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## ON THE LAW OF DECLINE IN THE RATE OF PROFIT.

### 1. INTRODUCTION.

As is well known, it has often been alleged that Marx was the first to expound theoretically the law of decline in the average rate of profit. Marx says: "Capitalistic production tends to reduce variable capital more and more relatively to constant capital, which results in a steady elevation of the organic composition of the total capital. The direct consequence of this is that even when the degree of extraction from labour either remains constant or grows, the rate of surplus value comes to be expressed in terms of an ever falling general rate of profit . . . . The fact that the general average rate of surplus value gradually comes to be expressed in terms of a falling general rate of profit, as the capitalistic methods of production improve, can thus be demonstrated to be a necessary, self-evident matter from the point of view of the essential character of capitalistic methods of production . . . . [Expressed in this way,] the law of the falling rate of profit may present itself as a very simple one, but . . . all schools of economists have so far failed to discover this law. . . . [Yet] this law is of great importance to capitalistic production, and it is a mystery which all economists, from Adam Smith downwards, have vainly attempted to solve. It may be said that the differences between the various schools of economists posterior to Adam Smith lie in their various approaches to this problem."

The Marxian theory regarding the law of decline in the average rate of profit has hitherto provoked many criticisms. Most of its critics maintain that even if the organic composition of capital become elevated, the rate of profit can still increase, provided the rate of surplus value increases beyond a certain point, and that consequently

the elevation of the organic composition of capital does not necessarily bring about a decrease in the rate of profit.

The whole controversy hinges, after all, on the point whether or not, in case the organic composition of capital becomes elevated in a capitalistic society, the consequent increase in the rate of surplus value ultimately attains such proportions as to increase the rate of profit. Marx thinks that it does not attain such proportions, while his critics hold that it does. The mere fact that rival contentions exist shows that it is no solution of the issue for both sides simply to assert their respective views as being self-evident. For its solution, it is necessary that the point at issue should be explained afresh, starting from mutually self-evident ground.

Now, it is obvious that if there is a general reduction of real wages or a general extension of the working day, the value composition of capital necessarily becomes elevated and the rate of profit rises, provided that in all other circumstances there are no changes. This may seem to suggest that the Marxian theory can easily be disproved. But the true aim of the Marxian theory is not to contend that the elevation of the value composition of capital for such reasons brings about a decline in the rate of interest. Marx's contention is concerned with the elevation of the organic composition of capital caused by the increase of productive power, not with the elevation of the value composition of capital from any other causes. It is, therefore, wrong to criticise the Marxian theory from this angle. In determining whether the Marxian theory is correct or not, attention must be confined to those cases where the organic composition of capital becomes elevated by the increase of productive power.

I have so far paid no attention to special circumstances which enter into the average of rates of profit. If these circumstances are taken into consideration, it can be proved that the rate of profit (price) can even rise, instead of falling, when the organic composition of capital becomes

elevated, even if it be assumed that the rate of the surplus value (value) is constant. From this point of view, the Marxian theory is open to criticism. Let me explain this point further. If the idea of the average of the rates of profit is carefully thought out, we see that the organic composition of capital, in so far as it concerns the production of goods for capitalist consumption, is not to be taken into consideration either in the determination of the rate of surplus value (value) or in the determination of the rate of profit (price), no matter what it may be. It follows therefore, that the elevation or fall of the organic composition of capital, which is concerned with the production of goods for capitalist consumption, affects neither the rate of surplus value (value) nor the average rate of profit (price), provided there is no change in all other circumstances. Yet, the organic composition of the total social capital undergoes a certain change. To put it in a different way, the rate of profit (price) remains unaffected by an elevation in the organic composition of the total social capital caused by changes in productive power in regard to goods for capitalist consumption, if the other conditions remain the same. Further, if the organic composition of capital concerned with the production of goods in capitalist demand is to be elevated to the extent of causing an elevation of the organic composition of the total social capital, when there is a rise in the average rate of profit (price) on account of changes in productive power, the elevation of the organic composition of the total social capital due to changes in productive power causes a rise in the rate of profit (price). From this point of view, therefore, it is easy to point out the error in the Marxian theory.\* But it is only fortuitously that the organic composition of capital concerned with the production of goods in capitalist demand undergoes such

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\* It was L. v. Bortkiewicz that proved this: Zur Berichtigung der grundlegenden theoretischen Konstruktion von Marx im dritten Band des „Kapital“ (*Jahrb. f. Nationalökonomie und Statistik*, 1907.)

special changes, and therefore no amount of discussion of such fortuitous cases can disprove the Marxian theory concerning the general law of development in capitalistic society. An examination of the Marxian theory must be made where no such special circumstances exist.

In the present article, I propose to examine the Marxian theory as applied to cases where the elevation of the organic composition of capital is due to the growth of productive power and where there exist no special circumstances of the kind above mentioned.

In order to come directly to grips with the central issue let us postulate that we have to do in the present article with a simple and pure industrial capitalistic society. In this society, there is absolutely free competition, and currency moves in consonance with productive activity (free, therefore, from obstacles which arise from currency itself). The period of turn-over of capital is one year and is concurrent in all branches of production. There is no stagnation of money capital. Nor is there any fixed capital, and there is a single kind of means of consumption, means of production and labour power. For the sake of simplicity of exposition, let us use the following symbols:  $a$  (amount of the means of production required for the production of one unit of money);  $a_1$  (amount of the labour power necessary for the production of one unit of money);  $a_2$  (amount of the means of production required for the production of one unit of means of consumption);  $a_3$  (amount of the labour power required for the production of one unit of means of consumption);  $\beta$  (amount of the means of production required for the production of one unit of means of production);  $b$  (amount of the labour power required for the production of one unit of means of production);  $p$  (price of means of consumption);  $k$  (price of means of production);  $q$  (wage);  $m'$  (rate of surplus value);  $p'$  (rate of the average profit);  $c$  (constant capital);  $v$  (variable capital); and  $m$  (surplus value).

2. THE MAIN ARGUMENT

I shall first examine the Marxian theory, and this examination will be carried on by assuming, in turn, the following five instances :

Instance 1. Let us now assume:  $a_1 = \frac{2}{3}$ ,  $a_2 = \frac{1}{30}$ ,  $a_3 = \frac{2}{3}$ ,  $a_4 = \frac{1}{30}$ ,  $\beta = \frac{2}{3}$ ,  $b = \frac{1}{30}$ , and  $q = 5p$ .

In such a case, we obtain the three equations :

$$1 = \left( \frac{2}{3} k + \frac{1}{30} \cdot 5p \right) (1 + p') = p = k$$

as the standards by which to determine the price compositions of money, means of consumption and means of production respectively. Accordingly,  $p=1$ ,  $k=1$ , and  $p'=20\%$ . By this we know that the price compositions of money, means of production and means of consumption are all  $\frac{2}{3} k$ ;  $\frac{1}{30} \cdot 5p$ ;  $\left( \frac{2}{3} k + \frac{1}{30} \cdot 5p \right) p' = 4c : 1v : 1m$  respectively. This price composition of capital ought to be equal to the price composition of the total social capital. It ought also to be equal to the value composition of the total social capital.

Instance 2. Let it now be assumed that in a case like this, changes occur in the technical composition of capital in the branch of the production of means of consumption and in the branch of the production of means of production, resulting in:  $a_2 = \frac{401}{600}$ ,  $a_4 = \frac{199}{6000}$ ,  $\beta = \frac{401}{600}$ , and  $b = \frac{199}{6000}$ .

In such a case, the three equations :

$$1 = \left( \frac{2}{3} k + \frac{1}{30} \cdot 5p \right) (1 + p')$$

$$p = k = \left( \frac{401}{600} k + \frac{199}{6000} \cdot 5p \right) (1 + p')$$

are obtained as the standards by which the price compositions of money, means of consumption and means of production are determined respectively. Accordingly,  $p=1,001$ ,  $k=1,001$ ,

and  $p' = 19.88012\%$ . By this we know that the price compositions of means of consumption and means of production are all  $\frac{401}{600}k : \frac{199}{6000} \cdot 5p : \left( \frac{401}{600}k + \frac{199}{6000} \cdot 5p \right) p' = 4.030151c :$

$1v : 1m$ . Consequently, if it is assumed that money is not actually produced, the price composition of the total social products ought to be the same as this. Moreover, as, in that case, the value compositions of capital in all branches of production are to be the same, the value composition of the total social products ought to be the same too.

When Instance 1 is compared with Instance 2, it will be noticed that in the case of Instance 2 the organic composition of capital is of a higher order than in the case of Instance 1, while the rate of profit is lower. That is to say, as Marx anticipated, the elevation of the organic composition of capital is necessarily associated with a reduction of the rate of profit. What must not be overlooked here is, however, that there is a simultaneous rise in price.

Seeing that this rise in price occurs where there are changes in the methods of producing means of production and means of consumption only, all other circumstances remaining unchanged, it is attributable solely to the changes in the methods of producing means of production and means of consumption. Now, the elevation of the organic composition of capital in a capitalistic society is due to the desire to lower the cost of production so as to gain surplus profit—which, in the end, leads to a fall in price. The changes in productive power such as are assumed in Instance 2 are then as a matter of fact impossible, except where the law of the progressive increase of the cost of production rules. The elevation of the organic composition of capital is, to say the least, possible only where it does not cause a rise in price.

Instance 3. Now, let us suppose that the elevation of the organic composition of capital to the extent assumed in Instance 2 takes place, with no change occurring in price. For this to be possible,  $a_2$ ,  $a_3$ ,  $\beta$ , and  $b$  have only to be



$\frac{1}{1.001}$  times the size of what they are assumed to be in Instance 2. That is to say,  $a_1 = \frac{4100}{6006}$ ,  $a_2 = \frac{199}{6006}$ ,  $\beta = \frac{4100}{6006}$ , and  $b = \frac{199}{6006}$ . For if the changes in the methods of pro-

duction are as stated, the equations to be given as the standards by which to determine the price compositions of money, means of consumption and means of production respectively ought to be

$$1 = \left( \frac{2}{3} k + \frac{1}{30} \cdot 5p \right) (1 + p')$$

$$p = k = \left( \frac{4010}{6006} k + \frac{199}{6006} \cdot 5p \right) (1 + p')$$

and according to these equations,  $p=1$ ,  $k=1$ , and ( $p'=20\%$ ) will result. By these equations, the price compositions of means of consumption and means of production will both be  $\frac{4010}{6006} k : \frac{199}{6006} \cdot 5p : \left( \frac{4010}{6006} k + \frac{199}{6006} \cdot 5p \right) p' = 4.030951 c : 1v : 1.006030m$ . Supposing that money is not actually produced, the price composition of the total social products ought to be the same as this. Moreover, as, in that case, the value compositions of capital in all branches of production are to be the same, the value composition of the total social products ought to be the same too.

By comparing Instance 3 with Instance 1, it will be seen that while there are changes neither in the prices of all commodities nor in the rate of profit, the organic composition of capital is elevated. This disproves Marx's anticipation that the elevation of the organic composition of capital necessarily goes hand in hand with a reduction of the rate of profit. Nor is this all. As has already been explained, it is usual in a capitalistic society for the elevation of the organic composition of capital to take place only where it brings surplus profit by lowering the cost of production—which, in the end, brings about a fall in price.

Instance 4. Consequently, let us now assume that  $a_1$ ,  $a_2$ ,  $\beta$ , and  $b$  are somewhat smaller than we assumed them to

be in Instance 3 and are  $a_2 = \frac{401}{601}$ ,  $a_3 = \frac{199}{6010}$ ,  $\beta = \frac{401}{601}$ , and  $b = \frac{199}{6010}$ . In this case, as the standards by which to determine the price compositions of money, means of consumption and means of production, the three equations:

$$1 = \left( \frac{2}{3} k + \frac{1}{30} \cdot 5p \right) (1 + p')$$

$$p = k = \left( \frac{401}{601} k + \frac{199}{6010} \cdot 5p \right) (1 + p')$$

can be obtained, and according to these equations,  $k = 0.99933444$ ,  $p = 0.99933444$ , and  $p' = 20.07992\%$ . From this it is found that the price compositions of means of production and means of consumption are both  $\frac{401}{601} k : \frac{199}{6010} \cdot 5p : \left( \frac{401}{601} k + \frac{199}{6010} \cdot 5p \right) p' = 4.030151c : 1v : 1.010050m$ . Assuming that money is not actually produced, the price compositions of the total social products ought to be the same as this. Moreover, as, in such a case, the value compositions of capital in all branches of production are to be the same, the value composition of the total social products ought to be the same too.

By comparing Instance 4 with Instance 1, it will be found that with the elevation of the organic composition of capital, there is a rise in the rate of profit, and the prices of products in the branches of production, in which the methods of production have undergone such changes as signify the elevation of the organic composition of capital, have fallen in comparison with those in the branches of production where no such changes have occurred.

A study of the above-mentioned four instances one by one reveals the following facts. Such changes in the methods of production as cause depreciation of the prices of products in the branches of production in which they take place, in comparison with the prices of products in the branches of production where they do not occur, cause the average rate of profit to rise, even when they are of a

kind to bring about the elevation of the organic composition of capital. And the elevation of the organic composition of capital in a capitalistic society usually takes place because it brings prices down more or less. Accordingly, the elevation of the organic composition of capital in a capitalistic society does not cause a decline of the average rate of profit, on the contrary, it operates to bring about a rise in the average rate of profit. Marx says: "He (the capitalist) pockets the margin between the prices of producing commodities and those of other commodities produced at a higher cost of production. (That he can do so accounts for his attempts to elevate the organic composition of capital). . . . Competition makes this practice general and amenable to a general law. In this way, the decline of the rate of profit manifests itself." But, we have proved, just the contrary is the case. The widespread practice of elevating the organic composition of capital so as to bring down the cost of production necessarily causes a rise in the general rate of profit, provided there are no changes in other circumstances.

This fact was proved by Tugan Baranowsky long ago. He says: "(If it is assumed that social capital consists of variable capitals exclusively and the rate of surplus value—which ought to agree with the rate of profit in this instance—is 100%, and if it is further assumed that social products can be expressed in the amount of the unitary use value—Shibata) we obtain the formula  $\frac{a}{2}v + \frac{a}{2}m = a$ . In this formula, "a" denotes the total amount of social products (reduced to the unitary use value). . . . Let it be assumed that (in this case) half the number of the labourers can be replaced by machinery. . . . To simplify the presentation, let it be further assumed that the variable capital, replaced by machinery, (which is expressed in the unitary use value) is equal to the machinery (expressed in the unitary use value), . . . . The amount of articles produced under the new technical conditions (expressed in the unitary

use value) cannot diminish in this case, for if it diminishes, it would be economically meaningless to replace labour power by machinery. (Let us assume, therefore, that the amount of the goods produced under new technical conditions—expressed in the unitary use value—is the same as the amount of the goods produced with labour power only) . . . . Then, we must admit that the surplus products (expressed in the unitary use value) suffer no diminution of amount by the use of machinery. That is to say, we must admit that it remains  $\frac{a}{2}m$ . . . . (Accordingly, the rate of profit is  $\frac{a}{2}m : \left(\frac{a}{4}c + \frac{a}{4}v\right) = 100\%$ ). Thus, the rate of profit remains at 100%. Notwithstanding the changes in the organic composition of capital, that is, in spite of the fact that one half of the variable capital has been converted into constant capital, it has undergone no change. . . . In the above-mentioned case, . . . . it is assumed that the total amount of social products (expressed in the unitary use value) suffers no change. . . . But since, as a matter of fact, the amount of products—expressed in the unitary use value—increases when machinery is used, as compared with when manual labour is employed, the rate of profit is bound to increase in consequence of the relative increase of constant capital. . . . Thus, we know that the replacement of labour power by machinery, so far from tending to lower the rate of profit, stimulates the rate of profit to rise.\* This theory of Tugan Baranowsky's would be tenable, if there were only one kind of social products, but social products are by no means of one kind. So, the question remains whether it can be justified when there is more than one kind of social products. Baranowsky subsequently treated this aspect of the question, but he failed to demonstrate convincingly the validity of his theory as applied to such cases, for the further he went, the more

\* Tugan-Baranowsky: *Theorie und Geschichte der Handelskrisen in England*, 1901. S. 212-5.

errors his argument revealed.\*\* Much less successful was Moszkowska in her attempts to deal more minutely with this problem, for in his work even more errors appeared.\*\*\*

Now, I have examined the Marxian theory and, I hope, have made it clear that the elevation of the organic composition of capital in a capitalistic society does not, of itself, cause a reduction of the average rate of profit, but that rather it tends to bring about a rise of the average rate of profit. However, this by no means proves that the fall of the organic composition of capital brings about a fall in the rate of profit. Nor does it imply that a fall of the average rate of profit may not be simultaneous with the elevation of the organic composition of capital. It simply shows that if the elevation of the organic composition of capital and the fall of the average rate of profit really happen at the same time, this phenomenon requires to be explained in a different way from the one which Marx adopted.

If the elevation of the organic composition of capital and the decline of the average rate of profit really take place at the same time, it is presumably due to the following circumstance. The decline of the average rate of profit and the fall of the value composition of capital, caused by the increase of real wages (or the shortening of the working day), and the rise of the average rate of profit and the elevation of the value composition of capital, due to changes in the methods of production, operate conjointly; but, owing to the fact that the forces that elevate the value composition of capital, due to changes in the methods of production, operate more strongly than those responsible for its fall arising from the increase of real wages (or the shortening of the working day), there is, after all, an elevation in the organic composition of social capital. On the other hand, because the operation of the

\*\* Tugan-Baranowsky: *Theoretische Grundlagen des Marxismus*, 1905, S. 176 ff.

\*\*\* Natalie Moszkowska: *Das Marxsche System*, 1929, S. 41 ff.

decline of the average rate of profit due to the increase of real wages (or the shortening of the working day) is superior in force to the operation of its rise on account of changes in the methods of production, there is a decline in the average rate of profit. For instance, this phenomenon is perhaps brought about in the following way:—

Instance 5. Suppose, now, that in the branch of producing means of consumption and in the branch of producing means of production, the same changes as are assumed in Instance 4 have taken place in the methods of production and that real wages have at the same time risen to  $q=5.02p$ .

In this case, the three equations:

$$1 = \left( \frac{2}{3} k + .5.02p \right) (1 + p')$$

$$p = k = \left( \frac{401}{601} k + \frac{199}{6010} \cdot 5.02p \right) (1 + p')$$

can be obtained as the standards by which to determine the price compositions of money, of means of consumption and of means of production. Accordingly,  $p=0.99932963$ ,  $k=0.99932963$ , and  $p'=19.984508\%$ . By this it will be seen that the price compositions of means of consumption and means of production are both  $\frac{401}{601} k : \frac{199}{6010} \cdot 5.02p : \left( \frac{401}{601} k + \frac{199}{6010} \cdot 5.02p \right) p' = 4.0140944c : 1v : 1.0020421m$ . Assuming that money is not actually produced, the value composition of the total social products ought to be the same as this. Moreover, as, in this case, the value compositions of capital in all branches of production are to be the same, the value composition of the total social products ought to be the same too.

Compare this Instance 5 with Instance 1, and it will be found that while there is an elevation in the organic composition of capital, there is a fall in the rate of profit, and that the prices of the products in the branches of production in which the methods of production have undergone such changes as to cause the elevation of the organic composition

of capital have declined as compared with those of the products in the branches of production in which no such changes have taken place. If the elevation of the organic composition of capital and the decline of the average rate of profit actually take place simultaneously, it may be due to such circumstances. Superficially, it may appear as if the elevation of the organic composition of capital (such as causes the decline of the prices of the products in the branches of production where it takes place, as compared with those of the products in the branches of production where it does not take place) brought about the decline of the general rate of profit, but this is by no means the case.

(I have thus far maintained that if the elevation of the organic composition of capital in a capitalistic society brings about a rise in the rate of profit, it is because it is intended to secure surplus profit by reducing the cost of production—which, after all, means the lowering of prices. Conversely, any elevation of the organic composition of capital which is calculated to bring surplus profit by reducing the cost of production—which, after all, leads to lower prices and a higher average rate of profit—is always welcome to capitalists, no matter what are its effects in other directions. This fact presents, as was pointed out by Ricardo already, a very important problem for us to study.

The economic life of mankind is maintained and developed by means of incomes. And production in a capitalistic society is carried on with profits accruing to capitalists. Herein lies a problem of great consequence. For example, if we compare Instance 4 with Instance 1, we see that the rate of profit is higher in the case of Instance 4 than in the other case. Such changes as are assumed in Instance 4 are, therefore, naturally welcomed in a capitalistic society and, accordingly, are carried out. But the rate of income, that is, the amount of income ( $v+m$ ) per unit of capital ( $c+v$ ), is  $\frac{1v+1.010050m}{4.030151c+1v} = 39.960033\%$  in the case of Instance 4, while it is  $\frac{1v+1m}{4c+1v} = 40\%$  in the case of Instance

1. Assuming the amount of capital to be ¥100,000,000 in both cases, therefore, the income accruing from it will fall from ¥40,000,000 in the case of Instance 1 to ¥39,960,033 in the case of Instance 4. This bare statement of facts may lead one to imagine that since the prices of products fall at the same time as the amount of income decreases, the income calculated on the basis of real things may increase. But as a matter of fact, not only is such an inference not permissible, but an even grater decrease is inevitable in the amount of income calculated on the basis of real things. Even assuming the amount of income calculated on the basis of real things to be equal to the amount already given, namely, ¥40,000,000 in the case of Instance 1 and ¥39,960,033 in the case of Instance 4, the amount of the corresponding means of production is  $40,000,000 \times \frac{4c}{1v+1m} = 80,000,000$  in the case of Instance 1 and  $39,960,033 \times \frac{4.030151c}{1v+1.010050m} = 80,199,889$  in the case of Instance 4. In the actual process of production, however, the means of production to be used for production in the current year are already turned out by the production of the previous year. (This applies to the case where, as is assumed in the present article, the cyclic period of capital is one year. Where the case is different, the situation must undergo certain necessary changes. This does not fundamentally alter the present argument however.) The amount of the means of production cannot, therefore, be more than 80,000,000 in the case of Instance 4. If so, the amount of the income calculated on the basis of real things will, at the most, be  $39,960,033 \times \frac{80,008,000}{80,1019,881} = 39,900.242$  in the case of Instance 4. Nor does this explain the whole matter. When the kinds and ratios of the means of production required for the production of goods vary according to the kinds of goods produced, changes in the methods of production cause changes in the requisite amounts of the means of production of various kinds. As the amount for



consumption of the means of production concerned is to be conditioned by the existing amount of that means of production which shows the highest rate of increase in the amount required, the actual requisite amounts of the other means of production will be lowered to that extent. Such being the case, it is impossible to say that the entire quantities of the means of production in existence in a society will always be employed. The amount of income calculated on the basis of real things must in consequence be at a still lower level.

### 3. CONCLUSION.

What I have proved in the preceding chapter may be summed up as follows: The elevation of the organic composition of capital in a capitalistic society does not, of itself, constitute a cause of the decline of the average rate of profit, which is regarded as dominant in capitalistic society; on the contrary, it is the cause of the rise of the average rate of profit. Granting that the elevation of the organic composition of capital and the decline of the average rate of profit are taking place simultaneously in capitalistic society, the cause of the decline of the average rate of profit must be sought elsewhere than in the elevation of the organic composition of capital.

K. SHIBATA.