

## PART II

## FULL FLOWERING OF THE CLASSICAL SURPLUS MODEL, 1800 – 1870

## CHAPTER 4

## DAVID RICARDO

In presenting Ricardo's work, I am going to concentrate on only Ricardo's concern with the origin of profits, the forces which affects the level of profits, the relationship between rents and profits, and the relationship between rents and profits, and the relationship between profits and wages:

“The produce of the earth – all that is derived from its surface by the united application of labour, machinery, and capital, is divided among three classes of the community; namely the propriety of the land, the owner of the stock or capital necessary for its cultivation, and the labourers by whose industry it is cultivated. But in different stages of society, the proportions of the whole produce of the earth which will be allotted to each of these classes, under the names of rent, profit, and wages, will be essentially different; depending mainly on the actual fertility of the soil, on the accumulation of capital and population, and the skill, ingenuity, and instruments employed in agriculture. To determine the laws which regulate this distribution, is the principal problem in Political Economy.” [Ricardo, *Principles*, p. 5]

To carry out this discussion it will also be necessary to present Ricardo's labor theory of value. Our presentation will take place in three parts – the first is devoted to Ricardo's *An Essay on the Influence of a Low Price of Corn on the Profits of Stock* (1815); the second briefly to the

transition from the *Essay* to *On the Principles of Political Economy and Taxation* (1821), and the third to the chapters in *Principles*.

### **An Essay on the Influence of a Low Price of Corn on the Profits of Stock**

#### Historical Background

In the decade following Napoleon's initial defeat in 1815, there was no matter of national economic policy in Britain that aroused more attention, controversy, and hostility than that surrounding the regulation of the 'corn trade.' Ricardo's *Essay*, published on 24 February 1815, was intended as a contribution to the debates on the 'Corn Law' expected to take place in the House of Commons in March.

The matter was generally perceived as a contest of power between the landed classes, who controlled the Parliament, and the country at large. The war, lasting from roughly 1793 to 1815, had enhanced the position of agriculturalists, both landlords and farmers, and had sparked an investment boom in land improvements. Since European supplies of 'corn' (a generic term used to refer to grains in general—most particularly wheat, barley, and oats) were either cut-off entirely or unreliable throughout most of the war, and population growth was especially rapid, a great stimulus was given to domestic production. It was a source of both economic and patriotic pride to the agriculturalists that they had successfully responded to the wartime emergency and brought hundreds of thousands of acres of previously unproductive lands into tillage. As the cessation of hostilities between England and the continent approached, it was widely believed that were English ports reopened to imported grains corn prices would plummet and the vaunted wartime land improvement bankrupted. At the impetus of landlords, Parliamentary committees were formed in 1813 and 1814 to search for remedial measures. In 1815, the landed classes

successfully pushed through parliament a bill which virtually prohibited the importation of all foreign grains. The battles over the Corn Law in 1815 and those continuing in subsequent years polarized English society and symbolized the struggle of the following several decades for both economic and political power between the landed and the middle classes.

Ricardo's *Essay on Profits* was thus as much polemic as it was scientific. Its objective was to argue upon the grounds of the 'Principles of Political Economy' for "leaving the importation of corn unrestricted by the law." Its infamous conclusion was "that the interest of the landlord is always opposed to the interest of every other class in the community."

The *Essay on Profits* followed closely on the heels of pamphlets by Thomas Malthus, Richard Torrens, and Edward West which detailed a theory which has since been called the "Ricardian theory of rent." Although much the same theory is contained in the *Essay*, Ricardo claimed no originality for it. His contribution was to integrate that theory along with the Malthusian theory of wages and his own already formulated views on profits into a coherent and complete explanation of the distribution of income. It led, moreover, to a startling conclusion regarding the ultimate effects of the accumulation of capital. Its simplicity and elegance, as will be seen below, have rendered it one of the most admired creations of the human imagination.

### The Pure Corn Model

Ricardo begins the *Essay* by asking the reader to consider "the first settling of a country rich in fertile land, and which may be had by anyone who chooses to take it." He then discusses the factors which in such circumstances will *regulate profits and the rate of profit*. We propose to formalize his argument in the following way (discussion of the correspondence between

Ricardo's argument and the formalization being proposed below will be postponed to later paragraphs):

Imagine a society in which corn is produced by means of labor (productive activity) and itself. We thus incorporate Sraffa's interpretation of the outset. Assume furthermore, that production takes exactly one year, that the production coefficient for corn is fixed, and that land of a uniform quality exists in abundance. The annual process of production in such a society might be depicted in the following way:

$$\text{Corn} + \text{Labor} \Rightarrow \text{corn},$$

where the arrow means "produces in one year" and the units in which labor is measured are "man-years." The 'quantity relations' between corn and labor as inputs and corn as output may be expressed more explicitly as

$$C_c + L_c \Rightarrow C$$

where  $C_c$  is the quantity of corn used to produce  $C$  units of corn and  $L_c$  is the quantity of direct labor necessary to produce  $C$  units of corn. It is convenient to redefine the units in which corn is measured such that the gross output of corn,  $C$  becomes the unit of measurement. By so doing, the quantity relations may be written

$$c + \gamma \Rightarrow 1 \text{ unit of corn.}$$

where,  $c = C_c/C$  (it is also called a production coefficient) the quantity of corn necessary to produce a unit of corn, and  $\gamma$  is the quantity of labor required to produce a unit of corn.

The convenience of this respecification is that it makes it easier to discuss outputs of corn other than  $C$  and the concomitant input requirements which, accordingly, will be other than  $C_c$  and  $L_c$ . Thus, since  $c$  is fixed, if  $Y$  units of corn are being produced,  $Yc$  units of corn and  $Y\gamma$

units of labor will be necessary to produce it. Thus also, the net output of the system will be  $Y - Y_c$ . Finally, assume that the laborers' wages are paid entirely in corn, let  $\alpha$  denote the corn wage per unit of labor, and let  $w$  denote the money corn wage per unit of labor:  $w = \alpha p_c$ . The total wage bill (in corn) thus becomes  $Y\gamma\alpha$  and total profits (also in corn) become  $Y - Y_c - Y\gamma\alpha$ . Since the capital advanced by capitalists consists of the corn that they advance as seed,  $Y_c$ , and the corn that they advance as wages,  $Y\gamma\alpha$ , the rate of profit, which will be denoted  $r$ , may be written

$$r = (Y - Y_c - Y\gamma\alpha)/(Y_c + Y\gamma\alpha)$$

$R$  is clearly a pure number, since it is a ratio of physically homogeneous stuff (corn), and independent of valuation. The latter observation implies that even if other commodities were being produced in addition to corn, if competition enforces uniformity in the rate of profit in all branches of production, then that uniform rate of profit must be the one prevailing in the production of corn. Hence we may make sense of Ricardo's preposition in the *Essay on Profits* that "when the profits on agricultural stock, by supposition, are fifty per cent, the profits on all other capital, employed either in ... rude manufactures ... or in foreign commerce ... will be also fifty percent."

*Example of the above presentation*

Let  $c = .5 p_c$ ,  $l = .25$ , and let  $w = l p_c$ , thus we get the following  $(.5c p_c + .25l w)(1 + r) = p_c$

Now substituting  $w = l p_c$  we get

$$(.5p_c + .25p_c)(1 + r) = p_c \text{ or}$$

$$(.75c p_c)(1 + r) = p_c \text{ or}$$

$$r = (1 - .75)p_c / .75p_c = .25 / .75 = 33\%$$

Since  $r$  is determined independent of valuation or prices, it must rule in the entire economy, especially the manufacturing sector which uses corn as an input. This can be seen in the following example:

$$(10c_c p_c + 5L_c w)(1 + r) = 20p_c$$

$$(2m_c p_c + 2L_m w)(1 + r) = 4p_m$$

Now letting  $w = l_c p_c$  and then putting into production coefficient form and simplifying we get

$$(.75c_c p_c)(1 + r) = p_c$$

$$(1m_c p_c)(1 + r) = p_m$$

Thus we can readily see that  $r$  is determined in the corn sector alone where  $r = 1/3$ . Now if we let  $p_c = 1$ , then we can solve for  $p_m$  ( $p_m = 1.33$  in this case). Thus we can also see that prices in the manufacturing sector is dependent on  $p_c$  and  $r$  (which are determined solely within the corn sector) and not vice versa.

In this setting, Ricardo made two arguments concerning profits:

- (a) Profits will increase if wages fall, and vice versa (Ricardo, *Essay*, p. 11).
- (b) Profits will increase if improved methods of production are introduced which reduces  $c$  or  $\gamma$ . (Ricardo, *Essay*, p. 11)

To prove both of these arguments let us go back to our original price model:

$$(c p_c + \gamma w)(1 + r) = p_c$$

Now reworking the equation we get

$$r = (p_c - c p_c - \gamma w) / c p_c + \gamma w$$

- (a) working with wages let us consider the following situations
  - (i)  $w = 0$  then  $r = (1 - c) / c =$  maximum rate of profit =  $R$

(ii)  $r = 0$  then  $w = (p_c - cp_c)/\gamma = (1 - c)/\alpha$  which is the maximum real wage in terms of corn

(iii)  $r > 0$  and  $w > 0$  then  $r = (1 - c - \gamma\alpha)/c_c + \gamma\alpha$  so as  $\alpha$  increases  $r$  decreases.

This can be shown with a graph based on the above numerical model - let  $c = .5$ ,  $\gamma = .25$ , and  $w = \alpha p_c$ ; now the rate of profit can be expressed as follows

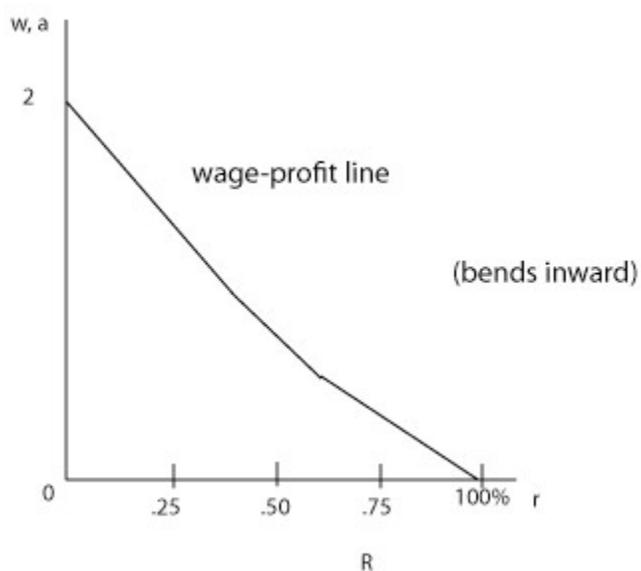
$$r = 1 - .5 - \alpha.25/.5 + .25\alpha = .5 - .25\alpha/.5 + .25\alpha$$

So when  $\alpha = 0$ ,  $r = R = 100\%$

So when  $\alpha = 1/2$ ,  $r = 60\%$

So when  $\alpha = 1$ ,  $r = 1/3\%$

So when  $\alpha = 2$ ,  $r = 0$



This clearly shows the inverse relationship Ricardo posited in his *Essay* (also clearly shows that profits originate in the surplus).

(b) working with agricultural improvements we can easily see that any reductions in  $c$  or  $\gamma$  (given  $\alpha$ ) increases the surplus for profits while at the same time reducing the amount of corn

capital needed for production - therefore  $r = 1 - c - \alpha\gamma/c + \gamma\alpha$  must increase - again showing that the surplus is the origin of profits – that is profits are created in the sphere of production.

### Corn-Land Model

Ricardo then takes up the much more important circumstances which arise “after all the fertile lands in the immediate neighborhood of the first settlers were cultivated.” In such a case, if population increased and more food was required, then it might only be obtainable from land which was “less fertile” or “not so advantageously situated.” The annual production in such a ‘state of society’ would be tabulated as

Corn + labor + land of the first quality => corn

Corn + labor + land of the second quality => corn

Explicitly, the quantity relations might be written

$$C_{c1} + L_1 + S_1 \Rightarrow C_1$$

$$C_{c2} + L_2 + S_2 \Rightarrow C_2$$

Here, the symbols are given the following meaning:  $C_{ci}$  is the quantity of corn used to produce  $C_i$  units of corn on land of the  $i^{\text{th}}$  quality,  $S_i$ , and  $L_i$  is the quantity of labor required to produce it.

The meaning to be given to the statement that land of the second quality is “less fertile” or “less advantageously situated” than land of the first quality is therefore that  $(C_2/(C_{c2} + L_2w))$  is less than  $(C_1/(C_{c1} + L_1w))$ , the terms of which are the output/capital ratios of capital employed in the two lands.

Since competition among capitalist farmers may be assumed to equalize the rate of profit obtained on all the different lands, a ‘rent’ will arise on the better land. This rent will be equal to the difference between the gross output obtained on the better land and the capital advanced on

such land plus the profit thus obtained at the uniform rate. If there is unutilized land of the worst quality, competition for tenants amongst the owners of such land may be expected to reduce the rent obtainable from it to zero, or the least necessary to recompense the landlord for the trouble of attending to the lease of his land. The general and uniform rate of profit will therefore be determined by the ratio of the corn profit to the expenses of production (in corn) on the worst land under cultivation. In Ricardo's words, "the general profits of stock" are "regulated by the profits made on the least profitable employment of capital in agriculture."

(i) Formally, the 'competitive requirements' of uniformity of the rate of profit and zero rent on the worst land in cultivation may be written as

$$(C_{c1}p_c + L_1w)(1 + r) + v_1p_c = C_1p_c$$

$$(C_{c2}p_c + L_2w)(1 + r) = C_2p_c$$

where  $v_1p_c$  is the rent of the land of the first quality in value terms or  $v_1$  is the rent in terms of a quantity of corn.

These expressions simply say that the gross receipts of the capitalist must equal the expenses of production plus profit plus rent. Clearly,  $r$  is determined solely by the no-rent equation:

$$1 + r = C_2p_c / (C_{c2}p_c + L_2w) \text{ or}$$

$$r = [C_2p_c / (C_{c2}p_c + L_2w)] - 1 = [C_2 / (C_{c2} + \alpha L)] - 1 \text{ since } w = \alpha p_c$$

$$r = (C_2 - C_{c2} - \alpha L) / (C_{c2} + \alpha L) = \text{surplus (profit) / capital required for production (all in corn)}$$

With  $r$  determined,  $v_1p_c$  or  $v_1$  can now be determined:

$$v_1p_c = C_1p_c - (C_{c1}p_c + L_1w)(1 + r)$$

substituting the value of  $r$  from above and  $\alpha p_c$  for  $w$  we get

$$v_1 = C_1 - (C_{c1} + \alpha L_1) (C_2)/(C_{c2} + \alpha L_2)$$

If it is now supposed that population continues to advance, and it is necessary to bring still worse land into cultivation we come to the most startling result of the model. In Ricardo's words, "by bringing successively land of a worse quality, or less favorably situated into cultivation, rent would rise on the land previously cultivated, and in precisely the same degree would profits fall; and if the smallness of profits do not check accumulation, there are hardly any limits to the rise of rent and the fall of profit." Indeed, as the model clearly shows, with the advance of population, profits will fall towards zero and rents will engross increasing amounts of the surplus. In one of the classic understatements in the history of economic thought, Ricardo remarks, "This is a view of the effects of accumulation which is exceedingly curious, and has, I believe, never before been noticed."

Numerical Example (straight from Ricardo's *Essay*)

$C_{ci} + \alpha L_i$ (in corn) $C^*_{ci}$	$C_i$	$C_i - C^*_{ci}$	R	$v_1$	$v_2$	$v_3$	$v_4$
200	300	100	50%	0	14	28	40
210	300	90	43%	N.A.	0	14	27
220	300	80	36%	N.A.	N.A.	0	14
230	300	70	30%	N.A.	N.A.	N.A.	0

It should not be hard for the reader to see the connection of this argument to the Corn Law. In England, which was already a densely populated country, tillage had been already carried to quite unproductive lands, especially during the war. As a result, rents had risen--hence

the wartime prosperity in agriculture (indeed, during Parliamentary debates of 1813-1815 it was claimed that rents had tripled). It follows that if imports of grain were prohibited and population continued to increase, it would be necessary to extend cultivation to even less fertile lands, leading to higher rents and lower profits. Assuming, as the English middle classes generally did, that profits are accumulated and rents are expended in extravagant living, capital would increase progressively more slowly relative to population; wages would consequently also fall. In the process, rents would be continuously increasing, and hence we are led to Ricardo's conclusion that "the interest of the landlord is always opposed to the interest of every other class in the community." On the other hand, the landlords' fears of the consequences of free importation are also vindicated. For if gains may be imported at a lower price than they may be produced on the least fertile lands in use, capital will leave agriculture, profits will rise, and rents will fall.

The deductive severity of Ricardo's analysis has made it hard for some modern readers to understand his appeal to his contemporaries. But as the foregoing remarks have shown, there was a near perfect correspondence between the events which transpired during the war (namely, the extension of cultivation to formerly barren lands, rising corn prices, and rising rents) and the course of events that is predicted by Ricardo's theory.

d. The implication of this *Essay* for Ricardo's later work on distribution and the theory of value are as follows:

(1) That Adam Smith view that profits and wages are determined independently of each other - rather Ricardo argued in his pure corn model and in his corn-land model that profits are the leavings of wages. Ricardo pursued this point in *Principles*.

(2) That Smith's view that rent help determined the prices incorrect as shall be seen, prices are determined solely in conjunction with the no rent land. Example:

$$(C_{c1}p_c + L_1w) (1 + r) + v_1p_c = C_1p_c$$

$$(C_{c2}p_c + L_2w) (1 + r) = C_2p_c$$

$$(C_{c3}p_c + L_3w) (1 + r) = Mp_m$$

$r$  is determined on the no rent land; since the real wage is given and  $p_c = 1$ ,  $p_m$  can be determined independently of rent.

(3) That Smith's view that an increase in the wage rate (or the price of corn) increases all prices is incorrect.

“It has been thought that the price of corn regulates the prices of all other things. This appears to me to be a mistake. ... Commodities, I think, cannot materially rise or fall, whilst money and commodities continue in the same proportions, or rather whilst the cost of production of both estimated in corn continues the same.” [Ricardo, 1815, p. 21]

In his *Principles* provides a better argument for why Smith's argument does not hold.

(4) That Smith's view that the fall in the rate of profit is based on increase in the quantity of capital via a 'supply and demand' mechanism is false - Ricardo argued, as we shall also see in *Principles*, that the rate of profit falls solely because of the increase in the wage rate.

(5) Improvements in production technology lowers the exchange values of goods.

(6) Difficulty of production ultimately regulates the change value of goods.

## **Corn Model and Classical Political Economy**

### Schema of Production

Imagine an economy in which a single product is produced by means of labor (productive activity) and itself. It is helpful to call this product "corn". Assume that production takes time (exactly one year), that there are constant returns to scale, that there exists only one method of production, that land of a uniform quality exists in abundance, and that food is necessary for human survival. The schema of production in such an economy might be depicted symbolically in the following way:

corn + human labor power --> more corn,

where the arrow means "produces in one year". The corn on the left hand side of the arrow is meant to include the corn required as seed, whereas the corn on the right hand side is meant to include the corn needed for the survival of those who contribute their labor power as well as corn for the capitalist.

A method of production is to be thought of as a "recipe" detailing the technical relationship existing between products and means of production (outputs and inputs). In the one-good corn economy being imagined here, for example, the method of production may call for 5t. of corn and the labor power of two workers for one year to yield 10t. of corn. The assumption that there are constant returns to scale means that if all inputs are increased proportionally then output can increase by the same proportion. Therefore the actual quantities of corn and labor power as inputs and corn as output in the whole economy will be some multiple of those given in the recipe. They might be tabulated as follows:

100t. corn + 40 labor power --> 200t. corn,

where the arrow again means "produces in one year", and the units in which labor power is tabulated are "person years".

### Surplus and its Distribution

If more corn is harvested at the end of the year than was used up in producing it during the course of the year, then the economy is producing a surplus. Surplus is simply that part of the annual produce of the economy which is above what is necessary to maintain production. However, with the production of a surplus the issue of how it is distributed and what use is made of it become important economic and social questions, and the answer to the questions depend on the particular property and social arrangements embedded in the economy. We shall assume that the society which is embedded in the economy is a capitalist one. Consequently, private property rights exist in all things, that every kernel of corn, in other words, is owned by someone. Such property rights entitle the owners of things to their exclusive use and to the power to transfer them to others at their discretion. Assume, furthermore, that there are two classes of persons, capitalists and workers. The capitalists, it shall be assumed, are the owners of the economy's accumulated stock of corn. They hire workers to sow, tend and harvest their crop. They may also, at their discretion, participate directly in the production process. Or, they may do nothing, leaving even the labor of management, supervision, and accounting entirely to hired hands. It will also be assumed that the workers are the owners of nothing except their labor power, that is their own capacity to labor. Being without access to means of production of their own, they are forced to sell their labor power or cease to survive, that is they are wage slaves.

The wages of the workers consist entirely of corn as does the profit of the capitalists. Specifically, the profit of the capitalist consists of the corn left over at the end of the harvest

which is in excess of the corn which he lays out in the spring of the year for seed and the corn which is distributed to the workers for food--that is, the origin of profits is found in the creation of the surplus. For the moment, let it also be assumed that the wages paid the workers are the minimum necessary to keep them alive and fit to work from year to year. Wages, then, are like a technical datum. Food is necessary to keep workers working just as feed is necessary to keep oxen plowing.

Under the assumptions made thus far, part of the surplus accrues to the capitalist as profit. Although the surplus originates in production through the productive activities of the workers, the part which is in excess of what the workers need to live on becomes the property of the capitalists by virtue of their ownership of the corn used as means of production.

#### One-Sector Corn Model

The above description of production, the surplus, and distribution of the surplus can be illustrated through a one-good model, most commonly known as a corn model. Consider the above production schema: 100 t. corn + 40 labor power --> 200t. corn. This can be rewritten in terms of price, wage rate, and rate of profit as:

$$(5) \quad (100c_p c)(1 + r) + 40_l w = 200c_p c$$

where  $p_c$  is the price of corn,

$r$  is the rate of profit, and

$w$  is the wage rate.

Now let us assume that the workers must eat two tons of corn per year if they are to maintain themselves at a subsistence level; thus we can say that the worker's wage rate equals two tons of corn times the price of corn, or

$$(6) \quad w = 2c_p c.$$

Substituting (2) into (1), we get

$$(7) \quad (100c_p c)(1 + r) + 40l(2c_p c) = 200c_p c \text{ or}$$

$$(8) \quad (100c_p c)(1 + r) + 80c_p c = 200c_p c.$$

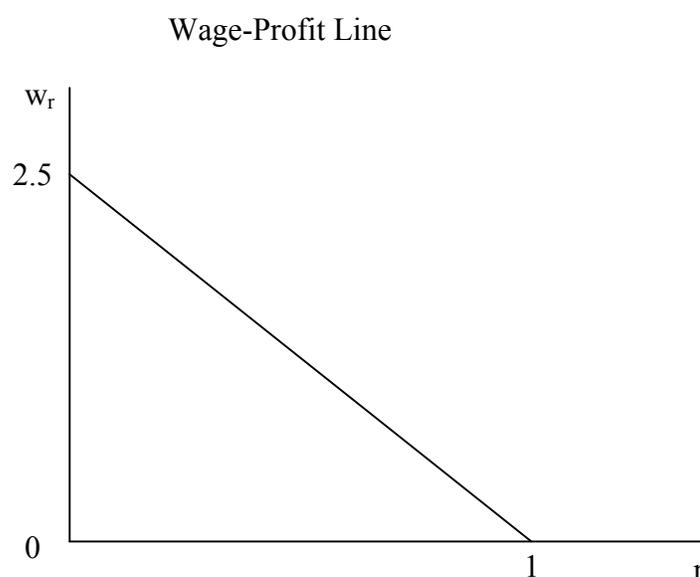
From equation (4) we can see that out of the total amount of corn produced, 100t. has to be returned to capitalists to replace the seed used up in production, which leaves a surplus of 100t. of corn to be divided between the capitalists and the workers. However, since the workers must consume in total 80t. of corn to reproduce themselves, that leaves only 20t. of corn out of the surplus for profits for the capitalists and a rate of profit for the capitalists of 20% (20t./100t.). Thus the rate of profit (the ratio of profit to capital) thus also becomes, like the wage, a technical datum, determined entirely by the physical relationship between products and means of production. Further, it should be noticed that the price of corn has no particular role in the economy; this is because the wage rate is specified in terms of corn; that is it is a real wage rate as opposed to a money wage rate denoted simply in dollars.

Let us assume a different lower real wage for the workers, such as  $w = 1c_p c$ , and substitute it into equation (8). While the surplus still remains 100t. of corn, the workers' share of the surplus decreases to 40t. of corn, while the capitalists' share increases to 60t. of corn and their rate of profit increases to 60% (60t./100t.). Thus within the corn model there exists an inverse relationship between workers wages and capitalists rate of profit--the lower the real wage rate the higher the rate of profit and vice versa. This can be clearly seen with a slight reworking of equation (1) to make the rate of profit a function of the wage rate:

(9)  $r = 1 - .4w_r$  where  $w_r$  is the real wage in terms of units  
of corn.

Equation (5) is known as the *wage-profit line* and it shows what the rate of profit will be for any given real wage rate. If the real wage rate happens to be one-half ton of corn then the rate of profit will be 80%; or if the real wage is two and a half tons of corn, the rate of profit will zero. This inverse relationship between the wage rate and the rate of profit is illustrated in Figure 1.1 below.

Figure 1



The wage-profit also clearly shows that the distribution of the surplus, that is profits and wages, is determined by the social-economic forces affecting the real wage. More pointedly, distribution of the surplus takes the form of the more the capitalist gets the less the workers get, which indicates that there is an inherent worker-capital conflict in a capitalist economy.

### Growth and Luxuries

Since the capitalists have control over the uses which their profits can be put, their decisions as to how to spend the profits affects the growth of the economy. That is, for example, if all of the profits of one year are used to increase the production in the next year, assuming that the additional workers can survive the agricultural year without consuming any corn produced by the economy, the rate at which the annual product of the economy would grow from one year to the next would be given by the ratio of profits to capital or the rate of profit. To see this, consider the following production schema:

$$(10) \quad .5t \text{ corn} + .2 \text{ labor power} \rightarrow 1t. \text{ corn.}$$

If the capitalists held 100t. of corn for seed and assuming an unlimited availability of labor power, then that 100t. of corn along with 40 units of labor power would produce 200t. of corn.

Further, if the real wage of each unit of labor power is 2t. of corn, then the profit for the capitalists consists of 20t. of corn and their rate of profit is 20%. Now, assume that the capitalists add their corn profits to the 100t. of seed corn which they have set aside; thus the total amount of seed corn is 120t. and applied to production would produce 240t. of corn:

$$(11) \quad 120t \text{ corn} + 48 \text{ labor power} \rightarrow 240t. \text{ corn.}$$

In this case, the corn harvest grew by 20%, the same as the rate of profit. Thus, assuming that all corn profits are reinvested, the maximum rate at which the annual product of society could grow from one year to the next is given by the ratio of profit to capital or the rate of profit. Now, if by some trick, the capitalists are able to reduce the workers' real wage to 1t. of corn and reinvested all of the additional profits, the growth rate of the annual produce would increase to 60% as

would also the rate of profit. Therefore, variations in the real wage directly and inversely affects the growth rate of the economy--the higher the real wage the lower the growth rate.

The above discussion was based on the assumption that the capitalists reinvested all their corn; however, if they consumed some of their corn profits in some manner, the growth rate of the economy would decline as surely as if the workers' real wage increased. To show this, consider the extreme case in which real wages are given as 1t. of corn and the capitalists use all their corn profits to produce cakes (according, of course, to some particular one year, constant returns to scale recipe for cakes--1.5t. corn + .5 labor power --> 1 cake). Suppose that before the production of cakes the economy's annual production had been

$$(12) \quad 100t. \text{ corn} + 40 \text{ labor power} \rightarrow 200t. \text{ corn}$$

where the profits consisted of 60t. of corn and that afterwards it became

$$(13) \quad 100t. \text{ corn} + 40 \text{ labor power} \rightarrow 200t. \text{ corn}$$

$$45t. \text{ corn} + 15 \text{ labor power} \rightarrow 30 \text{ cakes.}$$

In such circumstances, the economy could not grow at all. Of the 200t. of corn being produced, 145t. is needed for seed and for producing cakes and the other 55t. is needed for workers consumption; thus, all 200t. of corn is needed to maintain production in the succeeding year. In this case, the profits of the economy consist of 30 cakes which are consumed by the capitalists.<sup>1</sup> It might also be noted that additional labor is employed in the production of cakes, and that, as a consequence, the production and consumption of luxuries appears to be in the interest of the

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<sup>1</sup>The rate of profit in the economy is 60% which is derived in the corn industry alone. Also, assuming that the corn is taken as the numeraire-commodity so that  $p_c = 1$ , then the price of cakes is 2.9.

working population. If all the potential working population was employed as well as not growing and if workers were given a wage that not only permitted them to buy their 1t. of corn but also a portion of a cake, this would certainly be the case. But if the potential working population is growing, the increased employment occasioned by the production of luxuries is at the expense of all future increases in employment.

If less than the entire corn profits is used to produce luxuries then the economy may grow. That is, the gross annual output of both corn and cakes can expand at a rate determined by the proportion of the corn profits not consumed either directly as corn or indirectly as cakes. For example, if only 10 cakes are produced, we would have

$$(14) \quad 100t. \text{ corn} + 40 \text{ labor power} \rightarrow 200t. \text{ corn}$$

$$15t. \text{ corn} + 5 \text{ labor power} \rightarrow 10 \text{ cakes.}$$

Consequently, the profits of the capitalists would consist, in terms of products, of 40t. of corn and 10 cakes.<sup>2</sup> Now, the ratio of corn profits to total corn used in production is 34.8%; therefore it is possible for the capitalists allocated their 40t. of corn between the corn and cake industries so that the year-end production of corn and cakes would also increase by 34.8%. In this case, production the next year would be

$$(15) \quad 134.80t. \text{ corn} + 53.92 \text{ labor power} \rightarrow 269.60t. \text{ corn}$$

$$20.20t. \text{ corn} + 6.74 \text{ labor power} \rightarrow 13.48 \text{ cakes.}$$

A close inspection of (15) will reveal that all the inputs as well as the outputs increased by 34.8%, that the corn profits increased by 34.8%, but that the rate of profit and the price of cakes

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<sup>2</sup>It should be clear that the rate of profit is still 60% and the price of cakes is still 2.9.

remained at 60% and 2.9 respectively. Hence there is a trade-off between the production of luxuries (cakes) and the attainable rate of growth. This conclusion is more general than has just been stated. The production of luxuries such as cakes reduces the potential for growth because while means of production are used up in their production they themselves can make no contribution to production. The same conclusion holds in the case of any thing or service that requires means of production and labor power to produce but which is not itself used in production.

### Land and Rent

Until now, it has been assumed that land of a uniform quality exists in abundance. In such circumstances the ownership of land carries with it no particular distinction. Any landlord who attempted to extract a rent from his capitalist tenants would induce them to flee. Landlords could only extract a rent if they acted together as a cartel (by, for example, not accepting new tenants). In such a case the only limit to rent would be the size of profits. If landlords ceased acting in concert, competition for tenants would reduce rents to zero, or the minimum necessary to induce individual landlords to attend to the trouble of leasing their land.

If population were to advance to the point at which all of the land of the highest quality was brought under cultivation, any further advance in population would require recourse to land of a lesser quality. The production schema of the economy in such a case might be depicted as

(16)            corn + labor power + land of the highest quality --> corn  
                   corn + labor power + land of the second quality --> corn.

With the advent of bring under cultivation second quality land, the amount of corn seed input would have to increase, given the same amount of labor power, to produce the same amount of output on the highest quality land

$$(17) \quad 100t. \text{ corn} + 40 \text{ labor power} + \text{LHQ} \rightarrow 200t. \text{ corn}$$

$$110t. \text{ corn} + 40 \text{ labor power} + \text{LSQ} \rightarrow 200t. \text{ corn.}$$

If land of the second quality exists in abundance, then its owners would receive no rent. If competition among capitalists equalizes the rate of profit that could be obtained on lands of both qualities, the owners of the land of the higher quality would be able to obtain a rent equal to the difference between the gross output obtainable on the better land and necessary outgoings of production, wages, and profit at the uniform rate. That uniform rate of profit will be determined by the ration of corn profit to capital on the land of the second quality. To see this, consider the following economy:

$$(18) \quad (100_c p_c)(1 + r) + 40_l w + v_r p_c = 200 p_c$$

$$(110_c p_c)(1 + r) + 40_l w = 200 p_c$$

where  $v_r$  is rent in terms of corn.

Assuming that  $w = 1_c p_c$ , it is easy to see that the uniform rate of profit can be directly determined on the no-rent land and is 45.5%. Now if the rate of profit is substituted back into the first equation, we find that total corn profits are 45.50t. of corn. Now subtracting the 100t. corn for seed, the 40t. corn for wages, and the 45.50t. of corn for profits from the 200t. of corn that was produced, we find that rent on the highest quality land,  $v_r$  is 14.50t. of corn.

If population continued to advance and it were necessary to bring land of a still lesser quality into cultivation a rent would arise on the land of the second quality and the rent of the

land of the highest quality would rise. The rate of profit would fall to the ratio of the corn profit to capital on the land of the lowest quality (the land that yields no rent).

Every advance in population, therefore, which requires recourse to land of an inferior quality will reduce profits and raise rents. If population were to advance to the point where it would be necessary to bring land into cultivation that yielded no surplus above what were necessary to maintain production, the rate of profit would fall to zero and all of surplus would accumulate in the hands of the landlords as rent. In such circumstances further growth of the economy would be impossible and an absolute limit to population would have been reached. In the absence of any changes in the methods of production or any decrease in wages the economy would be unable to do more than reproduce itself on an unchanging scale year after year.

#### **Transition from the *Essay* to *Principles***

In both the *Essay* and in Ricardo's letters of 1814 and early 1815, a basic principle had been that the profits of farmers regulate the profits of the other trades, that the rate of profit can be determined independently of prices, and that variations in the real wage affects the rate of profit in an inverse relationship. Malthus, however, objected to the form of Ricardo's argument because "in no case of production, is the produce exactly of the same nature as the capital advanced. Consequently we can never properly refer to a material rate of profit. Thus forced from his one-commodity world found in the *Essay*, Ricardo tried to re establish the same propositions found there but in a (n) 2-sector (n) 2-commodity economy. But in trying to do so, he found that he had to develop a theory of value (or relative prices) in order to accomplish his objectives. The result of all this work was the chapter on value in *On the Principles of Political Economy and Taxation*.

***On The Principles of Political Economy and Taxation (1817, 1819, 1821)***

Theory of Value

A theory of value has two components, a quantitative explanation or theory of prices and relative prices and a ‘qualitative’ explanation that provides the basis for the systematic buying and selling of goods and their prices. In the theory of value of classical political economy, its theory of prices consisted of a quantitative explanation of the ratio at which commodities in a competitive market are exchanged against each other and of the social relationships that ensured the existence of systematic exchanges that resulted in the social and economic reproduction of capitalism. In particular, classical economists were concerned with answering three distinct questions: (a) the conditions essential for the existence of value; (b) the conditions determining market values; and (c) the conditions determining natural values. To answer the first question, they argued that the four conditions essential for the existence of value were:

- (1) *use-value*: the commodity must possess a set of physical properties that are socially known to belong to it and which are socially useful. Thus for a commodity to possess exchange-value or a price, it must, in part, fulfill the social needs of society. However, use-value does not measure or determine the quantitative level of exchange value. In fact, use-value and exchange-value or price are incomparable insofar as the former covered the qualitative aspect and the latter is a quantitative notion, or as Richard put it:

Utility [use-value] then is not the measure of exchangeable value, although it is absolutely essential to it. If a commodity were in no way useful, — in other words, if it could in no way contribute to our gratification, — it would be destitute

of exchangeable value, however scarce it might be, or whatever quantity of labour might be necessary to procure it” (Ricardo, 1975, p.11)

- (2) *private property*: this is an umbrella term which denotes all the social and political institutions, such as the ownership of the means of production by one social class and propertylessness of a second social class that must work for the former to survive, that must exist if private exchange among individuals is to take place and from which prices emerges.
- (3) *scarcity*: given (1) and (2) above, a good can possess a price if it is scarce. Such goods are those that are non-producible and hence are simply given to the economy. However, non-produced goods were virtually ignored by the Classical economists in their development of theory of value since they formed a very small part of the mass of goods daily exchanged in the market and they did not contribute to the growth of the system.
- (4) *production by produced commodities and labor*: given (1) and (2) above, a commodity can possess a price if its existence is based on the use of produced commodities and labor in its production. These commodities form the bulk of the market transactions and contribute to the growth of the economic system. Thus the Classical economists were only concerned with them when developing their theory of value. It should be noted that these commodities can be freely reproduced with no assignable limit.

In *Principles* Ricardo opens his chapter “On Value” with a concern about a measure of value. He first dismisses that utility as a measure of value. He then says that a measure of value is needed: when two commodities vary in relative value, we wish to know in which the variation has really taken place—that is we want to know the factors-laws that regulate relative prices.

One impact consists of absolute values and the difficulty of production and the second impact arises from the rise and fall of wages and profits. There an invariable standard of measure of value that dealt with both causes was Ricardo's goal. Ricardo accepted that labor embodied was the appropriate measure of value because it could adequately distinguish between the two impacts on relative prices mentioned above. On the other hand he rejected Smith's labor commanded approach as a measure of value because at different wage rates-rates of profit, prices will command different amounts of labor.

To establish that embodied labor determined relative prices, Ricardo switch from a corn model to a labor-based model in which labor was the only original input in production. There are two types of production and price models used by Ricardo--point input-point output model and flow input-point output model. The former model is a one production period model in which labor directly creates a final consumption good:  $L_c \rightarrow C$  where  $L_c$  is a given amount of labor and  $C$  is the amount of the consumption good produced by the (unassisted) labor. The corresponding price model is  $L_c w(1 + r) = C p_c$  where  $w$  is the wage rate,  $r$  is the rate of profit, and  $p_c$  is the price of the consumption good. On the other hand, the latter model is a multi-stage production model where inputs occur at various dates but output emerges only at a single date:

$$(1) \quad L_m \rightarrow M$$

$$M + L_c \rightarrow C$$

where  $L_m$  is the amount of labor needed to produce  $M$  number of machines; and

$L_c$  is a given amount of labor combined with  $M$  machines to produce  $C$  amount of the consumption good.

The corresponding price model is:

$$(2) \quad L_m w(1 + r) = M p_m$$

$$(M p_m + L_c w)(1 + r) = C p_c$$

where  $p_m$  is the price of the machine.

This view of production is called a linear view or a one-way-street because the original input of labor can be traced unilaterally to its final resting place in the final production good.

### The One-Stage Classical Production Model with Two Produced Goods

First considering a pure labor economy in which each good is produced solely by direct labor without the use of tools and materials that are themselves produced by human effort. In this case, the relative prices of two goods are determined by the relative amounts of labor expended in their production. This can be shown in the following manner:

$$(3) \quad \gamma_m w(1 + r) = p_m$$

$$\gamma_c w(1 + r) = p_c$$

where  $\gamma_m$  is the amount of labor needed to produce one machine;

$\gamma_c$  is the amount of labor needed to produce one unit of corn;

$w$  is the wage rate;

$r$  is the rate of profit; and

$p_m$  and  $p_c$  are the prices of machines and corn respectively.

Thus the relative price ratio  $p_m/p_c = \gamma_m/\gamma_c$  which says that the relative price of machines in terms of corn is determined by the ratio of the amount of direct labor expended (embodied) in the production of one machine relative to one unit of corn. This represents an embodied labor theory of value. Now what would happen if labor productivity is assumed to be continually increasing

but at different rates for the two goods? It is clear that the relative price ratio would change based since  $\gamma_m$  and  $\gamma_c$  would be changing at different rates.

### Two-Stage Classical Production Model

Let us expand his one-stage two good model to include produced means of production. In its most simplified form, the model of production by means of labor and capital goods has the following form:

$$(4) \quad L_m w(1+r) = Mp_m$$

$$(Mp_m + L_c w)(1+r) = Cp_c$$

or, through substitution we get

$$(5) \quad L_m w(1+r) = Mp_m$$

$$L_m w(1+r)^2 + L_c w(1+r) = Cp_c$$

where  $L_m$  is the total amount of labor needed to produce  $M$  number of machines; and

$L_c$  is the total amount of labor needed to produce  $C$  units of corn.

Equations (4) and (5) can also be written in terms of per unit of output:

$$(6) \quad \gamma_m w(1+r) = p_m$$

$$(m_c p_m + \gamma_c w)(1+r) = p_c$$

or, through substitution we get

$$(7) \quad \gamma_m w(1+r) = p_m$$

$$\gamma_{mc} w(1+r)^2 + \gamma_c w(1+r) = p_c$$

where  $\gamma_m$  is the amount of labor needed to produce one machine;

$m_c$  is the number of machines needed to produce a unit of corn;

$\gamma_c$  is the amount of labor needed to produce one unit of corn; and

$\gamma_{mc}$  is the amount of 'machine-labor' needed to produce a unit of corn.

Assuming that  $w = \alpha p_c$  where  $\alpha$  is known and falls between zero and the model's corn-labor ratio (that is assuming a real wage in terms of corn), it can be substituted into the price equation for corn where we have the following:

$$(8) \quad \gamma_{mc} \alpha p_c (1+r)^2 + l_c \alpha p_c (1+r) = p_c.$$

With  $p_c$  canceling out on both sides, we have remaining an equation with only one unknown,  $r$ ; and this can be easily solved for. With the rate of profit solved for, it is now possible to determine the relative price of machines in terms of corn ( $p_m/p_c$ ). As indicated in equation (9) below, the price ratio is not solely a function of the amount of labor expended in their production; rather  $p_m/p_c$  is also a function of the rate of profit and cannot be determined independently of it:

$$(9) \quad \frac{p_m = \gamma_m w (1+r)}{p_c = \gamma_{mc} w (1+r)^2 + \gamma_c w (1+r)} = \frac{\gamma_m}{\gamma_{mc}(1+r) + \gamma_c}$$

It can also be showed that, in general, relative prices could not be determined independently of the rate of profit even if each price had the same number of  $(1+r)$  terms or stages of production as long as the ratio of indirect to direct labor for each sector are not the same for each price. This can be shown using a two-integrated sector model:

$$(10) \quad \frac{p_b = \gamma_{xb} w (1+r)^2 + \gamma_b w (1+r)}{p_c = \gamma_{mc} w (1+r)^2 + \gamma_c w (1+r)} = \frac{\gamma_{xb}(1+r) + \gamma_b}{\gamma_{mc}(1+r) + \gamma_c}$$

We can conclude this discussion by establishing two points - that the wage rate and the rate of profit are inversely related to each other, and that the origin of profits is found in those sectors that produce the goods found in the workers' subsistence bundle. To establish the former point, let us consider the two-sector model of equation (11):

$$(11) \quad \gamma_m w(1+r) = p_m$$

$$(m_c p_m + \gamma_c w)(1+r) = p_c$$

or, through substitution we get

$$(12) \quad \gamma_{mc} w(1+r)^2 + \gamma_c w(1+r) = p_c.$$

Now if we set  $p_c = 1$ , then equation (12) can be rearranged into the following form:

$$(13) \quad w = 1/[\gamma_{mc}(1+r)^2 + \gamma_c(1+r)].$$

Thus we can easily see that  $w$  and  $r$  are inversely related to each other. The latter point will be left to the student to figure out.

### Market Prices and Natural Prices

Before ending this discussion, it should be quite obvious that one of the most significant results of Ricardo's work on prices is that he not only carried out the analysis without reference to supply and demand but also clearly showed that an explanation of prices could be carried out without recourse to those concepts. That is Ricardo and the classical economists defined *market prices* as those prices that occur daily in the market and reflect the fortuitous and temporary circumstances of the market as well as the permanent forces that underlie natural prices. Their determinants were categorized as supply and demand:

... we must not be supposed to deny the accidental and temporary deviations of the actual or market price of commodities from---their primary and natural price. In the ordinary course time to be supplied precisely in that degree of abundance, which the wants and wishes of mankind require, and therefore there is none which is not subject to accidental and temporary variations of price (Ricardo, 1975, p.88).

However because the classical economists did not envision any functional relationship between price and quantity sold in the market, they did not see either supply or demand as the conventional functions of price. That is supply and demand were not seen as functions of quantity supplied or demanded and price. Furthermore, market prices were market-clearing prices in that they cleared the market daily of all commodities brought to it. In this respect, we can also say that the market is clearable.

So far we have discussed natural prices and market prices separately; however we have implied that there is a link between the two. The Classical economists saw natural prices as centers of gravitation which the market price would move towards via the forces which establish the natural uniform wage rate and rate of profit. The Classical economists accepted the proposition that the proportion between supply and demand may, for a time, affect the market price of a commodity until it is supplied in greater or lesser abundance, according as the demand may have increased or diminished; but this effect would be only of temporary duration. The reason was that if the market price is above or below its natural price, then profits are elevated above, or depressed below their general level, and capital is either encouraged to enter into, or is warned to depart from the particular employment in which the variation had taken place, with the movement of capital, the supply of the relevant commodities is so affected that the market price gravitates towards the natural price at the same time the uniform rate of profit gets reestablished: It is then the desire of diverting his funds from a less to a more profitable employment that prevents the market price of commodities from continuing for any length of time either much above, or much below their natural price (Ricardo, 1975, p.91).

However this convergence process is not mechanical as is found in the contemporary supply and demand theories. Rather because there is no functional relationship between price and output, the convergence process has little rhyme or reason. Thus the natural price cannot be seen as an equilibrium price, the level of output as an equilibrium level of output, and the convergence process as an equilibrium level of output, and the convergence process as and equilibrating process. On the other hand, the convergence process implies that natural prices are long period market clearing prices and that the markets in which they habit are clearable.

Having fully acknowledged the temporary effects which, in particular employments of capital, may be produced on the prices of commodities, as well as on the wages of labor, and the profits of stock, by accidental causes, without influencing the general prices of commodities, wages or profits, since these effects are equally operative in all stages of society, the Classical economists left them out of considerations when developing their theory of value. Thus they concentrated on the determinants of the natural wage rate and natural rate of profit in order to determine natural prices.

## CHAPTER 5

## KARL MARX

**Background: Economics, Socialism, and Utopia**

1. Utopia and Revolution
  - a. American Revolution – Declaration of Independence
 

“that all men are created equal; that they are endowed by their Creator with certain unalienable rights; that among these are life, liberty, and the pursuit of happiness.”
  - (1) American utopian themes: equality and rights
  - b. French Revolution: view that society could be changes based on its own views, complete break with the past—no connection; indicative of this utopian view is a new calendar.
2. Socialism and Utopia
  - a. Establish that socialism is utopian
    - (1) continues program and ideals of More’s Utopia
    - (2) follows in the same broad tradition
    - (3) represents a new form of society that replaces the existing capitalist society
  - b. Socialism as utopia represents the desire for a society greatly improved over that of the present, in which the regulation of production and property relations is a crucial basis of the social order.
  - c. Hence a socialist utopia can be a product of the actual evolutionary development of the current capitalist system.
3. Socialism emerges from the evolution? Collapse of capitalism; thus Socialism has three components:
  - a. explanation of how capitalism works
  - b. explanation of the process that leads to the collapse

- c. vision of the new society.
4. Explanation of how capitalism works
- a. Material and political conditions
    - (1) failure of democracy to emerge
    - (2) liberalism not favor the poor, growth of poverty and hunger as well as growth of the very rich and the consumption of luxury goods
    - (3) Poor Laws and the Workhouse:
      - (a) widespread view of the upper class/merchant class, etc.: Poverty is a most necessary and indispensable ingredient in society
      - (b) old poor laws – 1601 parish maintenance of its own paupers via tax on landlords/merchants
      - (c) in the period following 1815, business cycle, depression, secular increase in paupers (all due to capitalism etc); as a result taxes for the poor increased; at the same time rents fell
      - (d) 1834 New Poor Law: designed to make the seeking of relief so bad/painful/demeaning that only the most destitute would seek it with the end result that taxes on the wealthy would decline. Upon entering the workhouse:
        - men separate from women – breaking up families
        - food stripped of everything that made it attractive
        - Christmas forbidden (for a while)—see Dickens A Christmas Carol
        - Workhouse regime would deter through the principles of supervision, classification, and segregation
        - able-bodied paupers would be made to carry out menial and arduous labor
        - the unofficial view is that whoever is unable to work almost should not live—no rights to charity; children must die
      - (e) view of the wealthy was that they should not be taxed because some poor sod cannot find work due to his/her own failings
- b. The workings of capitalism
  - (1) National wealth is a function of the physical production of goods by the laboring classes; labor is the only source of wealth.
    - (a) implications: clergymen, shopkeepers, professions, landlords,

merchants, capitalists are useless in that they are maintained by surplus produced by labor once the means of production and labor subsistence has been subtracted.

- (b) property nothing but human labor; capital is hoarded labor
- (c) mechanization enhances the production of national wealth

- (2) Economic distress caused by the use of new machinery leads to the decline in the value of manual labor (which means what); higher wages are good—THE MACHINERY QUESTION
- (3) Society: producers are useful labor so their numbers should increase; non-producers are useless labor so their numbers should decline. This is the distinction between productive and unproductive workers.
- (4) Markets lack the capability to regulate economic activity—depressions
- (5) Exchange predicated on labor value—so the values of all goods can be represented in terms of the labor hours embodied in them—like Ricardo.
- (6) Goods are exchanged at equal labor value—but not all goods, since labor is also a good who has value; thus profit emerge with unequal exchange of labor-time and this is especially the case for labor—so labor is exploited.

c. The collapse of capitalism and the emergence of socialism

- (1) private property caused selfishness that resulted in competition
- (2) competition also due to the need to bargain over prices and from the introduction of machinery
- (3) competition generates centralization of wealth in the hands of the few and the poverty of the many
- (4) and this would eventually instigate the downfall of the system (but how?).
- (5) contradiction in capitalism: labor has a right to what it produces so where is profit—unequal exchanges; if got rid of would there be no capitalist?
- (6) lack of the market to regulate itself means that planning is necessary and this leads to socialism.

5. Escaping capitalism to socialism

a. Communitarianism

- (1) forming separate communities as the way: Owenism-Robert Owen, Fourierism-Charles Fourier, Saint-Simonism-Henri de Saint-Simon
- (2) characteristics:
  - (a) reject division of labor, large-scale urbanization, enclosures and large-scale farming, factory system
  - (b) adopted small-scale communities as living examples

- (c) communal living
- (3) never really successful—so go towards economic socialism
- b. The new society: economic socialism
  - (1) image: well-feed, clothed, housed, improved justice, egalitarian, morally improved
  - (2) community of goods and lands
  - (3) substantial degree of national economic planning and organization of production; production and change regulated for moral and commercial purposes
  - (4) emphasis on the production of basic goods for workers—material affluence with reduced working hours
  - (5) emphasis on educational and cultural advancement
  - (6) democratic
  - (7) no harmful division of labor
  - (8) labor is the standard of value; value of labor in goods exchange at prime costs—equitable exchange; value of goods based on material costs plus average labor time to produce the good
  - (9) labor notes as medium of exchange
  - (10) distribution: equal; but there is a problem as there are some arguments that the reward of labor should be proportionate to the value of the produce of labor—labor theory of wages

### **Introduction**

#### 1. Production

- a. independent individuals, 18<sup>th</sup> Century ideas, contrasts material production; production as a social process with Smith's deer/beaver example and a social individual relative to society as exchange relations of individual; Marx rejects the 18<sup>th</sup> Century notion of society consists only of individuals; rather for him society is the relationship between individual—individuals are enmeshed in social relationships.

The social relations within which individuals produce, the social relations of production, are altered, transformed, with the change and development of the material means of production, of the forces of production. The relations of production in their totality constitute what is called the social relations, society, and, moreover, a society at a definite stage of historic development, a society with peculiar, distinctive characteristics. Ancient society, feudal society, bourgeois (or capitalist) society, are such totalities

of relations of production, each of which denotes a particular stage of development in the history of mankind. Capital also is a social relation of production. It is bourgeois relation of production, a relation of production of bourgeois society....Capital is not only a sum of material products, it is a sum of commodities, of exchange values, of social magnitudes.” [*Wage-Labour and Capital*, pp. 28-29]

- b. historical relations of production
  - (1) production by social individuals means historical context/period
  - (2) production in general requires produced means of production and produced social skills; but actual production requires particular produced means of production and skills
  - (3) all production requires property and legal system; historically specific production has historically specific property and legal systems
  
- c. Marx concludes that the economic organization of society—meaning the way society is organized to produce the material well-being of its members—can be captured by the concept of *mode of production*. Moreover he argued that the key to social change was to be found in the movements of the mode of production. Hence Marx was in effect committed to an exhausted study of political economy from the standpoint of the laws governing changes in the mode of production. To lay bare the economic law of motion of modern society became the scientific goal to which he devoted his life to.
  
- d. The movement of the mode of production from one form to another, Marx argued, was due to class struggle: “The history of all hitherto existing society is the history of class struggles” [*Manifesto of the Communist Party*]. That is, the economic forces at work manifest themselves in class conflict under capitalism as under earlier forms of society. It follows that the essential economic relations are those which underlie and express themselves in the form of class conflict.

## 2. Production, Distribution, Exchange, Consumption

- a. first there is the linear notion of production-distribution-exchange-consumption and this view supports the notion that production and distribution are wholly distinct and separate from each other. Marx disagrees with this.
  
- b. For Marx production is immediate consumption as outputs are used as inputs; consumption is immediate production as inputs are consumed to produced output; and differentiated production/labor skills require different goods.
  
- c. Regarding distribution and production: production is based on particular

ownership will have particular form of distribution—this cannot be separated; hence class-based production is associated with class-based ownership of the means of production

- d. Regarding exchange and production: the type of exchange is based on a type of production

### 3. Capitalism as a specific Mode of Production

- a. Capitalism is based on primitive (or original) accumulation capital. Marx means by this the following:

“We should find that this so-called Original Accumulation means nothing but a series of historical processes, resulting in a Decomposition of the Original Union existing between the Labouring Man and his Means of Labour... The Separation between the Man of Labour and the Means of Labour once established, such a state of things will maintain itself and reproduce itself upon a constantly increasing scale, until a new and fundamental revolution in the mode of production should again overturn it, and restore the original union in a new historical form.” [*Value, Price and Profit*, pp. 38 – 39]

- b. labor power is a good bought and sold—the critical feature of capitalism as a mode of production; its value is the goods necessary for its reproduction; what the labor power does is to create goods in surplus of what it needs.

“Labour-power is, in our present-day capitalist society, a commodity like every other commodity, but yet a very peculiar commodity. It has, namely, the peculiarity of being a value-creating force, the source of value, and, moreover, when properly treated, the source of more value than it possesses itself.” [*Wage-Labour and Capital*, p. 12]

- c. these surplus goods constitute the surplus value and is based on a social relationship of wage-labor vs. capital. The existence of surplus value comes about when people are transformed into free labor—that is people who can work but do not access to the means of production or more specifically food; the only thing they have to sell is their labor power, that is work for wages. Workers are free in two senses: first they are free to sell their labor-power to the capitalists for wages (which they must sell to survive, but can choose who to sell it to) and second they are free from access to capital.

“It appears that the capitalist buys their labour with money, and that for money they sell him their labour. But this is merely an illusion. What

they actually sell to the capitalist for money is their labour-power. This labour-power the capitalist buys for a day, a week, a month, etc. And after he has bought it he uses it up by letting the worker labour during the stipulated time. With the same amount of money with which the capitalist has bought their labour-power he could have bought a certain amount of sugar or of any other commodity. The two shillings with which he brought twenty pounds of sugar is the price of the twenty pounds of sugar. The two shillings with which he brought twelve hours' use of the labour-power, is the price of twelve hours' labour. Labour-power, then, is a commodity, no more, no less so than is the sugar. The first is measured by the clock, the other by the scales." [*Wage-Labour and Capital*, p. 17]

"The worker leaves the capitalist, to whom he has sold himself, as often as he chooses, and the capitalist discharges him as often as he sees fit, as soon as he no longer gets any use, or not required use, out of him. But the worker, whose only source of income is the sale of his labour-power, cannot leave the whole class of buyers, i.e., the capitalist class, unless he gives up his own existence. He does not belong to this or to that capitalist, but to the capitalist class; and it is for him to find his man, i.e., to find a buyer in this capitalist class." [*Wage-Labour and Capital*, p. 20]

- d. from the labor power they sell for wages goods are produced and workers have no claims upon them—that is workers/labor power become alienated from what it produces; so labor's own labor power becomes independent of itself the living labor.
- e. so exchange under capitalism rests on the exchange of relative quantities of free labor but there is more. To be exchanged, commodities must have a social use-value, but more significantly to be exchanged must also be a social relationship. That is exchange is not simply a quantitative relation between two goods, such as the exchange of commodity A for commodity B. Rather it is an exchange of social labor A for social labor B—hence the importance and significance of the labor theory of value. Therefore to exchange social labor means that the exchange must be performing a social function, representing a particular social relationship. Hence for Marx, economics is not about goods/wealth but about social relationships that are represented in terms of goods.

As the exchangeable values of commodities are only social functions of those things and have nothing at all to do with the natural qualities, we must first ask: What is the common social substance of all commodities? It is labour. To produce a commodity a certain amount of labour must be bestowed upon it, or worked up in it. And I say not only labour, but social labour. A man who produces an article for his own immediate use, to

consume it himself, creates a product, but not a commodity. As a self-sustaining producer he has nothing to do with society. But to produce a commodity, a man must not only produce an article satisfying some social want, but his labour itself must form part and parcel of the total sum of labour expended by society. But to produce a commodity, a man must not only produce an article satisfying some social want, but his labour itself must form part and parcel of the total sum of labour expended by society. It must be subordinate to the division of labour within society. It is nothing without the other division of labour, and on its part is required to integrate them. If we consider commodities as values, we consider them exclusively under the single aspect of realized, fixed, or, if you like, crystallized social labour....A commodity has a value because it is a crystallization of social labour. The greatness of its value, or its relative value, depends upon the greater or less amount of that social substance contained in it; that is to say, on the relative mass of labour necessary for its production. The relative values of commodities are, therefore, determined by the respective quantities or amounts of labour, worked up, realized, fixed in them. The correlative quantities of commodities which can be produced in the same time of labour are equal. Or the value of one commodity of labour is to the value of another as the quantity of labour fixed in the one is to the quantity of labour fixed in the other.” [*Value, Price and Profit*, pp. 30 – 31]

- f. although implied above, let’s make it clear that Marx saw capitalism as a method of control, as embodying power over others/workers. In particular, capitalism eliminated the individual’s control over his/her own life and forced them to enter the labor market—so the worker is a wage-slave. In addition, capitalism exerts control over the worker by controlling the job with regard to the skills needed to produce the good, the context of production itself, and the kind of good being produced. For capitalists, workers are only a means to an end, hence their material, socially, and personal well-being are only a means to an end. One predominate feature of capitalism is deskilling and dethinking on the part of the worker. Finally, capitalism imposes a hierarchy of power: bossman vs workers; those who know/control/own vs those who do not have anything
- g. Marx sees the state as an institutional force that supports and reinforces the capitalist control over workers. In fact the state reflects the hierarchy of power in the workplace: within the state there are those that lead and those that follow; those that follow are made dependent via power/control over their lives; and the appendages of the state, such as schools and charities reinforce this hierarchy. Hence for Marx (and other radicals—anarchists, syndicalists) the political process of a capitalist state is not democratic because it is based on power and control.

#### 4. Method of Political Economy

Previous political economy starts from the concrete-complex and goes to the determinant-abstract-general relations; for Marx the method should be to start with the abstract determinants that reproduces the concrete—the former determinants are historically specific while the latter are historically concrete.

#### **Marx's Labor Theory of Value**

To discuss Marx's labor theory of value, let us first construct a two-sector, long period commodity model of a capitalist economy:

$$(280p_c + 12p_m)(1 + r) + 46w(1 + r) = 575p_c$$

$$(120p_c + 8p_m)(1 + r) + 24w(1 + r) = 20p_m.$$

The model says that it takes 280 units of corn, 12 machines and 46 units of labor to produce 575 units of corn; and that it takes 120 units of corn, 8 machines and 24 units of labor to produce 20 machines. Moreover, the rate of profit is the same in both industries and, as befitting a long period position, input and output prices are the same. Finally, the 46 and 24 units of labor power are units of *abstract labor power*. Abstract labor power 'abstracts' from the skills and capabilities of particular so as to have 'labor power in general'. Marx does this so to focus on what is common to all productive human activity. Abstract labor power being homogeneous means that actual labor power has been reduced to a common denominator. This means that it is now possible to add together different amounts of labor power; and it also means that the wage rate must be the same in both industries since the abstract labor power in both industries are qualitatively the same. It can be shown that the total amount of labor embodied in each unit of corn is .4 and in each unit of machine is 6. Marx called this amount of labor in each good the

*socially necessary labor time*, which is the “average” amount of labor time embodied in a good.<sup>3</sup> It can also be shown that the ratio of the labor embodied in the in the material inputs and direct labor is the same in both industries (and equals 4). Hence the exchange ratio of machines for corn is  $6/.4 = 15$  or the ratio of their embodied labor. This can be shown in two ways: first if  $p_c$  is set equal to 1 then  $p_m = 15$  (since 1 is 2.5 times larger than .4 which means that 6 must also be 2.5 times larger);<sup>4</sup> or secondly,  $p_c$  is set equal to .4 then  $p_m = 6$  (which means that the prices of both goods are equal to their embodied labor), but they still exchange at a ratio of 15. It should be noted that these prices are long period prices or what Marx called *prices of production*. Marx noted that such prices were determined by the fundamental technological and class forces that embrace the economy. He also noted that actual market prices deviated from the prices of production as a result of variations of non-functional supply and demand but always gravitated to them. Yet supply and demand could not actually explain or account for prices of production:

You would be altogether mistaken in fancying that the value of labour or any other commodity whatever is ultimately fixed by supply and demand. Supply and demand

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<sup>3</sup> “It might seem that if the value of a commodity is determined by the quantity of labour bestowed upon its production, the lazier a man, or the clumsier a man, the more valuable his commodity, because the greater the time of labour required for finishing the commodity... In saying that the value of a commodity is determined by the quantity of labour worked up or crystallized in it, we mean the quantity of labour necessary for its production in a given state of society, under certain social average conditions of production, with a given social average conditions of production, with a given social average intensity, and average skill of the labour employed.” [*Value, Price and Profit*, p. 33]

<sup>4</sup> What this means is that corn is the commodity *numeraire*. Such an approach was used by Marx but he took gold as the commodity *numeraire*: “We suppose... that one quarter of wheat and one ounce of gold are equal values or equivalents, because they are crystallizations of equal amounts of average labour, of so many days’ or so many weeks’ labour respectively fixed in them.” [*Value, Price and Profit*, p. 31; also see *Value, Price and Profit*, p. 35]

regulate nothing but the temporary fluctuations of market prices. They will explain to you why the market price of a commodity rises above or sinks below its value, but they can never account for that value itself....At the moment when supply and demand equilibrate each other, and therefore cease to act, the market price of a commodity coincides with its real value, with the standard price round which its market prices oscillate. In inquiring into the nature of that value, we have therefore nothing at all to do with the temporary effects on market prices of supply and demand. The same holds true of wages as of prices of all other commodities.” [*Value, Price and Profit*, p. 26]

Using the above information the commodity model can be reconstructed in terms of embodied labor:

$$[(280)(.4) + (12)(6)] + 46 = (575)(.4)$$

$$[(120)(.4) + ( 8)(6)] + 24 = ( 20)( 6)$$

or

$$(112 + 72) + 46 = 184_{\text{ccc}} + 46_{\text{LLc}} = 230_{\text{c}}$$

$$( 48 + 48) + 24 = 96_{\text{ccm}} + 24_{\text{LLm}} = 120_{\text{m}}$$

That is, the *total value of the output* (in terms of embodied labor) is equal to the labor embodied in the means of production (or what Marx called *constant capital*) plus the direct labor (or what Marx called *living labor*). This relationship will have extraordinary explanatory power as long as prices are based on embodied labor ratios at all rates of profit.

Now let us look at this embodied labor model from the eyes of Marx. The value of the means of production that are used up in production Marx called constant capital, denoted by cc. This quantity of value used up in production does not in the process of production undergo any

quantitative alternation in value. That is, capital cannot contribute something extra to the value of a commodity—capital is not productive in this sense (it has no marginal product). The second category of capital that Marx used is called *variable capital*. It represents that portion of living labor needed to replace the stock of wage goods advanced by the capitalist for the maintenance of the workers and is denoted by  $vc$ :

“Capital consists of raw materials, instruments of labour, and means of subsistence of all kinds, which are employed in producing new raw materials, new instruments, and new means of subsistence. All these components of capital are created by labour, products of labour, accumulated labour. Accumulated labor that serves as a means of new production is capital.” [*Wage-Labour and Capital*, p. 28]

“It is only the dominion of past accumulated, materialized labour over immediate living labour that stamps the accumulated labour with the character of capital.” [*Wage-Labour and Capital*, p. 31]

“Wages, therefore, are not a share of the worker in the commodities produced by himself. Wages are that part of already existing commodities with which the capitalist buys a certain amount of productive labour-power.” [*Wage-Labour and Capital*, p. 19]

There is a third category of labor in the above which Marx called *surplus value* ( $sv$ ). This represents the portion of living labor that is not needed for the reproduction of the worker and there is appropriated by the capitalist. With these categories in hand let us delineate the labor model again but this time let the amount of labor time needed to replace the stock of corn advanced for the maintenance and reproduction of the worker be .4 (that is the real wage is equal to one unit of corn,  $w = 1p_c$ ). Thus the amount of living labor in the corn industry devoted to

wages is  $(46)(.4) = 18.4_{vcc}$  and the amount in the machine industry is  $(24)(.4) = 9.6_{vcm}$ . This means that the surplus value for the corn industry is  $46 - 18.4 = 27.6_{svc}$  and for the machine industry it is  $24 - 9.6 = 14.4_{svm}$ . Thus our Marxian model takes the following form:

$$184_{ccc} + 18.4_{vcc} + 27.6_{svc} = 230_c$$

$$96_{ccm} + 9.6_{vcm} + 14.4_{svm} = 120_m$$

Let us now take a deeper look behind this model. To say that this model represents a labor theory of value, we are saying many things. The first thing we are saying is that profits and the rate of profit can be completely "explained" in terms of surplus labor.<sup>5</sup> That is, in Classical political economy profits originated because of the existence of surplus commodities, but nowhere was it really explained in a fundamental way what was the basis of the origin of these surplus commodities. Marx does provide an answer to this in terms of the *exploitation of labor*. Marx starts his analysis by stating that the laborer sells his/her labor power on the market just like any other commodity is sold on the market. Consequently, since all commodities are assumed to exchange in ratios based on their embodied labor, so does labor. That is, labor in the form of *labor-power* enters into exchanges in a similar manner in that its price is based on the amount of labor embodied in itself or more specifically in the goods needed for its reproduction. Thus if the amount of embodied labor in a unit of corn is .4 units of labor and a unit of corn is needed to reproduce a unit of labor power, then the amount of labor "embodied" in a unit of

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<sup>5</sup> Marx takes the position that profits emerge from the nature of production and not from monopoly tendencies: "To explain... the general nature of profits, you must start from the theorem that, on an average, commodities are sold at their real values, and that profits are derived from selling them at their values, that is, in proportion to the quantity of labour realized in them. If you cannot explain profit upon this supposition, you cannot explain it at all." [*Value, Price and Profit*, p. 37]

labor power is .4 (and the real wage rate is equal to a unit of corn). Hence .4 represents the *necessary labor time* for workers to reproduce themselves:

“The value of the labouring power is determined by the quantity of labour necessary to maintain or reproduce it, but the use of that labouring power is only limited by the active energies and physical strength of the labour. The daily or weekly value of the labouring power is quite distinct from the daily or weekly exercise of that power....The quantity of labour by which the value of the workman’s labouring power is limited forms by no means a limit to the quantity of labour which his labouring power is apt to perform. Take the example of our spinner. We have seen that, to daily reproduce his labouring power, he must daily reproduce a value of three shillings, which he will do by working six hours daily. But this does not disable him from working ten or twelve or more hours a day. But by paying the daily or weekly value of the spinner’s labouring power the capitalist has acquired the right of using that labouring power during the whole day or week. He will, therefore, make him work daily, say, twelve hours. Over and above the six hours required to replace his wages, or the value of his labouring power, he will, therefore, have to work six other hours, which I shall call hours of surplus labour, which surplus labour will realize itself in a surplus value and a surplus produce.” [*Value, Price and Profit*, p. 41]

Given that the worker needs to work only part of the time for his/her reproduction, it might be thought that the worker would stop working once the needs are fulfilled. However, the capitalist, by buying the worker’s labor-power for the wage rate, can use the laborer and his/her labor power as long as s/he thinks fit. Thus the worker must also work a period of time for the

capitalist—a period of time which is beyond his/her own needs (thus is surplus to him/her). This extra time worked is the basis of surplus labor-power and hence the surplus commodities.

Because of the position the capitalist holds in the economy, s/he can exploit the worker in this manner and therefore is able to expropriate this “unpaid” surplus labor; and this surplus labor-power is the basis/origin of capitalist profits.

“...it is evident that the replacement of the wages and the surplus (the profit of capital) are as a whole taken out of the new value, which is produced by the labour of the worker and added to the raw materials. And in this sense we can view wages as well as profit, for the purpose of comparing them with each other, as shares in the product of the worker.” [*Wage-Labour and Capital*, p. 36]

“The surplus value, or that part of the total value of the commodity in which the surplus labour or unpaid labour of the working man is realized, I call Profit.” [*Value, Price and Profit*, p. 45]

To make this point clearer, Marx clearly stated that profits are not derived from land or capital as such.<sup>6</sup> Therefore the income categories of rent, interest, and industrial profit are simply different names, different parts of profits per se, that is of surplus value:

“The monopoly of land enables the landlord to take one part of that surplus value, under the name of rent, whether the land is used for agriculture or buildings or railways, or for any other productive purpose. On the other hand, the very fact that the possession of the means of labour enables the employing capitalist to produce a surplus value, or, what

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<sup>6</sup> This means that Marx rejects the notions of the marginal productivity of land and capital.

comes to the same, to appropriate to himself a certain amount of unpaid labour, enables the owner of the means of labour, which he lends wholly or partly to the employing capitalist—enables...the money-lending capitalist to claim for himself under the name of interest another part of that surplus value, so that there remains to the employing capitalist as such only what is called industrial or commercial profit....Rent, Interest, and Industrial Profit are only different names for different parts of the surplus value of the commodity, or the unpaid labour realized in it, and they are equally derived from this source, and from this source alone. They are not derived from land as such nor from capital as such, but land and capital enable their owners to get their respective shares out of the surplus value extracted by the employing capitalist from the labourer.” [*Value, Price and Profit*, p. 45]

Given the above, it is clear that the amount of surplus labor-power the capitalist can appropriate is a function of the following factors. The first is the amount of labor embodied in the corn (or necessary consumption goods). If the amount of embodied labor goes down because of technological change, then the amount of necessary labor time decreases, hence resulting in an increase in surplus labor time. A second factor is the length of the working day. If the capitalist can extend the working day (or the unit of labor time), the worker must work more of the capitalist, thus giving him/her more surplus labor time, hence more profits. This action increases both the total amount of surplus labor time the capitalist gets as well as the relative amount. The third factor is the workers’ standard of living in terms of necessary consumption; if the capitalist can reduce this by have the worker consume less goods or consume goods with less embodied labor, then s/he will get more surplus labor time. In the case of an increase in the length of the

working day, Marx speaks of the production of *absolute surplus value*, while either a lowering of the real wage or an increase in productivity, leading to a reduction of necessary labor, results in the production of *relative surplus value*.

At this point, the concept of the *rate of surplus value* (or *rate of exploitation*) can be introduced:

$$\text{rate of surplus value (rate of exploitation)} = \text{surplus value/variable capital} = s/v = \sigma.^7$$

The rate of surplus value denotes the rate at which the capitalist can ‘exploit’ the worker since it is the ratio of surplus labor to necessary labor.<sup>8</sup> Moreover, the rate of surplus value is the same in all industries because the greater  $\sigma$  the greater are the total profits and rates of profits are for the capitalist; thus, like the explanation for the uniform rate of profit, capitalists seek those out industries that have high  $\sigma$  but the process of doing so reduces the rate of surplus value. In our example above we have  $\sigma_c = 27.6/18.4 = 1.5$  and  $\sigma_m = 14.4/9.6 = 1.5$ . At this juncture let us introduce the surplus rate of profit:

$$s/(c + v) = \pi.$$

In our above example it takes the following form:

$$\pi_c = 27.6/(184 + 18.4) = 0.13636$$

$$\pi_m = 14.4/(96 + 9.6) = 0.13636.$$

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<sup>7</sup> The two concepts, rate of exploitation and rate of surplus value, can often be used interchangeably, but it is important to remember that the former is the more general concept applicable to all exploitative societies while the latter applies only to capitalism.

<sup>8</sup> “The rate of surplus value... will depend on the proportion between that part of the working day necessary to reproduce the value of the labouring power and the surplus time or surplus labour performed for the capitalist. It will, therefore, depend on the ratio in which the working day is prolonged over and above that extent, by working which the working man would only reproduce the value of his labouring power, or replace his wages.” [*Value, Price and Profit*, p. 42]

The uniformity of  $\pi$  is based on the same reasoning as for the uniformity of the actual rates of profits.

Let us now use the above discussion to show how profits and the rate of profit can be explained from this labor-based approach. Because of the nature of the model we already know that  $p_c = .4$  and  $p_m = 6$  (for all wage rates and rates of profit)—that is prices equal their quantities of embodied labor. Therefore we have the following:

Corn industry: total capital costs = 184; total wages and profits = 46; total revenue = 230

Machine industry: total capital costs = 96; total wages and profits = 24; total revenue = 120

Now assume that  $w = 1p_c = .4$ , then we get the following:

Corn industry: total wages = 18.4; total profits = 27.6

Machine industry: total wages = 9.6; total profits = 14.4

As can be seen, these prices of  $p_c = .4$  and  $p_m = 6$  ensure that capital costs, total wages, total profits, and total ‘total revenue’ all equal their labor values counterparts. In particular, total profits = total surplus value, the surplus rate of profit equals the surface rate of profit; and total ‘total revenue’ (or what Marx called ‘total prices’) = total value. Hence the surface model when prices are equal to their embodied labor is identical to the labor model; thus the labor model provides the entire explanation of what is going on in the surface model.<sup>9</sup> More importantly, this relationship between the labor and the surface model suggests that total profits are a function of surplus value and thus is dependent on the degree to which capitalist can exploit labor.

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<sup>9</sup> It should be noted that the exchange ratio of  $p_m/p_c = 6/.4 = 15$ . Hence if  $p_c = 1$ , then  $p_m = 15$ . Consequently, if the latter prices are used, then the surface model will be 2.5 larger in money/value terms than the labor model. But in all other respects, they are completely identical.

As noted above  $\pi = s/(c + v)$ . This can be rewritten as  $\pi = (s/v)/(c/v) + 1$ . Thus the surplus rate of profit is dependent on the rate of surplus value (and the organic composition of capital which is defined as  $c/v$ ). Hence if  $s/v$  is positive in any sector (meaning all sectors), the surplus rate of profit is positive. Now if the surplus rate of profit is positive so is the rate of profit. Therefore, the existence of the rate “surface” rate of profit is ultimately dependent on the exploitation of labor and is completely explainable in those terms. To put it a different way is that profits find their origin in the exploitation of labor; total profits is a function of and completely explained in terms of surplus labor; and the rate of profit is greater than zero if  $s/v > 0$  and its absolute value as a partial function of  $s/v$  (and a partial function of  $c/v$ ).

The second thing we are saying when we state that this model represents a labor theory of value is that the simple picture of distribution found in the corn model can be reproduced in the labor model. That is, since total profits and wages equals 70, we can write the following relationship:

$$\pi = (70 - v)/(c + v) = (70 - v)/(280 + v).$$

Thus if  $v = 0$ , then  $\pi = 25\%$  and  $s/v = \sigma$

$$v = 35, \text{ then } \pi = 11.\% \text{ and } s/v = 1 = \sigma$$

$$v = 70, \text{ then } \pi = 0\% \text{ and } s/v = 0 = \sigma$$

Hence the greater the rate of surplus value, the greater  $\pi$  is and more importantly the relationship between  $\pi$  and  $v$  is straight forward in that 70 and 280 do not alter as  $\pi$  and  $v$  alter—hence as  $v$  increases,  $\pi$  decreases directly because  $s$  decreases and  $c + v$  increases. Because there is this simple relationship between  $\pi$  and  $v$  and because  $\pi = r$  and  $v$  is the aggregate counterpart to the wage rate, this same simple relationship must also exist in the surface model:

$r = [\text{total profits and wages} - \text{total wages}] / [\text{total capital costs} + \text{total wages}]$  or

$$r = [70 - 70w] / [280 + 70w]$$

if  $w = 0$ , then  $r = 25\%$

if  $w = 1$ , then  $r = 13.636\%$

if  $w = 2$ , then  $r = 4.1666\%$

if  $w = 2.5$ , then  $r = 0\%$

Thus we can conclude that the labor theory of value ensures that the simple  $\pi - v$  relationship also exists in the surface model because variations of  $r$  and  $w$  will not be able to affect the values of total maximum profits (70) and the money values of the means of production (280). This results also implies that the  $r-w$  relationship is founded on  $\pi - v$  relationship (and not the other way around).

“What, then, is the general law that determines the rise and fall of wages and profit in their reciprocal relation? They stand in inverse proportion to each other. The share of (profit) increases in the same proportion in which the share of labour (wages) falls, and vice versa. Profits rises in the same degree in which wages fall; it falls in the same degree in which wages rise.” [*Wage-Labour and Capital*, p. 37]

“We thus see that, even if we keep ourselves within the relation of capital and wage-labour, the interests of capital and the interests of wage-labour are diametrically opposed to each other.” [*Wage-Labour and Capital*, p. 39]

“The general rise in the rate of wages will ultimately result in nothing else but a general fall in the rate of profit.” [*Value, Price and Profit*, pp. 15-16]

“We can only say that, the limits of the working day being given, the maximum of profit corresponds to the physical minimum of wages; and that wages being given, the maximum of profit corresponds to such a prolongation of the working day as is compatible with the physical forces of the labourer. The maximum of profit is therefore limited by the physical minimum of wages and the physical maximum of the working day. It is evident that between the two limits of this maximum of profit an immense scale of variations is possible. The fixation of its actual degree is only settled by the continuous struggle between capital and labour, the capitalist constantly tending to reduce wages to their physical minimum, and to extend the working day to its physical maximum, while the working man constantly presses in the opposite direction.” [*Value, Price and Profit*, p. 58]

The ultimate thing we are saying when we state that the Marxian model represents a labor theory of value is that a complete and detailed analysis of profits, wages, and distribution can be fruitfully and analytically carried out without error by solely dealing with embodied labor which is the primal mode of analysis without having to refer to the distracting, misleading surface phenomena. To state this in a different manner—we can say that a labor theory of value model is like the corn model (except that labor is the prime mode of analysis because of its historical/social relationship to production and capital) in that we have labor producing labor, and when we have this homogeneous input-output model, the simple and clear cut relationships noted above will always exist.

### **Circular Production and Simple and Expanded Reproduction**

Marx represented capitalism as an economic system primarily engaged in the accumulation of capital through the generation of profits and their continual reinvestment. He did so in the following manner:

$$M \rightarrow C \rightarrow P \rightarrow C' \rightarrow M' \rightarrow M' \rightarrow C' \rightarrow P \rightarrow C'' \rightarrow M'' \rightarrow$$

where  $M$  = money;

$C$  = commodities or goods used in production;

$P$  = production;

$$C' = C + \Delta C;$$

$$M' = M + \Delta M;$$

$$C'' = C' + \Delta C; \text{ and}$$

$$M'' = M' + \Delta M.$$

This circuit of capital obviously depends on the nature of production and exchange, since not only must production produce a surplus of commodities for accumulation, these commodities must also be exchanged in a manner which permits production to take place again at the same or larger scale. Marx investigated this aspect of the circuit of capital via his well known models of simple and expanded reproduction.

Marx worked with two kinds of reproduction models—one in which there was no net investment (which means that all of the surplus is consumed by the capitalists in the form of consumption and or luxury goods and in one where there is net investment. The former model is called *simple reproduction* and the latter is called *expanded reproduction*. Marx makes three important assumptions when discussing these models: first the models are closed (that is there is no government or foreign trade); secondly, there are only two classes—capitalists and workers;

and thirdly, the workers spend what they get on consumption goods while the capitalists can spend their income on either consumption goods or investment goods.

### Model of Simple Reproduction

Simple reproduction refers to a capitalist system which preserves indefinitely the same size and the same proportions among its various parts. For these conditions to be satisfied capitalists must every year replace all capital worn out or used up and spend all of their surplus value on consumption; and workers must spend all of their wages on consumption. If these requirements are not fulfilled there would take place either an accumulation or a depletion of the stock of means of production, and this is excluded by definition of simple reproduction. More specifically, the assumption of this model is that the scale of production (and surplus) must remain unchanged through successive cycles of production and exchange and this requires that the capitalist consume their profits (surplus value) in the form of unproductive consumption. The simplest way to set up the model is to assume that there are two industries: machine industry and corn industry. The machine industry produces only machines that are used in production while the corn industry produces only goods for consumption. Thus the model has the following form:

$$\text{Machine industry: } c_m + v_m + s_m = TV_m$$

$$\text{Corn industry: } c_c + v_c + s_c = TV_c$$

For simple reproduction to exist, the following relationships must hold. First  $c_m + c_c = c_m + v_m + s_m = TV_m$  or  $c_c = v_m + s_m$  which essentially says that all the machine output in value terms must be absorbed by the needs to replace the machines used up in production. Secondly,  $v_m + s_m + v_c + s_c = c_c + v_c + s_c$  which essentially says that the total value of consumption goods produced must

equal the total consumption of capitalists and workers. When both of these relationships are met, the scale of production will remain unchanged from one year to the next. However, if both machines and corn are used in production while corn is the only commodity consumed by the workers and capitalists, then the model becomes a bit more complicated and the required relationships a bit more complicated, but the outcome is still the same conditions—see Appendix I. What is of interest is that the prices that emerge from these models (Marx called these prices, *prices of production*) are such that they ensure that the exchange of the output will take place in the manner that will permit production at the same scale to take place again.<sup>10</sup>

#### Model of Expanded Reproduction

The capitalist who lives in the imaginary world of simple reproduction does not manifest the characteristics which Marx attributes to capitalists and the capitalist system—accumulate, accumulate that is the law of Moses and the prophets. That is, for Marx the capitalist shares with the miser the passion for wealth as wealth. But that which is the miser is a mere idiosyncrasy, is, in the capitalist, the effect of the social mechanism of which he is but one of the wheels. The

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<sup>10</sup> The simple reproduction model can be expanded to include a luxury good (cake) sector where the capitalist spend all their profits. It takes on the following form:

$$\begin{aligned} \text{Machine industry: } & c_1 + v_1 + s_1 = TV_1; \\ \text{Corn industry: } & c_2 + v_2 + s_2 = TV_2; \text{ and} \\ \text{Cake industry: } & c_3 + v_3 + s_3 = TV_3. \end{aligned}$$

The following relationships hold:

- (1)  $c_1 + c_2 + c_3 = TV_1$  – all the machines produced are used up in production
- (2)  $v_1 + v_2 + v_3 = TV_2$  – all the corn produced is consumed by workers
- (3)  $s_1 + s_2 + s_3 = TV_3$  – all the cakes produced are consumed by capitalists.

circulation form of M-C-M', in which the capitalist occupies the key position, is objectively a value-expansion process. This fact is reflected in the subjective aim of the capitalist. It is not at all a question of innate human propensities or instincts; the desire of the capitalists to expand the value under his control (to accumulate capital) springs from his special position in a particular form of organization of social production. The capitalist is a capitalist and in an important figure in society only in so far as he is the owner and representative of capital. Deprived of his capital, he would be nothing. But capital has only one quality, that of possessing magnitude, and from this it follows that one capitalist is distinguishable from another only by the magnitude of the capital that he represents. The owner of a large amount of capital stands higher in the social scale than the owner of a small amount of capital; position, prestige, power are reduced to the quantitative measuring rod of dollars and cents. Success in capitalist society therefore consists in adding to one's capital.

So given the social urge to accumulate, there are many kinds of models of expanded reproduction to represent this. In any case, we shall continue to assume that workers continue to consume their entire incomes but that capitalists invest part or all of theirs in enlarging the process of production. This means that capitalists lay out a part or all of their surplus value in purchasing additional means of production and additional labor power. If this is to be accomplished without difficulties, means of production over and above what is necessary to replace constant capital used up in the current production period must be produced, and consumption goods for additional workers must also be produced. To simplify the discussion, I will only deal with two kinds. The first is that the capitalist reinvests all of his profits and in the second one the capitalist spends part of his profits on luxury goods. In both models workers

spend all their wages on consumption goods or corn. Because the capitalists in the first model reinvest all their profits, it can be represented as a two-sector model as in the case of the first simple reproduction model above:

$$\text{Machine industry: } c_1 + v_1 + s_1 = TV_1$$

$$\text{Corn industry: } c_2 + v_2 + s_2 = TV_2.$$

In this model the following relationships hold. First,  $v_1 + v_2 < TV_2$  or the workers consume corn but not all of it, which means there is surplus for accumulation. Secondly,  $c_1 + c_2 < TV_1$  or there is a surplus of machines that can be used for accumulation. Finally, the capitalist does not consume the surplus, which is  $s_1 + s_2$ , but uses the surplus of machines and corn for accumulation. This can be illustrated in the following manner. Since the surplus in each sector is used for expansion, this means that the surplus machines and corn must be divided between the two sectors in a manner that would permit accumulation. Letting  $s_1 = s_{1c} + s_{1v}$  and  $s_2 = s_{2c} + s_{2v}$ , we have the following relationships:

	Period 1	Period 2
Machine Industry	$c_1 + v_1 + s_{1c} + s_{1v} = TV_1$	$c_1^* + v_1^* + s_{1c}^* + s_{1v}^* = TV_1^*$
Corn Industry	$c_2 + v_2 + s_{2c} + s_{2v} = TV_2$	$c_2^* + v_2^* + s_{2c}^* + s_{2v}^* = TV_2^*$
where	$c_1 + c_2 + s_{1c} + s_{2c} = TV_1$	where $c_1^* = c_1 + s_{1c}$ ; $v_1^* = v_1 + s_{1v}$
	$v_1 + v_2 + s_{1v} + s_{2v} = TV_2$	$c_2^* = c_2 + s_{2c}$ ; and $v_2^* = v_2 + s_{2v}$

Thus for accumulation to smoothly take place with no crisis both industries must produce a surplus *and* the surplus must be distributed to both industries in the correct proportions—which happens to be equal to  $s/(c + v) = \pi$  the surplus rate of profits and also the growth rate of the

economy.<sup>11</sup> If all the surplus corn was kept for use in the corn industry, such as to hire more workers, it would not be possible to obtain the additional machines to complement the additional workers in order to produce additional corn. Likewise, if all the surplus machines were retained in the machine industry, then it could not obtain the corn necessary to obtain the additional workers needed to work with the additional machines to produce more machines. Hence, as long as the surplus is correctly allocated to each industry, the economy will run and grow smoothly; but if the allocation is incorrect with the rest that one industry grows faster than the other a disproportionality crisis will occur—see the next section for further discussion. In addition, like in simple reproduction, there is no primacy in this model of one industry over the other in expanded reproduction.

The second model in which the capitalists send part of their profits or surplus value on luxury goods can be represented as follows:

$$\text{Machine Industry: } c_1 + v_1 + s_1 = TV_1$$

$$\text{Corn Industry: } c_2 + v_2 + s_2 = TV_2$$

$$\text{Cake Industry: } c_3 + v_3 + s_3 = TV_3$$

where  $c_1 + c_2 + c_3 < TV_1$  or the number of machines produced is greater than those used

<sup>11</sup>This can be shown in the following manner: let the economy be represented as follows

$$\text{Machine Industry: } c_1 + v_1 + s_1 = TV_1$$

$$\text{Corn Industry: } c_2 + v_2 + s_2 = TV_2$$

For balance growth to occur the constant and variable capital in both industries must grow at the same rate. Letting  $g$  represent the uniform growth rate for each industry, we can rewrite the above as:

$$\text{Machine Industry: } [c_1 + v_1][1 + g] = TV_1$$

$$\text{Corn Industry: } [c_2 + v_2][1 + g] = TV_2.$$

Now  $g = s/(c + v) = \pi$  or the surplus rate of profit. Thus in an economy where capitalists reinvest all their surplus, the balance growth rate is equal to the surplus rate of profit. If the capitalists spend some of their surplus value on luxury goods, then  $g < \pi$ . For further discussion, see the appendix at the end of the section.

up in production,

$v_1 + v_2 + v_3 < TV_2$  or the amount of corn produced is greater than the amount

consumed by workers, and

$s_1 + s_2 + s_3 > TV_3$  or the amount of surplus value produced is greater than the

value of the cakes produced which means there is surplus value available

for growth.

Now let us assume that part of the surplus is used for expansion and part for luxury consumption.

Letting  $s_1 = s_{1c} + s_{1v} + s_{1l}$ ,  $s_2 = s_{2c} + s_{2v} + s_{2l}$ , and  $s_3 = s_{3c} + s_{3v} + s_{3l}$ , we have the followings:

Period 1

Machine Industry  $c_1 + v_1 + s_{1c} + s_{1v} + s_{1l} = TV_1$

Corn Industry  $c_2 + v_2 + s_{2c} + s_{2v} + s_{2l} = TV_2$

Cake Industry  $c_3 + v_3 + s_{3c} + s_{3v} + s_{3l} = TV_3$

where  $c_1 + c_2 + c_3 + s_{1c} + s_{2c} + s_{3c} = TV_1$

$v_1 + v_2 + v_3 + s_{1v} + s_{2v} + s_{3v} = TV_2$

$s_{1l} + s_{2l} + s_{3l} = TV_3$

Period 2

$c_1^* + v_1^* + s_{1c}^* + s_{1v}^* + s_{1l}^* = TV_1^*$

$c_2^* + v_2^* + s_{2c}^* + s_{2v}^* + s_{2l}^* = TV_2^*$

$c_3^* + v_3^* + s_{3c}^* + s_{3v}^* + s_{3l}^* = TV_3^*$

where  $c_1^* = c_1 + s_{1c}$ ,  $v_1^* = v_1 + s_{1v}$ ,

$c_2^* = c_2 + s_{2c}$ ,  $v_2^* = v_2 + s_{2v}$ ,

$c_3^* = c_3 + s_{3c}$ ,  $v_3^* = v_3 + s_{3v}$ ,

$s_{1l}^* + s_{2l}^* + s_{3l}^* = TV_3^*$ , and

$TV_1^* > TV_1$ ,  $TV_2^* > TV_2$ ,  $TV_3^* > TV_3$ ,

Because some of the surplus is devoted to luxury consumption instead of for capital

accumulation, the increase in the machine and corn industries is reduced and therefore so is their

total value. To put it another way, the rate of the expansion of the economy is less when part of the surplus is devoted to luxury or unproductive consumption.<sup>12</sup>

### **Falling Rate of Profit and the Collapse of Capitalism**

Accumulation and expanded reproduction however brings with it problems for capitalism. That is for expanded production to take place there must not be inherent barriers to accumulation. While classical political economy (and modern neoclassical economics) believed that there were no inherent internal barriers to accumulation (but as noted above and below there are external constraints such as land), Marx thought otherwise. So he set himself the task of discovering the barrier to capitalist production within the process of capitalist production itself. If the barrier to the continuation of the capitalist system of production is internal to that process, to its own inner drive for expansion, then it follows that the capitalist process is inherently self-limited so as to drive towards its own internal transformation. The first possible barrier to accumulation concerned the problem of the impact of economic expansion on the real wage of workers. Accumulation raises the demand for workers and this will increase their real wage above the value of labor power; but this means that the amount of surplus value falls thus increasingly putting the breaks on accumulation. To escape this problem, capitalist put in place

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<sup>12</sup>The *Tableau Economique* provided both the inspiration and the theoretical foundation for Marx's discussion of reproduction. To Marx, the period between the publication of the *Tableau* and his own work on the reproduction schemes was a sterile one in regard to the analysis of capitalist reproduction. An examination of Marx's discussion of the *Tableau* indicates the route by which he came to his own analysis of reproduction and also how he clearly saw the historical limitations of it. However, the seminal aspect of Quesnay's work, Marx believed, was that he transferred the inquiry into the origin of surplus value from the sphere of circulation into the sphere of direct production, and thereby laid the foundation for the analysis of capitalist production.

labor-saving technology which increases the organic composition of capital ( $c/v$ ) and which increases the number of unemployed workers. The body of unemployed workers, which Marx called the *reserve army of labor*, maintains a downward pressure on the real wage to keep it in close to the value of labor power. Hence when accumulation starts to reduce the reserve army of labor thus resulting in the real wage increasing above the value of labor power, the capitalist introduce labor-saving technology thereby increasing the reserve army and hence restoring the equality between the real wage and the value of labor power and with it increasing the surplus value of capitalists.

“Machinery produces the same effect, but upon a much larger scale. It supplants skilled labourers by unskilled, men by women, adults by children; where newly introduced, it throws workers upon the streets in great masses; and as it becomes more highly developed and more productive it discards them in additional though smaller numbers. We have hastily sketched in broad outlines the industrial war of capitalists among themselves. This war has the peculiarity that the battles in it are won less by recruiting than by discharging the army of workers. The generals (the capitalists) vie with one another as to who can discharge the greatest number of industrial soldiers.” [*Wage-Labour and Capital*, p. 45]

“The more productive capital grows, the more it extends the division of labour and the application of machinery; the more the division of labour and the application of machinery extend, the more does competition extend among the workers, the more do their wages shrink together.” [*Wage-Labour and Capital*, p. 47]

However, the role of labor-saving technology and the reserve army of labor in restoring the surplus value of capitalist has an unintended outcome—the reduction of the rate of profit. And it is the falling rate of profit that Marx sees as generating the barrier to production under capitalism and hence leading to its downfall. The falling tendency of the rate of profit is not new to Marx. As noted above, classical political economy argued that external factors—the combination of increasing population and diminishing returns to agriculture due to using naturally given less fertile land—would generate a fall in the rate of profit and bring progress in capitalism to an end, to a stationary state. That is accumulation by capitalist—the motor force of the whole process—will cease altogether when their profits are so low as not to afford them an adequate compensation for their trouble and the risk which they must necessarily encounter in employing their capital productively. This inexorable course of evolution could be temporarily checked by technical and scientific discoveries that would render the production of necessities less costly. But eventually it must work itself out to its logical conclusion, the stationary state. However, Marx took this argument one step further. Instead of relying on the external law of population and diminishing returns, he placed the cause of the falling rate of profit on the need of capitalists to increase the organic composition of capital ( $c/v$ ) to counteract the tendency of the real wage to rise under accumulation. And the outcome of the falling rate of profit was not a stationary state but the downfall of capitalism itself. Thus, accumulation of capital erodes and eventually eliminates the very basis of its continuation through the falling tendency of the rate of profit. This law thereby expresses the existence of an internal contradiction inherent in the general dynamics of the process of capitalist accumulation and development.

### Falling Rate of Profit

To express Marx's argument of the falling rate of profit, let us refer to the model used above in which the labor theory of value holds. This permits us to use the surplus rate of profit in place of the "surface" rate of profit since they are the same:  $\pi = s/c + s = (s/v)/(c/v) + 1$  where  $c/v$  is called the organic composition of capital which can simply be seen as the ratio of constant capital to variable capital (or a capital-labor ratio). Now assuming a constant rate of surplus value ( $s/v$ ), then  $\pi$  will fall as  $c/v$  increases due to the pressures needed to "mechanize" the production process in order to reduce the amount of living labor required for production. That is, Marx felt that capitalists were forced to introduce techniques with increasing  $c/v$  ratios in the context of a growing economy if they were to maintain their going surplus rate of profit. However, the process of doing so lowered the prevailing surplus rate of profit and thus the capitalist ability to accumulate and grow.

Marx's discussion of the falling rate of profit is tied up directly with his discussion of accumulation and was used to show why accumulation could not be maintained indefinitely. However, he did recognize the fact counteracting causes existed so as to prevent  $\pi$  from falling continuously (these counteracting forces are only temporary however). Two of these forces are important enough to note: (1) the cheapening or lowering the value of the inputs in constant capital via the use of more mechanized techniques which increases labor productivity; and (2) raising the rate of surplus value via means that do not affect the organic composition of capital.<sup>13</sup>

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<sup>13</sup> There are three additional temporary factors Marx argued for counteracting the fall of the rate of profit: depression of the real wage below the value of labor power, relative overpopulation, and foreign trade. But they will not be dealt with here. There are other factors depressing the

### Collapse of Capitalism

As noted above the central characteristic of capitalism is accumulation of capital. This means that  $c/v$  becomes greater which means that is more of the surplus is spent on capital, not labor. In this process, capital reproduces itself on a larger scale. This means that more of the population becomes workers and that centralization occurs, meaning some capitalists become workers. Both together imply a growth in the reserve army of labor and with it a fall in the value of labor—the lives of workers become more desperate. In the end, the process of accumulation will have transformed capitalist society so that the step towards socialism can be taken—capitalism collapses:

“As soon as this process of transformation has sufficiently decomposed the old society from top to bottom, as soon as the labourers are turned into proletarians, their means of labour into capital, as soon as the capitalist mode of production stands on its own feet, then the further socialisation of labour and further transformation of the land and other means of production into socially exploited and, therefore, common means of production, as well as the further expropriation of private proprietors, takes a new form. That which is now to be expropriated is no longer the labourer working for himself, but the capitalist exploiting many labourers. This expropriation is accomplished by the action of the immanent laws of capitalistic production itself, by the centralisation of capital. One capitalist always kills many. Hand in hand with this centralisation, or this expropriation

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surplus rate of profit include trade unions and government support of labor; and there are three possible factors that contribute to increasing the surplus rate of profit, employer’s associations, monopolies, and government support of business. These factors will be discussed below.

of many capitalists by few, develop, on an ever-extending scale, the co-operative form of the labour-process, the conscious technical application of science, the methodical cultivation of the soil, the transformation of the instruments of labour into instruments of labour only useable in common, the economising of all means of production by their use as the means of production combined, socialised labour, the entanglement of all people in the net of the world-market, and with this, the international character of the capitalistic regime. Along with the constantly diminishing number of the magnates of capital, who usurp and monopolise all advantages of this process of transformation, grows the mass of misery, oppression, slavery, degradation, exploitation; but with this too grows the revolt of the working-class, a class always increasing in numbers, and disciplined, united, organised by the very mechanism of the process of capitalist production itself. The monopoly of capital becomes a fetter upon the mode of production, which has sprung up and flourished along with, and under it. Centralisation of the means of production and socialisation of labour at last reach a point where they become incompatible with their capitalist integument [skin, husk]. Thus integument is burst asunder. The knell of capitalist private property sounds. The expropriators are expropriated.” [*Capital*, Vol. 1, pp. 836 – 837]