Chapter 20: Simple Reproduction

Part 3: Fixed Capital in the Reproduction Process

11 The Replacement of the Fixed Capital

I: 4,000\(c\) + 1,000\(v\) + 1,000\(s\)

II: 2,000\(c\) + 500\(v\) + 500\(s\)

which resolves into:

\[4,000I\ c + 2,000II\ c + 1,000I\ v + 500II\ v + 1,000I\ s + 500II\ s = 6,000\ c + 1,500\ v + 1,500\ s = 9,000\]

We now have to consider a new difficulty. One part of the constant capital value, that which consists of instruments of labour,\(^3\) is transferred to the commodity product while these instruments continue to function as part of productive capital. We shall not be considering here those components of fixed capital whose life is shorter than a single (here, annual) production period, for if they need to be replaced during the production period, they can be treated in the same way as circulating capital.

The problem under consideration here is this:

[T]he part of the money received from the sale of commodities that represents the realised value component of the commodities, which is equal to the wear and tear of the fixed capital, is not transformed back again into the component of productive capital whose loss of value it replaces. It settles down alongside the productive capital and persists in its money form. This precipitation of money is repeated until the reproduction period during which the fixed element of the constant capital continues to function in the production process in its old natural form, and which consists of a greater or lesser number of years, has elapsed.

This disruption in the circulation of money supposes a disruption in reproduction itself.

We now need to investigate the various ways in which this disruption might be resolved.

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\(^1\) Where I insert my own subheads they appear, as here, in sans serif type.

\(^2\) ‘Section 11 of Chapter 20 [...] [was] written late (1878) in one of the last Volume Two manuscripts (VIII) and introduce[s] an important new theme into Marx’s analysis of reproduction, which Marx seems to have discovered while working on his reproduction tables: the effects of the discontinuity of investment in fixed capital on the reproduction of capital. In the case of simple reproduction [...]’, this discontinuity of investment results from the fact that buildings and machinery and other forms of fixed capital are not replaced every year, but only after a number of years. This discontinuous reinvestment means that part of the constant capital recovered by some capitalists is not immediately used to replace buildings, machinery and so on, but instead remains in the form of a money hoard.’ Fred Moseley, ‘Marx’s Reproduction Schemes and Smith’s Dogma’, pp. 178-9.

\(^3\) Or ‘means of labour’: those means of production which, by interposing themselves between the producer and the objects of production, mediate the action of the former. They consist in tools, etc., and those other elements on which production depends, such as workshops, roads, canals, etc. Instruments of labour are to be distinguished from objects of production (and from labour-power too) in the way that, as use-values, they are consumed in production. Instruments of labour enter constantly and directly into the valorisation process but only in parts into the labour process. Instruments of labour thus give up their value to the product in proportion to their loss of use-value: the extent to which they pass on their value to the product is an average calculation in function of the time from which they enter production to that when they are used up or worn out and need to be replaced. As the instruments are used up, one – steadily declining – part of their value remains fixed in the production process. Instruments of labour thus form a part of fixed, and not circulating, capital. Cf. Karl Marx, Capital, vol. 1 (Harmondsworth, 1990) [hereafter C1], pp. 285-6 and 313-4, and Karl Marx, Capital, vol. 2 (Harmondsworth, 1978) [hereafter C2], pp. 237-8.
(a) Replacement of the Depreciation Component in Money Form

\[
\begin{align*}
\text{I: } & 4,000_v + 1,000_s + 1,000_s \\
\text{II: } & 2,000_v + 500_v + 500_s \\
\end{align*}
\]

\(\text{II}_v \leftrightarrow \text{I}(s + v)\) supposes that the value component \(\text{II}_v\) is converted in its entirety in kind – from means of consumption to means of production. But if this value contains an element of depreciation of fixed capital, which cannot be replaced in kind, but is rather transformed into money in the exchange, one part of this value component – equal to the value of wear and tear of fixed capital – cannot be converted into constant capital form but has to remain in money form, and cannot participate more in circulation. Where does this money come from? Precisely from \(\text{I}(s + v)\). But earlier we said that money advanced into circulation has to return to the capitalist producer who cast it in, so that she can repeat the process.

If we assume that the depreciation element = 200, then department II sells 2,000 to department I, but only buys from I 1,800. The commodity value 2,000\(\text{II}_c\) breaks down into 1,800 commodity product to be exchanged against means of production, and 200 for the replacement of wear and tear, to be maintained in money form. We thus have the following exchange (suffix \(d\) indicating depreciation).

\[
\begin{align*}
\text{I: } & 1,000_v + 1,000_s \\
\text{II: } & 1,800_v + 200_v(d) \\
\end{align*}
\]

The following sets of exchanges now take place:

**A** The workers of department I buy 1,000 consumption commodity with their wages; this money returns in exchange for means of consumption (such that capitalists I receive their variable capital back in money form).

**B** Department II advances M400 to buy means of production \(\text{I}_s\), and department I uses this same sum to buy means of consumption \(\text{II}_c\); the M400 returns to the capitalists of II.

**C** Department I now advances M400 to buy means of consumption; department II uses this money to buy means of production from department I; the M400 once more has returned.

Diagrammatically, we can represent these three sets of transactions like this (blue indicating movement of commodities, red exchange of money; dotted lines indicating a hypothetical fourth set of exchanges which, for reasons explained below, does not take place):
After these exchanges, in which all money cast into circulation has returned to who cast it in, and all commodity product values (bar the last 200) has been exchanged, I holds 200I, in commodity form (means of production) and II 200II(d) as means of consumption. On our assumptions up till now, department I would buy the outstanding 200II(d) with M200 received from II to buy I’s product of 200I, (means of production) – the dashed exchanges in the diagram above; however, this value represents (partial) wear and tear, not (completely) spent means of production: II thus holds on to the M200, and I cannot realise 200I, surplus-value. To realise 200II(d) , i.e. to complete I(v+s) ↔ II(c), an extra M200 has to appear, as it were, as if it ‘had rained down from heaven’.4

The law that, in the normal course of reproduction (whether simple or on an expanded scale), the money advanced to circulation by the capitalist producer must return to its starting-point [...] excludes once and for all the hypothesis that the 200II(d) can be realized by the money advanced by department I. 5

Thus the conclusion we have arrived at is that the realisation of the 200II(d) has to be achieved, assuming simple reproduction as conceived here, through means other than the advance of money from department I.

(b) Replacement of the Fixed Capital in Kind

If department II advanced the M200 equivalent to 200II(d), buying 200I, this money would flow back as I bought 200 of means of consumption; department II does not do this, hoarding the money as depreciation fund. 200I is consequently not realised.

But the various capitalists in department II find themselves at different points in terms of when they need to replace their fixed capital: those at the point when replacement is imminent have to advance money capital to the value of the fixed capital to be replaced as well as to the value of circulating constant and variable capital.

Let us assume that department II casts M200 into circulation to exchange with department I. Let us also assume that, say, one half of this sum emanates from those capitalists in department II who not only have to renew in kind – by sale of commodity product – their circulating capital, but also to renew – with money – their fixed capital (let us call these capitalists sector II1), while the other derives from those in II who renew only their circulating capital (sector II2). Sectors II1 and II2, in some combination, advance M100 together to renew circulating capital; II1 also advances a further M100 (to be reaccumulated little by little in the form of the depreciation component of the commodities to be produced by the fixed capital equivalent to this value). The M200, as it flows back (as I buys means of consumption) is differentiated proportionally between these two sectors of department II. Thus, II1 converts M100 into elements of fixed capital in kind, while II2, rather then receiving commodities in kind from

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4 C2, p. 532. Marx here raises the point – tangential at this stage of the exposition but important when we come to the matters under consideration in volume 3, that this ‘hypothesis’ (i.e. money raining down from heaven) would appear less absurd if ‘instead of appearing, as [...] a component of the value of commodities that their capitalist producers have to realize in money by selling them [I] appears in the hands of the capitalist’s co-partners, e.g. [...] in the hands of the landlord or [...] the money-lender. If the part of the surplus-value in commodities that the industrial capitalist has to deduct as ground-rent or interest for other persons with a claim on surplus-value cannot be realised in the long run by the sale of the commodities themselves, there is then an end to the payment of rent and interest [...]. It helps just as little if, instead of direct exchange between departments I and II [...] the merchant is brought in as mediator [...]. In the given case [...], 200II, must finally be disposed of to the industrial capitalists of department II. It may go through the hands of a whole series of merchants, but the last of these still finds himself in the same position vis-à-vis department II [...] as the capitalist producers of department I did at the beginning, i.e. they cannot sell the 200I to department II; and as this sum of purchases has thus stuck fast, it prevents department I from repeating the process.’ C2, p. 532.
5 C2, p. 533.
6 From this point on I have changed Marx’s figures (by halving them) to maintain numerical consistency with the examples that have preceded.
department I is paid with the money with which II₁ bought fixed capital. II₁ thus renews its fixed capital while II₂ conserves a stock of money so as to be able to renew its fixed capital in kind at a later date. This is shown diagrammatically below (again, red lines indicate transfers of money; blue of commodities).

Let us assume here then that we are dealing with the exchange 200I₁ ↔ 200II₂. We shall consider three cases.

**Case 1:** Of the 200II₂, a certain proportion has to replace the proportion of circulating parts of the constant capital for sections 1 and 2 in the ratio of half each.

Sector II₁ holds 50ₗ and sector II₂ 150ₗ, of which 100ₗ represents depreciation. II₁ casts in M150: M50 to buy I₁ circulating capital and M100 to replace fixed capital. M50 returns to buy means of consumption 50II₁ₗ. II₂ casts in M50 (to buy 50II₁ₗ circulating capital), which returns in exchange for means of consumption 50II₂ₗ. II₂ also receives the M100 cast in by II₁ (in exchange for fixed capital) in exchange for means of consumption 100II₂ₗ(d). The fixed capital depreciation in II₂ is thus balanced by the money cast in by II₁.
Case 2: \(\text{II}_1\) has sold its entire commodity, so that \(\text{II}_2\) still has 200 to sell.

\(\text{II}_1\) simply buys 100\(\text{I}\) fixed capital. This money returns to \(\text{II}_2\) in exchange for means of consumption; \(\text{II}_2\) also casts in M100 in exchange for circulating capital, money which returns in exchange for means of consumption. Again, the fixed capital depreciation in \(\text{II}_2\) is balanced by the money cast in by \(\text{II}_1\).\(^7\)

\[\begin{array}{c}
\text{II}_1 \\
\hline
200\text{I}_c \\
\hline
\text{II}_2 \\
\hline
100\text{II}_2c \quad 50_i \\
\text{means consumption} = 100 \\
\text{means consumption} = 100 \\
\end{array}\]

Case 3: \(\text{II}_2\) has sold all except the 100 that carries the depreciation value.

\(\text{II}_1\) advances M200: M100 in mutual commodity exchange with I and M100 to buy fixed capital. With this second M100 I buys means of consumption from \(\text{II}_2\). Once again, fixed capital depreciation in \(\text{II}_2\) is balanced by the money cast in by \(\text{II}_1\).

\(^7\) Marx draws a distinction between the advance of [..] [M100], which makes possible the exchange of means of production for means of consumption, and [..] [M100], which is used to buy means of production without a corresponding sale of means of consumption and which, therefore, must come from the reserve fund. While the [..] [M100] which has been advanced by section II returns to it, the [..] [M100] used by section [..] \(\text{II}_1\) as a mere purchaser does not return to it, since department I does not use this [..] [M100] to buy means of consumption from section \(\text{II}_1\). Department I uses this [..] [M100] to buy [..] [100 means of consumption] from section \(\text{II}_2\). The [..] [M100] that is withdrawn from the reserve fund by some capitalists is compensated by the [..] [100] that is saved by some other capitalists. Withdrawals and deposits offset each other and thus neither one increases nor decreases department II's purchasing power. G Carchedi and W de Haan, 'On the Replacement of Fixed Capital in Marx's Simple Reproduction', *History of Political Economy* 27.3 (1995), pp 602-3.
We now look now at a variant of this last case, in which department I begins the exchange process by casting in M100 to buy means of consumption from II2, money which stays with the buyer, even though II1 still advances M200.

We started with the exchange:

I: \[4,000_c + 1,000_v + 1,000_s\]

II: \[2,000_c + 500_v + 500_s\]
We saw earlier in the chapter that 4,000 I, is disposed of by ‘mutual exchange’ between the capitalists of this department and that the 500, of workers’ wages and 500, of capitalists’ surplus value in department II are spent on means of consumption within this department. What we are investigating here is the exchange I, ↔ II.

The problem we introduced was what happens when commodity value 2,000II, breaks down into 1,800II, commodity product to be exchanged against means of production, and 200II,(d) for the replacement of wear and tear, to be maintained in money form, thus:

\[
\begin{align*}
\text{I:} & \quad 1,000_r + 1,000_s \\
\text{II:} & \quad 1,800_c + 200_c(d)
\end{align*}
\]

In reality, then, since 1,800I, ↔ 1,800II, is uncomplicated, we are focusing on the exchange 200I, ↔ 200II, which we have broken down into 200I, ↔ [II1, + II2,], where II1 represents that sector of department II which is at the stage in which it does not only have to renew in kind – by sale of commodity product – its circulating capital, but also to renew – with money – their fixed capital, and II2 that sector in which it only has to renew its circulating capital, since its fixed capital is not yet exhausted (but, because of this, it needs to accumulate a hoard of money for future fixed capital renewal.

Our resolution of the problem was for II1 to advance money to balance the fixed capital depreciation of II2,(d) ; essentially, either directly or indirectly:

The solution to our problem therefore reduces itself to this:

[T]he fixed component of department II’s constant capital which in any given year has been transformed back into money to its full value and thus has to be renewed in kind (section I) has to be equal to the annual wear and tear of the other fixed component of the constant capital in department II which still goes on functioning in its old natural form, and whose wear and tear, the loss of value that it transfers to the commodities in whose production it is involved, has first to be replaced in money. Such a balance accordingly appears as a law of reproduction on the same scale [...] 8

Thus, if we denote the money that sector II1 casts in exchange for fixed capital MII1, , and that which sector II2 receives as a depreciation fund in exchange for consumption goods (really the same money – ‘money that circulates

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8 C2, p. 540, italicisation added.
simply to exchange commodities between I and II: money that does not mediate reciprocal commodity exchange, but appears in its unilateral function as a means of purchase\(^9\) \(MII_2(d)\), then the condition for the reproduction of fixed capital to occur without impeding the (simple) reproduction of the whole system is \(MII_1 = MII_2(d)\). Equally evident, the two possible conditions under which this equality is broken are (1) \(MII_1 > MII_2(d)\) and (2) \(MII_1 < MII_2(d)\). We now need to look at these two conditions in turn.

(1) \(MII_1 = 110 > MII_2 = 100\)

In this case, either (a):

Here, \(10MII_1\) cannot be transformed into fixed capital in kind.

Or (b):

Now, there is \(10MI_j\) which cannot be realised, i.e. cannot be transformed into means of consumption.

In both these cases, there is a remnant of money – a surplus – which cannot be converted into commodities. In

\(^9\) C2, p. 543.
case (b), importing ‘foreign’ commodities would permit the monetary surplus on $I$ to be realised.

(2) $\text{MII}_1 = [90] < \text{MII}_2 = [100]$

Now, we are left with an unsalable $10I$ and $10II$, commodities to the value of 20 which cannot be converted into money: now a monetary deficit means a surplus of commodities. Here, exporting means of consumption would help to realise the depreciation component of $II$, in means of production.

Even assuming an equal and constant level of productivity (i.e. a fixed value relation), these results will be consequent when we come to consider expanded reproduction.

(c) Results

Assuming all else (scale of production, productivity of labour) to be equal, then: (1) if a greater part of the fixed part of $II$ needs to be replaced in kind, then that part of proportion of the fixed part of $II$ that needs to be replaced with money has logically, because we are assuming the sum of fixed capital functioning to be constant, to be proportionally smaller; (2) if more of $I$’s commodity capital consists in $II$’s fixed capital, then, since we assuming a given and fixed level of production in department $I$, including what department $I$ produces for $II$, $II$’s circulating component must be proportionally less; and (3) the total production of department $II$ remains unchanged;

This leads to the following problems:

1. Department $II$’s production cannot stay the same if the proportion of constant capital in circulating form goes down.
2. The increased money that accrues to $I$ in exchange for fixed capital – ‘money that circulates simply to exchange commodities between $I$ and $II$: money that does not mediate reciprocal commodity exchange, but appears in its unilateral function as a means of purchase’\(^{10}\) is only matched by decrease in $II$’s fixed capital, i.e. not only does more money flow from department $I$ to $II$, but there is less of that commodity product against which $I$ only functions as buyer. A greater part of $I$ would be unconvertible against $II$, and would be stuck in money form. ‘There would be a crisis

\(^{10}\) C2, p. 543.
– a crisis of production – despite reproduction on a constant scale.’

if [...] a constant proportion is not assumed between the defunct fixed capital [i.e., II_1] [...] and the fixed capital which continues to operate in the old natural form [i.e., II_2(d)] [...] then in one case the amount of circulating components to be reproduced remains the same, but the amount of fixed components to be replaced will have increased; the total production of department I therefore has to grow, or else there would be an insufficient amount of reproduction quite independent of the monetary relations. In the other case, if the proportionate size of the fixed capital in department II that has to be reproduced in kind declines, then the amount of constant capital II’s circulating components that have been reproduced by department I remains unchanged, while the fixed components to be reproduced have declined. There is thus either a reduction in the total production of department I, or alternatively a surplus (as previously a deficit) [...] that cannot be realized.

An increase in productivity in department I would, in the first case (i.e., MII_1 > MII_2(d)) mitigate these imbalances, but this would also have deleterious consequences: (1) transfers of labour and capital between branches of production would be necessary, producing temporary dislocations; (2) department I would have more value to exchange with department II, i.e. department I’s product would depreciate. In case 2 (MII_1 < MII_2(d)), department I would have to either contract its production, or supply a surplus. In both these instances, crisis results.

In both cases, foreign trade would mitigate the imbalance: in the first case, supplying means of consumption for exchange with department I, in the second to dispose of surplus commodities. ‘But foreign trade, insofar as it does not just replace elements (and their value), only shifts the contradictions to a broader sphere, and gives them a wider orbit.’

Looked at technically (i.e. from outside the context of capitalist reproduction), what the problem reduces itself to is that the quantity of fixed capital that needs to be replaced in kind will vary over production periods, while, independently of this, the mass of circulating capital that needs to be replaced in a production period, all else being equal, stays the same. The only remedy to the problem, looked at technically, would be a ‘perpetual relative overproduction’, either of fixed capital or of stocks of raw materials. ‘Over-production of this kind is equivalent to control by the society over the objective means of its own reproduction. Within capitalist society, however, it is an anarchic element.’

Marx concludes by noting that disproportions within the production of fixed and circulating capital does not just, as then contemporary political economists understood it, explain crisis, i.e. it is not an exceptional circumstance provoking exceptional problems, but is something that ‘can and must arise from the mere maintenance of the fixed capital; that [...] can and must arise on the assumption of an ideal normal production [...]’ and that, by implication, crisis too is a fact that ‘can and must arise on the assumption of an ideal normal production’.

11 C2, p. 543
12 C2, pp. 543-4.
13 ‘Of themselves, [...] surpluses are no evil [...] in capitalist production however, they are an evil.’ C2, p. 544.
14 C2, p. 544, italicisation added.
15 C2, pp. 544-5.
16 C2, p. 545.