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The Triumph of the Rentier? Thomas Piketty vs. Luigi Pasinetti and John Maynard Keynes

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In a celebrated passage in the *General Theory,* John Maynard Keynes (1936) argued that over time, with appropriate guidance by the state, capital would become so abundant that its return would only have to cover wastage and obsolescence together with some margin to offset risk and reward entrepreneurship. Utimate consequences would be the "euthanasia of the rentier" and the end of "….the cumulative oppressive power of the capitalist to exploit the scarcity-value of capital." As in other parts of the book, Keynes here sounds distressingly neoclassical – an abundant factor is bound to earn a low return.[1]

Thomas Piketty (2014) in his recent book on *Capital in the Twenty-First Century* embraces neoclassical production theory but argues that the return to capital does *not* need to fall by very much as it becomes more abundant relative to labor because substitution between these two factors is easy (details below). The rentier class can then use its power to increase its share of total wealth to a level approaching one hundred percent.[2]

Despite Piketty's empirical brilliance and the fears that he properly raises about increasing concentration of wealth, he glosses over simple national accounting

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[1] Implicit in Keynes's prediction is the notion that capital will become abundant as and when consumption demand stabilizes, perhaps at the level of Bliss in Frank Ramsey's (1928) pioneering growth model. Generations of innovators of novel consumer goods from long before Henry Ford through Steve Jobs (and presumably beyond) have made sure that consumers' Bliss has not arrived.

[2] Piketty defines national wealth broadly to include "physical" capital, land, and net financial assets (domestic and foreign). A more standard definition in terms of the national income and flows of funds accounts would include capital, net foreign assets, and government debt. For the record, world GDP is on the order of 60 (trillion dollars), capital is around 200, and government debt 100. The interest rate on debt is usually below the profit rate on capital, so it is ignored in this paper.

relationships and elides Luigi Pasinetti's (1962) path-breaking growth model focusing on the control of capital in a capitalist economy.[3] On the basis of Pasinetti's model and subsequent literature one can show along strictly Keynesian lines that euthanasia, persistence, and triumph of the rentier are all possible. Familiar macroeconomic forces affect the ratio (say Z) of capital held by a rich "capitalist" class to the total, and create conditions under which ever-increasing concentration of wealth may or may not occur.

We begin by discussing accounting, then recent changes over business cycles in economic activity and distribution between labor and capital, and go on to analyze long-term distribution in a demand-driven version of Pasinetti's model. One implication is that the recent rise of the rentier has been supported by politics and policy marshalled to drive up the share of income going to profits. Positive feedback of the control ratio Z into its own growth can then drive wealth of the rentier rapidly upward.

Why is $r > g$?

Piketty puts a lot of emphasis on the commonplace observation that the rate of profit (or r) exceeds the rate of output growth (or g). This inequality is basically a theorem of national income and flows of funds accounting. It follows from two "fundamental laws of capitalism" (his label, they are really accounting identities), but he does not make the connection very clear.

Let X be a generally accepted measure of "real" output (such as real GDP from the national accounts) and K a similar measure of capital (such as cumulated real net

[3] Piketty scarcely mentions the Cambridge capital controversies of the 1950s and 1960s in which Pasinetti's model played a central role.

capital formation). Both quantities are estimated using “appropriate” price deflators applied to nominal spending flows.

If π is the share of “profits” (or, say, the sum of all income flows except compensation of employees) in output, then the rate of profit on K *gross* of depreciation is

$$r = \pi X/K = \pi u$$

with $u = X/K$. The output/capital ratio u can be interpreted as the “productivity” (in the long run) or “utilization” (short-run) of capital

Let δ be the rate at which capital depreciates (say the inverse of the lifetime of a typical unit of physical capital). The profit rate r_n *net* of depreciation becomes

$$r_n = \pi u - \delta = r - \delta \qquad (1)$$

Equation (1) is a version of the first fundamental law, consistent with national income accounting. Typical values of these variables might be $\pi = 0.4$, $u = 0.3$, and $\delta = 0.07$. They combine to give $r_n = 0.05$, Piketty’s preferred number.

Now look at growth. In continuous time, the growth rate of output is $g = \hat{X} = (dX/dt)/X = \dot{X}/X$. Ignoring business cycle and other fluctuations, it will be close to the growth rate of capital stock $\widehat{K}$. But the increase in capital over time is

$$\dot{K} = sX - \delta K$$

with s as the saving rate from output. The growth rate $\widehat{K}$ follows as

$$\widehat{K} = su - \delta \quad , \qquad (2)$$

a riff on Piketty’s second law.

Evidently $r_n > \widehat{K}$ is tantamount to $\pi > s$. National saving rates are rarely as high as forty percent. For most times and places, Piketty’s inequality will be observed in the data. The real puzzle is what determines π and s. One can re-engineer Pasinetti's model to address that question as well as the determination of the control ratio Z. Before doing that, however, it makes sense to look at the evolution of π and u over the last few decades.

What happens with π and u in the medium run?

Piketty relies on off-the-shelf neoclassical production theory to argue that r and π are jointly determined by the capital/labor ratio $\kappa = K/L$ with a fully employed labor force L. In particular, because the elasticity of substitution σ of an assumed macroeconomic production function is "high" (or $\sigma \gg 1$) π will not go down by very much when κ increases as the economy grows.[4] If rich people control a large share of capital, they can amplify their earnings to amass dynastic fortunes.

This fable, which dates back to the 19th century economic Darwinist John Bates Clark, does not fit the facts. Certainly at the global level full employment is not observed, and π varies over time, across both business cycles *and* longer periods. It is natural to address these observations using a model in which output, economic growth, employment, and income distribution are determined along Keynesian lines by effective demand.[5] For background, we can look at income distribution over the past few cycles.

[4] Of course since the Cambridge controversies, it is well known that on plausible microeconomic assumptions an aggregate production function cannot exist. This inconvenient fact is universally ignored by contemporary neoclassical economists. See James Galbraith's (2014) review of Piketty on this issue.

[5] Fair warning: in the modeling to follow, K is a number calculated from the national accounts that basically sets the scale of the economic system. At the macro level it is *not* a "factor of production" (and so cannot be scarce in Keynes's terms). Neither is labor. Employment is determined as output divided by the output/labor ratio, or productivity.

Cyclically, saving and investment respond positively to a rise in the profit rate. If the increase in investment is strong enough, output, employment, and the growth rate of the capital stock go up. Such a "profit-led" adjustment to a shift in the income distribution appears to be characteristic of (at least) high income economies. In the same time frame there is a thought dating back to Karl Marx that a tighter labor market (as signaled by an increase in the output/capital ratio) will tend to reduce the profit share. This negative feedback means that any initial profit surge and increased economic activity will be offset by an induced "profit squeeze."[6]

This cyclical growth scenario was first formalized by Richard Goodwin (1967) in a simple "predator-prey" model. Contemporary versions such as Nelson Barbosa-Filho and Lance Taylor (2006) and David Kiefer and Codrina Rada (forthcoming) treat the wage share $\psi = 1 - \pi$ as predator and capacity utilization as prey. Both papers follow Goodwin in setting up dynamics of capacity utilization and the wage share. In continuous time we have

$$\dot{u} = f(u, \psi)$$

and

$$\dot{\psi} = h(u, \psi) \quad .$$

These differential equations will be locally stable if $\partial f/\partial u < 0$ and $\partial h/\partial \psi < 0$. In the medium run, effective demand will be profit-led if $\partial f/\partial \psi < 0$. There will be a profit squeeze if $\partial h/\partial u > 0$. The opposite signs of the latter two "cross partial" derivatives suggest that a cycle is likely.

[6] Jargon about output and/or growth being profit-led or wage-led has become popular in the literature on demand-driven models since the terminology was coined by Taylor (1991). Profit-squeeze and wage-squeeze are natural extensions.

Figure 1 illustrates the dynamics. The $\dot{u} = 0$ and $\dot{\psi} = 0$ schedules are “nullclines” showing combinations of u and ψ that respectively hold the time-derivatives $\dot{u}$ and $\dot{\psi}$ to zero. The small arrows show the directions in which u and ω move when they are away from their nullclines. The negative slope of the $\dot{u} = 0$ schedule can be interpreted to mean that aggregate demand is profit-led in the medium run; the positive slope of the $\dot{\psi} = 0$ curve indicates that there is a profit squeeze à la Marx when output and employment go up.

Figure 1

Suppose that there is an initially low level of u as at point A. Capital utilization will begin to rise toward its nullcline, and the wage share will fall. Later in the cycle ψ will begin to increase.[7] Eventually the rising labor share forces the trajectory to cross the $\dot{u} = 0$ nullcline, and output declines from its cyclical peak.

Using long-term quarterly data for 13 wealthy OECD economies, Kiefer and Rada fit a discrete-time cross-country econometric model like the one illustrated in Figure 1, obtaining nullclines with relatively steep slopes in the (u, ψ) plane, i.e. the economies are weakly profit-led but demonstrate a robust profit squeeze when economic activity rises.[8] Typical fluctuations of the variables over the cycle are in the range of five to ten percentage points.

[7] If ω is the real wage and ξ is labor productivity then $\psi = \omega/\xi$. Productivity typically goes up as an economy emerges from a slump so ψ falls. After a time a tighter labor market means that ω begins to rise, and ψ increases after the trajectory crosses the $\dot{\psi} = 0$ nullcline.

[8] Alternatively, the profit share rises sharply when capital utilization declines – a point of relevance below.

Note in the figure that the intersection of the nullclines establishes a focal point F around which the variables cycle. For our purposes, Kiefer and Rada's most significant result is that F has moved to the southwest over time. The "long run" (over four decades) wage share has dropped by around five percent and capacity utilization by two percent (before the Great Recession). Because the fall in u is proportionately less than the decrease in ψ, the profit rate $r = (1 - \psi)u$ has gone up.

The causes for these changes are not easy to ascertain, not least because different authors have differing background macroeconomic models in mind. Kiefer and Rada emphasize the impacts of globalization, reductions in labor's bargaining power, contractionary monetary policy, financialization, and technical change in reducing ψ and thereby increasing the capital share π[9]. As will be seen below, long-term distributive shifts may feed into the Kiefer-Rada results as well.

Growth with capitalists and workers

Now we can take up the dynamics of long-term wealth concentration. To keep the presentation as simple as possible, business cycle fluctuations are suppressed by replacing differential equations for u and ψ with "level" relationships based on the Kiefer-Rada nullclines. To save on symbols, investment and saving functions are set up in terms of the gross profit rate $r = \pi u$.

Let capital K be the sole component of wealth, and assume that there is a class of hereditary "capitalists" or rentiers who hold capital K_c to generate income rK_c.[10] The

[9] Servaas Storm and C. W. M. Naastepad (2012) add ten indicators of labor market regulation to get similar results.

[10] The mean income of US households in the richest one percent is roughly $2.5 million (Taylor, et.al. 2014). About one-fifth of that takes the form of employee

rest of capital is held by "workers" who receive labor income as well as capital income $r(K - K_c)$. Shares of income saved by capitalists and workers are s_c and s_w respectively, with $s_c > s_w$. If for completeness we assume that there is a tax on capitalist income at rate t with the proceeds transferred to workers,[11] the increase in capital permitted by available saving is

$$\dot{K}^S = s_c(1-t)rK_c + s_w[X - (1-t)rK_c] - \delta K \quad . \tag{3}$$

Dividing through by K, recalling that $r = \pi u$, and letting $Z = K_c/K$ gives

$$\widehat{K^S} = [(s_c - s_w)(1-t)\pi Z + s_w]u - \delta \quad . \tag{4}$$

In this equation $\widehat{K^S}$ is the capital stock growth rate *permitted* by available saving which depends on π and the capital control ratio Z.

Piketty's macroeconomic narrative *determines* $\widehat{K^S}$ in (4) from full employment plus the usual associated paraphernalia (aggregate production function, marginal conditions, etc.). This apparatus fixes u and π. With Z set by "history" at any point in time and pre-determined saving and depreciation rates the capital stock growth rate follows directly. This is basically the framework of the widely applied Solow (1956) growth model.

These incredible assumptions are certainly *not* adopted by Marx, Keynes (mostly), and Goodwin. Bringing in effective demand is the obvious alternative. Suppressing cyclical dynamics to focus on the long run, one way to do so is to follow Michal Kalecki (1971) and introduce an investment function

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compensation. This share would be far less for households in the top 0.1 or 0.01 percent.

[11] A negative value of t could represent tax breaks for the rich such as low rates in the USA for capital gains and "carried interest," or else the general observation that affluent households can usually contrive to get superior returns on their assets.

$$\dot{K}^I = g_0 K + \alpha \pi X - \delta K$$

or

$$\widehat{K^I} = g_0 + \alpha r - \delta \quad . \tag{5}$$

In these equations g_0 represents Keynesian animal spirits and capital stock growth responds to the profit rate (parameter $\alpha > 0$).

By setting excess effective demand to zero, $\dot{K}^I - \dot{K}^S = 0$, and solving we can get an expression for u,

$$\{[(s_c - s_w)(1-t)Z - \alpha)]\pi + s_w\}u = g_0 \quad . \tag{6}$$

A higher Z raises saving and thereby reduces capital utilization in a demand driven model (the paradox of thrift applies). If aggregate demand is profit-led, i.e.$(s_c - s_w)(1 - t)Z - \alpha < 0$, u will respond positively to π.

In effect (6) replaces the $\dot{u} = 0$ nullcline in Figure 1 for determination of u. Similarly, the relationship

$$\pi = \theta(u) \tag{7}$$

with $\theta' = d\theta/du < 0$ replaces the $\dot{\psi} = 0$ nullcline to set π (and ψ) as a function of u.

See Figure 2. Following Kiefer and Rada the $\pi(u)$ schedule is steep, signaling a strong profit squeeze. The dashed line illustrates how a higher Z can lead to a large increase in π accompanied by a decrease in u. The implication is that $r = \pi u$ can be (but does not necessarily have to be) an *increasing* function of Z. An increase in the capital control ratio can make a further increment easier to obtain, which Piketty might have stated as a third fundamental law (with behavioral content as opposed to his accounting rules). As will be seen, a fourth could be that feedback to still higher Z could lead to chronic capital underutilization and stagnation in the long run.[12]

Figure 2

In his original model, Pasinetti operated in a rather different world, assuming full employment (determining u) and a given growth rate $\widehat{K^S}$. He then argued that π would adjust so that (4) could be satisfied. If $\widehat{K^S}$ were to go up there would have to be a wage squeeze to generate "forced saving" to meet higher investment demand. As described above, wage squeezes when aggregate demand rises are not observed in the data, so in its own way Pasinetti's macroeconomic narrative is as unsatisfactory as Piketty's. We can do better by treating u, r, and $\widehat{K}$ as being determined by π and Z. To do so, we have to bring in dynamics of Z, Pasinetti's key contribution.

Conflicting claims to *K*

The growth rate of capitalists' capital is

$$\widehat{K_c} = s_c(1-t)\pi u - \delta \quad . \tag{8}$$

Because $\hat{Z} = \widehat{K_c} - \widehat{K}$ we can use (4) and (8) to get a differential equation for Z,

$$\dot{Z} = \{[s_c(1-Z) + s_w Z](1-t)\pi - s_w\}Zu \tag{9}$$

subject to the restrictions (6) and (7).

There is a possible steady state with $\dot{Z} = 0$ at $Z = 0$ (euthanized rentiers!) which is discussed below. For positive Z, there can be a steady state when the term in curly brackets in (9) vanishes. We can check its stability by differentiating (9) and setting the bracketed term to zero. The result is

[12] Households in the top one percent provide around 60% of private savings in the USA. A shift in the income distribution in their favor can significantly reduce the multiplier.

$$d\dot{Z}/dZ = -(s_c - s_w)(1-t)\pi + [s_c(1-Z) + s_w Z](1-t)\rho(Z) \qquad (10)$$

in which $\rho(Z) = d\pi/dZ > 0$ from Figure 2. For a stable steady state, we need $d\dot{Z}/dZ < 0$.

Clearly, $-(s_c - s_w)(1-t)\pi$ is negative. The term $[s_c(1-Z) + s_w Z](1-t)$ multiplying $\rho(Z)$ is positive so the overall sign of $d\dot{Z}/dZ$ is ambiguous. If $\rho(Z)$ is "small," the dynamics are illustrated in Figure 3. There is a stable Pasinetti equilibrium at point P.[13] With a low value of $\rho(Z)$, $dr/dZ < 0$ and the capital stock growth rate $\widehat{K}$ is a decreasing function of Z from (5).

Figure 3

A high value of ρ, on the other hand, means that a Pasinetti steady state can be unstable. That is more likely to happen when

$$[s_c(1-Z) + s_w Z](1-t) > 0 \qquad (11)$$

is also "large," i.e. Z is well below its upper bound of one. Two alternative scenarios can play out.

First, Z can converge to a stable steady level of zero at which rentier capitalists vanish. That point is labeled after a paper by Paul Samuelson and Franco Modigliani (1966) who called $Z = 0$ a "dual" steady state.

Figure 4

Another possibility is that Z will diverge upward from point P. In that case, the left-hand term in inequality (11) will shrink, possibly by enough to make $d\dot{Z}/dZ < 0$ at some level of $Z < 1$. There would be a steady state at point D, so labeled after William

[13] That is, when Z is above (to the right of) P, it tends to fall. It moves in the other direction from points below P. See the arrows along the horizontal axis.

Darity Jr (1981), perhaps the first to point out that such an “anti-dual” equilibrium can exist.[14] This triumph of the rentiers requires a high saving rate on their part, and a robust response of the profit share to an increase in their control of capital. From Figure 2, this eventuality would be accompanied by stagnating capital utilization. One is reminded of Kalecki’s (1943) invocation of “the sack,” low employment contrived in support of capitalist incomes.

What is to be done?

A simple growth model cannot address all policy and political economy questions. A few points, however, stand out.

The model’s economy can trend toward dominance of the rentier class when their saving propensity s_c is high and the profit share has a strong positive response to an increase in the share of capital Z that they control.

On the other hand, if the Pasinetti equilibrium is stable, then it is easy to see from (10) that the steady state level of Z (the target of the accumulation process) will fall if the profit share π shifts exogenously downward or the tax rate t on the wealthy goes up. Galbraith (2014) succinctly summarizes the policy complications. For present purposes, two observations can be added.

Current flows of taxes on the upper percentiles of the income distribution and transfers to the bottom in the USA are on the order of ten percent of GDP. Meanwhile the income share of the top percentile rose by more than ten percent between 1980 and 2010 (Taylor, et. al., 2014), to a large extent due to a rising profit share π. The tax/transfer program would have to be doubled in size (emphasizing estate taxes in

[14] A final possibility is that Z may simply converge to one, if a steady state at D does not exist.

particular) to offset the "autonomous" increase in π. On the policy front such an effort may not be likely.

With regard to political economy, the increase in π (and therefore the profit rate r) was not so autonomous after all. It was the outcome of a sociopolitical process which could be reversed. As Kiefer and Rada, Galbraith, and many others argue, shifting the trade-offs between π and u illustrated in Figure 2 by public intervention would go a long way toward maintaining aggregate demand and reducing capitalist control. Otherwise, wage repression leads to secular stagnation by enriching the rentier.

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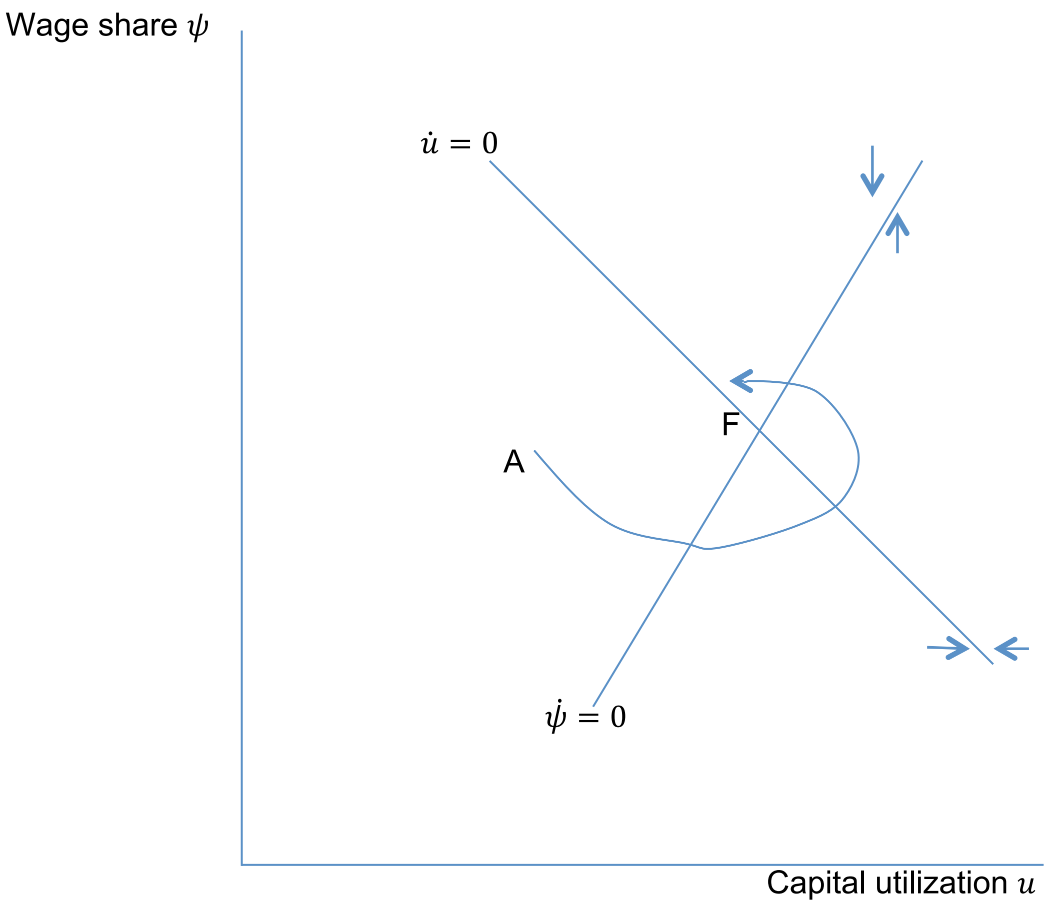

Figure 1: Cyclical dynamics between the wage share ψ and capital utilization u.

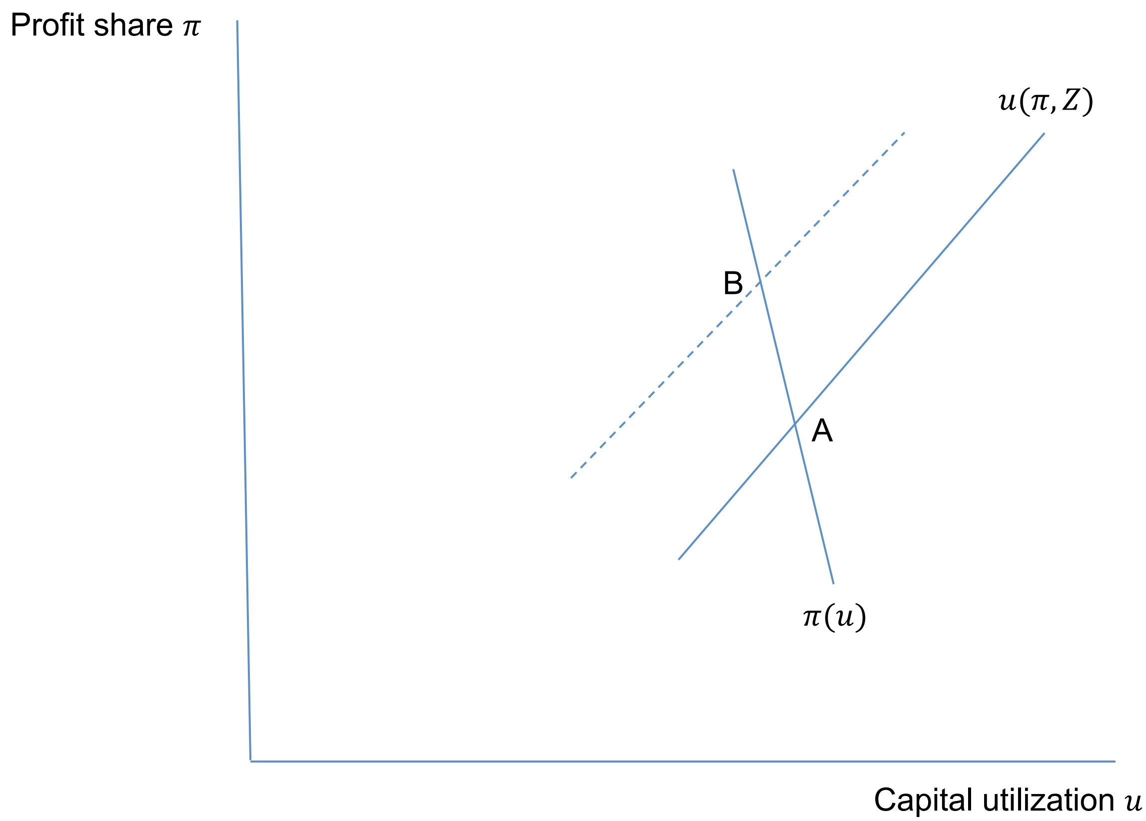

Figure 2: Determination of the profit share π and capital utilization u. The dashed line shows the effect of a higher value of the capital control ratio Z.

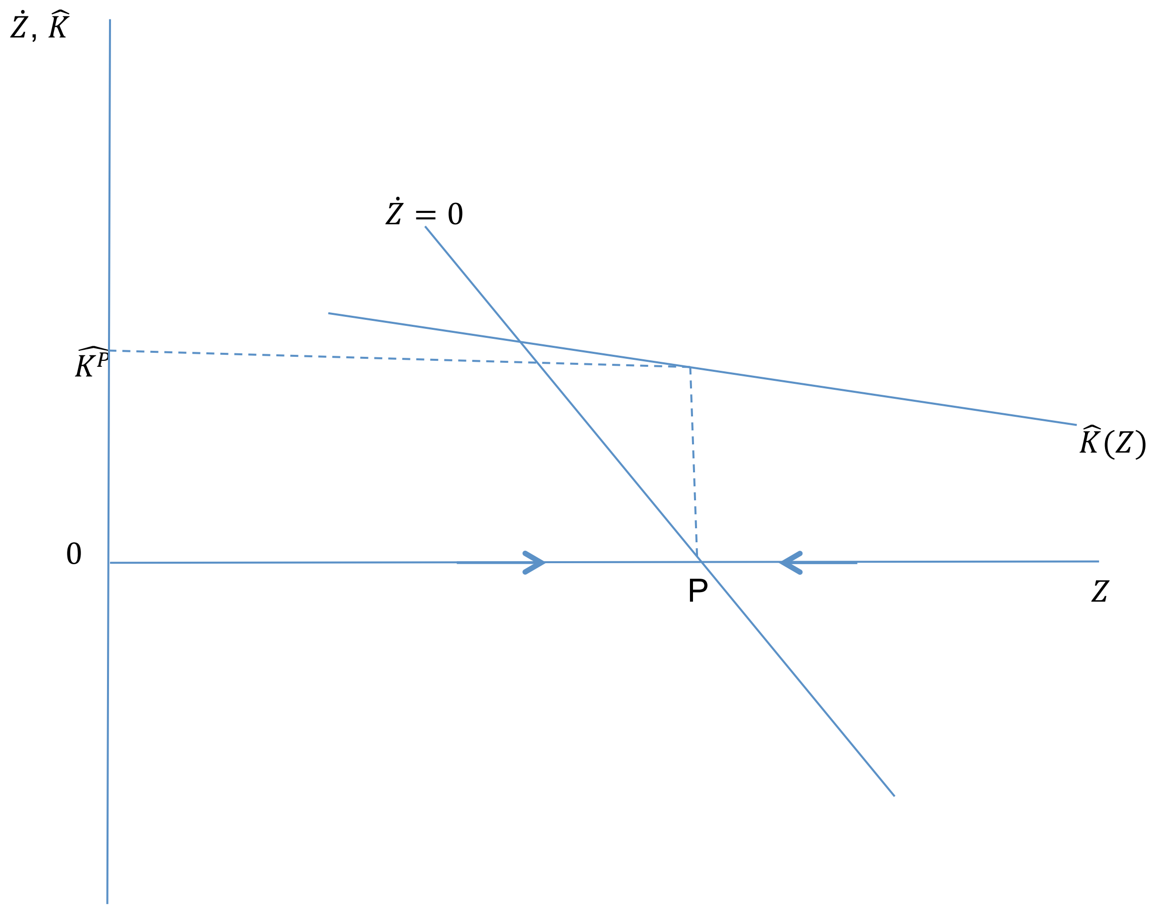

Figure 3: Stable Pasinetti equilibrium at point P. The growth rate $\widehat{K}$ is a declining function of Z with steady state level $\widehat{K^P}$.

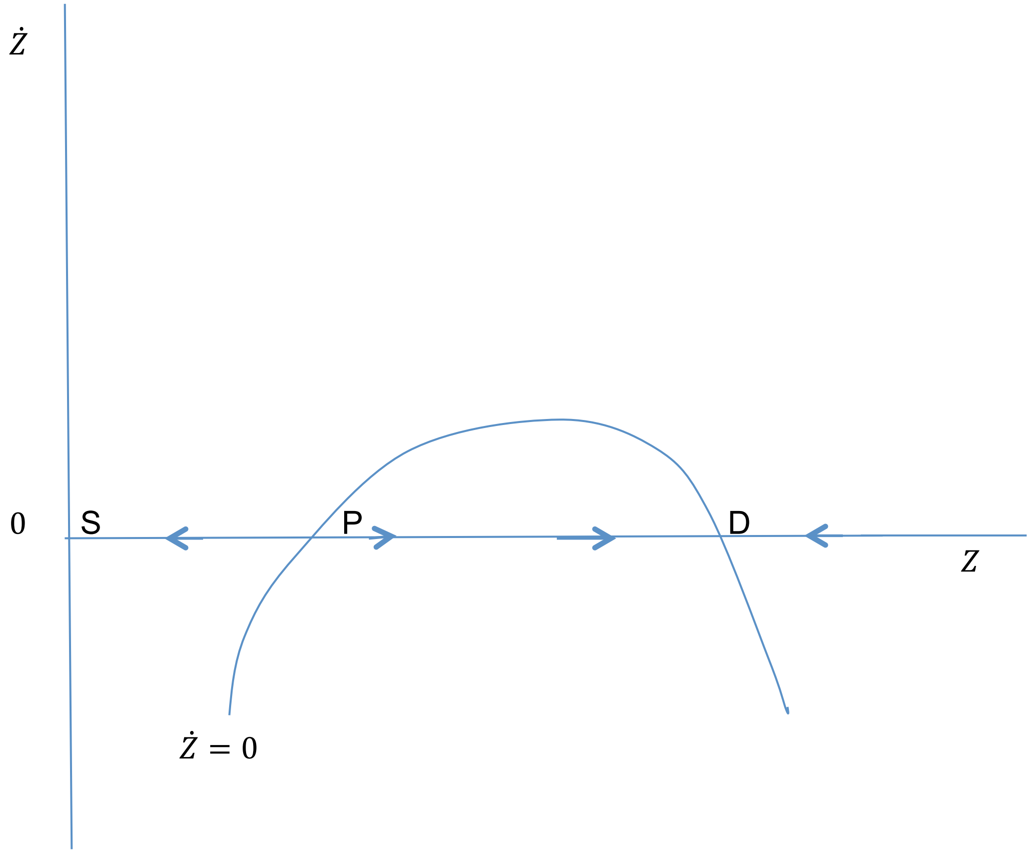

Figure 4: Unstable Pasinetti steady state at point P. Stable “dual” (Samuelson-Modigliani) and “anti-dual”(Darity) steady states at points S and D respectively.