Sraffa’s Interpretation of Marx’s Treatment of Fixed Capital

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ABSTRACT It is well known that Sraffa analyzed fixed capital as a ‘joint product’ along with regular products, such that in each period a given machine (together with other material and labor inputs) produces both a regular product plus a one-period-older machine of the same type. What is perhaps less well known is that Sraffa attributed this same method of dealing with fixed capital to Marx, and to Torrens, Maithus, and Ricardo. This paper examines the textual evidence presented by Sraffa to support his interpretation of Marx’s treatment of fixed capital, and also examines more comprehensive textual evidence from the three volumes of Capital not considered by Sraffa. It is argued that Marx did not treat fixed capital as a joint product in his theory of prices but instead consistently assumed a ‘straight-line’ method of depreciation, according to which a constant fraction of the total value of the fixed capital is transferred to the price of the product in each period, and the remaining value of the fixed capital is not part of the value of the product, but instead ‘remains fixed’ in the capital goods.

1. Introduction

It is well known that Sraffa analyzed fixed capital as a joint product, such that in each period a given machine (together with other material and labor inputs) produces both a regular product plus a one-period-older machine of the same type. The purpose of Sraffa’s assumption is to determine the prices of fixed capital goods simultaneously with the prices of regular products, and to determine the depreciation of fixed capital as the difference between the price of fixed capital goods from one period to the next. In Appendix D of Production of Commodities by Means of Commodities (‘References to the Literature’), Sraffa presents references on four specific points, which show the ‘connection of this work with the theories of the old classical economists.’ The fourth point has to do with Sraffa’s method of ‘treating what is left of fixed capital at the end of the year as a kind of joint product.’ Sraffa argues that this method of treating fixed capital was first introduced by Torrens, and then later ‘adopted’ by Ricardo and

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Malthus, and even by Marx. Sraffa states that ‘Thereafter [Torrens’s] method was generally adopted, even by opponents of Torrens’s theory: first by Ricardo in the next edition of his Principles, then by Malthus in the Measure of Value, and later by Marx...’ (Sraffa, 1960, p. 95; emphasis added). Sraffa’s interpretation of Marx’s treatment of fixed capital as a joint product has been repeated by leading Sraffian economists (e.g. Roncaglia, 1978, p. 36; Pasinetti, 1980, p. xv; Varri, 1987, p. 380; Kurz & Salvadori, 2005a, p. 91; 2005b, pp. 503, 515).

It is not entirely clear what Sraffa is claiming here. The meaning of ‘adopted’ is ambiguous. The two extreme meanings would seem to be something like: (1) a weak meaning, according to which Marx ‘adopted’ the joint product method on one or two occasions, for incidental, secondary purposes, that are not a part of Marx’s general theory of value; or (2) a strong meaning, according to which Marx ‘adopted’ the joint product method as part of his general theory of value, and in particular in the determination of depreciation and the net value of fixed capital.

If Sraffa intended the first weak meaning, then I would have no great quarrel with this claim, except that he should have been more explicit about this more modest meaning. And he also should have acknowledged that there is much more important and more substantial textual evidence to support the opposite interpretation—that Marx, in his general theory of value, including the determination of depreciation and the net value of fixed capital, definitely did not adopt the joint product method, but instead adopted an entirely different method, which will be examined at length below. Sraffa’s sparse, one-sided statement leaves the misleading impression that Marx’s ‘adoption’ of the joint product method was much more significant than it actually was. We will see below just how insignificant Marx’s ‘adoption’ was.

On the other hand, there is some indication that Sraffa intended something more like the stronger meaning of ‘adopted.’ In discussing Ricardo and Torrens, Sraffa suggested that Torrens used the method of fixed capital as a joint product as a solution to Ricardo’s problem of price determination, with fixed capital and equal rates of profit. Therefore, when Sraffa says on the next page that this same joint product method was ‘adopted’ by Marx, the implication seems to be that this method was adopted by Marx for the same purpose as in Torrens—to explain prices with fixed capital and equal rates of profit. This impression is strengthened by the fact that this method was of course used by Sraffa himself for this same purpose, and Appendix D is supposed to show the connections between Sraffa’s theory and the theories of ‘classical economists’, including Marx.

Sraffa’s ambiguity remains in the comments by the Sraffian economists mentioned above, who generally quote Sraffa that Marx ‘adopted’ the joint product from Torrens, without further clarification of the meaning of ‘adopted.’ However, again one gets the impression that something more like the stronger meaning is intended. Roncaglia (1978, pp. 34–35), like Sraffa, emphasizes that Torrens used the joint product method to solve Ricardo’s problem of prices determination with fixed capital and equal rates of profit. Pasinetti (1980, pp. xiv–xv) also seems to attribute to Marx a more general adoption of the joint product method. He suggests that the joint product method was the ‘classical’ method of treating fixed capital (i.e. the most commonly used method), as opposed to the ‘neoclassical’ method of treating fixed capital as a given stock. And he says, citing Sraffa’s Appendix D, that the ‘classical’ method was ‘accepted’ by Ricardo and Malthus and Marx, without further qualification.

The textual evidence presented by Sraffa in his Appendix D to support his interpretation of Marx’s treatment of fixed capital as a joint product consists of only two passages, cited in a footnote to the sentence quoted above. One passage is from Chapter 9 of Volume 1 of Capital, and the other passage is from Volume 3 of Theories of Surplus-Value, in a section on Torrens. Kurz & Salvadori (2005b, p. 15) identify one other passage, in the same section on Torrens in Theories of Surplus-Value, that Sraffa discussed in his unpublished notebooks, and that he also interprets as evidence of Marx’s treatment of fixed capital as a joint product. These three passages will be examined at length below.

Before discussing Sraffa’s three passages, the next section will present a more comprehensive and systematic review of Marx’s treatment of fixed capital in key chapters in the three volumes of Capital. It will be demonstrated that Marx certainly did not treat fixed capital as a joint product in his theory of value and in the determination of depreciation and the net value of fixed capital, but instead consistently assumed what has been called a straight-line method, according to which the total value of fixed capital is transferred to the value of the product only partially (‘bit by bit’), over multiple periods (depending on the lifetime of the fixed capital goods). During each period, a constant fraction of the total value of the fixed capital is transferred to the value of the product, and the remainder of the value of the fixed capital ‘remains fixed’ in the capital goods, i.e. this remainder does not become a joint product. Indeed, that is why Marx called fixed capital ‘fixed’—because it has not yet been transferred to the product, but remains ‘fixed’ in the capital goods.

To avoid misunderstanding, let me emphasize that the main point of this paper is an interpretative one. I am not arguing in this paper that Marx’s treatment of fixed capital is superior to Sraffa’s treatment of fixed capital as a joint product. (I believe that to be true, but that is a subject for another paper.) Rather, I am arguing that Marx’s treatment of fixed capital is fundamentally different from Sraffa’s treatment, and therefore that Sraffa’s interpretation of Marx’s treatment of fixed capital as a joint product is misleading to say the least.

2. Marx’s Treatment of Fixed Capital in Capital

2.1. Volume I

Marx presented his basic theory of surplus-value in Chapter 7, Section 2, of Volume 1 of Capital (‘The Valorization Process’). In this chapter, the concept of constant capital has not yet been introduced (it is introduced in Chapter 8), but it is clear that the value transferred from the means of production to the product includes only the depreciation cost (the ‘wear and tear’) of the fixed capital goods; in other words, includes only a fraction of the total fixed capital, not the total fixed capital. In Marx’s example in Chapter 7, fixed capital goods are represented by a spindle, and the fraction of the value of the spindle that is
transferred to the value of the product is assumed to be 2 shillings in a 6 hour day and 4 shillings in a 12 hour day. Nothing is said about the net value of the spindle being a joint product along with the yarn.

In Chapter 8 of Volume 1 (‘Constant Capital and Variable Capital’), Marx introduces his key concepts of constant capital and variable capital. Constant capital is defined as the money capital invested in the means of production. A distinction is made between raw materials, which are entirely consumed within one period of production, and 'instruments of labor' (tools machines, factory buildings and containers) that last more than one period. The money capital invested in raw materials is entirely transferred to the value of the product in one period. However, the money capital invested in the instruments of labor is not entirely transferred to the product in one period, but is instead transferred 'bit by bit' over the expected lifetimes of the instruments. Again nothing is said here about the net value of the fixed capital being treated as a joint product along with the regular products.

A basic distinction in Marx's theory is between the labor process (the production of use-values) and the valorization process (the production of value and surplus-value). These are the titles of the two sections of Chapter 7 of Volume 1. In Chapter 8, Marx emphasizes again that the instruments of labor enter wholly into the labor process, but enter only partially into the valorization process:

Thus it appears that one factor of the labour process, a means of production, continually enters as a whole into that process, while it only enters in parts into the valorization process. The distinction between the labour process and the valorization process is reflected here in their objective factors, in that one and the same means of production, in one and the same process of production, counts in its totality as an element in the labour process, but only piece by piece as an element in the creation of value. (Marx, 1867, p. 312; emphasis added)

Sraffa's treatment of fixed capital assumes in effect that fixed capital goods enter wholly into both the labor process and valorization process. But Sraffa's valorization process is an imaginary one, not the actual valorization process analyzed by Marx, into which the value of fixed capital enters only partially or 'piece by piece.'

The depreciation cost for each period (d), i.e. the value transferred in each period from any particular fixed capital good, is determined by Marx by an average, 'straight-line' method, i.e. by dividing the total fixed capital invested in this fixed capital good (F) by its expected lifetime (n), both of which are taken as given, i.e. d = F/n. 'Suppose,' for example, 'a machine is worth £1000, and wears out in 1000 days. Then every day on one-thousandth of the value of the machine is transferred to the day's product' (Marx, 1867, p. 312). Nothing is said here about the net value of the machine each day being treated as a part of the day's product.

Marx's straight-line method of determining the depreciation cost of each period is entirely different from Sraffa's joint product method of determining the depreciation cost. According to Sraffa's method, the depreciation cost of a given fixed capital good of a given age is determined by subtracting the price of this machine at the given age from the price of this machine one period earlier, with the prices of the machines for all ages determined simultaneously with the prices of the regular products. According to this method, the depreciation cost of a capital good changes from period to period (usually increases). There is nothing remotely like this in Marx's theory.

In Chapter 9, Marx introduces the concept of the rate of surplus-value, the ratio of the surplus-value produced in a given period to the variable capital invested in that period. In this ratio, the amount of surplus-value is related to the variable capital only, because, according to Marx's theory, variable capital is the only source of surplus-value. Constant capital, on the other hand, is not a source of surplus-value, because the value transferred to the product from the constant capital cannot be greater than the constant capital itself.

With respect to the constant capital component of the value of commodities, Marx repeats what he said in Chapters 7 and 8 about the remaining value of the fixed capital:

Now we have seen how that portion of the constant capital which consists of the instruments of labour transfers to the product only a fraction of its value, while the remainder of that: values continues in its old form of existence. Since this remainder plays no part in the determination of value, we may at present leave it on one side. (Marx, 1867, pp. 320–321; emphasis added)

Note that the remaining value 'plays no part in the determination of value.'

Marx then makes the point that 'to introduce [the remaining value of the fixed capital] into the calculation would make no difference' to the magnitude of surplus-value. In order to illustrate this point, Marx presents a numerical example in which the total value of the machinery is £1054, and the straight-line depreciation cost of the machinery in the first period is £54. Marx then states:

Now if we also reckoned the remaining £1000 [the remaining value of the machine], which continues to exist in the old form of the machinery, as which treats fixed capital goods as if they were circulating capital goods, i.e. as if fixed capital goods were entirely consumed in each period and also produced in each period one-year older fixed capital goods.
transferred to the product, we would also have to reckon it as part of the value advanced, and thus make it appear on both sides of our calculation. We should in this way, get £1,500 on one side and £1,590 on the other. The difference between these two sums, or the surplus-value, would still be £90. (Marx, 1867, p. 321; emphasis added)

This is one of the two passages cited by Sraffa in his Appendix D to support his interpretation of Marx’s treatment of fixed capital as a joint product. A footnote to the first sentence in this passage quotes a sentence from Malthus, and Malthus’s sentence could be interpreted to mean that he adopted this joint product treatment of the net value of the fixed capital.  

Sraffa apparently interprets this passage and the footnote to mean that Marx himself ‘adopted’ the joint product method of treating fixed capital. If Sraffa intended the strong meaning of ‘adopted’ — that Marx adopted the joint product method in his general theory of value and in the determination of depreciation and the net value of fixed capital — then surely Sraffa was mistaken. We have seen in the above discussion of Chapters 7 and 8, and even earlier in the same paragraph, that Marx did not include the net value of fixed capital goods as a joint product. Rather, Marx’s method was to include only a fraction of the total value of the fixed capital goods in the value of the product of any period (e.g. only £54, not £1054). On the other hand, if Sraffa intended only the weak meaning of ‘adopted’, then this passage could perhaps be interpreted in that way. However, this interpretation would be of almost no significance. Marx’s point in this passage is not to adopt Malthus’s method, but simply to point out that, if one were to follow this method, and include the net value of fixed capital in the value of the product, then this net value would also have to be included in the costs of producing the product, so that it would make no difference to the magnitude of the surplus-value. The magnitude of the surplus-value would be the same in either case (£90). Marx’s point is that the magnitude of the surplus-value is independent of the total fixed constant capital advanced, just as it is independent of the circulating constant capital consumed in each period, not that the net value of the fixed capital should be treated as a joint product. In the sentence which follows the above passage, Marx explicitly rules out this joint product treatment of the remaining value of the fixed capital by stating that ‘When we refer, therefore, to constant capital advanced for the production of value, we always mean the value of the means of production actually consumed in the course of production, unless the context demonstrates the reverse’ (Marx, 1867, p. 321; emphasis added).

This conclusion is reinforced by the discussion which follows of Marx’s determination of the fixed capital component of the value of the product in Volumes 2 and 3 of Capital.

2. Volume 2

In Chapter 8 of Volume 2 (‘Fixed Capital and Circulating Capital’), Marx introduces for the first time the concepts of fixed capital and circulating capital, so this is obviously another key chapter for understanding Marx’s treatment of fixed capital and depreciation. He begins by referring back to his discussion of constant capital in Chapter 8 of Volume 1, and summarizes what he said in that chapter about the partial transfer of value from the fixed capital goods (‘means of labor’) to the value of the product over multiple periods:

We saw in Volume 1, Chapter 8, that one part of constant capital maintains the specific use-form in which it enters the production process, over against the products it helps to fashion. It continues to perform the same functions over a shorter or longer period, in a series of repeated labour processes. Examples of this are factory buildings, machines, etc.—in short, everything that we collect together under the description means of labour. This part of constant capital gives up value to the product in proportion to the exchange-value that it loses together with its use-value. The extent to which the value of such a means of production is given up or transferred to the product that it helps to fashion is determined by an average calculation; it is measured by the average duration of its function, from the time that it enters the production process to the time it is completely used up, is dead, and has to be replaced or reproduced by a new item of the same kind. (Marx, 1884, p. 237; emphasis in the original)

Marx then goes on to discuss further what he calls the ‘peculiarity’ of fixed capital, which consists of two characteristics: (1) fixed capital goods do not enter the sphere of circulation, but instead remain fixed in the sphere of production; and (2) the value of fixed capital is not transferred to the product all in one period, but instead is transferred in small portions over multiple periods. The remaining value of the fixed capital that has not yet been transferred to the product remains fixed in the capital goods.

In the next paragraph, Marx states that these peculiarities are the defining characteristics of the concept of fixed capital:
The circulation of the part of the capital considered here is a peculiar one. In the first place, it does not circulate in its usual form. It is rather its value that circulates, and this does so gradually, bit by bit, in the degree to which it is transferred to the product that circulates as a commodity. A part of its value always remains fixed in it as long as it continues to function, and remains distinct from the commodities that it helps to produce. This peculiarity is what gives this part of the constant capital the form of fixed capital. (Marx, 1884, p. 238; emphasis in the original)

In Chapter 20 of Volume 2 ('Simple Reproduction'), Marx presents his analysis of the 'reproduction of the total social capital.' In the first ten sections, Marx assumes that constant capital consists only of circulating capital; i.e., no fixed capital. Then in Section 11 ('Replacement of the Fixed Capital'), Marx extends his analysis of simple reproduction to include fixed capital. In this section, it is clearly assumed, as in earlier chapters, that the value of the fixed capital is transferred to the product 'bit by bit' over multiple periods:

One portion of the constant capital value, that which consists of means of labour... is transferred from the means of labour to the product of labour (the commodity) while these means of labour still continue to function as elements of the productive capital; and moreover in their old natural form; what is transferred from the instrument to the product of labour, and reappears as an element of the value of the commodities that these means of labour produce, is their wear and tear, the loss of value that they suffer bit by bit in the course of their function over a certain period. (Marx, 1884, pp. 524–525; emphasis added)

In Marx's numerical tables in this chapter, the constant capital component of the value of commodities consists only of the depreciation portion of the fixed capital. The net value of fixed capital is not included at all in these tables, since it plays no role in the value of the product, nor in the value that must be reproduced in this period. The net value of fixed capital is 'left aside', as Marx said in Chapter 9 of Volume 1. The products of Departments I and II are regular products, new means of production in Department I and new means of subsistence in Department II. The products of the two departments never include partially used machines as joint products, as in Sraffa's misinterpretation.

2.3. Volume 3

In Volume 3, Marx continues to treat fixed capital and depreciation in the same way as in Volumes 1 and 2, as would be expected. In Chapter 1 of Volume 3, Marx introduces the concept of cost price, which is the sum of variable capital plus the constant capital consumed in a given period. Marx emphasizes that the constant capital component of the cost price, like the constant capital component of the value of commodities discussed in Volumes 1 and 2, includes only the depreciation portion of the fixed capital; it does not include the total fixed capital advanced.

With respect to the formation of the cost price itself, ... the only distinction that matters is the distinction between fixed and circulating capital. In our example, the depreciation of the means of labour was reckoned at £20...
3. Sraffa’s Textual Evidence

3.1. Capital, Volume 1, Chapter 9

We have already discussed above the passage cited by Sraffa from Chapter 9 of Volume 1 of Capital, and have seen that Sraffa either misinterpreted this passage or exaggerated its significance. Marx is not saying in this passage that he includes the net value of fixed capital as a part of the value of the product in his own theory of value and surplus-value. Rather, Marx is saying that, even if one did include the net value of fixed capital as a part both of the value of the product and of the cost of production (as Malthus apparently did), this would not make any difference in the magnitude of the surplus-value produced. This passage has nothing to do with the determination of the magnitudes of surplus-value or depreciation or net fixed capital. These magnitudes are assumed in this passage, not determined. The determination of these magnitudes has already been discussed in Chapters 7 and 8, with no reference to the joint product method.

We will now examine the other two passages cited by Sraffa to support his interpretation of Marx’s treatment of fixed capital.

3.2. Theories of Surplus-Value, Volume 3, pp. 71–72

The other passage cited by Sraffa in his Appendix D is from Volume 3 of Theories of Surplus-Value, in a section about Robert Torrens, one of the most important critics of Ricardo’s labor theory of value. Torrens’s main criticism was (like Malthus’s) that the labor theory of value was contradicted by the empirical tendency toward an equal rate of profit in all industries. According to this criticism, the labor theory of value implies that equal capitals that employ different quantities of labor should receive unequal amounts of profit (and the amount of profit should vary directly with the quantity of labor employed), but this conclusion is contradicted by the empirical evidence of a tendency toward an equal rate of profit across industries.

Torrens also expressed this criticism in terms of what he called his ‘general principle’—that ‘equal capitals produce equal exchange-values’, even though they employ different quantities of labor. By ‘exchange-values’, Torrens meant not only the exchange-value of the regular products, but also the remaining exchange-value of the fixed capital goods (after depreciation costs have been deducted). Torrens’s ‘general principle’ follows from the equalization of profit rates. If equal capitals have equal amounts of profit, then equal capitals will also have equal exchange-values in this broader sense. Since each capital earns the same rate of profit, the ‘exchange-values’ of two commodities produced by equal capitals must be the same. For example, in Torrens’s numerical example quoted below, a capital of £2,000 is invested in both the woolen and the silk industry. Since both capitals earn a 10% rate of profit, the ‘exchange-values’ (including both the prices of the woolen and the silk and the remaining value of the fixed capital in each industry) produced by these two equal capitals is equal to £2,200.

In a passage quoted at length by Marx on the page cited by Sraffa as evidence that Marx ‘adopted’ Torrens’s method, Torrens supposes that:

a woolen and a silk manufacturer were each to employ a capital of £2,000; and
... the former were to employ £1,500 in durable machines, and £500 in wages and materials; while the latter employed only £500 in durable machines, and
£1,500 in wages and materials. . . . Supposing that a tenth of the fixed capital is 
annually consumed, and that the rate of profit is ten per cent, then, as the 
results of the woolen manufacturer’s capital of £2,000, must, to give him this 
profit, be £2,200, and as the value of his fixed capital has been reduced by the 
progress of production from £1,500 to £1,350, the goods produced must sell 
for £850. And, in like manner, as the fixed capital of the silk manufacturer is 
by the process of production reduced one-tenth, or from £500 to £450, the 
silkeds produced must, in order to yield him the customary rate of profit upon 
his whole capital of £2,000, sell for £1,750 ... when capitals equal in amount, 
but of different degrees of durability, are employed, the articles produced, 
together with the residue of capital, in one occupation, will be equal in 
exchangeable value to the things produced, and the residue of capital, 
in another occupation. (Torrens, 1821, pp. 28–29, as quoted by Marx, 1861–
63, pp. 71–72; emphasis added by Marx)3

Sraffa interprets Torrens’s treatment of the remaining fixed capital as part of the exchange-value of the product as similar to his own treatment of fixed capital as a joint product. However, Torrens’s treatment of fixed capital and depreciation is significantly different from Sraffa’s treatment, in the following important respects: (1) Depreciation is not determined by the differences in the prices of partially used fixed capital goods of successive ages (as in Sraffa’s theory), but is instead determined by the same straight-line method that Marx used—by dividing the total fixed capital by the expected lifetimes of the fixed capital goods, both of which are taken as given. In Torrens’s example, the expected lifetimes of machines in both industries is ten years, and the amount of depreciation in the wool industry is £150 (= £1500/10) and is £50 in the silk industry (= £500/10). (2) The net value of fixed capital is also determined by the same procedure followed by Marx, that is, by subtracting depreciation from the gross value of fixed capital—not by determining the prices of given quantities of partially used fixed capital goods of different ages simultaneously with the prices of regular products. In Torrens’s example, the net value of fixed capital is £1350 (= £1500 — £150) in the wool industry and £450 (= £500 — £50) in the silk industry. (3) The prices of regular products are not determined simultaneously with the prices of partially used fixed capital goods, but are instead derived from the net value of fixed capital, which is taken as given, as determined in point (2) above (together with the circulating capital and the ‘customary rate of profit’, which are also taken as given). The prices of regular products are determined by subtracting the net value of the fixed capital in each industry from the total exchange-value in each industry.4 In Torrens’s example, the price of the wool product is £850 (= £2,200 — £1,350), and the price of the silk product is £1,750 (= £2,200 — £450).

3Sraffa cites this same passage in his Appendix D as evidence that Torrens treated fixed capital as a joint product similar to Sraffa’s approach in Production of Commodities.
4Torrens’s method of determining the prices of regular products is thus different from Marx’s method.
Therefore, even though Torrens did treat the net value of the fixed capital as a 'result' of production, along with the value of regular products, his method of determining depreciation and the net value of fixed capital had more in common with Marx's method than with Sraffa's method. Torrens did use a form of the joint product method to determine the prices of regular products, but in a different way from Sraffa—not simultaneously with the prices of used fixed capital goods, but derived from the net value of fixed capital.

Marx's comment on Torrens's passage quoted above is a familiar criticism that Marx made many times of Ricardo's theory and of classical economics in general—that Torrens did not explain how the 'customary rate of profit' is determined, but instead just 'presupposed' this crucial variable: 'a "customary rate of profit" is presupposed without explaining how it comes about, or even the feeling that this ought to be explained' (Marx, 1861–1863, p. 72). Marx then quotes a fragment from Torrens:

*Equal capitals, or, in other words, equal quantities of accumulated labour, will often put in motion different quantities of immediate labour; but neither does this furnish any exception to our general principle. ...* (Torrens, 1821, pp. 29–30, as quoted in Marx, 1861–63, p. 72; emphasis added by Marx)

Marx completes the passage by paraphrasing Torrens's general principle: 'namely, to the fact that the value of the product plus the residue of the capital not consumed, yield equal values, or, what is the same thing, equal profits' (emphasis added by FM).

Sraffa appears to have interpreted this passage to mean that Marx 'adopted' Torrens's treatment of fixed capital, which Sraffa interpreted as similar to his own method. However, we have seen above that Torrens's treatment of fixed capital and depreciation was in fact very different from Sraffa's method. Furthermore, in his completion of Torren's sentence, Marx is not accepting Torrens's treatment of fixed capital as part his own theory, but is instead just summarizing Torrens's general principle, which follows from the equalization of profit rates. Elsewhere in Marx's writings (including elsewhere in this section of *Theories of Surplus-Value*), Marx generally expressed the apparent empirical contradiction with the labor theory of value in terms of equal rates of profit or 'equal capitals yield equal profits', rather than in terms of Torrens's principle. Most importantly, Torrens's principle, and his inclusion of the net value of fixed capital as part of the product in the formulation of this principle, play no role whatsoever in Marx's theory of value, including the determination of depreciation and the net value of fixed capital. Therefore, this passage cited by Sraffa does not provide any textual evidence at all to support Sraffa's interpretation that Marx 'adopted' the joint product method of treating fixed capital, not even with the weak meaning of 'adopted', and certainly not with the strong meaning.

### 3.3. Theories of Surplus-Value, Volume 3, pp. 69–70

Another passage from Marx's writings that Sraffa discussed in his notebooks, according to Kurz & Salvadori (2005b, p. 503), is located two pages before the passage just discussed, at the beginning of the same section on Torrens. Marx's main point in these opening paragraphs, as in the passage two pages later, is the apparent contradiction between the law of value and the empirical phenomenon of equal rates of profit, or the phenomenon that 'equal capitals produce equal profits', even though they employ different amounts of labor. Marx comments that Smith noted this phenomenon, but did not realize that it contradicts the law of value. Marx then praises Ricardo as the first to recognize this contradiction. Then Marx makes the convoluted and unclear remark discussed by Sraffa in his notebooks:

*[Equal capitals can yield equal profits only] inasmuch as the commodities they produce—although they are not sold at equal prices (one can, however, say that their output has equal prices provided the value of that part of constant capital which is not consumed is added to the product)—yield the same surplus-value, the same surplus of price over the price of the capital outlay. (Marx, 1861–1863, pp. 69–70; Marx's emphasis)*

Again, Sraffa interprets this sentence as evidence that Marx 'adopted' the joint product method of treating fixed capital. But again we can see that Sraffa's interpretation is mistaken, certainly with the strong meaning of 'adopted' and even with the weak meaning. Marx's own formulation of the empirical phenomenon that appears to contradict the law of value is similar to Ricardo's—'equal capitals yield equal profits.' However, Marx notes in the parenthetical comment in this convoluted sentence that one could also formulate this apparent contradiction as 'equal capitals yield equal prices ... provided the value of the constant capital not yet consumed is added to the value of the product.' It is clear from the context that this alternative parenthetical formulation of the empirical contradiction is not Marx's own formulation, but is instead Torrens's formulation, discussed explicitly two pages later. Furthermore, and more importantly, this alternative formulation of the empirical contradiction plays no role whatsoever in Marx's theory of the determination of prices, neither the prices of regular products, nor the depreciation cost, nor the net value of fixed capital.

### 3.4. Theories of Surplus-Value, Volume 3, p. 71

On the next page after the sentence just discussed, and immediately before Marx's long quotation of Torrens discussed above in Section 3.2, there is another convoluted sentence about the contradiction between the law of value and the empirical phenomenon of equal profits, which Sraffa apparently did not mention in his notebooks. This passage is as follows:

*But [Ricardo's] great contribution remains: Ricardo has a notion that there is a difference between value and cost-price [i.e. price of production], and in certain cases, ... he formulates the contradiction that capitals of unequal organic composition (that is, in the last analysis, capitals which do not exploit the same amount of living labour) yield equal surplus-value (profit) and—if one disregards the fact that a portion of the fixed capital enters into the labour process without entering into the process that creates value—equal values, commodities of equal value (or rather of equal cost-price, but he confuses this). (Marx, 1861–63, p. 71; brackets and emphasis added)*
We can see that once again Marx first formulates the crucial empirical contradiction as ‘equal capitals yield equal profits’ and then adds: if one disregards the fact that the net value of fixed capital does not enter the valorization process, and instead assumes (as Torrens did) that this net value of fixed capital is added to the value of the product, then one could formulate this contradiction (as Torrens did) as ‘equal capitals yield equal values.’ However, this sentence makes it manifestly clear once again that, in Marx’s own theory, the remaining value of the fixed capital does not enter into the value of the product. We saw above that Marx emphasized in Chapter 8 of Volume 1 (and other chapters) that, in his own theory, fixed capital enters only partially (‘bit by bit’) into the valorization process.

3. Conclusion

I conclude from this re-examination of the textual evidence that Marx definitely did not adopt the joint product method of treating fixed capital in his theory of value, and in particular in his determination of depreciation and the net value of fixed capital. Instead, he consistently assumed in all the key chapters reviewed above a straight-line method of depreciation, in which only a fraction of the total fixed capital (the fixed depreciation portion) is transferred to the value of the product of any given period, and the remaining value of fixed capital, that has not yet been transferred to the product, remains ‘fixed’ in the capital goods.

Reference


References


The same conclusion also applies to Sraffa’s interpretation of Ricardo’s treatment of fixed capital as similar to Torrens’s method and thus similar to Sraffa’s own method. In his Appendix D, Sraffa cites only one page from Ricardo’s works, from the Principles (Ricardo, 1821, p. 3). However, an examination of this page and the surrounding pages suggests that Ricardo’s method of dealing with fixed capital and depreciation is neither like Torrens’s method, nor like Sraffa’s. Indeed, in Ricardo’s numerical examples of price determination on the page cited by Sraffa and on the pages that follow, the depreciation cost of fixed capital is missing altogether! Price is determined by the sum of wages plus profit on wages plus profit on the fixed capital. The depreciation cost of the fixed capital is missing as a cost in the determination of prices in these examples (and so are circulating constant capital, the cost of raw materials, etc.).