But Still It Falls: On the Rate of Profit Ed George, July 4, 2013

With regard to the rate of profit ($\frac{s}{C}$), where s = surplus-value, and C = total capital laid out), and the factors that influence it, the fundamental relation that Marx establishes (in chapter 3 of volume 3 of *Capital*) is $\pi = \delta.\frac{v}{C}$, in which π = rate of profit, δ = rate of surplus-value ($\frac{s}{v}$), and v = variable capital (capital laid out as wages): 'The rate of profit is thus determined by two major factors; the rate of surplus-value and the value composition of the capital.'[1] The rate of profit increases in function of a rise in the rate of surplus-value, and falls in function of an increase in the constant part of capital with respect to variable. Marx's purpose in this chapter was to delink the rate of surplus-value from the rate of profit: to show that the same rate of surplus-value can find expression as different rates of profit, and that the same rate of profit can arise from different rates of surplus-value.

It is intrinsic to capitalist production that the productivity of labour rises. This is because it is inherent on each capital to seek a surplus profit, and a surplus profit is achieved by increasing the productivity of labour over that of competing capitalists in order to reduce per-unit output prices (most importantly as set out in *Capital* volume 1, chapter 12; and volume 3, chapter 10). A capitalist that achieves this is able to realise a surplus profit because the per-unit cost price of her commodity product falls below that of her competitors', allowing her, if she sells at the old price, or even below it (which she will almost certainly have to do to fulfil conditions of social demand) to achieve a rate of profit on her capital higher than that her competitors do. Yet when the new productive technique is generalised in the sector of production in question (and then beyond it), when a new level of productivity of labour is reached, when the socially-necessary value (labour-time) of the commodity in question falls to a new level – ignoring for the moment the question of social demand and the realisation of the commodity value – what happens then?

In production, raw material (constant circulating capital) is converted into product by labour (bought as labour-power, variable capital) using machines (fixed (constant) capital). The productivity of labour is the measure of the physical quantity of use-value produced by a given amount of labour-time. If a single worker-day can produce ten units of a given commodity product, and then can produce 20 qualitatively identical units, then the productivity of labour has doubled.

There are many ways to increase the productivity of labour: making people work harder (increasing the intensity of labour), making people work longer (increasing absolute surplus-value), improving productive techniques (organisation of production), and using more productive machines (fixed capital). Let us ignore the first two of these (increasing the intensity of labour and lengthening the working day/week). And let us assume that an increase in productivity is achieved through more efficient productive techniques (better cooperation, less waste, etc.), i.e. the fixed capital (machines, etc.) is just used more efficiently. Per worker, more commodity product is produced. More raw materials are transformed into commodity product. If the constant capital laid out is converted into fixed capital and constant circulating capital (raw materials) then, if productivity rises, and the fixed capital remains the same, more raw materials are transformed into commodity product. A greater physical quantity of constant capital is absorbed proportionally by the same quantity (number of workers) of labour. This ratio of physical mass of constant capital to labour Marx calls the 'technical' composition of capital.[2] If labour productivity rises, the technical composition rises too, by definition.

Now let us imagine that the productivity of labour is increased by the use of more efficient fixed capital (say, a better machine). The result is the same: more raw materials are transformed into commodity product, and the ratio of physical mass of constant capital to labour rises.

Let us imagine in these cases that the price of raw materials, fixed capital and labour-power (wages) are constant. If the technical composition of capital rises because more raw materials are transformed into commodity product then the value composition – ratio of the price of constant capital to variable capital (wages) – also rises. This

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[1] Karl Marx, *Capital*, vol. 3 (Harmondsworth, 1981), p. 161.

[2] Karl Marx, *Capital*, vol. 1 (Harmondsworth, 1990), p. 762; *Capital* vol. 3, p. 244.

change Marx calls the 'organic' composition of capital: the value composition of capital, 'in so far as this is determined by its technical composition and reflects it.'[3]

By definition, a rise in the productivity of labour means that a given mass of labour (number of workers) will absorb a greater mass of means of production. Hence the organic composition will rise. And, *all else being equal*, if the organic composition rises then the value composition will too. This rise in the value composition because of the change of the technical composition – and only this – is *precisely* what we mean by a rise in the organic composition of capital. In other words, a rise (or fall) in the organic composition is the *direct* effect of a rise (or fall) in productivity of labour.

Marx's assumption is that it is constitutive to capitalist production to increase the productivity of labour constantly,[4] therefore it is also constitutive to capitalist production to increase the technical composition of capital constantly as well.

If $\pi = \delta.\frac{v}{c+v}$, all else being equal ('all else being equal' meaning that δ is constant and v is constant) and then c rises in relation to v, π will fall. This is the 'law' part of the 'law of the tendential fall': that it is intrinsic and perennial, all else being equal, that the rate of profit will fall, because it is intrinsic and perennial to capitalist production that the organic composition will rise, and this is because it is intrinsic and perennial to capitalist production that the productivity of labour will rise.

It is cardinal to understand here that 'organic composition' is a concept that refers to changes in the value composition of capital *because of changes in the productivity of labour*, and to nothing else: to changes in the value composition of capital arising from changes in the mass of constant capital absorbed by a given mass of labour-power because of a rise in labour productivity.

There are many other factors that can impact on the value composition of capital, and we shall see some of them below. What we need to keep in mind here is that Marx saw it *critically important* to identify the effect on the value composition of a change in the technical composition, and maintain it conceptually separate from other causes of changes in the value composition.

What else can change the value composition of capital? Ruling out contingencies – climate, war, plunder, class struggle – and focusing only on processes endogenous to 'normal' capitalist accumulation, what we are left with essentially is changes in price of the elements of constant capital (fixed and circulating) and a change in the value of labour-power (through changes in price of the means of subsistence). And what will fundamentally change the prices of constant capital and means of subsistence is the labour-time socially necessary for their production,

i.e. their prices are ultimately determined by the level of the productivity of labour. In other words, if labour productivity rises, the per-unit prices of commodities *in general* fall, which means that both the elements of constant capital (means of production) and means of workers' subsistence will fall, and the latter, if the value of labour-power is held to be the commodities that the worker consumes in the reproduction of her labour-power, and these are held constant, means that the value of labour-power will fall too, so that, per worker, less variable capital is laid out by the capitalist. Hence, when it is said above that, *all else being equal*, if the organic composition rises then the value composition will rise in direct function of this too, 'all else is *not* equal': as *indirect* consequences of a rise in labour productivity the value of labour-power (v) will fall, and if v falls, for the same given mass of labour-power surplus-value will rise (and by the same amount), if v falls and s rises then the rate of surplus-value will rise, and if the means of production are cheapened the value of constant capital (c) will fall, and hence that of total capital (C) can fall too.

But these effects, unlike that of the change in the technical composition, are *indirect* effects, and in this precise sense: that they occur *subsequently in time*. The change in the value composition of capital because of the change in the technical composition is immediate: more capital is laid out as constant capital compared to variable. But the cheapening of constant capital and means of workers' subsistence that occurs as a consequence is the cheapening

[3] *Capital* vol. 1, p. 762; *Capital* vol. 3, p. 245.

[4] *Capital* vol. 1, p. 437; this is also an observable fact.

of the commodity product *output* of a more productive production process; it is only in *subsequent* production periods (and iteratively) that these cheaper commodities affect the value composition of capital. With regard to the 'Law of the Tendential Fall in the Rate of Profit' as Marx sets it out, this temporal distinction is the same distinction as that between the 'law itself' and the 'countervailing tendencies': 'the law itself' arises because of the perennial rise in labour productivity and hence organic composition (with determinate consequences for the rate of profit) inherent to capitalist production, the 'countervailing tendencies' because of the indirect effects that temporally subsequent consequences (cheapening of commodities) have on the value composition (and also on the rate of profit). Because of the cheapening of commodities in general, productive inputs (means of production and labour-power) are cheaper, but because the rise in the organic composition is intrinsic and perennial to capitalist production as these input prices fall labour productivity and organic composition rise still further.

Now, the argument that is frequently offered is that the 'countervailing tendencies' might (or can) outpace the rise in the organic composition of capital in terms of the effect on the rate of profit; that, despite the rise in the organic composition, the rate of profit may go up if the effect of the countervailing tendencies is strong enough. That, under normal conditions of capitalist production and reproduction, that the rate of profit displays a tendency to fall is a possibility, but only a possibility, because if the countervailing tendencies are strong enough then the rate of profit may also go up, despite the rise in the organic composition. And the charge is that in Marx's exposition of the LTFRP there is nothing *per se* to say, despite the perennial rise in productivity, that the rate of profit has to go down rather than up.

Let us look first then at the effect of the cheapening of the elements of constant capital on the value composition of capital. If we denote the value composition the ratio between constant capital and variable $\frac{c}{v}$, a rise in the organic composition – a consequence of a rise in the productivity of labour – means that $\frac{c}{v}$ (in value terms) rises. But a cheapening of the elements of constant capital, also a consequence of a rise in the productivity of labour, which means that c falls, will mean that $\frac{c}{v}$ will fall too. Can the latter effect, then, outpace the former?

In a given production period (here, for future reference, the first), a capital transforms 100 units of raw material (at €1 per unit) into 100 units of commodity product (there is, for the moment, no fixed capital). For each 100 units of raw material processed €100 of new value – $(v + s)$ – is produced. The per-unit commodity product price is $\frac{100_c + 100_{(v+s)}}{100}$ = €2. In the next production period (the second) productivity doubles (let us not worry about how): 200 units of raw material are processed by the same amount of labour, producing 200 units of commodity product, whose per-unit price is $\frac{200_c + 100_{(v+s)}}{200}$ = €1.50 (75 % of its former value). Let us imagine that this rise in productive technique is immediately generalised, and that conditions of production elsewhere in the economy are the same, such that the prices of the raw materials that function as inputs for the next production period are affected at the same time and by the same amount. In the next production period, the third here, let us imagine that productivity doubles again: 400 units (but now at €0.75 per unit – 75 % of their former value) are transformed by the same labour. The per-unit commodity price is now $\frac{(400 \times 0.75)_c + 100_{(v+s)}}{400}$ = €1. If we take the value composition of capital to be $\frac{c}{v}$, at the rate of surplus-value as a constant 100 % (such that v is held at €50) then in period 1 it stands at $\frac{100}{50} = 2$; in period 2, $\frac{200}{50} = 4$, and in period 3, when the fall in the price of raw materials takes effect, $\frac{300}{50} = 6$ (were it not for this fall in price it would stand at $\frac{400}{50} = 8$).

In other words, the value composition rises, even though constant capital is cheapened, although not by as much as it would have done had it not; the cheapening of the price or raw materials offsets the change in the value composition wrought by the rise in the organic composition but inevitably only *partially*. Why only partially? Precisely because cheaper constant capital enters production as the product of a production period *previous* to that

in which the productivity of labour rose; and in the production product in which it enters as input the value composition continues to rise because the productivity of labour continues to rise. The change in the value composition as a result of the change in the technical composition which it is purported the change in the value composition as a result of the cheapening of the elements of constant capital might offset is a 'moving target' which the latter, because it is the product of previous changes in the productivity, can never reach.

Because of the temporal difference in effect, then, the indirect effect of a rise in the productivity can 'countervail', but *only* countervail: it can never reach, let alone supersede, the effect of the change in the organic composition.

But what about the cheapening of labour-power, and the effect of this on the rate of surplus-value (and hence the rate of profit)?

Going back to the first case, let us, in period 3, introduce a fall in the value of labour-power, to the same extent as the cheapening of raw materials, to 75 % of its former value. Now $c = 300$, $v = 37.5$, $s = 62.5$ ($v + s$ is unchanged because the size of the workforce is unchanged).

The rates of profit ($= \frac{s}{c + v}$) for the first two production periods stand at 1: $\frac{50_s}{100_c + 50_v} \approx 33.3\ \%$; 2: $\frac{50_s}{200_c + 50_v} = 20\ \%$. The rate of profit for production period 3, with no cheapening of factors of production, $= \frac{50_s}{400_c + 50_v} \approx 11.11\ \%$; with only the constant capital cheapened $\frac{50_s}{300_c + 50_v} \approx 14.29\ \%$; and with both constant capital and labour-power cheapened $\frac{62.5_s}{300_c + 37.5_v} \approx 18.52\ \%$. The rise in productivity of period 2, when passed on to period 3 in the shape of cheapened factors of production, again *countervails*, but does not *reverse*, the fall in the rate of profit; this last falls less, but it still falls.

Now, none of this is to say that the rate of profit can never go up. If the value of labour-power falls far enough, or labour-power is sold below its value, i.e. if a high enough rate of surplus-value obtains, then the rate of profit will rise. If, in the last case, we take $v = 10$ and $s = 90$ then the rate of profit $= \frac{90_s}{300_c + 10_v} \approx 29.03\ \%$. Why might this happen? Wage levels are determined in good part by class struggle (here a 'contingency'): if capitalists succeed in depressing wages below the value of labour-power,[5] or achieve a de facto reduction in the 'moral and historical' element of the value of labour-power, or if the effects of a rise in the productivity of labour affect means of subsistence more sharply[6] then the rate of surplus-value can rise sufficiently to allow a rise in the rate of profit, despite the rise in the value composition as a consequence of the change in the technical composition (even if countervailed).

But if a high enough rate of surplus-value can negate the effect on the rate of profit of the value composition of capital (which *must* keep rising) why might the rate of surplus-value not remain high enough to maintain a rising rate of profit *forever*? Because the productivity of labour keeps on rising, and what this means is that living labour component of production falls, and falls *exponentially* (and thus keeps falling). This places a natural limit on the effect of a rise in the rate of surplus-value on the rate of profit, ultimately 'checking' it, but not 'cancelling it out', as Marx puts it.[7]

To see how this works, let us take the example we started with above, but multiply the mass (and starting value) of the constant capital by ten.

In the first production period 1,000 units of raw material (at €1 per unit) are transformed into 1,000 units of commodity product; again, for each 1,000 units of raw material processed €100 of new value is added. The per unit

[5] Cf. *Capital* vol. 3, p. 342.

[6] And Marx notes the tendency for the generalisation of higher productivity to be uneven: see *Capital* vol. 3, p. 273.

[7] *Capital* vol. 3, p. 356.

commodity product price now is $\frac{1{,}000_c + 100_{(v+s)}}{1{,}000}$ = €1.10. In the second production period productivity doubles, so that 2,000 units of raw material are processed by the same amount of labour, producing 2,000 units of commodity product, whose per-unit price is $\frac{2{,}000_c + 100_{(v+s)}}{2{,}000}$ = €1.05. Again, let us imagine an immediate generalisation of this rise in productive technique. In the third production period, productivity doubles again: 4,000 units (now at €1 $\times \frac{1.05}{1.10} \approx$ €0.95 per unit) are transformed by the same labour. The per-unit commodity price is now $\frac{\left(4{,}000 \times \frac{1.05}{1.10}\right)_c + 100_{(v+s)}}{4{,}000} \approx$ €0.98.

The rates of profit are now: period 1, $\frac{50_s}{1{,}000_c + 50_v} \approx 4.76$ % ; period 2: $\frac{50_s}{2{,}000_c + 50_v} \approx 2.44$ % ; period 3: $\frac{50_s}{\left(4{,}000 \times \frac{1.05}{1.10}\right)_c + 50_v} \approx 1.29$ % .

Let us again introduce an arbitrarily high rate of surplus-value in period 3 of 900 %, such that $s = 90$ and $v = 10$. The rate of profit now stands at $\frac{90_s}{\left(4{,}000 \times \frac{1.05}{1.10}\right)_c + 10_v} \approx 2.35$ % . The rate of profit still falls; 'checked', but still it falls.

(The mass of surplus-value also depends on turnover time: the faster a capital turns over the greater the mass of surplus-value produced. But this effect too suffers from the same 'law of diminishing returns': as the living labour component of production falls, the amount of new value, including surplus-value, contained in the commodity product falls, and falls exponentially.)

To summarise. The rate of profit depends on the one hand on the rate of surplus-value, and on the other on the value composition of capital. All else being equal, if the rate of surplus-value rises, the rate of profit rises. All else being equal, if the value composition of capital rises, the rate of profit falls.

The value composition of capital, ruling out contingencies, depends, on the one hand, on changes in the technical composition of capital, and on the other on the value of the elements of constant capital and of labour-power (and this last depends on the value of the commodities making up the labourer's means of subsistence).

As the productivity of labour rises – and its constant rise is constitutive to capitalist production – the technical composition, by definition, and the organic composition both rise. But this same process cheapens the elements of constant capital, by cheapening commodities in general. Yet, in terms of the value composition, this cheapening of the elements of constant capital can never, under 'normal' conditions, outstrip the effect of the rise in the technical composition because its effect is temporally subsequent to it.

The cheapening of the means of workers' subsistence, all else being equal, will reduce the value of labour-power, and increase the rate of surplus-value. But long term, the effect of a high rate of surplus-value will only inhibit, and not cancel out, the fall in the rate of profit, because, by definition, increasing productivity means that the constant capital component of the finished commodity product will rise constantly over the variable capital component.

What kind of 'tendency' would all this predict for the long-term movement of the rate of profit? With a large living labour component (in value terms) in production, and a high rate of surplus-value, one would expect a high rate of profit, even a rising one. But as the productivity of labour rises, and the value composition with it (despite the 'countervailing effects' of the cheapening of the elements, and despite the rate of surplus-value), one would expect the rate of profit to begin to fall, and even precipitously so. Nevertheless, as the constant capital component of commodities in general grows in proportion to the variable capital component – and this will be a constant process because of the perennial tendency of capitalist production to raise the productivity of labour, one would expect a more or less continuous fall, but an exponential one, with the rate of fall continuously slowing. And one would

expect this final trend to be the 'normal' trend of 'normally' functioning capitalist reproduction.

So I think the argument that Marx fails to demonstrate in *Capital* that, under normal conditions, the rate of profit will fall, are, at best, unproven. Of course, this is not a argument as to whether Marx was right; simply as to whether he was theoretically coherent. It seems to me that here he was. As to whether he was right, the proof of the pudding, as Engels once said, is in the eating. It is interesting therefore that there is an increasing weight of work that appears to indicate the kind of long-term trend just described is indeed how capitalist production does tend to operate under normal conditions.[8] And ultimately, of course it is in relation to how it relates to the real world that theory must be judged.

León

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[8] I am thinking primarily of the recent work of Alan Freeman and Andrew Kliman, for example Alan Freeman, 'What Causes Booms?', <http://www.hetecon.net/documents/ConferencePapers/2012Non-Refereed/FREEMAN_What_causes_Booms.pdf>, and 'The Profit Rate in the Presence of Financial Markets: A Necessary Correction', <http://media.wix.com/ugd//b629ee_20b6bcc79e688bee2ab6f94f971f7b06.pdf>; Andrew Kliman, *The Failure of Capitalist Production: Underlying Causes of the Great Recession* (London, 2011).