

The Falling Rate of Profit in the Long-run-2

Missing component in Marx's Analysis: "New Commodities"

DRAFT

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In a recent article entitled *The Falling Rate of Profit in the Long-run* by Gürak (2020-a) the subject matter was whether Marx's analysis on the *Falling Rate of Profit* was essentially correct or incorrect. And the conclusion was that Marx was, essentially, correct; there is a tendency that "... *the rate of profit will fall in the long run.*" (Marx,1974). However, in the same paper, Marx's analysis and conclusions were considered as *incomplete* which needed further elaboration and refinement.

In this article on *The Falling Rate of Profit* we will attempt to take a closer look at Marx's analysis cited in Capital, Vol.3,Chapter-13, in order to show the missing component in his analysis, i.e., '*new commodities*'. To show the impacts of "*new commodities*", we will use an alternative method of analysis, similar to Marx's analysis but incorporating new concepts such as "*creative mental labor-power*" and "*saturation of markets*" which influence the rate of profit in the long-run.

New Technology in Marx's Model

Marx stated that:

... the same number of laborers, in the same time, i.e., with less labor, converts an ever-increasing quantity of raw and auxiliary materials into products, thanks to the growing application of machinery and fixed capital in general. To this growing quantity of value to the constant capital- ... - corresponds a progressive cheapening of products. (Marx, 1974, Vol. 3, Ch.13; 212-213)

As we see in the quote from Marx, the new technology in the form of "*the growing application of new machinery*" took place in *fixed capital*. That implies the new technology has to be "*unit-cost-reducing while productivity increasing*" which would provide the capitalist with new options such as:

- 1- *A price advantage* in competition or,
- 2- *An opportunity to raise total profits*, cet. par., or,
- 3- *A combination of both.*

According to the quote from Marx cited above, "*an increased quantity of raw and auxiliary materials into products thanks to the growing application of new machinery and fixed-capital in general*" implies an increase in the total quantity of commodities supplied in accordance with increased quantity of raw and auxiliary materials *for a 'given' commodity*. In other words, the final quantity supplied increases in accordance with the inputs increased.

New Technology & Changing Composition of Constant Capital

Marx's analysis and predictions on *the tendency of profit rate to fall in the long run* were associated with *an increase in constant capital*. This increase or "added investment" in constant capital, alternatively the increase in the organic composition (c/v) of capital,

contained a *technological innovation* facilitating the application of a more productive method of production *for a 'given' (the same) commodity*. As a result, 'given' the number of laborers and the wage-rate accompanied with less labor-time employed, new technology improved the per capita productivity of the laborer while the exploitation rate (s/v) remained constant, i.e., 100 percent.

Added investment to constant capital in the form of "*the growing application of new machinery*" also implies that not only the cost of fixed capital (c_f) but also the cost of circulating capital (c_c) increases as demand for the *additional raw and auxiliary materials* grows. To put it differently, the added investment in constant capital containing a new technology is *laborer productivity increasing corresponding a progressive cheapening of 'given' (the same) commodities*", cet. par.

Marx had not specified the features of technological innovation contained in "*the growing application of new machinery*." For the sake of simplicity, let's divide Marx's *constant capital* (c) into two components:

- 1- *Fixed capital* (c_f) such as land, plant-site, machinery and tools.
- 2- *Circulating capital* (c_c), i.e., inputs varying in accordance with the increased quantity of commodities supplied, such as energy, raw-materials, intermediary inputs, etc.

Added investment to constant capital (c) in the form of "*the growing application of new machinery*" contains a new technology that leads to an *increase in the composition of capital* (c/v). The features of new technology in "*the growing application of new machinery*" can be described as:

- *Quantity increasing*.
- *(Non-labor) unit cost-reducing*.
- *L-saving* (i.e., laborer- and/or labor-time saving).
- *A combination of the two or three options stated above*.

Plant capacity utilization rate is rather important in price and profit analysis as it affects the unit cost of production of commodities and thereby the rate of profit. Though Marx made no specific reference to plant capacity in Ch. 13, he must have assumed an optimum plant capacity utilization which minimized costs and maximized profits before and after the added investment in new machinery.

Summing up:

- 1- The added investment in constant capital or, alternatively, in "*the growing application of new machinery*" implies the application of *a new technology* or a new method of production *for a 'given' (the same) commodity*.
- 2- The "*growing application of new machinery*" containing a new technology is a product of the *creative mental labor*¹.
- 3- An *ever-increasing quantity of raw and auxiliary materials* to convert into products means that the cost of circulating capital (c_c) increases as output supplied grows *for a 'given' (the same) commodity*.
- 4- Increased total cost of constant capital is due to, and comprises of, the increased costs in both fixed-capital (c_f) and circulating capital (c_c) *for a 'given' (the same) commodity*.

¹ For details on this new concept see H. Gürak 2012 and 2015.

- 5- *The same number of laborers, in the same time, i.e., with less labor* means per capita labor-productivity increases with the growing application of new technology *for a given' commodity*.
- 6- The new technology contained in the new machinery ... *corresponds to a progressive cheapening of 'given' (the same) commodities*.

Important note: The new technology contained in the new machinery involves *no new commodities* but just a new method of production of the 'given' (the same) commodities.

Falling Rate of Profit, 'Given' the Commodities

Marx stated that:

... the gradual growth of constant capital in relation to variable capital must necessarily lead to a gradual fall of the general rate of profit, so long as the rate of surplus-value, or the intensity of exploitation of labor by capital, remain the same.
(Marx, 1974; 212)

In other words:

As c/v grows, the profit rate, $r = s/c + v$, will fall, cet. par.

Let's study what happens to initial values after the application of new technology contained in new machinery, i.e., a new method of production *for a 'given' commodity*.

Initial values supplied by Marx:

$$w_t = 1 \text{ £}$$

$$L_t = 100 \text{ laborers}$$

$$v_t = 100 \text{ £}$$

$$s_t = v_t \quad (\text{rate of exploitation})$$

$$s_t = v_t = 100 \text{ £ (surplus-value)}$$

$$s_t / v_t = 100 \text{ percent and constant}$$

't' denotes time and 'w' the wage-rate. Variations in values 'c', 'v', 's' and 'r' as predicted by Marx.

$$c_t = 50 \text{ £} \quad \text{and} \quad v_t = 100 \text{ £} \quad \text{then} \quad r_t = v_t / c_t + v_t = 100 / 150 = \quad \sim 66 \%$$

$$c_{t+1} = 100 \text{ £} \quad \text{and} \quad v_{t+1} = 100 \text{ £} \quad \text{then} \quad r_{t+1} = v_{t+1} / c_{t+1} + v_{t+1} = 100 / 200 = \quad 50 \%$$

$$c_{t+2} = 200 \text{ £} \quad \text{and} \quad v_{t+2} = 100 \text{ £} \quad \text{then} \quad r_{t+2} = v_{t+2} / c_{t+2} + v_{t+2} = 100 / 300 = \quad \sim 33 \%$$

$$c_{t+3} = 300 \text{ £} \quad \text{and} \quad v_{t+3} = 100 \text{ £} \quad \text{then} \quad r_{t+3} = v_{t+3} / c_{t+3} + v_{t+3} = 100 / 400 = \quad 25 \%$$

Conclusion: With the application of new machinery containing a new technology in the form of added investment in constant capital (c_t), the rate of profit shows a tendency to fall, 'given' the v , s/v and Q *for a 'given' (the same) commodity*.

New Technologies are Vital in Competition

The ‘fatal’ (cut throat) competition among capitalists compels them to seek ever new opportunities, i.e., new technologies, in order to lower the unit costs *for the ‘given’ (the same) commodities*. As long as the ‘*creative mental labor*’² continues to develop and introduce new cost-reducing technologies, this ‘fatal’ (cut throat) competition will continue *for the ‘given’ commodities*.

A production method bereft of new technology risks the capitalist of being wiped-out of the market. Assume that one day, just one capitalist succeeds to survive the competition and gains a monopolistic control over the market *of a ‘given’ commodity*. Would the capitalist with monopoly power be able to again raise the rate of profit in the long-run?

The answer is definitely negative regarding the *long-run* developments in markets. That is because as the market *for a ‘given’ commodity* saturates, demand for it is bound to decline. As demand declines, the plant capacity utilization rate is bound to decline accompanied by increasing unit costs which implies falling rate of profit. Thus the fall in the rate of profit is an inevitable outcome and Marx seems to have underestimated or overlooked this demand aspect of profit rate in the long-run *for ‘given’ (the same) commodities*.

The only exception for full saturation is the demand for foods and, to some extent, the demand for some health items, such as vaccines and some medicine.

Introducing Price & Wage Changes into Analysis

An Alternative Method of Analysis of the “Rate of Profit”

Marx’s intention was to analyze the proper functioning of a real capitalist economy. However, his analyses were based on some concepts, transactions and relations that did not properly reflect the functioning of a capitalist economy. Therefore his conclusions were, though theoretically impressive, misleading or incomplete.

The analysis below is not meant to be in line with Marx’s understanding (approach) but presented as an alternative within the context of the theory of labor-value, in general. In other words, it is an alternative to Marx’ analysis on the “falling rate of profit” where introduction of “new commodities”, the products of “creative mental labor”, play a vital role. “Creative mental labor” is a new concept which is an inseparable component of the labor-power³.

Important note; in Marx’s analysis there are “*new methods of production*”, i.e., new process technologies, *for ‘given’ (the same) commodities* but ‘*no new technologies supplying new products*’. That means as the market *for ‘given’ commodities* saturate, demand for them is bound to decline. As demand declines, the plant capacity utilization rate is bound to decline accompanied by increasing unit costs which implies falling rate of profit. Thus the fall in the rate of profit is inevitable.

Let’s analyze hypothetical competitive market relations from a capitalist(s) point of view, to find out *how “new technologies” and “new commodities” are likely to impact the price-level, wage rate and profit rate*.

² For more information on “creative mental labor” see H. Gürak 2012 and 2015.

³ For details see H. Gürak 2012 and 2015.

Case-1:

Assume a competitive capitalistic economy producing 40 pieces of *the same commodity* at a hypothetical price of, say **5£** per piece, cet. par. There is *no application of new machinery*, i.e., no increase in constant capital, yet.

$$p_t = 5 \text{ £}$$

$$Q_t = 40 \text{ pieces}$$

$$c_t = 50 \text{ £}$$

$$v_t = 100 \text{ £}$$

$$s_t = 100 \text{ £}$$

$$L_t = 100 \text{ laborers}$$

$$TR_t = p_t * Q_t = 5 * 40 = 200\text{£}$$

$$TC_t \text{ or } C_t = c_t + v_t = 50 + 100 = 150 \text{ £}$$

$$\pi_t = TR_t - TC_t = 200 - 150 = 50 \text{ £}$$

$$r_t = \pi_t / c_t + v_t = 50 / 50 + 100 = \sim 33 \%$$

π_t denotes the magnitude of profit, **TR**, the total revenue of capitalist and **TC**, the total cost of production. The rate of profit, (r_t), with a hypothetical price is **33 percent**.

What is likely to happen to the price-level, the wage-rate and the rate of profit after the application of *a new technology in growing application of machinery which reduces unit-cost while increasing the quantity of commodities supplied, for a 'given' commodity?*

New Technology in Machinery Enters the Stage

In the second phase of analysis with price, let's see how a hypothetical "price fall" affects the rate of profit after the application of a new technology in the form of new machinery.

The new machinery requires an additional investment in constant capital increasing it from its initial 50 £ level to 100 £, while output supplied increases from its previous level of 40 to 60 pieces. By assumption 'v_t', 's_t' and 'L_t' remain the same.

As Marx assumed *a progressive cheapening of products* takes place and the capitalist is now in a position to reduce the price from its initial level of 5£ to, say 4£ with the driving motive to eliminate the competitors

New magnitude of profit ' π ' and new rate of profit ' r ' would look like:

Case-2: Price Falls with the Application of New Machinery

$$\text{New } p_{t+1} = 4 \text{ £}$$

$$\text{New } c_{t+1} = 100 \text{ £}$$

$$\text{New } Q_{t+1} = 60 \text{ pieces}$$

$$v_{t+1} = 100 \text{ £}$$

$$s_{t+1} = 100 \text{ £}$$

$$L_{t+1} = 100 \text{ laborers}$$

$$TR_t = p_t * Q_t = 4 * 60 = 240 \text{ £}$$

$$TC_{t+1} = c_{t+1} + v_{t+1} = 100 + 100 = 200 \text{ £}$$

$$\pi_{t+1} = TR_{t+1} - TC_{t+1} = p_{t+1} \cdot Q_{t+1} - TC_{t+1} = 240 - 200 = 40 \text{ £}$$

$$r_{t+1} = s_{t+1} / (c_{t+1} + v_{t+1}) = 40 / (100 + 100) = 20 \%$$

As a result of the decline in the price, the magnitude of profit falls from 50£ to 40£ while the rate of profit falls from 66 percent to 20 percent, given the demand.

This outcome supports Marx's prediction: *The rate of profit falls in the long run.*

A Critical Question

The critical question regarding the new case is: Why should a capitalist, in the real world, make a new investment in more expensive machinery containing a new technology?

In general, there are four major reasons for a capitalist to introduce a new technology *for a given commodity*:

- 1- To increase the magnitude and the rate of profit, ceteris paribus.
- 2- To wipe-out competitors by lowering the market price of commodity.
- 3- To counter-attack a price reduction introduced by his/her competitor(s).
- 4- A combination of any of the three alternatives stated above.

The capitalists in competitive markets have no choice but to seek for, and to apply unit cost-reducing new technologies. Otherwise the capitalists lagging behind technological progress risk of being wiped-out of the market. The new technologies in new and more expensive machinery may cause the rate of profit to fall in competitive markets due to competition. But it's better to survive with a lower rate of profit than being completely wiped-out of the market. So every capitalist is obliged to seek and apply new cost-reducing technologies.

Introducing Variations in 'Demand for Laborers' & the 'Wage-rate'

A new technology to produce *a given (the same) commodity*, not infrequently, requires fewer laborers or labor-time employed than before. In such a situation, a capitalist would, though not enthusiastic about it, be prepared to accept a rise in the wage-level in order to avoid any conflict with laborers which could interrupt production. As a result, neither 'v' (variable cost) nor 's' (surplus value) or 's/v' (exploitation rate) are likely to remain the same.

What is likely to happen to the wage rate and the number of laborers employed when, say a *laborer and/or labor-time saving and quantity increasing, i.e., unit-cost-saving* new technology is applied, given the demand for commodities supplied? And what is likely to happen to both the magnitude and rate of profits?

Fewer Demand for Laborers

Assume that a new *laborer-saving technology* enables the capitalist to sell his commodities at a lower price, say $p = 4 \text{ £}$ while the output supplied increases from 40 to 60 pieces. At the same time, the total cost of constant capital, c , rises from 50 £ to 100 £ while the wage-rate remains unchanged. Due to new technology demand for laborers is halved from 100 to 50.

Case-3: Fewer Laborers Employed

New $L_{t+2} = 50$ laborers

$p_{t+2} = 4 \text{ £}$

$$c_{t+2} = 100\text{£}$$

$$Q_{t+2} = 60 \text{ pieces}$$

$$w_{t+1} = 1 \text{ £}$$

$$LWC_{t+2} = w_{t+2} * L_{t+2} = 1 \text{ £} * 50 \text{ laborers} = 50 \text{ £}$$

$$TC_{t+2} = c_{t+2} + LWC_{t+2} = 100 + 50 = 150 \text{ £}$$

$$TR_{t+2} = p_{t+2} * Q_{t+2} = 4 * 60 = 240\text{£}$$

$$\pi_{t+2} = TR_{t+2} - TC_{t+2} = 240 - 150 = \mathbf{90 \text{ £}}$$

$$r_{t+2} = \pi_{t+2} / c_{t+2} + LWC_{t+2} = 90 / 100 + 50 = 90/150 = \mathbf{60 \%}$$

LWC denotes the total wage cost ($w*L$). The rate of profit increases from its previous level of 20 percent to 60 percent while the magnitude of profit increases from 40 to 90 £, compared to previous **Case-2**, in spite of the application of a more expensive machinery containing new technology.

Wage-rate Rises

Now since laborer per capita is more productive and the rate as well as the size of profit greater compared to **Case-2**, the capitalist can afford a wage-rise demand in order to avoid a conflict with a labor-union. Suppose the new wage level doubles from its previous level of 1£ to 2£, a 100 percent rise. What is likely to happen to both, the magnitude and rate of profits, *cet. par.*

Case-4: Wage-rise takes place

$$\text{New } w_{t+3} = 2 \text{ £}$$

$$p_{t+3} = 4 \text{ £}$$

$$L_{t+3} = 50 \text{ laborers}$$

$$Q_{t+3} = 60 \text{ pieces}$$

$$c_{t+3} = 100 \text{ £}$$

$$LWC_{t+3} = w_{t+3} * L_{t+3} = 2\text{£} * 50 \text{ laborers} = 100\text{£}$$

$$TC_{t+3} = c_{t+3} + LWC_{t+3} = 100 + 100 = 200\text{£}$$

$$TR_{t+3} = p_{t+3} * Q_{t+3} = 4 * 60 = 240 \text{ £}$$

$$\pi_{t+3} = TR_{t+3} - TC_{t+3} = 240 - 200 = \mathbf{40 \text{ £}}$$

$$r_{t+3} = \pi_{t+3} / c_{t+3} + LWC_{t+3} = 40 / 100 + 100 = 40/200 = \mathbf{20 \%}$$

In the end both the laborers and the capitalists would have reasons to be satisfied with the outcome. But, in the long-run, as the markets saturate, the rate of profit for all “*given (the same) commodities*” is bound to fall.

In Conclusion

Marx’s prediction that *the rate of profit will fall in the long run (for ‘given’ commodities)* was not wrong *essentially* but *incomplete or deficient* depending on from which angle you look at it. The profit rate analysis by Marx needs further elaboration and refinement but his followers do not seem to have lived up to him, so far.

Unfortunately Marx, just like A. Smith and D. Ricardo before him, made *no reference to 'new products'* in their profit analysis. Economists advocating labor-value theories, whether of the Marxist or non-Marxist heritage, have to develop and/or further develop "*new*" *labor-value theories*⁴ including:

- 1- Profit analysis with '*new commodities*'.⁵
- 2- The study of the *origin of all new technologies*, i.e. , "*creative mental labor*."⁶
- 3- *Impact of "new" commodities on growth-rate, wage rate and employment.*
- 4- *Analysis of "service sector" output involving technological progress, growth and profit analysis in the largest component of GDP*⁷.

REFERENCES

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⁴ There might be some *unnoticed and/or ignored* academic works on these issues somewhere around the Globe.

⁵ For details see H. Gürak 2012 and 2015.

⁶ "*Creative mental labor*" is the reason why the rate of profit does not fall in the long-run. (see H. Gürak (2012, 2015 and 2020b)

⁷ See H. Gürak 2015.