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**Surplus Value and the Keynesian Multiplier**

Andrew B Trigg

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***Copies may be obtained from:***

Economics Department

Faculty of Social Sciences

The Open University

Walton Hall Milton Keynes MK7 6AA

Telephone: 01908 654437

Email: [Socsci-economics-support-list@open.ac.uk](mailto:Socsci-economics-support-list@open.ac.uk)

Fax: 01908 654488

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# **SURPLUS VALUE AND THE KEYNESIAN MULTIPLIER**

**Andrew B Trigg**

Economics Discipline  
The Open University  
Walton Hall  
MK7 6AA

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ABSTRACT: De Angelis (2000) identifies a monetary expression for the value of labour power as a constituent component of the employment multiplier. By conjoining this multiplier with Marx's falling rate of profit thesis, a critique is formulated of alternative strategies of employment generation. This paper takes the dissection of the multiplier one step further by demonstrating the role of the value of labour power itself in both income and employment multipliers. Nesting this approach in Marx's reproduction schema and using the Domar growth model, it is argued that De Angelis underestimates the importance of aggregate demand as a determinant of employment.

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## Introduction

The recent contribution of De Angelis (2000) provides an important insight into the relationship between the Keynesian employment multiplier and Marxian economic categories. Using Marxian categories, De Angelis develops the concept of a 'social multiplier' in which the constituent 'social wage rate' is interpreted as a monetary expression for Marx's concept of the value of labour power. By dissecting the structure of the social multiplier in this way its role in the determination of employment is examined.

A particular role for the multiplier is developed in relation to Marx's law of the tendency of the falling rate of profit. Since an increase in the rate of surplus value provides such an important counteracting factor to the falling rate of profit, De Angelis examines the consequence of this distributional shift upon the size of the multiplier. Adverse effects upon employment can result, which has serious implications for both Keynesian and neoliberal strategies for employment generation; and, in response, an alternative radical strategy is developed in which income is redistributed from capitalists to workers.

The contribution of this paper is to expand and build upon the translation achieved by De Angelis between Marxian and Keynesian categories. In the first part, two additional insights into the structure of the multiplier are suggested. First, by applying a method of decomposition developed by Trigg (1999), a more direct translation between the multiplier and the Marxian categories is achieved. This is done by identifying an expression for the value of labour power itself, instead of its monetary expression, as a core component of the multiplier. Moreover, instead of introducing concepts such as the 'social multiplier' and 'social wage rate', this translation employs existing and well-established economic categories. Second, instead of restricting this analysis to the employment multiplier the structure of the income multiplier is also examined.

In the second and third parts of the paper, a critique is formulated of the way in which De Angelis conjoins the multiplier with the falling rate of profit thesis. In the second part, a demonstration is provided of the integral role of the multiplier in Marx's expanded reproduction schema, as developed in *Capital*, Volume 2 (Marx, 1956). In the third part, the Domar growth model is used to develop a formal representation of the reproduction schema. Building upon the insights provided by Lianos (1979), a two step decomposition of the Domar model is introduced in which, first, the role of surplus value is established in the multiplier and, second, the role of this multiplier is established in the reproduction schema. A further expansion of the De Angelis translation between Keynesian and Marxian categories is therefore achieved by showing that the multiplier is not a concept which lies outside of Marx's system but is integral to it. Moreover, this generalisation of De Angelis shows that the multiplier forms part of Marx's pioneering demonstration of the endemic problems of realisation associated with capital accumulation.

It follows that by considering the multiplier as a concept outside the reproduction schema, De Angelis provides only a partial consideration of the problem of realisation. In so doing he narrowly focuses upon the impacts on demand associated with a (falling rate of profit induced) increase in the rate of surplus value. This results in a downgrading of the realisation problems associated with a nondeclining rate of profit; and, in consequence, he underestimates the importance of aggregate demand to alternative strategies for

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employment generation. It will be shown that the precise way in which a translation between Keynesian and Marxian categories is specified has serious implications for policy formation.

### The Structure of the Multiplier

De Angelis (2000) uses the Keynesian income multiplier relationship as his starting point:

$$Y = \frac{1}{1-b} I \quad (1)$$

where  $Y$  is net income,  $I$  is autonomous investment, and  $b$  is the propensity to consume. Making use of the relationship

$$Y = \pi L \quad (2)$$

where  $\pi$  represents labour productivity ( $Y/L$ ) and  $L$  is a measure of total labour in hours of work, it follows that the employment multiplier relationship

$$L = \frac{1}{\pi - \pi b} I \quad (3)$$

can be derived. De Angelis refers to  $1/\pi - \pi b$  as the ‘social multiplier’ with the term  $\pi b$  defined as the ‘social wage rate’ and  $\pi - \pi b$  as the profit per hour. Note that if  $C$  is the money value of total consumption, we can write

$$\pi b = \frac{Y}{L} \frac{C}{Y} = \frac{C}{L} \quad (4)$$

The social wage rate is simply a ratio of consumption to labour, the consumption (in money units) per unit of labour power. A number of simplifying assumptions are made in order to relate equation (4) to Marxian economic categories. Capitalist consumption is assumed to be empirically negligible, a particularly unrealistic claim which will be relaxed in the next section. In addition, there is assumed to be no exogenous element in worker consumption and although workers are allowed to save, their savings are not included as part of the social wage rate. The social wage rate captures worker consumption  $C$  that is necessary for the reproduction of labour power. De Angelis therefore argues that the social wage rate is a monetary expression for Marx’s value of labour power – it represents the money value of the labour embodied in the commodity bundle required to reproduce each unit of labour power. An inverse relationship between the multiplier and the rate of surplus value is established, thereby providing a penetrating insight into the structure of

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the multiplier, ‘to show how class relations are represented, in a mystified form, in economic categories’ (De Angelis, 2000, p.9).

In this spirit, examining the structure of the propensity to consume can provide a further, even more incisive, insight into the structure of class relations. By simple decomposition, following the approach taken by Trigg (1999), the propensity to consume can be written as:

$$b = \frac{C}{Y} = \frac{L}{Y} \frac{C}{L} \quad (5)$$

On this interpretation  $b$  represents the labour-output ratio ( $L/Y$ ) multiplied by the consumption per unit of labour ratio ( $C/L$ ). This expression represents the value of labour power – the labour embodied in the commodity bundle required to reproduce each unit of labour.<sup>1</sup> Since the propensity to consume is a pure number (money/money) decomposition makes it possible to show that it is identical to the value of labour power (labour/labour) which is also a pure number.<sup>2</sup> An examination of equation (1), therefore, reveals that the value of labour power itself (not its monetary expression) appears as the core component of the Keynesian income multiplier. This represents a more revealing insight into the structure of class relationships, with Marx’s theory of surplus value directly represented in the denominator of the multiplier. Since the component  $b$  is the value of labour power, the denominator  $1-b$  is the share of surplus value, the proportion of labour time extracted as surplus value. This interpretation of the multiplier penetrates beneath the surface of monetary economic categories as considered by De Angelis, to the Marxian labour categories.

It should therefore be noted that to relate the multiplier to Marxian economic categories it is not necessary to restrict our analysis to the employment multiplier. The value of labour power, as represented by the propensity to consume, appears in both the income and employment multipliers.

### **The Role of the Multiplier in Expanded Reproduction**

De Angelis uses his Marxian interpretation of the multiplier alongside a consideration of Marx’s law of the tendency of the falling rate of profit. As Marx argues in *Capital*, Volume 3, to prevent the rate of profit from falling, due to increases in the capital-labour ratio, counteracting tendencies, such as an increase in the rate of surplus value, are required (Marx, 1966). For De Angelis, however, an increase in the rate of surplus value will also increase the denominator of the multiplier, thereby reducing its overall size. An increase in the rate of surplus value reduces the employment impact of a given volume of investment. From a demand side perspective, this counteracting tendency to the falling rate of profit has adverse consequences in terms of the amount of labour employed by capital.

By marrying the Marxian interpretation of the multiplier with the falling rate of profit thesis, De Angelis formulates a critique of Keynesian and neoliberal strategies of employment generation. The problem with the Keynesian strategy of stimulating aggregate demand is that it relies on a stable multiplier. Since ‘capitalists are under increasing pressure’ to increase the rate of surplus value, the Keynesian strategy of stimulating aggregate demand is ‘self-defeating, as the employment impact of a given level of



investment falls' (De Angelis, 2000, p.97). For the neoliberal strategy the problems are even more severe, since 'from the very start' the objective is to increase the rate of surplus value by downward pressure on wages and increasing intensity of work etc. (p.98). This neoliberal strategy compounds the problems already associated with increasing the rate of surplus value in order to prevent a declining rate of profit.

An alternative radical strategy is developed by De Angelis in which a redistribution from capitalists to workers is suggested – a reduction in the rate of surplus value. This increases the size of the multiplier and, despite the problem of a falling rate of profit, opens up the possibility of smaller growth targets with higher employment. The logical consequence, however, is that with such a threat to profitability, investment could not be relied upon on the part of capitalists and some form of 'socialisation of investment' would be required – a move away from a capitalist mode of production.

In the analysis that follows, these strategies are discussed further by developing the relationship between the Keynesian multiplier and Marx's system. Instead of treating the multiplier as a conceptual device that is placed outside of Marx's system, we show its integral role in the reproduction schema as expounded in *Capital* Volume 2 (Marx, 1956). This dynamic extension to the ostensibly static analysis of De Angelis is then formalized by making use of the well-established relationship between the schemes of reproduction and the Domar growth model.

To establish this relationship we first need to relax our previous assumption that capitalist consumption is empirically negligible. In his consideration of expanded reproduction in *Capital*, Volume 2, Marx assumed that for Department I (the capital goods sector) a half of profits are directed to capitalist consumption, the other half to investment (see Marx, 1956, p.511). In order to model capitalist consumption, a useful bridging point between the Marxian and Keynesian economic categories is provided by the work of Kalecki. A sharp distinction can be specified between worker consumption ( $C$ ) and capitalist consumption ( $C_K$ ).<sup>3</sup> Assuming zero savings on the part of workers, Kalecki (1971) relates income to expenditure such that:

$$Y = C + C_K + I \quad (6)$$

where  $C = bY$ , the coefficient  $b$  representing the ratio of worker consumption to net income. By defining  $\lambda$  as the ratio of capitalist consumption to total profits ( $P$ ), it follows<sup>4</sup> that  $C_K = \lambda P$ . By then employing Kalecki's identity  $P = C_K + I$  the relationship

$$C_K = \frac{\lambda}{1-\lambda} I \quad (7)$$

can be defined<sup>5</sup>. Substituting (7) into (6) it follows that:

$$Y = bY + \frac{\lambda}{1-\lambda} I + I \quad (8)$$

which can be re-arranged to derive the income multiplier relationship:

$$Y = \frac{1}{(1-\lambda)(1-b)} I \quad (9)$$

Using our previous interpretation of equation (5) the consumption propensity  $b$  represents the value of labour power. Since  $b$  captures the volume of labour needed for the reproduction of a unit of labour, the term  $1-b$  represents the volume of surplus value produced per unit of labour. This latter term can be written as  $e$ , the (per capita) share of surplus value produced by each unit of labour.<sup>6</sup> For ease of exposition we can also re-express  $(1-\lambda)$  as  $\lambda$ , the ratio of investment to profits.

Re-writing the income multiplier equation as

$$Y = \frac{1}{\lambda^* e} I \quad (10)$$

we can now turn to an explicit consideration of the growth of income and investment in Marx's schemes of reproduction. In this analysis the Marxian categories will be used throughout, although it should be noted that in the Keynesian approach  $\lambda^* e$  is simply the propensity to save.

Table 1 is used by Lianos (1979, p.407) to illustrate the process of expanded reproduction for Department I, based on numbers provided by Marx in *Capital* Volume 2. In keeping with the macro Keynesian system a one-sector economy is assumed – the important issue of proportionality between sectors is not considered within the confines of this analysis. It is also assumed that all elements are measured in money units of account. The standard assumptions made by Marx are a 4:1 ratio of constant to variable capital, and a 100 per cent ratio of profits to variable capital (wages). Net income, which is included for purposes of comparison with the Keynesian system, is made up of variable capital plus profits.

**TABLE 1 Marx's Expanded Reproduction Schema**

Periods	Constant Capital	Variable Capital	Profits	Net Income	$\frac{\Delta Y}{Y}$	$I$	$\frac{\Delta I}{I}$
1	4000	1000	1000	2000	–	–	–
2	4400	1100	1100	2200	0.1	500	–
3	4840	1210	1210	2420	0.1	550	0.1
4	5324	1331	1331	2662	0.1	605	0.1
5	5856.4	1464.1	1464.1	2928.2	0.1	665.5	0.1

Units are in £ sterling

Source: Lianos (1979), p.407

In period 1 profits of £1000 are produced, half of which are directed to capitalist consumption, the other half retained as investment. This £500 investment is allocated in period 2 to the expansion of constant capital (£400) and variable capital (£100),

maintaining the 4:1 ratio. Given the same ratio of profits to variable capital, an increase in profits of £100 is also established, which together with the increase in variable capital of £100 results in a £200 increase in net income. In period 3, £550 is now available for investment, £440 of which is allocated to constant capital and £110 to variable capital. Profits once more expand and are allocated for further capital expansion in period 4, and so on.

The role of the Keynesian multiplier in this example can be established by identifying the key parameters from equation (10). First, on the assumption of workers' zero savings, the propensity to consume is equal to the ratio of wages to net income. In period 3, for example, this is calculated as 1210/2420. In each period the propensity to consume is equal to  $\frac{1}{2}$ , from which it follows that the (per capita) share of surplus value ( $e=1-b$ ) is also equal to  $\frac{1}{2}$ . Similarly, we know that  $\lambda^*$ , the ratio of investment to profits, is also equal to  $\frac{1}{2}$ , in which case the multiplier has the value throughout Table 1 of:

$$\frac{1}{\lambda^* e} = \frac{1}{\frac{1}{2} \times \frac{1}{2}} = 4 \quad (11)$$

The role which this multiplier plays as part of capital accumulation is shown in each period of expansion. In period 2, for example, net investment of £550 multiplied by 4 (the multiplier) results in a net income of £2200. The net investment appears in the accounts as  $I$ , capital accumulation in the subsequent period. Similarly, in period 3 net investment of £605 (capital accumulation in period 4) multiplied by 4 results in a net income of £2420.

What becomes clear from this examination of expanded reproduction is that there are two ways of viewing the accounts. From the supply side, a surplus is produced in each period and this is allocated for expansion of capital in the subsequent period. And from the demand side, investment in each period is necessary, via the multiplier, for the realisation of the net income of the previous period. Surplus profits are both a source of further expansion and a surplus product which must be sold in the market place.

### The Domar Growth Model

A formal role for demand and supply in the schemes of expanded reproduction, as identified by Lianos (1979), can be established using the well-known Domar growth model. Following Domar (1957), the demand side is modeled using the multiplier to define the relationship between the increase in income ( $\Delta Y$ ) and the increase in investment: ( $\Delta I$ )

$$\Delta Y = \frac{\Delta I}{\lambda^* e} \quad (12)$$

The supply side is then modeled by letting  $\sigma$  represent the productivity of investment, the economy's capacity to increase income in proportion to the increase in capital stock. Given that investment is the same as an increase in the capital stock it follows that:

$$\sigma = \frac{\Delta Y}{I} \quad (13)$$

Domar assumes at the outset that there is full capacity utilisation, and moreover that ‘the fraction of labour force employed is a function of the ratio between national income and productive capacity’ (Domar, 1957, p.87). Since the supply side models the economy’s capacity to produce output, full employment of the labour force requires that the potential change of output is equal to the change in output demanded via the multiplier. Hence the full employment rate of growth could be established by setting

$$\frac{\Delta I}{\lambda^* e} = I\sigma \quad (14)$$

It follows from multiplying both sides of (14) by  $\lambda^* e$  and dividing by  $I$  that:

$$\frac{\Delta I}{I} = \lambda^* e\sigma \quad (15)$$

Since by assumption in (10) income is a constant multiple of investment, it also follows that the rate of change of investment is equal to the rate of change of income:

$$\frac{\Delta Y}{Y} = \frac{\Delta I}{I} = \lambda^* e\sigma \quad (16)$$

(see Domar, 1957, p.91).

The rate of growth (of income and investment) which could, if achieved, deliver full employment is equal to a multiple of the ratio of investment to profits  $\lambda^*$ , the (per capita) share of surplus value ( $e$ ) and the productivity of investment ( $\sigma$ ).

Examination of the expanded reproduction scheme in Table 1 reveals that the productivity of investment ( $\sigma$ ) in each period is equal to  $2/5$ . In period 2, for example, capital increases by £500 resulting in an increase in income of £200, a ratio of  $\Delta Y$  to  $I$  of  $200/500$  (see equation 13). Together with our previous information on the other two parameters, the full employment rate of growth is hence equal to:

$$\lambda^* e\sigma = \frac{1}{2} \times \frac{1}{2} \times \frac{2}{5} = 0.1 \quad (17)$$

which is established by Marx in his expanded reproduction schema for Department I.<sup>7</sup>

Of course, both Marx and Domar were far from optimistic about the possibilities of a balanced growth rate being maintained over time. Indeed, for this particular growth

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model such an outcome is very unlikely given the conditions that are necessary for its establishment. Marx's schemes of expanded reproduction should be seen as a heuristic device for showing the difficulty of establishing these conditions due to the classical contradiction between demand and supply. By showing that supply does not automatically create its own demand both Domar and Marx provide a rejection of Say's Law.

The problem, as articulated by Domar (1957), is the dual role of investment in the process of capital accumulation. This can be explained in relation to equation (14). On the left-hand side the increment in investment determines, via the multiplier, the increment of income which the economy demands. On the right hand side, however, the increment in capacity, which the economy can supply, is determined by the amount of investment. Whereas changes in investment are necessary in order to induce increasing demand, only a particular amount of investment is required to enable a matching increase in supply. For Domar this provides the heart of the problem as to why full employment growth is so difficult to achieve for a capitalist economy. An absolute amount of investment generates an increase in capacity, but to realise this capacity in terms of increasing income requires an increase in investment. This is why 'even in relatively prosperous periods a certain degree of underemployment has usually been present. Indeed, it is difficult enough to keep investment at some reasonably high level year after year, but the requirement that it always be rising is not likely to be met for any considerable length of time' (Domar, 1957, p.98). Overproduction of capacity relative to demand is a persistent tendency inherent in the schemes of expanded reproduction as formalised in the Domar growth model. As Marx wrote, 'the more productive power develops the more it finds itself at variance with the narrow basis on which the conditions of consumption rest' (Marx, 1966, p.244–45).

In comparing this approach with De Angelis the key point to note is that the problem of realisation is established with a constant rate of profit. Throughout the five periods considered in the reproduction schema (Table 1) the rate of profit is a constant 20 per cent. This contrasts with the approach taken by De Angelis in which realisation problems are associated specifically with the counteracting factors to the falling rate of profit, and in particular with increases in the rate of surplus value. This redistribution from workers to capitalists has a detrimental impact upon demand because of the reduced size of the multiplier. It can be argued, however, that De Angelis assumes that with a nondeclining rate of profit investment can be sustained without any problem of realisation. In discussing both Keynesian and neoliberal strategies for employment generation, De Angelis (2000, p.98) states that it is possible both to 'allow a nondeclining profit rate and therefore sustain investment demand'. Implicit is the suggestion that the only realisation problem is the distributional impact on demand associated with one particular counteracting tendency to the falling rate of profit. If the rate of profit is nondeclining, which it can be due to various other counteracting factors considered by Marx, then, for De Angelis, investment demand is sustainable.

This is not to suggest that the insights provided by De Angelis into the structure of the multiplier are not worthwhile. On the contrary, as we have seen in Table 1, the role the rate of surplus value in the multiplier is represented in Marx's reproduction schema. Indeed using the Domar representation of Marx's schema (equation 16) it can be seen that an increase in the rate of surplus value, as represented in the share of surplus value  $e$ , could enable a higher rate of growth but would make the problem of realisation more pronounced. More profits would need to be realised by higher increments of investment. Core to this realisation problem would be the lower multiplier associated with a higher

rate of surplus value. Whilst a higher rate of surplus value will exaggerate the realisation problem, however, the problem applies at any positive level of the rate of surplus value. The problem of realisation is more general than the consideration by De Angelis of particular upward trajectories of the rate of surplus value.

This partial consideration of the problem of realisation by De Angelis has important consequences for his discussion of different strategies of employment generation. It can be argued that he underestimates the realisation problems associated with each of the three strategies considered. In relation to the Keynesian strategy, problems of realisation are confined to distributional consequences, via a reduced multiplier, of an increasing rate of surplus value (in response to a falling rate of profit). There is an implicit recognition that if the multiplier is stable then the stimulation of aggregate demand can be effective, but this is contradicted by the suggestion in the absence of a Keynesian strategy that investment demand is sustainable so long as there is a nondeclining rate of profit. De Angelis cannot have it both ways. Either Say's Law holds with a nondeclining rate of profit, whereby the surplus produced is always sold, or it does not hold, in which case there is a need for aggregate demand to be stimulated. The overall impression is that De Angelis downplays the importance of aggregate demand by focusing specifically on questions of distribution.

In relation to the De Angelis discussion of the neoliberal strategy, problems of demand are more obviously restricted specifically to distribution. This is understandable since the basis of this strategy is a restriction on workers' living standards in order to raise profitability, which, if successful, supplements the counteracting increase in the rate of surplus value which is necessary to prevent the rate of profit from falling. However, the implication of this analysis is that if the neoliberal strategy is not successful in terms of its impact upon distribution, and if for a period of time the rate of profit is nondeclining, then investment demand is sustainable. A policy of *laissez faire* in such circumstances would not be subject to any substantive critique from De Angelis. Using Marx's reproduction schema, however, the endemic realisation problems associated with this scenario provide a powerful argument for intervention to stimulate aggregate demand.

Finally, the radical strategy suggested by De Angelis also underestimates the importance of demand considerations. He argues that a redistribution away from capitalists to workers would increase the size of the multiplier, thereby stimulating employment. It is suggested that even though the rate of profit, and hence investment, are declining in this scenario, the increase in the size of the multiplier makes it technically possible for employment to increase. The only problem foreseen by De Angelis is a reluctance by capitalists to see their profits eroded in this way, therefore requiring a 'socialization of investment'. However, what is missing in this strategy is any recognition of the problems of realisation which still exist even at low levels of profitability and investment. The multiplier may be larger in size but to suggest that aggregate demand itself does not have to be stimulated, to make sure that everything produced is sold, is a serious omission. To develop a radical strategy to stimulate employment may indeed require the socialist intervention that De Angelis suggests, but as part of this strategy it must include a planned programme of government spending to stimulate aggregate demand.

## Conclusions

In this paper an enhanced role for the Marxian economic categories is identified in relation to the Keynesian multiplier, taking the insights provided by De Angelis (2000) one step further. In addition to the monetary expression for the value of labour power, which De Angelis identifies in the employment multiplier, the value of labour power itself is identified as a constituent element of both the employment and income multipliers.

By relating this refined version of the income multiplier to Marx's reproduction schema, the well-established role of the Domar growth model in expanded reproduction is identified. In addition, a two-stage method of decomposition is developed in which first surplus value is nested in the multiplier and second the multiplier is nested in the Domar model. Using this explicitly dynamic framework, the problem of realisation, which is endemic to capital accumulation, is elucidated without recourse to a varying rate of profit, in contrast to the approach taken by De Angelis. Whereas he restricts the role of demand to one particular counteracting tendency to the falling rate of profit – an increasing rate of surplus value – in Marx's reproduction schema the realisation problem is more general, being fundamental to capital accumulation even at a nondeclining rate of profit. It follows that De Angelis seriously underestimates the importance of demand in his assessment of Keynesian, neoliberal and radical strategies of employment generation. In considering each strategy the issue is not just the effect of changes in distribution on demand, in the context of a falling rate of profit. For any strategy of employment generation within the confines of a surplus-producing capitalist economy, deficiencies in aggregate demand have to be addressed for every distributional outcome and at all levels of the rate of profit.

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## Footnotes

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<sup>1</sup> The interpretation here rests on the assumption of a one-commodity macro model in which the economy-wide labour-output ratio also represents the technology required for the production of consumption goods. In the next part of the paper, the translation between the multiplier and the Domar growth model is also made possible by this one-commodity assumption. For a less restrictive multisectoral multiplier framework see Trigg (1999).

<sup>2</sup> To be consistent with the approach taken by De Angelis (2000), labour hours are assumed to be the unit of account. However, since the propensity to consume is a pure number, the unit of account could instead be the number of person-days, a possibly more standard interpretation of the value of labour power.

<sup>3</sup> In the analysis that follows  $C$  is no longer a proxy for worker consumption, as assumed by De Angelis, but is precisely worker consumption. The propensity to consume,  $b$ , is now precisely the ratio of worker consumption to net income.

<sup>4</sup> In contrast to Kalecki capitalist consumption does not have an autonomous component in this model. This modification allows a more simple interpretation of Marx’s reproduction schema in Table 1. Note, however, that following both Kalecki and De Angelis, investment is assumed to be autonomous.

<sup>5</sup> Writing  $C_K = \lambda P$  as a component of  $P = C_K + I$  gives the relationship



$$P = \lambda P + I$$

and therefore

$$P = \frac{1}{1-\lambda} I$$

Total profits ( $P$ ) are determined by autonomous investment ( $I$ ). Substituting this latter equation into

$C_K = \lambda P$  it follows that

$$C_K = \frac{\lambda}{1-\lambda} I$$

<sup>6</sup> In relation to the traditional Marxian categories, the share of surplus value is  $e = \frac{S}{S+V}$ , where  $S$  is

the volume of total surplus value and  $V$  is variable capital. This can be re-expressed as  $e = \frac{S/V}{S/V+1}$ ,

showing that we can speak interchangeably of the directional impact on the multiplier of changes in the share of surplus value ( $e$ ) and changes in the rate of surplus value ( $S/V$ ).

<sup>7</sup> This demonstration of the identical relationship between the Domar model and Marx's reproduction schema is more straightforward, and provides more insight into the underlying economic structure, than the mathematical proof used by Lianos (1979). By using two simple steps it is possible to first nest the share of surplus value in the multiplier and then nest the multiplier in Marx's reproduction schema using the Domar model. Conversely, Lianos sets up a collection of equations as an alternative to the Domar derivation, from which a Marxian dual to the Domar model is established. Whilst Lianos is able to focus on the role of surplus value in the balanced growth equation, as derived in equation (16), in the approach taken here a role for surplus value is specified in the multiplier relationship which forms a constituent part of the Domar model. A structural decomposition of the reproduction schema is achieved by establishing the role of surplus value in the building blocks required for the achievement of balanced growth.

This decomposition, as a precursor to future research, could be an analytical breakthrough for understanding the relationship between Marx and Keynes. It should be possible to nest a multisectoral multiplier, with surplus value as its core element, in a multisectoral expanded reproduction scheme. The two-stage decomposition of the one-commodity model could help to provide an insight into how surplus value might be nested in the more complex equations of multisectoral models of economic growth.

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