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The principle of effective demand – Marx, Kalecki, Keynes and beyond

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The principle of effective demand – Marx, Kalecki, Keynes and beyond*

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Abstract: The principle of effective demand, and the claim of its validity for a monetary production economy in the short and in the long run, is the core of heterodox macroeconomics, as currently found in all the different strands of post-Keynesian economics (Fundamentalists, Kaleckians, Sraffians, Kaldorians, Institutionalists) and also in some strands of neo-Marxian economics, particularly in the monopoly capitalism and underconsumptionist school In this contribution, we will therefore outline the foundations of the principle of effective demand and its relationship with the respective notion of a capitalist or a monetary production economy in the works of Marx, Kalecki and Keynes. Then we will deal with heterodox short-run macroeconomics and it will provide a simple short-run model which is built on the principle of effective demand, as well as on distribution conflict between different social groups (or classes): rentiers, managers and workers. Finally, we will move to the long run and we will review the integration of the principle of effective demand into heterodox/post-Keynesian approaches towards distribution and growth.

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Key words: Effective demand, employment, distribution, growth, Marx, Kalecki, Keynes

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1. Introduction

The rejection of Say's Law, and hence of the notion that there are no other long-run limits to output and growth than those given by productive capacities, unites several strands of heterodox macroeconomic theory. As Keynes (1979) in the drafts leading to the *General Theory* (1936) masterly made clear, Say's law can only be assumed to hold in a 'barter economy', where aggregate demand and aggregate supply cannot deviate, in a 'real-wage' or 'cooperative economy', where 'money' is only used as a means of exchange but not as a store of value, or in a 'neutral economy', where there is a market mechanism, such as the real or commodity rate of interest in the neoclassical capital market, which makes sure that the part of income saved and hence not spent by households for consumption purposes is spent by firms for investment purposes. However, in a 'monetary' or 'entrepreneur economy', and hence 'in the world in which we live', there may be leakages from the circuit of income (i.e. saving) which are not exactly compensated for by injections (i.e. investment) of the same amount, and aggregate demand may systematically deviate from aggregate supply. Therefore, output and growth are determined by aggregate demand, and thus adjust towards the latter, in the short and in the long run.

The principle of effective demand, and the claim that economic activity in a monetary production economy is demand determined, is therefore the core of heterodox macroeconomics, as currently found in all the different strands of post-Keynesian economics, which encompass the Fundamentalists, the Kaleckians, the Sraffians, the Kaldorians, and the Institutionalists (Lavoie 2014, Chapter 1) and also in some strands of neo-Marxian economics, particularly in the monopoly capitalism and underconsumptionist school (Foster 2014, Foster/McChesney 2012). The foundations of the principle of effective demand cannot only draw on Keynes's contributions, but can already be found in Marx's and Kalecki's work, in particular, where they are closely linked with the notion of distribution conflict between classes or social groups. In the second section of this contribution we will therefore outline the foundations of the principle of effective demand and its relationship with the respective notion of a capitalist or a monetary production economy in the works of Marx, Kalecki and Keynes. The third section will then provide a simple short-run macroeconomic model which is built on the principle of effective demand, as well as on distribution conflict between different social groups (or classes): rentiers, managers and workers. The section will provide a kind of workhorse model on which many heterodox macroeconomists might agree. In the fourth section we will move to the long run and we will review the integration of the principle of effective demand into heterodox/post-Keynesian approaches towards distribution and growth. The fifth and final section will briefly summarise and conclude.

2. The rejection of Say's law and the principle of effective demand in Marx, Kalecki and Keynes

The rejection of Say's law and its replacement by the principle of effective demand in the works of Marx, Kalecki and Keynes is based on their respective views of capitalist economies as monetary production economies. Following Schumpeter's (1954, pp. 277-278) distinction, all three contributions can be classified as following 'monetary analysis' – as opposed to 'real analysis':

> '(…) Monetary Analysis introduces the element of money on the very ground floor of our analytical structure and abandons the idea that all essential features of economic life can be represented by a barter-economy model. Money prices, money incomes, and saving and investment decisions bearing upon these money incomes, no longer appear as expressions – sometimes convenient, sometimes misleading, but always nonessential – of quantities of commodities and services and of exchange ratios between them: they acquire a life and an importance of their own, and it has to be recognized that essential features of the capitalist process may depend upon the "veil" and that the "face behind it" is incomplete without it.' (Schumpeter 1954, p. 278)

We will review Marx's, Kalecki's and Keynes's rejections of Say's law based on their respective monetary analyses and their views on the principle of effective demand in turn.

2.1 Karl Marx[1]

In *Capital, Volume I*, Karl Marx (1867, pp. 97-144) discusses three principal roles of money: money as a standard of value, money as a means of circulation and 'money as money', including money as a store of value, as a means of payment and as universal money. Money as a medium of circulation means that the succession of sales (C-M) and purchases (M-C) in the circuit C-M-C (commodity – money – commodity) of simple commodity production is interrupted. This function of money provides Marx with the first argument to explicitly reject Ricardo's version of Say's law in his *Theories of Surplus Value* and it constitutes Marx's 'possibility theory of crisis' (Marx 1861-63, pp. 499-508).[2] In the 'possibility theory of crisis' the existence and the use of money is the reason why a general crisis of overproduction *may* occur; it is not yet an explanation why an actual crisis *will* occur.[3] Since 'money as money' includes its potential to

[1] This section draws on Hein (2008, pp. 16-29).

[2] Ricardo's version of Say's law differs from the neoclassical version, because it is neither associated with full employment of labour nor is there an economic mechanism equating saving and investment. Ricardo's version of Say's law simply implies that saving and investment are identical (Garegnani 1978, 1979).

[3] On Marx's rejection of Say's law in the formulation of Ricardo and the 'possibility theory of crisis' as opposed to a theory of the actual crisis see more explicitly Kenway (1980) and Sardoni (1987, pp. 26-36, 2011, pp. 11-23).

function as a store of value (hoarding), an increase in the willingness to hoard causes a lack of aggregate demand for the economy as a whole and may therefore trigger a general crisis. Of course, this will only hold true if the demand for holding money does not constitute a demand for production and output. If money were a produced commodity, an increase in the demand for money would not generate a deficiency of aggregate demand. Therefore, money cannot be a reproducible commodity – a conclusion Marx did not seem to be aware of, because he built his theory of money on the assumption of a money commodity, i.e. gold.

For Marx, a second argument against Say's law derives from the function of money as a means of payment (Marx 1861-63, p. 511). Money functions as a means of payment when the sale of a commodity and the realisation of its price are separated. The seller becomes a creditor, the buyer a debtor, and money is the standard and the subject of a creditor-debtor-contract. In such a system, on the one hand, the demand for commodities is no longer limited by income created in production. On the other hand, money as a means of payment increases the vulnerability and fragility of the system. Capitalists do not only have to find appropriate demand for their produced commodities, but they have to find it within a certain period of time in order to be able to meet their payment obligations. If there are unanticipated changes in market prices for final products between the purchase of a commodity as an input for production and the sale of the final product, capitalists may be unable to meet their payment commitments. Default of individual units of capital may interrupt credit chains and cause a general crisis.[4]

The rejection of Say's law and its necessary replacement by a theory of effective demand as well as the need for endogenous money for the expansion of capitalist economies also become clear in Marx's discussion of simple and expanded reproduction in *Capital*, Vol. II (Marx 1885, pp. 396-527). In the schemes of reproduction Marx analyses the conditions for capitalist reproduction in a two-sector model without foreign trade and economic activity by the state. Sector 1 produces means of production and sector 2 produces means of consumption. The supply price of each sector is given by constant capital costs expended in production (K_c), wage costs (W) and normal profits (Π), either determined by the rate of surplus value, if relative prices are determined by labour values, or by the general rate of profit for the economy as a whole, if relative prices are determined by prices of production. The demand for output of sector 1 consists of gross investment (I^g) in constant capital of both sectors while the demand for output of sector 2 consists of consumption demand out of profits (C_Π) and out of wages (C_w). For the values of aggregate demand and aggregate supply we therefore have:

$$(1) \qquad K_{c1} + W_1 + \Pi_1 + K_{c2} + W_2 + \Pi_2 = I_1^g + I_2^g + C_{W1} + C_{W2} + C_{\Pi1} + C_{\Pi2}.$$

[4] The role of credit in economic crises is explored in more detail by Marx in *Capital, Vol. III* (Marx 1894, pp. 476-519), where he shows that the credit system may exacerbate economic crises.

Assuming that wages in the long run and for the workers' class as a whole are completely spent on consumption goods, and hence $W_1 + W_2 = C_{W1} + C_{W2}$, we get:

(2) $\Pi_1 + \Pi_2 = I_1 + I_2 + C_{\Pi 1} + C_{\Pi 2}$,

where $I = I^g - K_c$ denotes net investment. From this, Kalecki's (1968) interpretation of Marx's schemes of reproduction arises: As capitalists cannot determine their sales and their profits but can only decide about their expenditures on investment and consumption goods, these expenditures have to ensure that *produced* profits will become *realised* profits. Therefore, net investment determines saving (S) in Marx's schemes of reproduction:

(3) $S = S_1 + S_2 = \Pi_1 - C_{\Pi 1} + \Pi_2 - C_{\Pi 2} = I_1 + I_2 = I$.

The capitalists' investment and consumption thus determine their aggregate profits – it is the capitalists who have to advance the required amount of money in order to realise their 'produced' and expected profits. A realisation failure, the inability to sell commodities at predetermined prices, may occur if there is insufficient investment or consumption demand by capitalists. Aggregate supply will then exceed aggregate demand and the economy will suffer from unused productive capacity and unemployment, and hence from a crisis.

Whether Marx's principle of effective demand provides the conditions for an underemployment equilibrium, or a state of rest, is a matter of debate. Whereas Sardoni (1987, 2011) argues that Marx's microeconomics only allow for dynamic disequilibrium processes, Hein (2004, 2006) claims that Marx's contributions are, in principle, consistent with an underemployment equilibrium or state of rest of the post-Keynesian/Kaleckian type, which we will discuss below. Here is not the place to go deeper into this matter – and we therefore turn to Kalecki's and Keynes's contributions in the next sections.

2.2 Michal Kalecki[5]

Michal Kalecki did not elaborate on the monetary and financial system of a capitalist economy in any systematic way (Sawyer 2001a, 2001b). But his 'laconic' (Sawyer 2001a, p. 487) writings on the subject are perfectly compatible with post-Keynesian endogenous money and credit theory, as several authors claim (Arestis 1996b, Dymski 1996, Lopez 2002, Sawyer 1985, pp. 88-107, 2001a, 2001b): In two early papers, Kalecki (1932, 1969, Chapter 3) supposes that an economic expansion requires the simultaneous expansion of the volume of credit as a precondition to allow for financing of increasing production and investment, independently of

[5] This section partly draws on Hein (2014, pp. 192-199).

prior saving. The volume of credit is determined by credit demand, and the banking sector is capable of supplying the required amount of credit at a given rate of interest. Therefore, Kalecki follows the post-Keynesian causality in monetary theory: Credit demand determines credit supply, generating deposits with the commercial banks and making credit money an endogenous variable which is determined by credit creation and repayment. The rate of interest is a monetary category, mainly under the control of the monetary authorities and the banking sector, which is exogenous to the income generating process.

Based on these monetary foundations and by also taking into account Kalecki's determination of functional income distribution by mark-up pricing on roughly constant unit variable costs up to full capacity output (Kalecki 1954, chapters 1-2, 1971, chapters 5-6, Hein 2014, chapter 5.2), we can outline Kalecki's theory of effective demand following the elaborations in Kalecki (1954, Chapter 3; 1971, Chapter 7). Assuming a closed economy without government activity, production takes place in three departments of the economy: Department 1 produces investment goods, department 2 consumption goods for capitalists, and department 3 consumption goods for workers. Each department is vertically integrated, and hence produces all required raw materials and intermediate products within the department. Total national income (Y) is divided between workers and capitalists. Workers receive wages (W) and capitalists receive profits (Π), including retained earnings, dividends, interest and rent. Since the national product is equal to the sum of investment expenditures (I), consumption out of profits (C_Π) and consumption out of wages (C_W), it follows that:

$$(4) \qquad Y = W + \Pi = C_W + C_\Pi + I .$$

The respective price levels for consumption goods and investment goods and the weighted average price level for aggregate output are determined by mark-up pricing in incompletely competitive goods markets. Marginal and average variable costs which are marked up by firms are constant up to full capacity output, and prices are hence constant as long as the sectors of the economy operate below full capacity utilisation. Subtracting wages from both sides of equation (4), we obtain:

$$(5) \qquad \Pi = C_\Pi + I - S_W .$$

Profits are thus equal to consumption out of profits plus investment minus saving out of wages ($S_W = W - C_W$). If workers do not save and rather spend their income entirely on consumption goods ($W = C_W$), equations (4) and (5) become:

$$(6) \qquad \Pi = C_\Pi + I .$$

Profits are thus equal to consumption out of profits plus investment in capital stock. Kalecki reads the causality of this equation from right to left: The individual capitalists are not able to decide on the amount of their respective profits, but solely on their expenditures on consumption and investment goods.

> 'Now, it is clear that capitalists may decide to consume or to invest more in a given period than in the preceding one, but they cannot decide to earn more. It is, therefore, their investment and consumption decisions which determine profits, and not vice versa.' (Kalecki 1954, p. 46; 1971, pp. 78-79)

With given prices, the expenditures of workers determine the output of department 3 producing consumption goods for workers, whereas the expenditures of the capitalists determine the outputs of departments 1 and 2, producing investment goods and consumption goods for capitalists, respectively. The value of the output of department 3 is equal to the sum of wages, and the value of the outputs of departments 1 and 2 is equal to total profits in the economy. It should not come as a surprise that Kalecki's results so far do not diverge from those of Marx, because Kalecki's considerations are based on Marx's schemes of reproduction in *Capital, Vol. II* (Marx 1885, pp. 396-527).

We can further elaborate on Kalecki's approach, following Kalecki (1954, Chapter 3; 1971, Chapter 7) and assuming that capitalists' consumption expenditures are proportional to profits, ignoring the stable or autonomous part included in Kalecki's reasoning as well as any time lags. Therefore, we obtain the following simple function for consumption out of profits, with c_Π representing the constant marginal and hence average propensity to consume out of profits:

$$(7) \qquad C_\Pi = c_\Pi \Pi, \qquad 0 \leq c_\Pi < 1 .$$

Inserting equation (7) into equation (6) yields the following determination of the equilibrium level of profits in the economy as a whole:

$$(8) \qquad \Pi = \frac{I}{1 - c_\Pi} = \frac{I}{s_\Pi}, \qquad 0 \leq c_\Pi < 1,\ 0 < s_\Pi \leq 1 .$$

Profits are thus determined by capitalists' investment in capital stock and by the propensity to consume or the propensity to save out of profits ($s_\Pi = 1 - c_\Pi$). As equation (8) shows, we arrive at a first Kaleckian multiplier, which contains the sum of profits realised by the firms as a multiple of their investment expenditures. Since income distribution and hence the share of profits in national income is mainly determined by the mark-up in firms' price setting, the change in profits takes place through a change of aggregate production, thus the degree of

utilisation of the capital stock, and in national income. Taking into account that the share of gross profits in national income is defined as $h = \Pi / Y$, equation (8) becomes:

$$(9) \qquad Y = \frac{I}{(1 - c_\Pi)h} = \frac{I}{s_\Pi h}, \qquad 0 \leq c_\Pi < 1,\ 0 < s_\Pi \leq 1 .$$

Equation (9) displays a second Kaleckian multiplier, linking capitalists' investment expenditures with GDP and national income. The multiplier effect of exogenous investment expenditures depends inversely on the propensity to save out of profits and the profit share in national income. Therefore, the Kaleckian approach contains both a 'paradox of saving': an increase in the propensity to save lowers profits and national income, and a 'paradox of costs': a higher profit share and a lower wage share are detrimental to GDP and national income without affecting the sum of profits.[6]

2.3 John Maynard Keynes[7]

John Maynard Keynes's research programme of a 'monetary theory of production' is at the very root of his 'principle of effective demand'. In particular, the drafts preceding the *General Theory* (Keynes 1979), but less so the *General Theory* (Keynes 1936) itself, aim at providing a 'monetary theory of production', which Keynes in his 1933 contribution to the Spiethoff-Festschrift outlines as follows:

> 'In my opinion the main reason why the problem of crises is unsolved, or at any rate why this theory is so unsatisfactory, is to be found in the lack of what might be termed a *monetary theory of production*. The distinction which is normally made between a barter economy and a monetary economy depends upon the employment of money as a convenient means of effective exchanges – as an instrument of great convenience, but transitory and neutral in its effects. It is regarded as a mere link between cloth and wheat (…). It is not supposed to affect the essential nature of the transaction from being, in the minds of those making it, one between real things, or to modify the motives and decisions of the parties to it. Money, that is to say, is employed, but is treated as being in some sense *neutral*. That, however, is not the distinction which I have in mind when I say that we lack a monetary theory of production. An economy, which uses money but uses it merely as a neutral link between transaction in real things and real assets and does not allow it to enter into motives or decisions, might be called – for want of a better name – a *real-exchange economy*. The theory which I desiderate would deal, in

[6] See Hein (2014, pp. 198-199) for an extension including a government and an external sector.

[7] This section partly draws on Hein (2008, pp. 30-43)

> contradiction to this, with an economy in which money plays a part of its own and affects motives and decisions and is, in short, one of the operative factors in the situation, so that the course of events cannot be predicted, either in the long period or in the short, without a knowledge of the behaviour of money between the first state and the last. And it is this which we ought to mean when we speak of a *monetary economy*.' (Keynes 1933, pp. 408-409; italics in the original)

In the drafts of the *General Theory,* Keynes distinguishes a monetary economy from a barter economy, a real-wage or co-operative economy, and a neutral economy (Keynes 1979, pp. 76-101).[8] In the barter economy there cannot be any deviation of aggregate demand from aggregate supply, because in real exchange nobody can sell without buying simultaneously and demand is hence always equal to supply by definition. In the real-wage or co-operative economy, economic agents make use of money, but only as means of exchange in order to facilitate trade and the allocation of the social product. Therefore, there are no leakages from the monetary circuit and aggregate demand always equals aggregate supply. In the neutral economy, money may additionally be used as a store of value and there may hence be leakages from the monetary circuit. However, these leakages are exactly offset by injections of the same amount through an endogenous economic process, and aggregate demand therefore corresponds to aggregate supply.[9] In a monetary or entrepreneur economy, however, there may be leakages from the monetary circuit which are not exactly compensated for by injections, aggregate demand may therefore deviate from aggregate supply, and the latter will have to adjust to the former. Say's law will therefore not hold, mainly for two reasons:

First, income may be used by households for other purposes than direct spending on consumption goods. It is the specific nature of money which may then cause leakages from the monetary circuit and may hence be responsible for insufficient aggregate demand: Money can neither be fully substituted nor can it be reproduced by means of employing factors of production.

> 'Perhaps anything in terms of which the factors of production contract to be remunerated, which is not and cannot be a part of current output and is capable of being used otherwise than to purchase current output, is, in a sense, money. If so, but not otherwise, the use of money is a necessary condition for fluctuations in effective demand.' (Keynes 1979, p. 86)

[8] See also Bertocco (2005), Fontana/Gerrard (2002), and Rotheim (1981, 1991).

[9] In a neoclassical model this endogenous mechanism is the real rate of interest in the capital market which is supposed to equilibrate real saving and real investment.

Second, monetary injections may not automatically offset monetary leakages from the circuit of incomes. In a modern credit economy, monetary injections are independent of current income. They may hence be insufficient to make aggregate demand equal to aggregate supply at full employment. In particular, firms' production and investment decisions are geared towards monetary profits, and firms' spending for investment purposes may therefore be insufficient for full employment:

> 'The distinction between a co-operative and an entrepreneur economy bears some relation to a pregnant observation made by Karl Marx, - though the subsequent use to which he put this observation was highly illogical. He pointed out that the nature of production in the actual world is not, as economists seem often to suppose, a case C-M-C', i.e. of exchanging commodity (or effort) for money in order to obtain another commodity (or effort). That may be the standpoint of the private consumer. But it is not the attitude of *business*, which is a case of M-C-M', i.e. of parting with money for commodity (or effort) in order to obtain more money. (…) An entrepreneur is interested, not in the amount of product, but in the amount of *money* which will fall to his share.' (Keynes 1979, pp. 81-82, emphasis in the original)

From these considerations it follows that the long-run level of output and employment in a monetary economy is not determined by available resources, but by effective demand. And an important part of effective demand, investment, is determined by monetary criteria: Entrepreneurs have to achieve a minimum rate of return on monetary advances, which is given by a monetary rate of interest. In a monetary economy, Say's law is therefore replaced by the principle of effective demand. Aggregate spending determines output and employment while investment, which itself is determined by monetary criteria, determines saving.

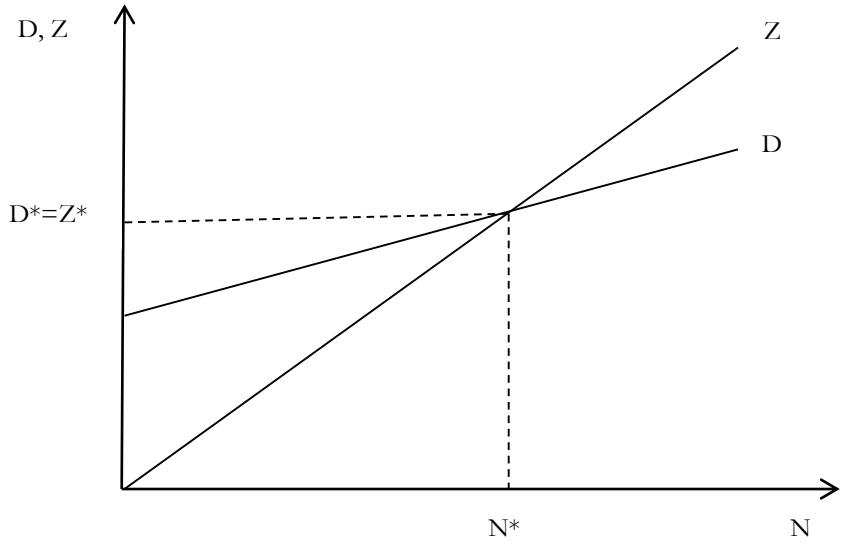
In Chapter 3 of the *General Theory*, Keynes (1936, pp. 23-34) explains the 'principle of effective demand' distinguishing the Aggregate Supply Function $[Z = Z(N)]$ and the Aggregate Demand Function $[D = D(N)]$. The Z-function represents the aggregate supply price of output as a function of employment (N). The supply price per unit of output (p) consists of unit production costs plus unit normal profits, and aggregate supply is then given by the level of employment and labour productivity ($y = Y^r / N$) in the following way:

(10) $Z = Nyp$.

The shape of the Z-function will therefore be affected by the technology of production determining the productivity of labour and by the price setting behaviour of firms affecting output prices. With constant marginal and hence average labour productivity and constant

nominal wage rates, and thus constant unit labour costs, as well as constant mark-ups, and therefore constant output prices, the Z-function will be linear, as in Figure 1.[10]

Figure 1: Keynes's (1936) 'principle of effective demand'



The D-function presents the proceeds expected by the entrepreneurs, also as a function of employment. In an economy in which Say's law is to hold, Z- and D-functions coincide, and the level of employment can then be determined by the neoclassical full employment labour market equilibrium based on utility maximising labour supply of households and profit maximising labour demand of firms.

> 'Thus Say's law, that the aggregate demand price of output as a whole is equal to its aggregate supply price for all volumes of output, is equivalent to the proposition that there is no obstacle to full employment.' (Keynes 1936, p. 26)

In a monetary production economy, however, aggregate demand may diverge from aggregate supply, as explained above, and the D-function will hence be different from the Z-function, and this will give rise to the principle of effective demand. As Davidson (2001, p. 393, emphasis in the original) puts it:

[10] In Keynes (1936), we do not find any figure on the principle of effective demand. Keynes (1936), however, assumes a falling marginal productivity of labour, which induced Asimakopulos (1991, Chapter 3.5), Chick (1983, Chapter 4) and Davidson (2011, Chapter 2) to derive a progressively rising Z-curve in their presentations. Davidson (2001) and Setterfield (2012), however, suggest a linear Z-curve, as the one we apply and explain here.

'This difference in the behavioural determinants of aggregate demand vis-à-vis aggregate supply is, I believe, what Keynes meant by the principle of effective demand in a *general* theory of employment, interest and *money*.'

With Keynes (1936, pp. 28-32) we can distinguish two components of the D-function: a first which is affected by income, i.e. income-dependent consumption (C), and a second which is independent of income, i.e. autonomous or exogenous investment (I). For the first component, we can assume a constant marginal propensity to consume out of income for the economy (c) as a whole, which is positive but below unity. Note that total nominal income is given by employment, labour productivity and the price level ($Y = Y^r p = Nyp$). Aggregate demand is hence:

(11) $D = c(Nyp) + I, \qquad 0 < c < 1.$

The point of intersection of the Z- and D-curves in Figure 1 is '*the effective demand*' (Keynes 1936, p. 25, emphasis in the original). Aggregate demand at this level of employment is exactly equal to aggregate supply, and firms can sell the level of output associated with this level of employment at the expected or required prices. For this equilibrium level of employment (N*) we have:

(12) $Z(N^*) = D(N^*),$

and hence:

(13) $N^* = \frac{I}{(1-c)yp}.$

An increase in investment (or any other autonomous demand aggregate, like income-independent consumption, government expenditures or exports) will raise the equilibrium level of employment. The same is true for an increase in the propensity to consume out of income – and we have the paradox of saving again.

Recently, in particular Allain (2009, 2013), Hartwig (2007, 2013) and Hayes (2007, 2013) have discussed the precise meaning of the aggregate demand function and the point of 'effective demand' in Keynes's theory. They insist that the aggregate demand function refers to firms' expected demand and not to actual demand and discuss different adjustment processes (Allain/Hartwig/Hayes 2013). Here is not the place to go into this discussion, because in the goods market equilibrium, expected and actual demand have to coincide, and in what follows we will confine ourselves to the discussion of the determinants of the goods market equilibrium according to the principle of effective demand.

As can easily be seen, our derivation of equilibrium employment in the D-Z-model can be translated into equilibrium income from the well-known textbook income-expenditure model, because from equation (13) we also get:

$$(14) \qquad Y^{*} = (Nyp)^{*} = \frac{I}{(1-c)},$$

with Y* as equilibrium income and $(1/(1-c))$ as the income multiplier for investment.

The volume of employment determined by the point of effective demand in Figure 1 and by equation (13) may well deviate from full employment in the labour market. However, any response in the labour market, i.e. any change in nominal wages affecting output prices, real wages and/or income distribution, will only have an impact on employment through aggregate demand and aggregate supply in the goods market. For a closer examination of the features and determinants of the goods market equilibrium, we will therefore outline a simple short-run macroeconomic model in the following section.

3. A simple post-Keynesian/Kaleckian short-run macroeconomic model based on the principle of effective demand

The post-Keynesian/Kaleckian short-run macroeconomic model to be outlined in this section provides an endogenous determination of investment, income and profits. It includes some monetary and financial variables, i.e. a stock of debt and a monetary rate of interest, which seems to be required for a model driven by effective demand, and it explicitly considers functional income distribution.

In the closed economy model without a government, homogeneous output is produced with a constant fixed coefficient production technology, using labour and a non-depreciating capital stock as inputs. Workers receive wages which are consumed entirely and firms receive profits. These profits are partly retained in the firms, and hence saved, and partly distributed to rentiers in terms of interest payments. Rentiers consume part of their income and save the rest. Long-term finance of the capital stock consists of accumulated retained earnings of the firms, on the one hand, and external finance in terms of long-term credit granted by rentiers, on the other hand. The capital stock, as well as the stock of debt and the stock of accumulated retained earnings, are treated as constants in our short-run macroeconomic model – for an analysis of the long-run dynamics of these variables in distribution and growth models based on similar foundations, see for example Hein (2008, Chapter 13, 2014, Chapter 9).

Firms have some price setting power and they determine prices in the goods market by applying a mark-up (m) to unit labour costs, the ratio of the nominal wage rate and labour productivity, which are assumed to be constant up to full capacity output:

$$(15) \qquad p = [1 + m(i)]\frac{w}{y}, \qquad m \geq 0, \frac{\partial m}{\partial i} \geq 0.$$

The mark-up is affected by the degree of competition in the goods market and the bargaining power of workers in the labour market, which each constrain the price setting power of the individual firm (Kalecki 1954, Chapter 1, Hein 2014, Chapter 5.2). Furthermore, apart from profits, the mark-up has to cover overhead costs and is thus potentially affected by changes in interest costs. With the stock of debt of the firms given in the short run, a change in the rate of interest will induce an upwards pressure on the mark-up, in particular if it is associated with weakened bargaining power of workers and/or a lower degree of competition in the goods market. The rate of interest in our model is a monetary category, with the short-term rate determined by central bank policies and the long-term rate also affected by liquidity and risk assessments of financial wealth holders (Lavoie 2014, Chapter 5). The relevant rate of interest in our model is the long-term rate of interest corrected for inflation, which we will call the real rate of interest (i).

The mark-up determines the profit share in national income, which is therefore affected by any changes in the determinants of the mark-up, including a change in the real rate of interest:

$$(16) \qquad h = \frac{\Pi}{Y} = \frac{m(i)}{1 + m(i)}.$$

Saving consists of retained earnings of firms, the difference between total profits and rentiers' income (R), and saving out of rentiers' income (S_R):

$$(17) \qquad S = \Pi - R + S_R = hY - (1 - s_R)iB, \qquad 1 \geq s_R > 0.$$

Rentiers' income is determined by the rate of interest and the stock of debt (B), and the propensity to save our rentiers income (s_R) is assumed to be positive and constant.

In a monetary production economy, investment of firms is independent of any prior saving in the economy, because firms have access to finance generated endogenously by the financial sector.[11] The investment function proposed here contains Keynesian and Kaleckian

[11] See Hein (2008, Chapter 10) for a more detailed discussion distinguishing 'initial finance' and 'final finance', based on a monetary circuit approach in the tradition of Graziani (1989, 1994) and Seccareccia (1996, 2003) and others.

features.[12] First, following Keynes (1936), we assume that investment decisions of firms are determined by long-term expectations and by 'animal spirits', the 'spontaneous urge to action rather than inaction' (Keynes 1936, p. 161), which are represented by a shift parameter I_a in equation (18). Second, investment is affected by (expected) sales and hence income, represented by the accelerator term βY. And third, we have included a negative effect of the rate of interest and interest payments on investment, represented by $-\theta iB$. Although a negative effect of the rate of interest on investment decisions is in line with Keynes's theory of investment based on the marginal efficiency of capital and the rate of interest, here we rely more on Kalecki's (1937) concept of the 'principle of increasing risk. Higher interest payments have a negative effect on investment, because they reduce the firms' own means of finance, which are important because access to external means in incomplete financial markets is constrained. The amount of own means of finance of the firm is usually a criterion for creditworthiness and thus impacts the amount of external finance a firm can raise. Furthermore, a drain of internal means of finance increases the risk of illiquidity of the firm relying on external finance and thus dampens the willingness to invest in the capital stock. Given these considerations, we arrive at the following investment function:

(18) $\quad I = I_a + \beta Y - \theta iB, \qquad I_a, \beta, \theta \geq 0$

Equation (19) presents the goods market equilibrium condition, the equality of investment and saving, and in equation (20) we have the Keynesian stability condition:

(19) $\quad I = S,$

(20) $\quad \dfrac{\partial S}{\partial Y} > \dfrac{\partial I}{\partial Y} \Rightarrow h - \beta > 0.$

The goods market equilibrium values for income, investment (as well as saving) and profits can be found in equations (21), (22) and (23). The effects of changes in the propensity to save out of rentiers' income, the profit share and the real rate of interest on the equilibrium values are also shown below:

(21) $\quad Y^* = \dfrac{I_a + (1 - s_R - \theta) iB}{h - \beta},$

(21a) $\quad \dfrac{\partial Y^*}{\partial s_R} = \dfrac{-iB}{h - \beta} < 0,$

[12] On the differences between Kalecki's and Keynes's investment theories see Lopez G. (2002), and on the problems regarding Keynes's determination of equilibrium investment by the marginal efficiency of capital and the rate of interest, see Kalecki (1936) and Sardoni (2011, Chapter 6). On Kalecki's theories of investment, see Steindl (1981), Sawyer (1985, Chapter 3), Lopez G./Assous (2010, Chapter 5) and Hein (2014, Chapter 5.6).

(21b) $$\frac{\partial Y^*}{\partial h} = \frac{-\left[I_a + (1 - s_R - \theta) i B\right]}{(h - \beta)^2} = \frac{-Y^*}{h - \beta} < 0,$$

(21c) $$\frac{\partial Y^*}{\partial i} = \frac{(1 - s_R - \theta) - Y^* \frac{\partial h}{\partial i}}{h - \beta},$$

(22) $$I^* = S^* = \frac{I_a h + \left[\beta(1 - s_R) - \theta h\right] i B}{h - \beta},$$

(22a) $$\frac{\partial I^*}{\partial s_R} = \frac{-\beta i B}{h - \beta} < 0,$$

(22b) $$\frac{\partial I^*}{\partial h} = \frac{-\theta i B - I^*}{h - \beta} < 0,$$

(22c) $$\frac{\partial I^*}{\partial i} = \frac{\left[\beta(1 - s_R) - \theta h\right] B - \beta Y^* \frac{\partial h}{\partial i}}{h - \beta},$$

(23) $$\Pi^* = \frac{h\left[I_a + (1 - s_R - \theta) i B\right]}{h - \beta},$$

(23a) $$\frac{\partial \Pi^*}{\partial s_R} = \frac{-h i B}{h - \beta} < 0,$$

(23b) $$\frac{\partial \Pi^*}{\partial h} = \frac{-\beta}{(h - \beta)^2} < 0,$$

(23c) $$\frac{\partial \Pi^*}{\partial i} = \frac{(1 - s_R - \theta) h B - \frac{\beta}{h - \beta} \frac{\partial h}{\partial i}}{h - \beta}.$$

As can easily be seen from equations (21), (22) and (23), an increase in long-term expectations and animal spirits (or in autonomous deficit financed expenditures by the government or an external sector in a more elaborated model) will have expansionary effects on all endogenous variables. From equations (21a), (22a) and (23a) we observe that an increase in the propensity to save out of rentiers' income reduces equilibrium income, investment and profits; the paradox of saving is thus valid with respect to all three endogenous variables. A rise in the profit share will have negative effects on equilibrium income, investment and profits, as is obvious from equations (21b), (22b) and (23b). This is the 'paradox of costs' (Rowthorn 1981): lowering the real wage rate and the wage share, and thus increasing the profit share is detrimental to aggregate profits.

Finally, a change in the real interest rate has ambiguous effects on the equilibrium values of the model, as can be seen in equations (21c), (22c) and (23c). If the mark-up is interest-inelastic and the propensity to consume out of rentiers' income exceeds the marginal effect of internal funds on investment ($1 - s_R - \theta > 0$), a higher interest rate will trigger higher equilibrium values for income and profits. A positive effect on equilibrium investment would also require a strong accelerator effect of income on investment decisions. This constellation is known as the 'puzzling case' (Lavoie 1995). Even when a change in the interest rate has only a mild impact on the mark-up and the profit share, which has dampening effects on equilibrium income, investment and profits, the 'puzzling case' effects may persist, in particular for equilibrium income and profits. With strong effects of a change in the interest rate on the profit share, the impact of a higher rate of interest on equilibrium income, investment and profits may turn negative. And if the 'normal case' (Lavoie 1995) conditions prevail, which means that the propensity to consume our of rentiers' income falls short of the marginal effect of internal funds on investment ($1 - s_R - \theta < 0$), a higher interest rate will trigger lower equilibrium values for income, profits and investment at any rate, irrespective of an interest-elastic or –inelastic profit share.

These are the principal features of the income generation process in a short-run macroeconomic model based on the principle of effective demand in a monetary production economy. They should also be at the core of more elaborated heterodox macroeconomic models, furthermore including the inflation generating process, and featuring the discussion of macroeconomic policies, i.e. monetary, fiscal and wage/incomes policies and their coordination, as shown for example in Hein/Stockhammer (2011).

4. The long-run principle of effective demand in heterodox distribution and growth models

As is well known, Cambridge Post-Keynesians were mainly concerned with extending Keynes's and Kalecki's principle of effective demand from the short period, with given productive capacities, to the long period applying it to distribution and growth issues (Harcourt 2006). Joan Robinson (1962, pp. 82-83) famously summarised the credo of post-Keynesian growth theories as follows:

> '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.'

Pasinetti (2001) also claimed that the principle of effective demand, and hence the notion that macroeconomic activity is demand determined, is of long-run nature and should hence also include changes in technology and the composition of demand. He further argued that the validity of the principle is independent of any specific institutions and market structures.[13]

Basically, we can distinguish two approaches applying the principle of effective demand to long-run growth and distribution:[14] There are the first generation post-Keynesian distribution and growth models by Nicholas Kaldor (1955/56, 1957, 1961) and Joan Robinson (1956, 1962) relying on flexible prices in the goods market and full utilisation of productive capacities given by the capital stock in the long run, or even also on full employment (Kaldor). In these models, in the long run, saving adjusts to investment through changes in income distribution and the profit share becomes endogenous with respect to capital accumulation. Alternatively, the second generation post-Keynesian models (Rowthorn 1981, Dutt 1984, Bhaduri/Marglin 1990, Kurz 1990) based on the works by Michal Kalecki (1954, 1971) and Josef Steindl (1952) contain cost-determined prices, which are inelastic with respect to demand, and variable rates of capacity utilisation (and employment). Also in the long run, saving adjusts to investment through changes in output growth and utilisation of growing productive capacities.

Starting from our model economy in the previous section, and ignoring the details on investment finance,[15] the principal differences between the two approaches can be explained as follows. By definition, the rate of profit (r) is given by the profit share, the rate of capacity utilisation (u) and the capital-potential output ratio (v):

$$(24) \qquad r = \frac{\Pi}{K} = \frac{\Pi}{Y}\frac{Y^r}{Y^p}\frac{Y^p}{K^r} = hu\frac{1}{v},$$

with K for the nominal capital stock, K^r for the real capital stock, Y for nominal output, Y^r for real output and Y^p for potential output.

With a fixed coefficient production technology (or with Harrod neutral technical change) the capital-potential output ratio is a constant:

$$(25) \qquad v = \bar{v}.$$

[13] "My claim is that the principle of effective demand belongs to a much more fundamental stage of investigation than the one at which most of Keynes's analysis was (and is) carried out. More precisely, my claim is that it belongs to a level of investigation that is independent of the particular institutions that any economic system may have chosen to adopt." (Pasinetti 2001, p. 386)

[14] For a detailed presentation and discussion of post-Keynesian distribution and growth models, see Hein (2014).

[15] For the integration of money, interest and finance into different versions of post-Keynesian distribution and growth models, see Hein (2008, 2014, Chapter 9).

Assuming the propensity to save out of wages to be zero, saving only draws on profits and we obtain for the saving-capital ratio or the saving rate (σ):

$$(26) \qquad \sigma = \frac{S}{K} = s_{\Pi} \frac{\Pi}{K} = s_{\Pi} h u \frac{1}{v}, \qquad 1 \geq s_{\Pi} > 0 .$$

The saving rate is thus determined by the propensity to save out of profits and the profit rate. Generally, the rate of capital accumulation (g) depends on long-term expectation and 'animal spirits' (α) and on the (expected) rate of profit, and hence on its constituting elements:

$$(27) \qquad g = \frac{I}{K} = g(\alpha, r) = g(\alpha, h, u, v), \ \frac{\partial g}{\partial \alpha} > 0, \frac{\partial g}{\partial r} > 0, \frac{\partial g}{\partial h} > 0, \frac{\partial g}{\partial u} > 0, \frac{\partial g}{\partial v} < 0 .$$

For the growth equilibrium in our demand-led growth model, we have:

$$(28) \qquad g = \sigma ,$$

and for the stability condition it follows:

$$(29) \qquad \frac{\partial \sigma}{\partial r} - \frac{\partial g}{\partial r} > 0 .$$

The closure of the first generation post-Keynesian models by Kaldor and Robinson assumes that in the long-run growth equilibrium firms utilise their productive capacities given by the capital stock at some exogenously given normal or target rate (u_n):

$$(30) \qquad u = u_n ,$$

so that the profit share becomes the accommodating variable. The equilibrium rates of capital accumulation and of profit, through a variable profit share, are then determined endogenously:

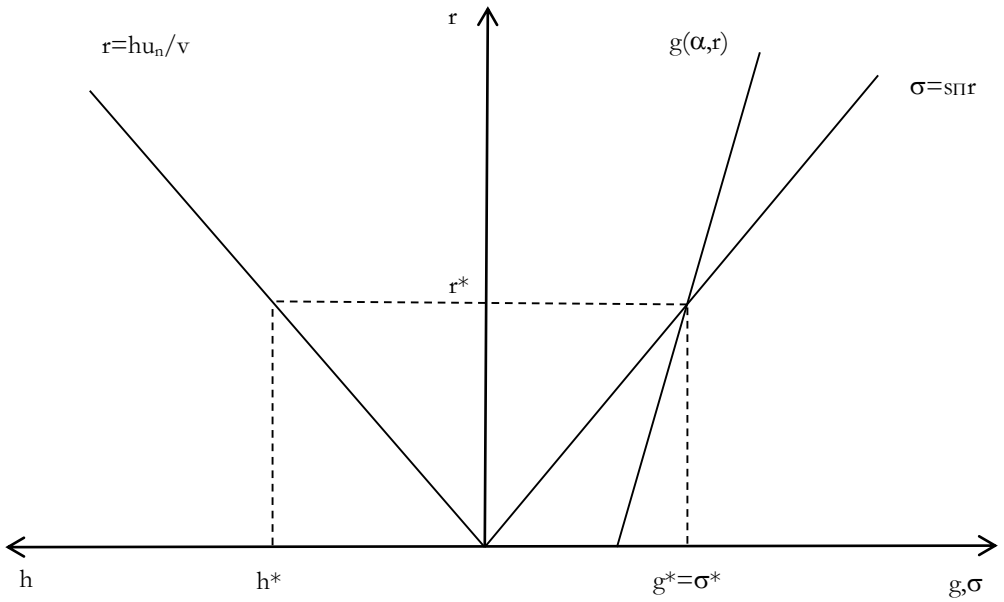
$$(31) \qquad r^* = \frac{g^*}{s_{\Pi}} ,$$

$$(32) \qquad h^* = \frac{g^*}{s_{\Pi} u_n \frac{1}{v}} .$$

Figure 2 displays the Kaldorian/Robinsonian post-Keynesian demand-led growth model. The g-σ equilibrium includes the determination of the equilibrium accumulation rate, saving rate, profit rate and hence profit share. An improvement in animal spirits, that is a shift of the g-function to the right, or a fall in the propensity to save out of profits, that is a counter clockwise rotation of the σ-function, will raise the equilibrium accumulation and growth rate as well as the profit rate and the profit share. Therefore, we have a long-run version of the paradox of saving in this model. However, the paradox of costs from the short-run model of the previous section has disappeared. Functional income distribution is not a parameter but an endogenous

variable, and the wage share is now inversely related to equilibrium accumulation and growth rates: A higher equilibrium accumulation and growth rate generates and requires a higher profit share and thus a lower wage share in national income.

Figure 2: The Kaldorian/Robinsonian post-Keynesian distribution and growth model



The closure of the second generation post-Keynesian distribution and growth models, the Kaleckian/Steindlian models, assumes that also in the long run, functional income distribution and hence the profit share are mainly determined by mark-up pricing of firms in the goods market, with the mark-up being affected by those variables outlined in the previous section:

(33) $h = h(m)$.

This means that the rate of capacity utilisation becomes an endogenous variable. The equilibrium rates of capital accumulation and of profit are again endogenously determined, but the latter now via a variable rate of capacity utilisation:

(34) $r^* = \frac{g^*}{s_\Pi}$,

(35) $u^* = \frac{g^*}{s_\Pi h \frac{1}{v}}$.

Figure 3 shows the Kaleckian/Steindlian variant of the post-Keynesian demand-led growth model. Here the g-σ equilibrium includes the determination of the equilibrium saving rate, accumulation rate, profit rate and rate of capacity utilisation. Again, a positive shift in animal spirits and a reduction in the propensity to save out of profits are expansionary and increase the equilibrium accumulation and growth rate, as well as the profit rate and the rate of capacity utilisation. On top of the paradox of saving, the Kaleckian/Steindlian model also allows for the paradox of costs in long-run growth. A lower profit share and thus a higher wage share will cause a counter clockwise rotation of the r-function in the left part of Figure 3, which will generate a higher equilibrium rate of capacity utilisation associated with the g-σ equilibrium in the right part. However, that is not where the story ends, because the Kaleckians explicitly include the components of the profit rate into their investment functions. The neo-Kaleckian variant, proposed by Rowthorn (1981) and Dutt (1984, 1987) in particular, includes a strong effect of the rate of capacity utilisation and neglects a direct effect of the profit share on investment decisions. Therefore any fall in the profit share will rotate the g-function clockwise, as in Figure 4, because each profit rate will then be associated with a higher rate of capacity utilisation. As an overall result of a lower profit share, we get a higher rate of accumulation and growth, a higher rate of profit and a higher rate of capacity utilisation in the new equilibrium. The paradox of cost is fully valid, and demand (capacity utilisation) and growth (capital accumulation) are unambiguously wage led. In the post-Kaleckian model, suggested by Bhaduri/Marglin (1990) and Kurz (1990), however, these results may change, because the profit share is included as a further determinant into the investment function. This will dampen the redistribution induced rotation of the g-function and may even reverse it. Therefore, different regimes may be derived, depending on the relative importance of capacity utilisation and profitability in the investment function, and on the propensity to save out of profit: 1. wage-led demand and wage-led growth, 2. wage-led demand and profit-led growth and 3. profit-led demand and profit-led growth (Hein 2014, Chapter 6).

Figure 3: The Kaleckian/Steindlian post-Keynesian distribution and growth model

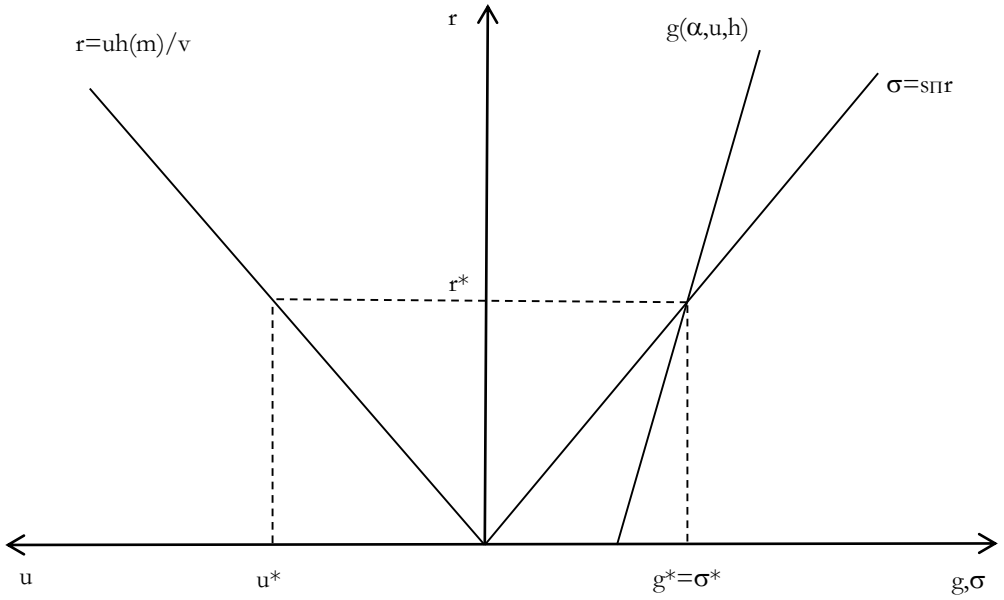
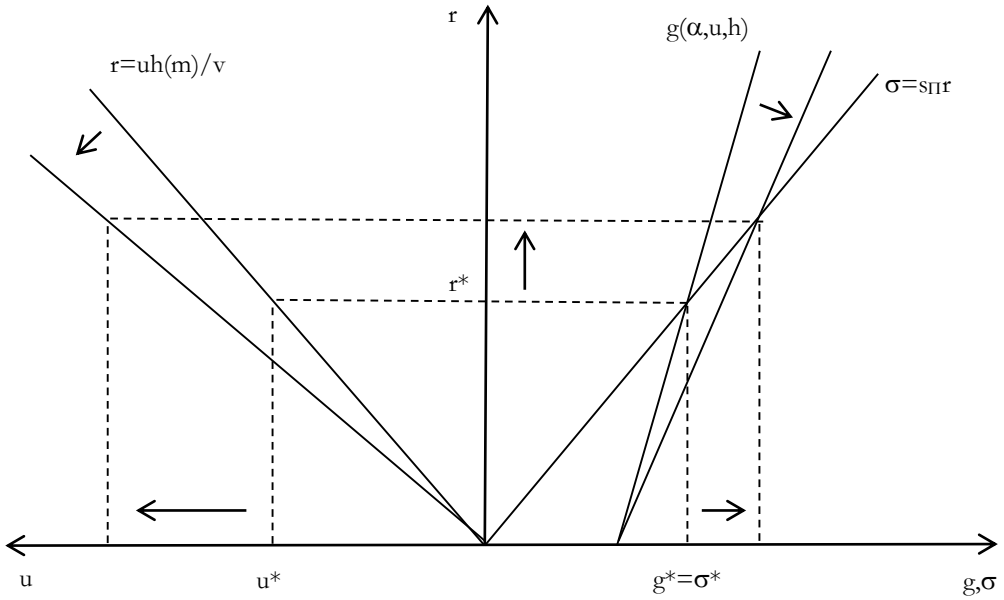


Figure 4: A reduction in the profit share in the neo-Kaleckian distribution and growth model



The Kaleckian treatment of the rate of capacity as an endogenous variable in long-run growth models, which may deviate from the normal or target rate of utilisation of firms, has been criticised by several Harrodian and Marxian authors, like Dumenil/Levy (1999), Shaikh (2009)

and Skott (2010, 2012).[16] Including an exogenous normal or target rate of utilisation into the Kaleckian models makes them prone to cumulative Harrodian instability, which then has to be contained by other mechanisms in the model, like an endogenous shift in income distribution and the respective change in the average propensity to save, or an endogenous change in animal spirits and thus in the inducement to invest. As a result, the paradox of costs completely disappears from the long-run equilibrium, and in several approaches even the paradox of saving vanishes, and thus the validity of the principle of effective demand. These approaches have been reviewed and criticised by Hein/Lavoie/van Treeck (2011). And Hein/Lavoie/van Treeck (2012) have discussed several Kaleckian responses to the critiques, either questioning the uniqueness of a target rate of capacity utilisation, as well as the ability of firms to realise utilisation targets when they are faced with other contradicting targets, or providing several mechanisms by means of which utilisation targets may become endogenous to actual capacity utilisation, and thereby retaining the paradox of saving and also the potential of a paradox of costs.

The determination of capital accumulation, growth and the rate of profit by the principle of effective demand, as outlined in this section, provides the foundations for more elaborated demand driven distribution and growth models. Several areas have been covered and can only be mentioned here:[17] the inclusion of an external sector generating export-led growth models (Kaldor 1970), the consideration of a balance of payments constraint to growth (Thirlwall 1979, Blecker 2013), the endogenous determination of technological progress and productivity growth (Kaldor 1957, 1961, Rowthorn 1981), the explicit integration and discussion of money, interest and credit (Dutt 1989, 1995, Lavoie 1995, Hein 2008), and recently also elaborations on finance-dominated capitalism in the context of demand-led growth models (Boyer 2000, van Treeck 2009, Hein 2012).

5. Conclusions

In this contribution, we have reviewed the 'principle of effective demand' from different angles. In Section 2, we have shown that the principle of effective demand can be found in, and based on, the contributions by Karl Marx, Michal Kalecki and John Maynard Keynes. We have argued that the respective views are rooted in an understanding of modern capitalist economies as monetary production economies, in which the role of money and monetary variables is special and provides the conditions for the separation of aggregate demand from aggregate supply and

[16] See Hein/Lavoie/van Treeck (2011, 2012), Hein (2014, Chapter 11) and Lavoie (2014, Chapter 6.5) for detailed discussions.

[17] More extensive literature reviews and model discussions on each of these areas can be found in Hein (2014).

the domination of the latter by the former. In Section 3, we have outlined a simple short-run macroeconomic model based on the principle of effective demand. The model provides an endogenous determination of investment, income and profits, it explicitly includes some monetary and financial variables, i.e. a stock of debt and a monetary rate of interest, and it considers functional income distribution. Within the context of this model we could derive the paradox of saving and the paradox of costs. In Section 4, we have then considered the long-run validity of the principle of effective demand in heterodox distribution and growth models. We have distinguished two main strands of post-Keynesian demand-driven growth models, the Kaldorian/Robinsonian strand and the Kaleckian/Steindlian variant. Whereas the latter is able to retain both the paradox of saving and, depending on the precise accumulation function, also the paradox of costs, in the former only the paradox of saving is preserved in the long run, whereas the paradox of costs disappears. Finally, we have briefly addressed some issues around and extensions of demand-driven growth models.

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