distribution?

- Yes, but at higher frequency (short cycles vs secular (long-term) growth)

Model foundations

- Assume two-class economy (workers, capitalists)
- Assume Leontieff production technology
- Assume closed economy with no fiscally-active government sector, all consumption funded by current income
  - investment the only (potential) source of autonomous demand
- Then ...

Model foundations (cont.)

Basic accounting identity:

$$wN + \Pi \equiv Y \equiv C_W + C_\Pi + I$$

From $Y \equiv wN + \Pi$:

$$1 \equiv \frac{wN}{Y} + \pi$$

$$\Rightarrow \pi = 1 - wa \tag{1}$$

where $\pi \equiv \Pi/Y$ and $a \equiv N/Y$

Model foundations (cont.)

Also from $Y \equiv wN + \Pi$:

$$\frac{Y}{K} \equiv \frac{wN}{K} + r$$

$$\Rightarrow r \equiv \frac{Y}{K} - \frac{wY}{K} \cdot \frac{N}{Y}$$

$$\Rightarrow r = \frac{Y}{K}(1 - wa)$$

Model foundations (cont.)

$$\Rightarrow r = \frac{Y}{K_u} . \frac{K_u}{K}(1 - wa)$$

$$\Rightarrow r = \frac{\pi u}{v} \tag{2}$$

where $u \equiv K_u/K$ and $v \equiv K_u/Y = K/Y_p$

Model foundations (cont.)

Note that:

a) If $u = \bar{u}_n = 1$:

$$r = \frac{\pi}{v} = \frac{1}{v}(1 - wa)$$

$$\Rightarrow \frac{dr}{dw} = -\frac{a}{v} < 0$$

Result: classical wage-profit frontier – strict trade-off between w and r

Model foundations (cont.)

b) If $u \neq \bar{u}_n = 1$:

$$r = \frac{\pi u}{v} = \frac{u}{v}(1 - wa)$$

$$\Rightarrow \frac{dr}{dw} = \frac{\partial r}{\partial \pi} \cdot \frac{d\pi}{dw} + \frac{\partial r}{\partial u} \cdot \frac{du}{dw}$$

$$\Rightarrow \frac{dr}{dw} = -u\frac{a}{v} + \frac{1}{v}(1 - wa) \cdot \frac{du}{dw}$$

Result: *No* strict trade-off between w and r

Model foundations (cont.)

Two important lessons emerge, even at this early stage:

- Importance of *closures*
- Importance of *treatment of u*

Model foundations (cont.)

From $wN + \Pi \equiv C_W + C_\Pi + I$:

$$wN + \Pi = c_W wN + c_\Pi \Pi + I$$

$$\Rightarrow (wN - c_W wN) + (\Pi - c_\Pi \Pi) \equiv S = I$$

where c_w and c_Π are marginal propensities to consume from wages and profits, respectively.

Model foundations (cont.)

Now assume $c_W = 1$ (Kalecki – workers "spend what they get") and define $s_\Pi \equiv 1 - c_\Pi$. It follows that:

$$s_\Pi \Pi = I$$

$$\Rightarrow s_\Pi \frac{\Pi}{K} = \frac{I}{K}$$

$$\Rightarrow r = \frac{1}{s_\Pi} g$$

$$\Rightarrow g^s = s_\Pi r \tag{3}$$

where $g \equiv I/K$ and $g^s = g|_{I=S}$

Model foundations (cont.)

Note: g is both 'rate of accumulation' and (long-term) 'rate of growth', since:

$$v \equiv \frac{K_u}{Y}$$

$$\Rightarrow \hat{Y} - \hat{K}_u|_{u=\bar{u}} = 0$$

$$\Rightarrow \hat{Y} = \hat{K}_u|_{u=\bar{u}}$$

$$\Rightarrow \hat{Y} = g$$

Model foundations (cont.)

To recap, we have so far established that:

$$\pi = 1 - wa \tag{1}$$

$$r = \frac{\pi u}{v} \tag{2}$$

$$g^s = s_\Pi r \tag{3}$$

Model foundations (cont.)

We've now reached a 'fork in the road'.

Consider two additional (alternative) closures:

- $I \equiv S \Rightarrow g \equiv g^s$ – classical Marxian model
- $I \not\equiv S$, $g = g(.)$ – Post-Keynesian model

Model foundations (cont.)

Complete (generic) PK model can therefore be summarized as:

$$\pi = 1 - wa \tag{1}$$

$$r = \frac{\pi u}{v} \tag{2}$$

$$g^s = s_{\Pi} r \tag{3}$$

$$g = g(.) \tag{4}$$

Model foundations (cont.)

Key in what follows will be:

- Different assumptions about u ($u = \bar{u}_n = 1$ vs. $u \neq \bar{u}_n = 1$)
- Different assumptions about $g(.)$

Joan Robinson's neo-Keynesian model

- Robinson (1956, 1962) can be considered the 'root' of contemporary PK theory of distribution and growth
- Robinson model is *neo-Keynesian* not Kaleckian (despite origins in Kalecki's two-sided relationship between investment and profits)
- A look at the structure and adjustment mechanisms of Robinson's model reveals nature of neo-Keynesian approach *and* (as will become clear) sets us up for investigation of subsequent Kaleckian developments

Joan Robinson's neo-Keynesian model (cont.)

Assume $u = \bar{u}_n = 1$. Then:

$$r = \frac{\pi u}{v} = \frac{1}{v}(1 - wa) \tag{2}$$

This is the classical wage-profit frontier

Joan Robinson's neo-Keynesian model (cont.)

Investment function:

$$g = g(r^e)$$

or:

$$g = \gamma_1 + \gamma_2 r^e \tag{5}$$

Joan Robinson's neo-Keynesian model (cont.)

Complete model:

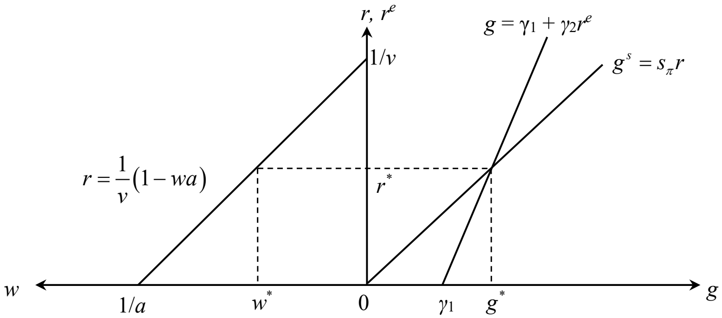
$$r = \frac{1}{v}(1 - wa) \tag{2}$$

$$g^s = s_\pi r \tag{3}$$

$$g = \gamma_1 + \gamma_2 r^e \tag{5}$$

To solve, set $r = r^e$ and assume *Keynesian stability condition* $s_\pi > \gamma_2$:

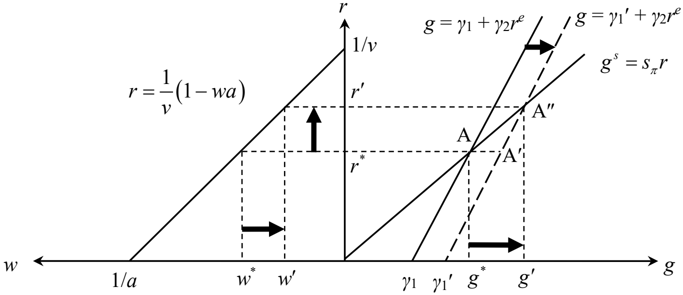
Joan Robinson's neo-Keynesian model (cont.)



Joan Robinson's neo-Keynesian model (cont.)

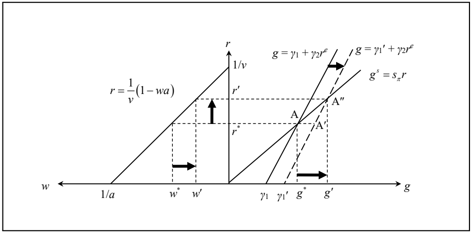
- Now suppose an improvement in animal spirits raises γ_1
- This will:
  - increase the rate of accumulation, which will ...
  - increase the equilibrium rates of growth and profit, and ...
  - ... decrease the equilibrium real wage

Joan Robinson's neo-Keynesian model (cont.)



Joan Robinson's neo-Keynesian model (cont.)

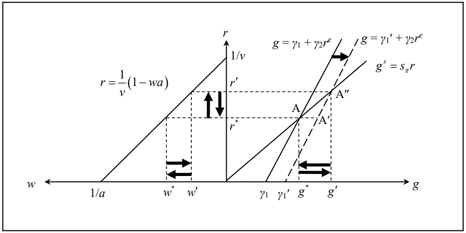
- What's happening is:
- $I > S$ bids up prices in the goods market ...
- ... which lowers w ...
- ... which raises r ...
- ... which raises g



Joan Robinson's neo-Keynesian model (cont.)

An aside: the inflation barrier

- Assume that w^* is a minimum wage
- Then as $I > S \Rightarrow \uparrow P$ in the goods market ...
- ... $w < w^* \Rightarrow \uparrow W$ in the labour market
- So $\uparrow P \Rightarrow \uparrow W \Rightarrow \uparrow P$ etc.
- Nominal dynamic – wage-price inflationary spiral



Neo-Keynesians versus Kaleckians

- How "truly" Keynesian is the Robinson model?
  - it's demand-led
  - BUT excess demand in the goods market resolved by *price* adjustment – and hence real wage adjustment, and hence change in the *distribution of income*
  - distribution is the adjusting variable that enables the model to 'get into' equilibrium ...
  - ... and necessarily so, because $u = \bar{u}_n = 1$ prevents alternative quantity adjustment channel
- These observations/criticisms are the fundamental point of departure for Kaleckians

Neo-Keynesians versus Kaleckians (cont.)

- If the complaint with the Robinson model is that it relies on price adjustment in the goods market ...
- ... and if this is inevitable because $u = \bar{u}_n = 1$ prevents quantity adjustment ...
- ... then the solution is simple: *relax* the assumption that $u = \bar{u}_n = 1$

Neo-Keynesians versus Kaleckians (cont.)

- This is the basis of *Kaleckian* theory, which treats u as variable
- *Note:* transition from neo-Keynesian to Kaleckian theory is analytically simple (relax $u = \bar{u}_n = 1$)
- But the consequences are profound:
  - investment function modified
  - (important) relationship between distribution and growth transformed
- And the behavioural basis for treating u as variable remains controversial

The Kaleckian model

In the Kaleckian model:

$$r = \frac{\pi u}{v} \tag{2}$$

is called the *pricing equation*.

The Kaleckian model (cont.)

This is because in the Kaleckian theory of the firm:

$$P = (1+\tau)Wa$$

$$\Rightarrow 1 = (1+\tau)wa$$

$$\Rightarrow \pi = 1 - wa = \frac{\tau}{(1+\tau)}$$

In other words, the profit share (π) is determined by the mark up (τ) chosen by firms in the pricing decision.

The Kaleckian model (cont.)

Recall also that with u now treated as variable:

$$r = \frac{\pi u}{v} = \frac{u}{v}(1 - wa) \tag{2}$$

This is the reformulation of the classical wage-profit frontier derived earlier

The Kaleckian model (cont.)

Investment function:

$$g = g(u^e, r^e)$$

or:

$$g = \gamma + g_u u^e + g_r r^e$$

The Kaleckian model (cont.)

Note that since:

$$r = \frac{\pi u}{v} \tag{2}$$

it follows that:

$$u = \frac{vr}{\pi}$$

$$\Rightarrow u^e = \frac{vr^e}{\pi}$$

if firms form expectations consistently (but see Lavoie (2003); Dallery and van Treeck (2011))

The Kaleckian model (cont.)

Hence upon substitution, the investment function can be re-written as:

$$g = \gamma + \frac{g_u v}{\pi} r^e + g_r r^e$$

$$\Rightarrow g = \gamma + \left(g_r + \frac{g_u v}{\pi} \right) r^e \quad (6)$$

The Kaleckian model (cont.)

Complete model:

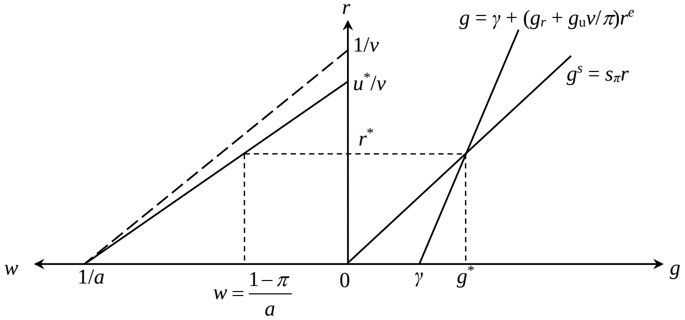
$$r = \frac{\pi u}{v} = \frac{u}{v}(1 - wa) \tag{2}$$

$$g^s = s_\pi r \tag{3}$$

$$g = \gamma + \left(g_r + \frac{g_u v}{\pi}\right) r^e \tag{6}$$

To solve, once again set $r = r^e$ and assume Keynesian stability condition $s_\pi > g_r + \frac{g_u v}{\pi}$:

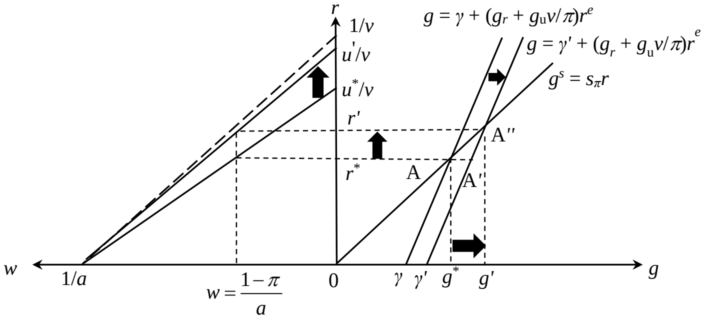
The Kaleckian model (cont.)



The Kaleckian model (cont.)

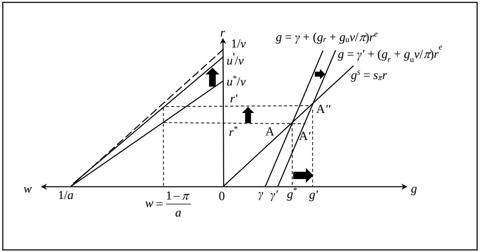
- Now suppose an improvement in animal spirits raises γ
- This will:
  - increase the rate of accumulation, which will ...
  - increase the equilibrium rates of growth and profit, and ...
  - ... increase the equilibrium capacity utilization rate, with the real wage (distribution of income) unchanged

The Kaleckian model (cont.)



The Kaleckian model (cont.)

- What's happening is:
- $I > S$ increases sales and production in the goods market ...
- ... which raises u ...
- ... which raises r ...
- ... which raises g



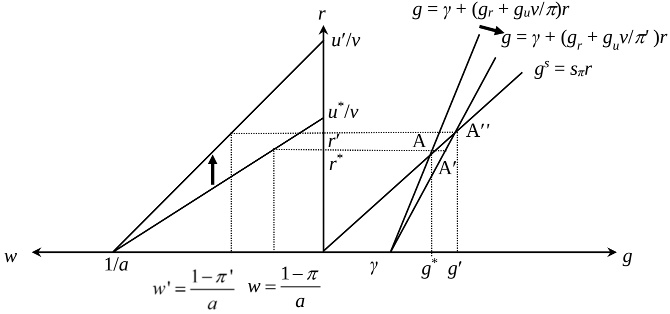
Neo-Keynesians versus Kaleckians again

- Note, then, that having relaxed the assumption that $u = \bar{u}_n = 1$, we've gone from:
  - *price* adjustment in the Robinson model to
  - *quantity* adjustment in the Kaleckian model
- Or, in other words, from:
  - exogenous capacity utilization and endogenous distribution (Robinson model) to
  - exogenous distribution and endogenous capacity utilization (Kaleckian model)
- These orthogonal dimensions of adjustment need not be treated as mutually exclusive, of course (Lavoie, 2010)

The paradox of costs

- Suppose now that we increase the real wage (i.e., decrease the profit share $\pi = 1 - wa$)
- This involves increasing the costs of production
- BUT - in the Kaleckian model, r will *rise* (as, too, will g and u)
- This is the (in)famous *paradox of costs*
- So how does it work?

The paradox of costs (cont.)



The paradox of costs (cont.)

No trickery is involved here. Hence note that:

$$g^* = \frac{s_\pi \pi \gamma}{(s_\pi - g_r) - g_u v}$$

$$\Rightarrow \frac{dg^*}{d\pi} = \frac{-s_\pi \gamma g_u v}{[(s_\pi - g_r) - g_u v]^2} < 0$$

$$r^* = \frac{\pi \gamma}{(s_\pi - g_r) - g_u v}$$

$$\Rightarrow \frac{dr^*}{d\pi} = \frac{-\gamma g_u v}{[(s_\pi - g_r) - g_u v]^2} < 0$$

The paradox of costs (cont.)

$$u^* = \frac{v\gamma}{(s_\pi - g_r) - g_u v}$$

$$\Rightarrow \frac{du^*}{d\pi} = \frac{-(s_\pi - g_r)\gamma v}{[(s_\pi - g_r) - g_u v]^2} < 0$$

Since if $s_\pi > g_r + \frac{g_u v}{\pi}$ (the Keynesian stability condition) and $\frac{g_u v}{\pi} > 0$, it must be that:

$$s_\pi > g_r + \frac{g_u v}{\pi} > g_r \Rightarrow s_\pi - g_r > 0$$

The paradox of costs (cont.)

Notice that by contrast in the the Robinson model:

$$g^* = \frac{s_\pi \gamma_1}{s_\pi - \gamma_2}$$

$$r^* = \frac{\gamma_1}{s_\pi - \gamma_2}$$

$$\Rightarrow \frac{dg^*}{d\pi} = \frac{dr^*}{d\pi} = 0$$

No influence of distribution on (equilibrium) growth and profit rates.

The paradox of costs (cont.)

- Key result of Kaleckian model: economy unequivocally *wage-led*. Redistribution towards wages:
  - enriches workers (higher w)
  - enriches *capitalists* at the same time (higher r)
  - *and* improves macro performance in the process (higher u, g)
- Win-win-win capitalism!
- And of obvious (massive) contemporary significance
- *Or is it too good to be true?*

The paradox of costs (cont.)

- First, note that paradox of costs is a macro result that might be *true in principle* but *difficult (impossible?) to achieve in practice*
  - it starts with an increase in w
  - do individual firms have the macro insights to accept this?
  - or will they resist it as a seeming attack on their profitability?

The paradox of costs (cont.)

- Second, paradox of costs may be wrong in principle
  - it emerges from a "re-tooling" of the Robinsonian investment function
  - but does this re-tooling "get the investment function right"?
- This brings us to third generation PK theory, associated with Bhaduri and Marglin (1990); Marglin and Bhaduri (1990)

Bhaduri-Marglin versus the Kaleckians

Bhaduri-Marglin - if $u \neq \bar{u}_n = 1$ so that:

$$r = \frac{\pi u}{v}$$

and:

$$g = g(r) \tag{7}$$

as in Robinson, then we can write:

$$g = g(\pi, u)$$

The influence of (now assumed variable) u on g is already captured by an essentially Robinsonian investment function!

Bhaduri-Marglin versus the Kaleckians

According to Bhaduri-Marglin, the Kaleckian investment function:

$$g = g(r, u)$$

overcounts the influence of u on g, which enters *twice* (directly and then again, indirectly, via r)

Bhaduri-Marglin versus the Kaleckians

BUT – this "accounting" argument is controversial. In the Kaleckian tradition:

- A *strong* accelerator effect (i.e., large effect of u on g) is to be expected:
  - firms operating objective is to keep pace with the expansion of the goods market, so as to maintain their market share and hence degree of monopoly power
- An *independent* accelerator effect (i.e., separate from r) is appropriate:
  - the influence of u and r on g are qualitatively different: u *causes* g (accelerator effect) whereas r *facilitates* g (source of finance) (Mott and Slattery, 1994)

But suppose we go along with Bhaduri-Marglin and see where this leads

The Bhaduri-Marglin model

As we've already seen, point of departure for Bhaduri-Marglin involves replacing the Kaleckian investment function:

$$g = g(r, u)$$

with:

$$g = g(\pi, u) \tag{8}$$

NOTE: implicit form of Bhaduri-Marglin function is deliberate – cannot obtain full suite of their results with linear investment function

The Bhaduri-Marglin model (cont.)

Complete model:

$$r = \frac{\pi u}{v} = \frac{u}{v}(1 - wa) \tag{2}$$

$$g^s = s_\pi r \tag{3}$$

$$g = g(\pi, u) \tag{8}$$

To solve, set $g = g^s = g^*$:

The Bhaduri-Marglin model (cont.)

$$\frac{s_\pi \pi u^*}{v} = g(\pi, u^*)$$

where u^* denotes the equilibrium rate of capacity utilization.

Can't solve explicitly for u^*, but by totally differentiating our equilibrium solution, we get:

$$\frac{du^*}{d\pi} = \frac{g_\pi - \frac{s_\pi u^*}{v}}{\frac{s_\pi \pi}{v} - g_u}$$

The paradox of costs again

If the Keynesian stability condition holds, so that:

$$\frac{s_\pi \pi}{v} - g_u > 0$$

Then:

$$\frac{du^*}{d\pi^*} > 0 \quad \text{if} \quad g_\pi > \frac{s_\pi u^*}{v}$$

or:

$$\frac{du^*}{d\pi^*} < 0 \quad \text{if} \quad g_\pi < \frac{s_\pi u^*}{v}$$

The paradox of costs again (cont.)

- Effect of redistribution on model outcomes now ambiguous
- What's going on – what happened to the paradox of costs?!
- Clue: *everything turns on the responsiveness of the investment function to the profit share (g_π)*
- So let's consider explicit (linear) form of Bhaduri-Marglin investment function
- (WARNING: recall that linear $g(.)$ does not deliver full suite of Bhaduri-Marglin results – so this exercise is good for intuition only!)

The paradox of costs again (cont.)

Write:

$$g = g(\pi, u) = \gamma + g_\pi \pi + g_u u$$

Since:

$$r = \frac{\pi u}{v} \Rightarrow u = \frac{vr}{\pi}$$

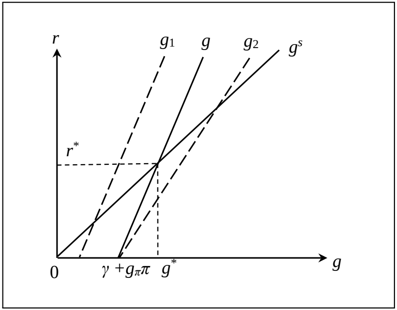
it follows that:

$$g = g(\pi, u) = \gamma + g_\pi \pi + \frac{g_u v}{\pi} r$$

Can now see that g varies directly with π via "intercept" term, and indirectly with π via "slope" term.

The paradox of costs again (cont.)

- In event of $\pi' < \pi$:
- g_1 captures "intercept effect" (*ceteris paribus*)
- g_2 captures "slope effect" (*ceteris paribus*)
- Final result ambiguous



The paradox of costs again (cont.)

The ambiguity so-noted creates *three* different cases in the Bhaduri-Marglin model

To see this, first note that since:

$$r^* = \frac{\pi u^*}{v}$$

it follows that:

$$\frac{dr^*}{d\pi} = \frac{\partial r^*}{\partial \pi} + \frac{\partial r^*}{\partial u^*}\frac{du^*}{d\pi} = \frac{u}{v} + \frac{\pi}{v}\frac{du^*}{d\pi}$$

$$\Rightarrow \frac{dr^*}{d\pi} = \frac{u}{v}\left(1 + \frac{\pi}{u^*}\frac{du^*}{d\pi}\right)$$

The paradox of costs again (cont.)

Meanwhile, the equilibrium condition $g = g^s = g^*$ means that:

$$g^* = \frac{s_\pi \pi u^*}{v}$$

so that:

$$\frac{dg^*}{d\pi} = \frac{\partial g^*}{\partial \pi} + \frac{\partial g^*}{\partial u^*}\frac{du^*}{d\pi} = \frac{s_\pi u^*}{v} + \frac{s_\pi \pi}{v}\frac{du^*}{d\pi}$$

$$\Rightarrow \frac{dg^*}{d\pi} = \frac{s_\pi u}{v}\left(1 + \frac{\pi}{u^*}\frac{du^*}{d\pi}\right)$$

The paradox of costs again (cont.)

So *in fact*, everything turns on the *sign* and *size* of:

$$\frac{\pi}{u^*}\frac{du^*}{d\pi}$$

which is the *elasticity of u^* w.r.t.* π. Hence if:

$$\frac{du^*}{d\pi} > 0 \Rightarrow \frac{\pi}{u^*}\frac{du^*}{d\pi} > 0$$

then:

$$\frac{dg^*}{d\pi}, \frac{dr^*}{d\pi} > 0$$

The economy is now unequivocally *profit-led*!

The paradox of costs again (cont.)

Meanwhile, if:

$$\frac{du^*}{d\pi} < 0$$

and:

$$\left| \frac{\pi}{u^*} \frac{du^*}{d\pi} \right| > 1$$

(u^* is π-elastic) then:

$$\frac{dg^*}{d\pi}, \frac{dr^*}{d\pi} < 0$$

The economy is unequivocally *wage-led* again (as in the Kaleckian model). The paradox of costs is restored!

The paradox of costs again (cont.)

Finally, if:

$$\frac{du^*}{d\pi} < 0$$

but:

$$\left| \frac{\pi}{u^*} \frac{du^*}{d\pi} \right| < 1$$

(u^* is π-inelastic) then:

$$\frac{dg^*}{d\pi}, \frac{dr^*}{d\pi} > 0$$

The economy is neither unequivocally wage- nor profit-led.

The paradox of costs again (cont.)

To summarize (and use Bhaduri-Marglin's terminology):

	Signs of partial derivatives		
$\partial u^*/\partial\pi$	–	–	+
$\partial g^*/\partial\pi$	–	+	+
$\partial r^*/\partial\pi$	–	+	+
Terminology	*Cooperative stagnationist*	*Conflictual stagnationist*	*Exhilarationist*

Bhaduri-Marglin: a summing up

- Bhaduri-Marglin claim to offer a *generalization* of the distribution-growth relationship
- BUT - don't forget controversy about behavioural basis of model (is $g = g(\pi, u)$ "correct"?)
- Similar results can be obtained by other means:
  - saving out of wages
  - open-economy effects
- But these also controversial:
  - are models with saving out of wages stock-flow consistent?
  - world is a closed economy

A selected menu of new topics

Various extensions and new developments merit exploration, including (but not limited to):

- autonomous-demand-led exogenous growth
- monetary and financial determinants of growth
- debt-financed consumption spending and the accumulation of household debt
- wage inequality
- technical change and the supply side

Autonomous-demand-led exogenous growth

- Associated with supermultiplier models – most recently Sraffian supermultiplier (Freitas and Serrano, 2015)
- In latter, *level* of output (but not g) is wage-led
- This has given rise to new Kaleckian interpretation of wage-led growth (Allain, 2015; Lavoie, 2016)

Autonomous-demand-led exogenous growth (cont.)

Key innovation:

$$S = s_\pi \Pi - A$$

so that $\Pi = 0 \Rightarrow S = -A < 0$ – i.e., capitalists dis-save to fund autonomous consumption (A)

Autonomous-demand-led exogenous growth (cont.)

Now assume $I = S$ and standardize by K:

$$\left.\frac{I}{K}\right|_{I=S} = \frac{s_\pi \Pi}{K} - \frac{A}{K}$$

$$\Rightarrow g^s = s_\pi r - a$$

where $a = \frac{A}{K}$

Autonomous-demand-led exogenous growth (cont.)

Note that:

$$a = \frac{A}{K}$$

$$\Rightarrow \dot{a} = a(\hat{A} - \hat{K})$$

$$\Rightarrow \dot{a} = a(\bar{g}_A - g)$$

We now have a new dynamic, driving a new adjusting variable (a), towards a new steady-state condition $\dot{a} = 0 \Leftrightarrow \bar{g}_A = g$

Autonomous-demand-led exogenous growth (cont.)

To bring all this into focus, consider the simplified Kaleckian model:

$$g = g(u)$$

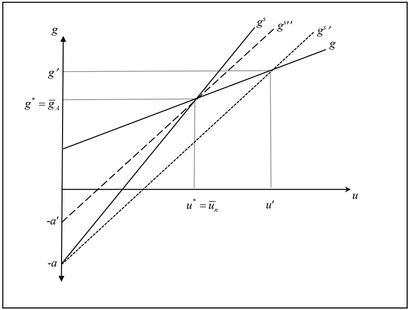
$$g^s = s_\pi r - a = \frac{s_\pi \pi u}{v} - a$$

and now suppose that the profit share of income, π, falls

Autonomous-demand-led exogenous growth (cont.)

Result:

- $\downarrow \pi \Rightarrow \uparrow u, g$ ...
- ... $g > \bar{g}_A \Rightarrow \dot{a} < 0$ ...
- ... until $a = a'$, where $g = g^* = \bar{g}_A$ (and $u = u^* = \bar{u}_n$)



Autonomous-demand-led exogenous growth (cont.)

Interpretation:

- $\Delta\pi$ has no effect on steady-state outcomes
- (and nor does anything else – exogenous growth!)
- So no influence of distribution on growth – specifically, no paradox of costs?
- Alternatively:
  - since $\downarrow \pi \Rightarrow g > \bar{g}_A$ during *traverse* ...
  - ... so that average value of g exceeds $\bar{g}_A$ in 'long run' ...
  - ... growth remains wage-led: paradox of costs survives
- Note connection to 'history versus equilibrium' thrust of PK thinking

Monetary & financial determinants of growth

- Kregel (1985) – PK growth theory like 'Hamlet without the Prince'
- But post-1980, much more attention to monetary and financial influences on distribution and growth
- Developments nicely summarized in Hein (2014, chpts.9 & 10)

Monetary & financial determinants of growth ((cont.)

Key innovation: introduction of third claimant (rentiers) on total income

$$Y \equiv wN + \Pi$$

$$\Pi = \Pi_F + iD$$

$$\Rightarrow Y = wN + \Pi_F + iD$$

Hence:

$$S = s_W wN + s_\pi \Pi_F + s_R iD$$

Monetary & financial determinants of growth ((cont.)

Now assume $s_W = 0, s_\pi = 1, 0 < s_R < 1$. Then:

$$S = \Pi_F + s_R iD$$

$$\Rightarrow S = \Pi - iD + s_R iD$$

$$\Rightarrow S = \Pi - (1 - s_R) iD$$

Monetary & financial determinants of growth ((cont.)

Now assume $I = S$ and standardize by K:

$$\left.\frac{I}{K}\right|_{I=S} = \frac{\Pi}{K} - (1 - s_R)i\frac{D}{K}$$

$$\Rightarrow g^s = \frac{\pi u}{v} - (1 - s_R)i\lambda$$

where $\lambda = \frac{D}{K}$

Monetary & financial determinants of growth ((cont.)

Note:

- $\lambda = \frac{D}{K} \Rightarrow \dot{\lambda} = \lambda(\hat{D} - g)$
  - debt dynamics now part of the picture
  - $\dot{\lambda} = 0 \Leftrightarrow \hat{D} = g$ required for steady state
  - steady-state debt:income ratio sustainable?
- With $g^s = \frac{\pi u}{v} - (1 - s_R)i\lambda$:
  - $\uparrow i, \lambda \Rightarrow \downarrow g^s$ ...
  - ... so *ceteris paribus*, rentier claims boost C ...
  - ... but other things aren't equal ...

Monetary & financial determinants of growth ((cont.)

Now have:

$$g = \gamma + g_u u + g_r r_F$$

where $r_F = \frac{\Pi - iD}{K} = r - i\lambda$

$$\Rightarrow g = \gamma + g_u u + g_r (r - i\lambda)$$

$$\Rightarrow g = (\gamma - g_r i\lambda) + g_u u + g_r r$$

So $\uparrow i, \lambda \Rightarrow \downarrow g$: *ceteris paribus*, rentier claims reduce I

Monetary & financial determinants of growth ((cont.)

So, if rentier claims on income rise, does economy improve or deteriorate? Depends:

- If firms 'hoard' retained earnings (g_r low) and rentiers free-spending (s_R low), g and u increase (dominance of C channel)
- If firms invest retained earnings (g_r high) and rentiers hoard (s_R high), g and u decline (dominance of I channel)

Monetary & financial determinants of growth ((cont.)

Finally, note that we can replace iD with ρE, where:

- E denotes shareholders' equity
- ρ denotes dividend rate earned by shareholders

Provides basis for interpreting rentier claims in terms of 'shareholder value' movement (extraction of profit from firms at expense of their capital development)

Household-debt-financed consumption spending

- Motivated by coincident rise of inequality and household borrowing
- Large literature on this theme
- PK models linking inequality and household borrowing to distribution and growth include (*inter alia*) Kapeller and Schütz (2015); Setterfield and Kim (2017, 2020)

Household-debt-financed consumption spending (cont.)

Key innovation(s):

$$C = C_W + C_R + \dot{D}$$

where:

$$\dot{D} = \beta(C^T - C_W) \quad , \quad \beta > 0$$

and:

$$C^T = \eta C_R$$

i.e., 'keeping up with the Joneses'. (Note: this can be augmented with 'running to stand still' effect)

Household-debt-financed consumption spending (cont.)

ALSO – how do households service debt? Like a tax:

$$C_W = c_W(WN - iD_R)$$

Or like an expense:

$$C_W = c_W WN$$

and:

$$S_W = (1 - c_W)WN - iD_R$$

Household-debt-financed consumption spending (cont.)

Central results:

- 'Consumption-driven, profit-led growth', or *paradox of inequality*:
  - redistribution towards profit boosts growth ...
  - ... but not for Bhaduri-Marglin reasons (primacy of I channel)
  - instead, inequality boosts C because of effects on household borrowing
  - financial sustainability?

Household-debt-financed consumption spending (cont.)

- Manner in which households service debts matters. When treated as expense:
  - paradox of inequality ‘super charged’: even transfer of income due to debt servicing boosts C
  - debt dynamics inverted: quadratic debt dynamics yield two steady-state debt:income ratios, with the *larger* of these now the *stable* solution – further challenge to financial sustainability

Wage inequality

- Motivation: much of the observed increase in inequality due to increased *wage* inequality
- Key innovation – distinction between:
  - *production workers* – actually engage in production process
  - *supervisory workers* (managers) – oversee production process

Wage inequality (cont.)

In PK models of distribution and growth, this innovation incorporated in different ways:

- Two-class models, with capitalist-managers who claim part of total wage income
- Three-class models
  - capitalists, supervisory workers, production workers
  - wage bill divided between supervisory workers and production workers

Wage inequality (cont.)

Example: Palley (2017) two-class model

Assume ϕ_W is production workers' share of WN and (because $s_W \neq 0$ and *a la* Pasinetti (1962)) δ_W their share of Π. Then:

$$S = S_W + S_K = s_W(\phi_W WN + \delta_W \Pi) + s_K([1-\phi_W]WN + [1-\delta_W]\Pi)$$

$$\Rightarrow \frac{S}{K}\frac{K}{K_u}\frac{K_u}{Y} = s_W(\phi_W[1-\pi] + \delta_W \pi) + s_K([1-\phi_W][1-\pi] + [1-\delta_W]\pi)$$

$$\Rightarrow \frac{S}{K}\frac{v}{u} = s_W(\phi_W[1-\pi] + \delta_W \pi) + s_K([1-\phi_W][1-\pi] + [1-\delta_W]\pi)$$

Wage inequality (cont.)

Now assume $I = S$. Then:

$$\left.\frac{I}{K}\right|_{I=S} = g^s = [s_W(\phi_W[1-\pi]+\delta_W\pi)+s_K([1-\phi_W][1-\pi]+[1-\delta_W]\pi)]\frac{u}{v}$$

Key result: $\uparrow \phi_W, \delta_W \Rightarrow \downarrow g^s$ if $s_W < s_K$

- Economy can still be profit-led
- BUT – redistribution of wage *or* profit income towards production workers with $\pi = \bar{\pi}$ expansionary (via C channel)
- New twist on ‘wage-led growth’ theme (worker-led growth!)

Technical change and the supply side

- Motivation: PK models only study impact of distribution on growth via the *demand side*
- Key innovation – impact of distribution on growth via the *supply side*. Possible because:
  - potential rate of growth (Harrodian natural rate) affected by labour productivity growth
  - labour productivity growth affected by distribution if technical change is induced (by profit squeeze) and factor biased (labour-saving)
- May give rise to growth that is profit-led in medium run, but wage-led in long-run steady state (Rada et al., 2021)

Technical change and the supply side (cont.)

Suppose that:

$$g = g^s$$

$$g^s = s_\pi r$$

$$r = \frac{1}{v}(1 - wa)$$

Then $\uparrow w \Rightarrow \downarrow \pi - (1 - wa) \downarrow r \Rightarrow \downarrow g$ – growth profit-led

Technical change and the supply side (cont.)

Note:

- No formal principle of effective demand (PED) in this model – essentially classical Marxian
- BUT – this just an abstraction for the sake of simplicity
  - think of profit-led growth scenarios in Bhaduri-Marglin model, in which PED alive and well

Technical change and the supply side (cont.)

Now write:

$$y_p = -\hat{a} + \bar{n}$$

$$\hat{a} = -\gamma wa \quad , \quad \gamma > 0$$

$$\hat{w} = -\hat{a} + \delta(g - y_p)$$

Technical change and the supply side (cont.)

Note that in the steady state:

$$g = y_p$$

(constant rate of employment)

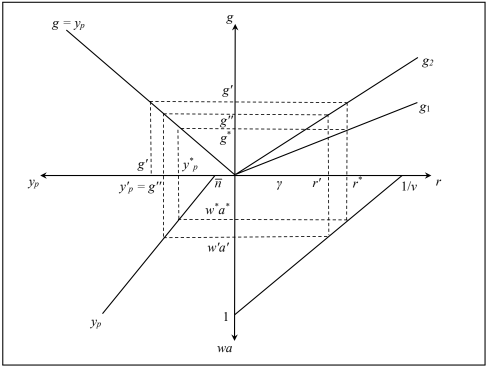
$$\Rightarrow \hat{w} = -\hat{a}$$

which renders the distribution of income $(1 - wa = \pi)$ constant

BUT – now assume $\downarrow s_\pi \Rightarrow \uparrow g \Rightarrow g > y_p$ initially. Two effects:

Technical change and the supply side (cont.)

- $\hat{w} > -\hat{a} \Rightarrow \uparrow wa \Rightarrow \downarrow r \Rightarrow \downarrow g$
- $\hat{w} > -\hat{a} \Rightarrow \uparrow wa \Rightarrow \uparrow -\hat{a} \Rightarrow \uparrow y_p$



Technical change and the supply side (cont.)

- RESULT – steady-state equilibrium restored when $g = y_p$, consistent with lower g and higher y_p
- In other words,
  - although growth profit-led in medium run ...
  - ... steady-state rate of growth *increases* in response to $\uparrow w$ – wage-led!
- Note consistency with Blecker (2016): growth more likely to be wage-led in long run

Summary and conclusions

- Even confining our attention to *functional* distribution of *income*, distribution-growth relationship complicated in PK models:
  - distribution can be endogenous (adjusting) variable (neo-Keynesian) ...
  - ... or exogenous cause of wage- or profit-led outcomes (Kaleckian, Bhaduri-Marglin) ...
  - ... or *neither* (exogenous growth models)
- Relationship between distribution and growth further complicated by extensions to basic (canonical) models

Summary and conclusions (cont.)

- In addition, distribution-growth relationship draws out controversy concerning treatment of u in macrodynamics
  - $u = \bar{u}_n = 1$ versus variable u
  - variable u a *necessary* condition for paradox of costs
  - but not a *sufficient* condition (Bhaduri-Marglin)
- All told, not surprising that distribution and growth remains a lively topic in PK analysis!

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