

Marx's accounting solution to the 'transformation problem'[#]

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Abstract

Before Foley (1982) and Duménil's (1983-4) 'New Interpretation' (NI), most economists concluded that Marx had failed to solve the 'transformation problem' in *Capital*, but that solving it rigorously showed his labour theory of value was incoherent. The NI allows a rigorous solution to the problem that is consistent with Marx's core claim that only socially necessary labour time adds money value to commodities, but the NI is inconsistent with some of Marx's claims and remains controversial. However, the paper argues that there is no 'transformation problem' in *Capital* to solve in the way economists pose it, of transforming socially necessary labour time into prices of production to give all capitalists the general rate of profit, but an accounting transformation that he did solve rigorously. It argues that Marx theorised capitalist accounting to solve the reverse of the economists' problem – how capitalists transform the general rate of profit and prices of production into socially necessary labour time – eventually working out that capitalists' accounts measure capital as the money value of socially necessary labour time, which is equal for identical use-values. Marx concluded that the history of capitalism had solved the 'transformation problem' by requiring individual capitalists to take control of the valorisation process and pursue 'cost-price', what accountants today call standard or target costs. The paper argues that this discovery explains Marx's decisions at the end of 1862 to change the title of his project to *Capital*, and to begin assuming that the price of a commodity equals the money value of the socially necessary labour time to produce it. It analyses the NI's advance and its accounting limitations, and challenges its conclusion that we cannot use Marx's theory of value to explain the prices of commodities and the profits of individual capitalist firms. It explains Marx's accounting solution to the transformation from prices to values and concludes that capitalist accounts support his claim, highlighted but not substantiated by the NI, that the sum of all of profits of individual enterprises is society's total surplus value; that an individual enterprise's profit is a fragment of society's surplus value. It uses Marx's theory of accounting to solve the apparently incorrigible problem of allocating joint costs, including fixed capital. The paper concludes that *Capital* provides an integrated accounting theory of how capitalists collectively control individual enterprises to produce, circulate, and simultaneously distribute surplus value from the exploitation of labour, so that every capitalist gets an equal return on capital. It calls on critical accountants to take Marx seriously, and on Marxists to take accounting seriously, as Marx did.

Introduction

“The nonsense about the necessity of proving the concept of value arises from complete ignorance both of the subject dealt with and of the method of science” (Marx, 1868, Letter to Kugelmann).

Marx claimed his work in *Capital* had dealt “a theoretical blow to the bourgeoisie from which they will never recover” (Marx and Engels, 1987, p.4). Today many economists (including some 'Marxist' economists) think his labour theory of value is incoherent.

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Most Marxists argue defensively that Marx did not try to explain prices and rates of profit, but propounded only a qualitative theory of capitalist exploitation. Only a beleaguered and dwindling minority cling to its intuitive appeal and continue searching for proof that Marx's theory has the rigour and generality he claimed. The paper supports the minority, but argues that only by understanding accounting can Marxists overcome the apparently "formidable problem of finding an interpretation and reconstruction of the labor theory of value which is simultaneously an unimpeachable representation of Marx's own views and a foundation for a progressive economic research programme" (Foley, 2000, p.3).

Some economists have noted an affinity between the labour theory of value and accounting (Sweezy, 1942; Hicks, 1974; Foley, 1986; Klamer and McCloskey, 1992), but have not pursued the matter. Sweezy, for example, said, "Marx's value theory has ... the great merit, unlike some other value theories, of close correspondence to the actual accounting categories of capitalistic business enterprise" (1942, p.63), but apparently thought these too obvious to state or discuss. Others simply believe that "profits as evidence of exploitation is clear to all who care to see" (Fine, 2001, p.51). The paper argues that the key to understanding Marx's labour theory of value is to recognise that accounting underlies *Capital's* explanation of how capitalism controls the production, circulation, and simultaneous distribution of surplus value. It shows that to work out his explanation, Marx theorised why and how capitalists keep their accounts the way they do.¹ Grounding his theory in accounting would explain why Marx dismissed the criticism that he had not 'proved' the concept of value. This is his assertion that "Even if there were no chapter on 'value' in my book, the analysis of the real relationships which I give would contain the proof and demonstration of the real value relation" (Letter to Kugelmann, 1868, quoted by Meek, 1973, p.153). As throughout *Capital* Marx uses accounting categories of capital, profit and cost, etc., and real capitalist accounts, to explain real relationships between capitalists and workers, the paper agrees with Marx that he had no need to 'prove' his theory of value.

Until the appearance of the 'New Interpretation' (NI) by Duménil (1983-4) and Foley (1982), a long line of economists had concluded that no rigorous solution existed for Marx's 'transformation problem' that remained consistent with the central claims of his labour theory of value (see, for example, Loranger, 2004 for a survey), but the NI is controversial. Many still think that *Capital* contains an unresolved logical contradiction etched into the structure of its presentation. In Volumes 1 and 2 Marx assumes that the market prices of all commodities equals the monetary value of the socially necessary labour time required to make them, yet from part two of Volume 3 he accepts that, in reality, competition means that prices equal the cost of production plus the general rate of profit.² Most economists (including supporters of the NI) conclude that Marx failed give

¹ There are several good reasons why Marx did not highlight accounting (Chiapello, 2007, pp.291-292), particularly, as we shall see here, that he thought it was too obvious to need stressing and that he wanted to get beneath its inchoate categories.

² In Volumes 1 and 2 Marx defined 'socially necessary labour time' to mean the labour time "required to produce an article under normal conditions of production, and with the average degree of skill and intensity prevalent at the time" (1996, p.49). Part 3 argues that in Volume 3 Marx modified the definition because

a fully rigorous solution to the ‘transformation problem’, how the economy transforms socially necessary labour time into prices of production, the long-run market prices that give all capitalists the (risk-adjusted) general rate of profit. The paper argues that this framing of the problem stands Marx on his head. That the problem Marx solved in Volume 3 was how capitalists collectively transform the general rate of profit and prices of production into socially necessary labour time in production, which solves the ‘transformation problem’ by requiring individual capitalists to take control of the valorisation process, and not the other way around. This would explain why Marx, who was not averse to mathematics, did not attempt to solve the economists’ transformation problem in Volume 3, and justify his apparent dismissal of the issue: “our present analysis does not necessitate a closer examination of this point” (Marx, 1959, p.165).

Foley (1982) and Duménil (1983-84) interpretation of the transformation problem at the aggregate level of the economy is consistent with the central claim of Marx’s theory of value that only socially necessary labour time adds money value to commodities in production. However, they conclude that Marx “locat[ed] the labor theory of value at the level of the aggregate production of commodities ... not, as Ricardo expressed it, in each particular commodity” (Foley, 1986, p.15). According to the NI, Marx gave us only an “aggregate theory asserting that the labor-time worked by productive labor is the source of all money value-added, whatever prices happen to be” (Mohun, 1996, p.41). It follows that we cannot use Marx’s theory to explain the prices of individual commodities and the profits of individual capitalist firms.³ The paper argues that we can by using Marx’s theory of capitalist accounting. It shows that, consistent with the NI’s treatment of variable capital (expenditure on productive wages), accounting for the ‘money value of socially necessary labour time’ is the key principle underlying capitalist accounting that Marx, with help from Engels, identified. This correspondence, the paper argues, is evidence that profit is, as Marx says it is, a ‘form’ or ‘fragment’ of surplus value, and supports his claim that the sum of individual profits equals society’s total surplus value.

Part 1 presents evidence that Marx drew on Engels’ knowledge of accounting to work out his labour theory of value and theory of capitalist control.⁴ It argues that a breakthrough in Marx’s theorising of accounting for fixed capital explain his decisions in December 1862 to change the title of his project to *Capital* and to start it with an analysis of the commodity assuming that the money value of socially necessary labour time required to produce it equalled its long-run market price. Part 2 argues that Marx’s method of presenting *Capital* followed from his theory of capitalist accounts. Volumes 1 and 2 analyse ‘capital in general’, the circuits of capital at the level of the capitalist firm as a representative of all capitals combined. Volume 1 analyses how the capitalist firm

he concluded that under competition capitalists imposed an overriding definition of ‘socially necessary’ labour time to mean that implied by ‘cost price’, what accountants today call ‘standard’ or ‘target cost’, the maximum cost of production that allows the capitalist to earn the general rate of profit. Until then, references to ‘socially necessary labour time’ are to Marx’s general definition.

³ References to the ‘individual capitalist’, ‘capitalist firm’ or ‘the capitalist’ are to joint stock companies with managers and many shareholders who own diversified portfolios.

⁴ Bryer (1994) noted the correspondence between Marx and Engels on the topic of depreciation. Chiapello (2007) analyses some of this and other correspondence on accounting. This paper extends the range of accounting topics and goes into the details and their significant for Marx’s project in *Capital*.

accounts for the production of surplus value. Volume 2 analyses how it accounts for the production and circulation of value (its sales) and shows they are part of the same integrated circuit, that production equals circulation. Volume 3 analyses the accounts of ‘total social capital’, the consolidated accounts of capitalists collectively, and how competition between individual enterprises (subsidiaries or branches) seeking the general rate of profit ensures they all produce and circulate surplus value so that every enterprise gets an equal return for equal capital.⁵ That is, Volume 3 shows that the production and circulation of surplus value simultaneously distributes it so that individual firms earn an equal return on capital. Part 3 provides an accounting critique of the NI and argues that, while it is an advance on previous interpretations, it gives only a partial accounting solution. Part 4 gives Marx’s accounting solution and supports his claim that in Volume 3 he had shown that labour remained the source of all value in the real world of competitive capitalism when prices diverged from values. The two critical aspects of this claim overlooked by economists are that his solution to the transformation problem is historical and that it relies on capitalist accounting. It presupposes the “really difficult” history of ‘total social capital’, capitalists functioning as a living collective, demanding the general rate of profit, and competing individual capitalists using accounts to control their labour processes to transform prices of production into socially necessary labour times, which they account for at what accountants today call standard or target costs. History created the general rate of profit and total social capital, which now requires individual capitalists to make the transformation from market prices to values rather than, as usually understood, to make the transition from values to prices. Part 4 concludes that Marx gives a general, quantitative solution to the transformation from prices to values, of capitalists keeping socially necessary labour time accounts in money, according to the ‘law of one cost’ whereby identical commodities absorb equal amounts of the ‘money value of socially necessary labour time’, Marx’s core claim highlighted by the NI. It concludes by using Marx’s theory of accounting to solve the apparently incorrigible problems of accounting for production overheads, fixed capital and joint costs to illustrate how capitalists account for the cost of production as the ‘money value of socially necessary labour time’, as target cost. The paper concludes that in *Capital* Marx explained his theory of capitalist control using a labour theory of value derived from capitalist accounts and that there is therefore no ‘transformation problem’. More generally, it concludes that understanding the role of accounting in *Capital* integrates Marx’s analysis of capitalist society and the capitalist firm, and promises to deal theoretically and empirically with other spurious problems invented by economists (such as the distinction between ‘productive’ and ‘unproductive’ labour – see, Bryer, 2007). It calls on Marxists to take accounting seriously, and on critical accountants to take Marx seriously.

Part 1: Marx’s labour theory of value and accounting

Marx only occasionally refers to ‘bookkeeping’ in *Capital*, but his letters contain many questions about accounting (Bryer, 1994; Chiapello, 2007), particularly from 1858 when

⁵ ‘Total social capital’ appears when individual capitalists passively hold well-diversified portfolios, but act collectively to control capitalist society, which began in Britain from around 1850 and in the US and elsewhere in the developed capitalist world from the 1880s (Bryer, 1993, 1994).

he was writing the *Grundrisse*, to the publication of Volume 1 of *Capital* in 1867, which Engels answers. Engels' father, a textile manufacturer, removed him from school before graduation to train in business (Wheen, 1999, pp.76-77). After working in Europe, in 1842 he came to Manchester to work in a branch of his father's partnership to learn to be a 'good tradesman' (Chiapello, 2007, p.285). Despite his radical inclinations, Engels was a businessman who, of necessity, had a good understanding of accounting. Marx knew his philosophy, but before he met Engels his "practical knowledge of capitalism was nil" (Wheen, 1999, p.75; Chiapello, 2007, p.285). Engels, by contrast had "invaluable firsthand knowledge of the machinery of capitalism" (Wheen, 1999, p.83), and knew from experience that accounting was a vital cog. A letter in 1850 about disagreements between his father and Peter Ermen (a partner in the Manchester firm of Ermen & Engels), suggests knowledge of accounting and reveals his view that it was critical to controlling capital:

"The balance for the year 1849/50 has not yet been struck; debits and credits are in the most splendid confusion. Father would seem to have been pressing them again, so I hear, and tomorrow they will set about putting this in order If Peter Ermen takes over the management of the office...this will greatly interfere with my examination of the books. ... I have abstracted the essentials, however In a few days' time I shall send Father Ermen Bros' complete accounts for 1849/50, duly classified and set out, as also those of Ermen's bleaching concern, so that he may see how these gentlemen carry on business with his capital" (Marx and Engels, 1975, p.253).

Engels published his first theoretical work in 1844, his *Outlines of a Critique of Political Economy*. This article kick-started Marx's study of political economy and set the direction for his later work.⁶ It fitted with Marx's materialist philosophy, because Engels drew on practical reality to criticise the received theories of political economy. He denounced Adam Smith for defining value solely as the 'cost of production', and John-Baptiste Say for defining value solely as 'utility' (i.e., demand), and criticised both for sneaking their opponent's ideas into their theories by the back door. He did not think that in practice the cost of production or the utility of the consumer (effective demand) determined value, but that both did: "Value is the relation of production costs to utility. The first application of value is the decision as to whether a thing ought to be produced at all; i.e., as to whether utility counterbalances production costs" (1975, p.426). Engels knew from experience that 'value' to capitalists meant only expected profit, and they would not produce without it. He criticised the idea that the cost of production was the sum of rent, profit and wages, because neither Smith's theory of rent nor Ricardo's theory dealt with obvious practicalities. Smith's theory did not account for varying land fertilities and Ricardo's theory assumed that in practice landlords could instantly withdraw inferior land from production if prices fell (Engels, 1975, pp.428-429). More significantly, no economists recognised that, in reality, capital and labour were "identical", and not just in the sense all admitted, that capital was stored-up labour. In practice, in the process of production, "the momentarily postulated separation of capital

⁶ Marx referenced this article several times in his later works, calling it a "brilliant essay on the critique of economic categories" (Marx and Engels, 1975, p.615, fn.180).

and labour is immediately superseded by the unity of both”; “capital is nothing without labour, without movement” (Engels, 1975, p.431). After their unity in production, the capitalist separated capital and labour at its end, and started the cycle again, typically on a larger scale. It was as a businessman that Engels knew, “After this separation [of capital and labour] is accomplished, capital is divided once more into the original capital and profit – the increment of capital, which it receives in production; although in practice profit is immediately lumped together with capital and set into motion with it” (Engels, 1975, p.430). The relationship between the cost of production, market prices and value; the practical inadequacy of Ricardo’s theory of rent; how capital and labour were both ‘separated’ and ‘identical’; were questions that preoccupied Marx for many years. Part 3 argues that his eventual understanding of these issues underlay his solution to the so-called transformation problem.⁷

After many philosophical and political detours, Marx began his study of political economy in earnest in late 1857, turning to write what became his *Grundrisse*. In January 1858, he wrote to Engels asking for practical information to stimulate his theoretical analysis of ‘the circulation of capital’, the focus of what became *Capital*:

“In my economic work I have now reached a point at which I could do with some information on practical matters from you, since nothing of the kind is to be found in theoretical writings. I mean, the *circulation* of capital – how it varies in various kinds of businesses; the effects of the same on profits and prices. If you can provide me with any information on the subject, it would be VERY welcome” (Marx and Engels, 1983, p.256).

Working out the effects of the circulation of capital on profits and prices would preoccupy Marx for several years. Engels provided him with accounting information, particularly about the circuit of fixed capital, which later gave Marx serious theoretical problems. This was the subject of their letters in March 1858, when Marx was writing the ‘Chapter on Capital’ in *Grundrisse*. He wrote to Engels asking him whether Babbage was right that in Manchester manufacturers replaced machinery every 5 years. Engels replied,

“... the most reliable criterion is the percentage by which a manufacturer writes down his machinery each year for wear and tear and repairs, thus recovering the entire cost of his machines within a given period. This percentage is normally 7½ on the declining balance” (Marx and Engels, 1983, pp.279-280).

Marx and Engels talked in the language of accounting, but this did not mean that at this time Marx (or Engels) had an articulated theory of capitalist accounting. Marx followed up with other accounting questions:

⁷ It is not possible to accept Oakley’s claim that Engel’s paper “lacks sophistication”, or his view that “it is appropriate to see the piece as a *catalyst* in Marx’s intellectual development only in the sense that it in no way directed or limited his subsequent studies” (1983, p.24, cf. Meek, 1973, p.140).

“Another question in respect of which I require only one example (approximate), is how, e.g., in your own mill or rather manufacturing business, floating capital is apportioned over raw material and wages, and what portion on average you leave in the bank. Further, how you *calculate* turnover in your books. Here the theoretical rules are very simple and self-evident. But it is nevertheless just as well to have some inkling of how things look in practice. The method of businessmen is, of course, partly based on illusions and even greater than those of the economists; on the other hand it rectifies the latter’s theoretical illusions by means of practical ones” (Marx and Engels, 1983, p.283).

Marx used the contemporary accounting terms – ‘floating capital’, for current assets, and ‘turnover’ for the ratio of sales or cost of sales to capital, as we shall see. He wanted to know the proportion of ‘raw materials and wages’ in the finished goods – implicitly, we shall see below when he asks again, he wants a breakdown of the cost of production – and how much capital was in the bank, owed by debtors, etc. In the same letter, he uses accounting information he found in a Report of the Factory Commissioners to calculate the rate of return on sales, but he also wants to calculate the cost of production (Marx, 1983, p.283):

| | |
|--|---------|
| Capital sunk in building and machinery..... | £10,000 |
| Floating capital..... | £ 7,000 |
| £500 interest on 10,000 fixed capital | |
| £350 interest on floating capital | |
| £150 Rents, taxes, rates | |
| £650 Sinking fund of $6\frac{1}{2}$ p.c. for wear and tear of the fixed capital | |
| <hr/> | |
| £1,650 | |
| 1,100 contingencies (?), carriage, coal, oil | |
| ----- | |
| £2,750 | |
| £2,600 wages and salaries | |
| ----- | |
| £5,350 | |
| £10,000 for about 400,000 lbs raw cotton at 6d | |
| ----- | |
| £15,350 | |

[£]16,000 [sales] for 363,000 LBS TWIST SPUN. VALUE [£]16,000. *Profit* [£]650, OR ABOUT 4.2 P.C. HENCE THE WAGES OF OPERATIVES here ABOUT 1/6.

Marx was not happy with the ‘about 1/6’ proportion of wages to sales which he simply assumed, and complained “It is a great pity that the above STATEMENT does not show the *number* of operatives, or the proportion of actual WAGES to what appears as SALARIES” (Marx and Engels, 1983, pp.283, 560, fn.147). This information would have allowed Marx to distinguish productive from unproductive workers and therefore to calculate cost of production. He used these accounts in the *Grundrisse* to illustrate calculating the rate of surplus value, the rate of profit, and the rates of turnover of fixed capital and floating capital (Marx, 1986, pp.485-486). There is no evidence of a reply

from Engels to the question of the practical calculation of turnover and Marx asks it again 10 years later, as we shall see below.⁸

These questions show that Marx did not yet have an articulated theory of capitalist accounts, but he persisted with his questions and analysis until he did. His comment that he was interested in accounts because “The method of businessmen is, of course, partly based on illusions and even greater than those of the economists; on the other hand it rectifies the latter’s theoretical illusions by means of practical ones” (Marx and Engels, 1983, p.283), suggests he thought that capitalists had no theoretical illusions in their accounts.⁹ It also implies that he theorised practical accounts to confront and rectify the theoretical illusions of the economists, particularly the illusion that the only value of interest to capitalists was market value, as we shall see in part 3.

Businessmen had ‘practical illusions’, but it was critical to Marx’s theory that, as he put it in Volume 3, “the nature of surplus-value impresses itself on the capitalist’s consciousness in the course of the immediate production process, as we were shown by his greed for the labour time of others” (Marx, 1981, p.135). As he carefully said, for without it his theory would have no practical relevance, the “surplus value and the rate of surplus value ... are, *relatively*, the invisible and unknown essence” (Volume 3, quoted in Meek, 1973, p.187, emphasis added). It is critical to the coherence of his theory that the capitalist have at least an inchoate “inkling of the source of his profit” (Marx, 1981, p.135), of labour as the source of his surplus value, to explain the bias towards increasing profits by reducing labour costs rather than reducing constant capital (Foley, 1986, p.55). In Marx’s theory, this ‘inkling’, that it gets its surplus only from labour, is embedded within the collective mentality of capitalists as a class, in the collective mentality of total social capital, signified today in the universal use of double bookkeeping (DEB) and cost-based accrual accounting (Bryer, 1993, 1999a, 1999b, 2000a, 2006b). Predictably, Marx used DEB to deepen his understanding of ‘total social capital’, the aggregate logic of its circuits of capital and its control of individual capitalists and their workers.

Total social capital and DEB

In June 1861, at the beginning of his most productive three years during which he wrote the second draft of *Capital* and the *Theories of Surplus Value* in the *Economic Manuscript of 1861-1863*, Marx asks Engels,

“If it could be done very briefly, without making undue demands on you, I should like to have a sample of Italian book-keeping (with explanations). It would help throw light on Dr Quesnay’s *Tableau economique*” (Marx and Engels, 1985b, p.381).

⁸ In *Grundrisse*, Marx calculated it in the same way that accountants still do today (Marx and Engels, 1983, p.560, fn.145).

⁹ By the ‘practical illusions’ of businessmen Marx meant that they saw ‘cost’ rather than the money value of socially necessary labour time, ‘profit’ rather than surplus value, and believed they earned profit from all their capital.

From his study of ‘Italian book-keeping’, that is, double entry bookkeeping, Marx would learn how it automatically accounts for flows of capital by simultaneously recording the effect of every transaction as both a source (a credit) and a use (a debit) of capital (Bryer, 1993a). He would also learn that capitalists used DEB to produce integrated departmental profit and loss accounts that calculated profitability as the increment to capital at the level of the individual department and at the level of the firm. This would certainly help him understand that it was necessary to distinguish between ‘capital’ and ‘revenue’ at the level of the individual firm or sectors of production (as Adam Smith did), and at the level of society (which Smith did not), that is, at the level of total social capital. Part 3 argues this was critical to Marx’s understanding of total social capital and therefore to his solution of the transformation problem in Volume 3 because it allowed him to reconstruct Quesnay’s Tableau and thereby reveal Adam Smith’s “nonsensicality of subsuming the *gross product* of a society *simply under revenue* (which may be consumed annually)”. Smith’s accounting was nonsense, because “if this were so, a society would have to start each year *de novo, without capital!*” (Marx and Engels, 1985b, p.485)!

Marx stayed in Manchester in April 1862 where he probably wrote his ‘digression’ on Quesnay’s Tableau in the *Theories of Surplus Value* (Marx, 1963, p.484, fn.88). In July 1863, he sent Engels his own Tableau (and a presentation of Quesnay’s Tableau) that produced integrated departmental profit and accounts for a two-sector (‘department’) economy (means of subsistence and means of production) showing how the accounts of both sectors balanced individually and overall (Marx and Engels, 1985b, pp.485-487, 490-491). We first present Marx’s Tableau in modern DEB and then show that DEB underlies his presentation by comparing it with his version of Quesnay’s simpler Tableau:

Marx’s Tableau using modern DEB

Society has opening money capital of £1,166.66 (all numbers are millions) that it invests in two departments, £500 in the means of subsistence department (MOS) that produces the means of consumption, and £666.66 in the means of production department (MOP). The subsistence department spends £400 on means of production (constant capital) and £100 on wages (variable capital). It sells its total output for £700 and makes a profit (surplus value) of £200. The means of production department spends £533.33 on constructing its own means of production and spends £133.33 on wages. It sells its total output for £933.33 and makes a profit of £266.66. The departmental businesses distribute all their profits to their capitalists as dividends who spend them all on the means of subsistence (consumption). Similarly, the workers spend all their wages on subsistence.

Marx effectively does two departmental profit and loss accounts using the simplest possible double entries (indicated by the connecting arrows), recognising that each transaction had two sides – each involved a use of capital (a debit, Dr) and a source of capital (a credit, Cr). The debit sides of the departmental and gross product accounts record the costs of production and the balance of profit; the credit sides record the sales.

Department 1 – Means of Subsistence (MOS):

| | | | |
|---------------------|--------|--------|------------------------|
| Dr | | | Cr |
| ----- | | | |
| | £ | | £ |
| Wages | 100.00 | -----> | Wages (MOS) 100.00 |
| Means of production | 400.00 | -----> | Wages (MOP) 133.33 |
| | | -----> | Dividends (MOS) 200.00 |
| Profit | 200.00 | -----> | Dividends (MOP) 266.67 |
| | ----- | | ----- |
| Sales | 700.00 | | 700.00 |
| | ===== | | ===== |

Department 2 – Means of Production (MOP):

| | | | |
|---------------------|--------|--------|------------------|
| Dr | | | Cr |
| ----- | | | |
| Wages | 133.33 | -----> | MOP (MOS) 400.00 |
| Means of production | 533.33 | -----> | MOP (MOP) 533.33 |
| Profit | 266.67 | | |
| | ----- | | ----- |
| Sales | 933.33 | | 933.33 |
| | ===== | | ===== |

Gross Product (Society):

| | | | |
|---------------------|----------|-----|----------|
| Dr | | | Cr |
| ----- | | | |
| Wages | 233.33 | MOS | 700.00 |
| Means of production | 933.33 | MOP | 933.33 |
| Profit | 466.67 | | |
| | ----- | | ----- |
| Sales | 1,633.33 | | 1,633.33 |
| | ===== | | ===== |

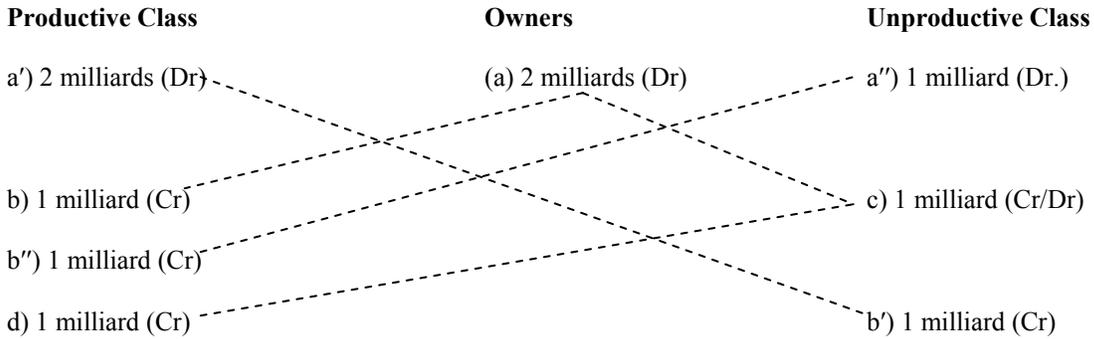
Marx used a complex diagram showing the flows of capital between the two sectors (1985b, pp.490-491). We can see that the lines joining up the numbers in the departments effectively indicated the double entries¹⁰ by looking at his solution to Quesnay’s much simpler Tableau in *Theories of Surplus Value* (1963, pp.308-344) where he uses the same diagrammatic approach. Here he links together the effects of transactions between farmers (Quesnay’s ‘productive class’), landlords (owners) and manufacturers (Quesnay’s ‘unproductive class’), but this time with a lettering system which maps the appropriate double entry debits and credits:

Quesnay’s Tableau

The farmers buy 1,000 million of means of production from the manufacturers and produce 3,000 million worth of food for sale (after their consumption). The farmers sell 1,000 million of food to landlords, 1,000 million of raw materials to manufacturers, who also consume 1,000 million of food. Farmers make a surplus of 2,000 million that they pay to the landlords as rent. The landlords spend 1,000 million of their rent on food and 1,000 million on manufactured goods. The

¹⁰ These lines show the double entries, but Marx does not call the links between the numbers debits and credits.

manufacturers buy 1,000 million of raw materials from the farmers and produce manufactured goods for sale worth 2,000 million. The manufacturers sell 1,000 million to the landlords and 1,000 million to the farmers. Marx presents Quesnay's Tableau thus:



In the *Theories of Surplus Value* Marx says that his lettering system and lines make Quesnay's Tableau "clearer" by showing "what Quesnay regards each time as the starting point of a circulation, as a, a', a'', the following link in the circulation as b, c, d, and as b', b'' respectively" (1963, p.308). All the starting points, a, a', a'' (and c in the line c to d, which Marx neglects to mention), are debits (uses of capital). The ending points c, d, b', b'' are credits (sources of capital). We can see this by writing Quesnay's Tableau in double entry profit and loss accounts for farmers and manufacturers:

Quesnay's Tableaux in DEB

| Farmers' Profit & Loss Account | | | |
|--------------------------------|-------|---------------------------|-------|
| Dr | | | Cr |
| Means of production | 1,000 | Landlords (food) | 1,000 |
| Rent | 2,000 | Manufacturers (materials) | 1,000 |
| Sales | 3,000 | Manufacturers (food) | 1,000 |
| | ===== | | ===== |

| Manufacturers' Profit & Loss Account | | | |
|--------------------------------------|-------|-----------|-------|
| Dr | | | Cr |
| Materials | 1,000 | Landlords | 1,000 |
| Surplus value | 1,000 | Farmers | 1,000 |
| Sales | 2,000 | | 2,000 |
| | ===== | | ===== |

Part 3 argues that Marx's excursion into DEB made concrete his theory of total social capital, the idea that capital as a whole controlled the 'departments' of production, whether sectors or individual firms, through the general rate of profit, and this underlay his accounting solution to the transformation problem in Volume 3 which he wrote in 1864-65. In the meantime, Marx continued to study accounting at the level of the firm and quickly ran into a major problem understanding accounting for fixed capital that temporarily threw him (as Engels put it) "off the rails". Jumping back onto the rails

appears to have been a watershed in Marx's understanding of accounting that he needed to solve the transformation problem and fix the name and structure of *Capital*.

Theorising capitalist accounting at the level of the firm: jumping off and back onto the rails

Engels gave Marx more information from the accounts of his firm when he visited Manchester in August and September 1861. Marx used these (plus later) figures in *Contribution to the Critique of Political Economy* (Marx and Engels, 1988, p.161) and in Volume 1 of *Capital* (1996, pp.228-229) to illustrate how to use capitalist accounts to calculate the rate of surplus value. In August 1862, Marx wrote asking for practical guidance: "In my critique I have demolished so much of the old stuff that there are a number of points I should like to consult you about before I proceed" (Marx and Engels, 1985b, p.411).

Top of the list was "One point which you, as a practical man, must have the answer", namely, the question of "what becomes of this fund, which yearly replaces [in his example] 1/12 of the machinery?" (Marx and Engels, 1985, p.411). In other words, what happened to the capital returned for what accountants call the wear and tear or depreciation of fixed assets? Marx's comments and questions show that, in addition to seeking support for his conclusion that it was "in fact, an accumulation fund to extend reproduction", he was struggling to understand the theory underlying capitalists' calculations of depreciation:

"[T]he same applies to machinery ... as ... to a horse with a life – or useful life – of 10 years. Although it would have to be replaced with a new horse after 10 years, it would in practice be wrong to say that 1/10 of it died every year. Rather, ... machinery (at least some types of machinery) RUNS BETTER in the second year THAN IN THE FIRST. AT ALL EVENTS, in the course of [a useful life of] ... 12 years does not 1/12 of the machinery have to be replaced *in natura* each year?" (Marx and Engels, 1985, p.411).

Marx here asked fundamental questions about the calculation of depreciation for fixed capital, rather than merely assuming an average calculation that, if (say) a life is 12 years, the capitalist always recovers 1/12th of the cost each year. Engels bluntly replied, quite rightly as we shall see, that "on the question of wear and tear ... I rather suspect you have gone off the rails", but promised "more about this" (Marx and Engels, 1985, p.414). Although at this time Marx understood that labour transferred the value of the fixed asset to commodities, his questions show that he had not yet grasped that changes in technical efficiency did not determine this transfer.

In capitalist accounting, the same rules do apply to machines and horses. If a horse lasts 10 years, Marx knew the capitalist recovered its cost over this period. However, his statement that "it would be wrong to say that 1/10 of it died every year" really asks the question, how does the capitalist recover the cost if he or she cannot allocate it over the horse's useful life in accordance with the decline in its technical efficiency? Horses lose

very little ‘technical efficiency’ over their useful working lives – and have not lost 90% of it by the end of year nine of a ten-year life, for example. His question about machines that run better in their second year raised the same point. It implies that, if technical efficiency determined the transfer of value from the machine to the commodity, in year 2 we could have negative depreciation, i.e., appreciation in value, a clear non-labour source of value and a catastrophe for Marx’s theory if true.¹¹ This question shows that Marx had not yet understood that run-in costs were additional socially necessary costs of producing the machine. That is, he had not yet worked out that capitalists added these costs to the cost of the machine and spread them over its economically useful lifetime such that each use-value the machine produced cost the same amount, just as they did with all other necessary costs.¹² Exactly the same principle applied to the recovery of the cost of the horse that (assuming equal operating costs) the capitalist spreads evenly over the horse’s use-values (for example, the distances it travels or the loads it pulls).

There is no further correspondence on this issue until 1867, but in December 1862 when Marx resumed work on ‘The Chapter on Capital’, turning to draft the section on ‘Capital and Profit’ (Oakley, 1981, p.89), he makes it clear that, through discussions with Engels or by other means, he had jumped back on to the accounting rails. Marx now theorises capitalist accounting for the cost of production, including the costs of fixed capital:

“The value of a *commodity* is determined by the total labour time, *past* and *living*, which enters into it ...; hence not only by the labour time which is added in the final production process, but by the labour contained in the fixed capital and the circulating capital, or in the conditions of production of the labour last to be added, by the labour time contained in the machinery, etc., the *matières instrumentales* ... [such as the coal consumed, the heating, lighting, etc ...] and the raw material, in so far as their value reappears in the commodity, which is entirely the case with raw materials and ... the *matières instrumentales*, whereas the value of the fixed capital only reappears partially in the product – in proportion to its WEAR AND TEAR” (Marx, 1991, pp.136-137).¹³

Part 2 argues that Marx’s theorisation of capitalist depreciation accounting completed his theory of ‘capital in general’ begun in *Grundrisse*. The link between this discovery and his decision in December 1862 to change the title of his proposed books from *A Contribution to a Critique of Political Economy* to *Capital* is, we shall see, that it was through theorising the cost of production as ‘capital’, as ‘cost-price’, that Marx found the accounting solution to his ‘transformation problem’.¹⁴

¹¹ The idea that machines transfer their use-value to the commodities they help to produce appears to be a lingering influence of Ricardo whose views on fixed assets Marx applauds in the *Grundrisse* (1987, p.35).

¹² The paper shows this in part 3.

¹³ The paper discusses capitalist accounting for the cost of production in parts 3 and 4. Bryer (1994) shows that Marx understood capitalist depreciation accounting, whereas Part 3 shows that Marxist economists do not.

¹⁴ Oakley (1981, pp.105-109) leaves as a complete mystery why Marx changed the title of his project to *Capital*, and its implications for our understanding of whether at this point Marx either compromised his ambitions or felt he could accomplish them under the heading of *Capital*. Part 3 argues for the latter interpretation.

Accounting and the reproduction and accumulation of capital

In Volume 2 of *Capital* Marx explicitly recognised the importance of accounting to capitalists in controlling the valorization process: “By way of bookkeeping, which also includes the determination or reckoning of commodity prices (price calculation), the movement of capital is registered and controlled” (Marx, 1978, p.211).¹⁵ Here, as Engels’ did, he saw the role of ‘bookkeeping’ as providing the means for “the supervision and ideal recapitulation of the process [of production]” (Marx, 1978, p.211), for controlling the circulation of capital through production and back from the market. To determine selling prices, Marx knew from Engels that capitalists turned to their books. He knew that where purchased and self-produced commodities “are not changed into actual money [i.e., sold], they are converted into accounting money; in short they are used as exchange-values and the element of value they add to the product in one way or another is precisely calculated” (Marx, 1976, p.952). In the capitalist’s mind, he thought, the value of the product is “express[ed] ... more precisely as money of account” (Marx, 1976, p.955). Like accountants, he thought of ‘capital’ as money invested for recovery with a return,¹⁶ and distinguished ‘fixed’ from ‘circulating’ capital and ‘productive’ from ‘capital of circulation’. He shared their idea of physical capital maintenance. The stocks in Marx’s circuit of capital are the assets we find in capitalist balance sheets and the flows appear in their profit and loss accounts (Bryer, 1999a, 1999b).

Some Marxist economists recognise the affinity between capitalist accounting and Marx’s circuit of capital, but they do not probe it. Sweezy said that $c + v + s = \text{total value}$ “is in effect a simplified version of the modern corporate income statement” and that it “constitutes the analytic backbone ... of Marx’s economic theory” (1942, p.63), but did not explain the underlying principles of accounting. He is broadly right that “Total value is equivalent to gross receipts from sales, constant capital to outlay on materials plus depreciation, variable capital to outlay on [productive] wages and salaries, and surplus value to all income” (Sweezy, 1942, p.63). Foley says that the circuit of capital, “ $M - C \dots P \dots C' - M'$... corresponds directly to the income, or profit and loss statement, of a capitalist firm” (Foley, 1986, p.33). That is, that capitalist accounts measure the cost of production (C) as the “capital outlays” on “labor and nonlabor inputs to production over a period of time” (Foley, 1986, p.68); that M' is sales that returns value as money capital, and that gross profit is therefore sales minus the cost of production. Foley adds, and is right, that the “stock variables in the circuit of capital model correspond to the categories on the asset side of the balance sheet of the firm” (1986, p.68). He is right again that “When we turn to Volume III of *Capital* we find Marx firmly in control of capitalist accounting categories underlying profit and profit rate measures. He clearly distinguishes stocks and flows ... and the definitions of accounting cost” (Foley, 2000, p.11). It is “Indeed, it is striking that the ordinary conventions of capitalist accounting reflect the labour theory of value concepts so faithfully”, both insisting “on a strict rule of

¹⁵ ‘Bookkeeping’ was not a term of abuse in the 19th century, having the same meaning as ‘accounting’ today.

¹⁶ Although Marx added that money became productive capital only by exploiting labour so that, for example, speculative profits did not come from exploitation although the value did.

conservation of value” (Foley, 1986, p.69; 2000, p.12); that is, the accountants’ principle that particular ‘costs attach’, which we shall see in part 3, Marx’s theory of value explains.

Finally, Foley is right that “All the circuit of capital variables for a real capitalist firm ... can be determined from ordinary accounting data” (1986, p.69), including surplus value (p.70) – that, assuming prices equal value, or in the aggregate that surplus value equals accounting profit. He is certainly right that “Capitalists calculate the rate of profit as the ratio of surplus value to the stock of capital tied up in their production” (Foley, 1986, p.76). Foley (1986) models the circuit of capital using “accounting conventions” (particularly, that ‘costs attach’) and, apparently without realising it, shows how Marx’s circuit of capital anticipates the widely used so-called ‘Du Pont’ formula (supposedly invented in US company in the early 20th century) for decomposing the rate of profit to financially control corporations.¹⁷ However, neither Foley nor any other Marxist economist has told us what capitalist accounting categories are, how capitalists measure capital, the cost of production, and assets, profit, etc. Earlier work argues that in Volumes 1 and 2 of *Capital*, Marx’s theory dealt with many of the major issues facing accountants then and today (Bryer, 1994, 1998, 1999a, b; Chiapello, 2007). Part 4 shows how Marx applied his theory to solve his transformation problem, but first we must explain the origin of the economists’ ‘problem’ in the accounting logic of *Capital* as a whole.

Part 2: The accounting logic of *Capital*

Why did Marx begin *Capital* assuming that prices equal the money value of socially necessary labour? Some say he did because it had the political advantage of allowing him to first focus on the distinction between constant and variable capital to demonstrate that labour alone in production was the source of all value. Workers could then plainly see that capitalists exploited them even if they bought labour power and sold commodities at their values (Duménil, 1983-84, p.443; Mohun, 1994a, p.396). Others suggest it fitted in with Marx’s history of the transition from feudalism to capitalism (Meek, 1971; 1977). Neither explanation commands general support as a sufficient reason for structuring his presentation in a way that would cause problems for readers, as it apparently left the ‘proof’ of real world relevance to the end.

However, consistent with the evidence of part 1, another possible explanation is that only having resolved the problem of accounting for fixed capital was Marx confident that he could explain how in competition capitalists accounted for cost and profit as forms of value. Only then did he fully understand that in the real world of competition capitalists accounted as though cost equalled the money value of socially necessary labour time and therefore that profit equalled the money value of surplus socially necessary labour time. Secure in this knowledge, he could then prove his theory while simultaneously simplifying, politicising and historicising the presentation by starting with ‘simple commodity production’, the circuit C-M-C that prevailed in pre-capitalist formations. He could fulfil his intellectual project and simultaneously hope to reach political theorists,

¹⁷ See the Appendix.

activists and educated workers in this simple world where fixed capital was non-existent, where all costs were labour costs, and where value equalled price, knowing that the same principles underlay capitalist commodity production, the circuit M-C-M', which he could postpone to the concluding volume.

In short, Marx's methodological approach to writing *Capital* is consistent with him knowing from real accounts produced under competition conditions, that the theory of value developed in Volumes 1 and 2 also worked when the money value of socially necessary labour time and price were not equal under competition, in Volume 3. This knowledge would allow Engels to confidently taunt Marx's rivals in his *Preface* to Volume 2 to come up with their own solution before he published Volume 3, and it would justify Marx's claim that "The laws thus found ... hold good *no matter how* the surplus value is later divided among the producer, etc" (Marx and Engels, 1988, p.23). Marx had a solution he was confident worked for 'capital in general'. This understanding appears to explain his decision to begin *Capital* with a detailed analysis of the commodity, just as the rules of accounting must begin with a definition of an 'asset' (e.g., FASB, 1976; IASB, 2006) and the production of surplus value before turning to its circulation in Volume 2 and its distribution through production and circulation in Volume 3.

The commodity as 'capital in general'

What did Marx mean when he wrote, "the commodity-form of the product of labour – or the value-form of the commodity – is the economic cell-form" (*Preface*, Volume 1)? Sweezy gives the common explanation and, we shall see, the starting point for the NI when he says it is because the commodity

"... absorbs a part of society's total available labor force (i.e., they are all materialized abstract labor) ... (which presupposes use value and manifests itself in exchange value) that makes of 'commodity' the starting point and central category of the political economy of the modern period" (1942, p.33).

In other words, Marx starts with the commodity because, like an accountant, he wants to add these up to get total capital as the sum of its parts, and this is one meaning of what Marx calls 'capital in general'. His other meaning, almost wholly neglected by Marxists and non-Marxists alike, is the total capital as more than the sum of the parts, as the structured totality that he calls 'total social capital'. Marx does want to add up commodities. However, the other reason for starting with the commodity was that understanding the formation of commodity value under total social capital and competition was the key to understanding capitalists' control of society's valorisation process, and from his study of their accounts he eventually concluded the same principle applied to both 'capital in general' and to 'total social capital'.

Rosdolsky (1977) highlighted the importance of Marx's idea of 'capital in general', but Heinrich (1989) argues that Marx had difficulties applying the concept to competition when writing the second draft of *Capital* in the early 1860s, abandoned it, and this

explains the structure of *Capital* (1989, p.64). Moseley shows that Heinrich's evidence is weak and argues that Marx did maintain the idea through Volumes 1 and 2 and parts of 3, but fails to analyse total social capital as a developed form of capital in general for the remainder of Volume 3. Heinrich is right that Marx did encounter difficulties, but they were not over the idea of capital in general, and is right that the idea of 'total social capital' is present in Volumes 1 and 2, but he also only thinks of it, like Moseley and others, as the whole defined as the sum of its parts.

In *Grundrisse*, Marx distinguished between 'capital in general' as an 'abstraction', and as a 'real existence', as capital in motion as an acting individual:

“*Capital in general* as distinct from particular capitals, does indeed appear (1) *only as an abstraction*; not an arbitrary abstraction, but ... which grasps the specific characteristics which distinguish capital from all other forms of wealth ... (2) however, capital in general, as *distinct* from the particular real capitals, is itself a *real existence*” (1973, p.449).

'Capital in general', treating the sum of all individual capitals as an abstract, undifferentiated individual, is the focus of Volumes 1 and 2. There Marx was not concerned with “an individual capital as distinct from other individual capitals”, not with the differences between capitals, but with what was common to them all, “capital as such, say the capital of the whole society” (1973, pp.310, 346). In Volumes 1 and 2, 'capital in general' meant, “the individual capitals are to be regarded simply as 'fragments' ... of social capital” (Rosdolsky, 1977, p.48); that we treat the whole society as an undifferentiated individual, or the individual as the ideal-typical representative of the whole (Moseley, 1997, p.12).

In Volume 3, however, 'capital in general' means 'total social capital', the whole in motion caused by differences between individuals, where the whole did not just equal the sum of the parts, but is a structured totality, the emergent outcome of interactions between the parts and the whole. Marx gave his solution to the historical transformation problem in Volume 3, where he analysed 'capitalist production as a whole', carefully labelling it 'total social capital', aggregating the effects of competing individual capitals into the movements of “one single capital” (1981, p.255). There he explains the result of competing individual capitals – the results that emerge in reality from “the process of capital's movement considered as a whole” (Marx, 1981, p.117), the functioning of 'total social capital'.

Marxist economists, including supporters of the NI we shall see, think only of 'capital in general' as the sum of the parts. For example, Moseley, following Rosdolsky (1977), distinguishes “between 'capital in general' (or 'total social capital') on one side, and 'many capitals' (or 'competition')” (2000, p.286) on the other (see also Moseley, 1995; Foley, 1986). Arthur sees the distinction between the two meanings of 'capital in general', but thinks there are

“... two contradictory discourses in Marx. The one asserts that total capital is an effective power and individual capitals simply replicate its categories as aliquot parts of it, picking up their share of the total surplus value as if they were merely shareholders in a single enterprise. The other discourse insists that capital necessarily exists as many capitals *confronting* one another in competitive struggle, that only thus are determinations of capital in general enforced on each other” (2002, p.141).

Marx’s discourses on ‘capital in general’ are not contradictory once we understand that capitalist accounting enforces the determinations of capital in general through ‘generally accepted accounting principles’ and the general rate of profit, as the target or required return. As Marx said, total social capital becomes an ‘effective power’ in competition, as an all-encompassing joint stock enterprise with many branches:

“The influence of individual capitals on one another thus becomes precisely their positing as general beings, and the suspension of the seeming independence and independent survival of individuals. This suspension takes place even more in credit. And the most extreme form to which suspension proceeds, which is however at the same time the *ultimate positing* of capital in the form adequate to it – is the joint stock company” (Marx, 1973, p.657-658).

Marxist economists puzzle over whether the ‘general rate of profit’ in Volume 3 is different from the ‘average rate’ in Volumes 1 and 2 (Arthur, 2002, pp.133-136). Again the answer is that under total social capital the ‘average’ rate becomes the ‘general’ rate by enforcement through accounting, to become the general, ‘required return on capital’ (Bryer, 1994). They overlook the role of accounting in holding capitalists together as a class, as a joint-stock enterprise against workers as a class; that its common rules, enforced as the ‘laws of accounting’ for capital, allow capitalists to socialise capital fully by holding well-diversified portfolios and simultaneously to promote a competitive system of individual enterprise for the benefit of all capitalists. Part 4 argues that total social capital is Marx’s social mechanism for controlling the production and distribution of profit to individual capitalists who compete for capital and a share of total surplus value under the discipline of the general rate of profit, enforced through accounting (Bryer, 1993, 1994, 2000a).

Accounting for the production and realisation of value

Marxist scholars usually explain the structure of *Capital* as the movement from the abstract to the concrete, which it was, but whereas they see this as a movement from theory to reality, Marx said his initial abstractions had captured reality in thought. By contrast, Marxist scholars usually think that before a capitalist sells a commodity on a competitive market, the “value categories of *Capital* have no *direct* empirical counterpart” (Yaffe, 1994, p.82; see also Meek, 1977, p.121). That is, in production, the focus of Volumes 1 and 2, “There is no manifestation of value in terms of its substance, abstract labour, nor of its measure, socially necessary labour-time[;] ... the reduction of labour to abstract labour is something that can only be done by the market” (Himmelweit

and Mohun, 1994, p.158), that Marx deals with in Volume 3.¹⁸ It is “the market mechanism [that] determines *a posteriori* which labors are to count as portions of social labour and for how much they are to count” (Mohun, 1994, p.33).

Marx certainly says many times in his early writing that the market finally stamps labour time as abstract labour and measures it as socially necessary labour time, particularly in *A Contribution to the Critique of Political Economy* (1971). It is consistent with the chronology of Marx’s accounting theory of part 1 that in this work “there is no clear distinction between value and exchange value” (Elson, 1979, p.130). He says in Volume 1, “It is only by being exchanged that the products of labour acquire, as values, one uniform social status, distinct from their varied forms as objects of utility”. However, he now adds that following the expansion of the market, where “useful articles are produced for the purpose of being exchanged, ... their *character as values has therefore to be taken into account, beforehand, during production*” (Marx, 1996, p.84, emphasis added). “Value ... does not stalk about with a label describing what it is” (Marx, 1996, p.85), namely, its social character, but it did stalk around in the capitalist’s mind, was an elemental cell in the capitalist mentality:

“Our capitalist has two objects in view: in the first place, he wants to produce a use-value that has a value in exchange...; and secondly, he desires to produce a *commodity whose value shall be greater than the sum of the values of the commodities used in its production*, that is, the means of production and the labour power, that he purchased with good money in the open market” (1996, p.196, emphasis added).

Marx never thought that value and surplus value were ‘stalking around’ as a material reality waiting for capitalists to harvest. “Universal social labour is ... not a ready-made pre-requisite but an emerging result” (1971, p.45). However, here, in *A Contribution to the Critique of Political Economy*, Marx attributes this ‘emerging result’ solely to the market. “Social labour-time exists in these commodities in a latent state, so to speak, and becomes evident only in the course of their exchange” (Marx, 1971, p.45). As Dobb said,

“Marx started, indeed, from concepts such as supply and demand, competition and the market ... [b]ut it is apparent also in the ... *Critique* of fifteen years later. (*Capital*, however, deals with the market ‘level’ towards its close, towards the end of Vol. III.)” (1971, p.6).

Marx’s answer in *Capital* was to leave the market as the final arbiter of value, but put the capitalist in control of the valorization process as the active prime mover and initial arbiter in the creation of value, not the market that can only verify its realisation or loss. This change of view is consistent with Marx’s comment in a letter to Engels on 15th

¹⁸ Elson also says that “divorced from its expression as exchange value, value is simply an abstraction, without practical reality. It cannot stand on its own: it is not a category designating a reality which is manifested through exchange value” (1979, p.134). Perelman claims, “the process of abstraction of labour defies quantification” (1999, p.721).

August 1863 that in writing *Capital* he “had to turn everything upside down” (Oakley, 1981, p.110).

This change of view also follows Marx’s decision in December 1862 to change the name of his project to *Capital* (Marx and Engels, 1985, p.435). We saw in Part 1 that this change followed Engel’s jibe that Marx was ‘off the rails’ in his understanding of depreciation accounting. Shortly after this Marx sat down to write the ‘Capital and Profit’ section of the ‘Third Chapter’ of what had been the *Critique* (Oakley, 1983, p.89). In this chapter, for the first time, he spelt out the relationship between value and the ‘cost of production’ and (as we saw) spelt out the capitalist theory of depreciation accounting for the first time (Marx, 1991, pp.78-103, 136). Having done this, Marx did not continue with the *Critique*, but “started the critical theory over again” (Oakley, 1981, p.109), “returned to the point of departure from which we proceeded in considering the general form of capital” (Marx, 1991, p.80).

He goes back, in other words, to rework his presentation to start from the most elemental cell of ‘capital in general’, the commodity, now confident he has the theoretical principles to handle the uncertain world of competition in which the individual capitalist had to control the labour process to create the desired result. Before this, when “Marx was struggling to draw up the plan of *Capital* he was uncertain how to present the early chapters on commodities or money: were they part of the thematization of capital itself or were they merely introductory” (Arthur, 2002, p.58). Marx knew that commodities were ‘capital’ in *Grundrisse* but, as his question on depreciation accounting showed, he was not confident he could explain how all commodities were capitals, particularly fixed assets. However, in January 1863 he immediately goes on to write a plan starting with opening chapters on the commodity and money and to complete his work with an analysis of competition (Oakley, 1983, pp.90-91).

Marx argued in *Grundrisse*, “The action of the individual capitals upon one another has the effect, precisely, of forcing them to behave as *capital*” (1987, p.47). That is, that competition forces individual capitalists to behave as capital – to calculate as capital – only because they are capitalists in the first place. Competition did not create the capitalist mentality, but expressed it. “Competition merely *expresses* as real, posits as an external necessity, that which lies within the nature of capital; competition is nothing more than the way in which the many capitals force the inherent determinants of capital upon one another and upon themselves” (Marx, 1973, p.651). However, this left the question of what that “inner nature of capital, its essential character” (1973, p.414) was exactly. In 1863 he knew he could start with a detailed analysis of the ‘inner essence’ of capital, starting with the commodity and capital in general as the typical individual capitalist, and defer his analysis of competition to what became Volume 3 knowing he would use the same principles to analyse this essence under competition. Consistent with this interpretation, in a letter to Kugelmann, where Marx first reveals his decision to change the title to *Capital*, he tells him

“... all it comprises is what was to make the third chapter of the first part, namely ‘Capital in General’. Hence, it includes neither the competition between capitals

nor the credit system. What Englishmen call ‘the principles of political economy’ is contained in this volume. It is the quintessence” (Marx and Engels, 1985b, p.385).

Oakley finds these comments “confusing” (1981, p.109), whereas seen as Marx’s response to working out his theory of accounting they are clear. What Englishmen meant by the ‘principles of political economy’ was the art and later ‘science’ of the ‘*management of the economy by the state*’ (Bullock et al, 1977, p.659, emphasis added), by which Marx meant management by capital, that is, by total social capital and by individual capitalists. Marx now emphasises that the capitalist must spend money (capital) securing all the necessary inputs and organise and control labour to create a use-value with a potential exchange value greater than its cost and then must “expose it to the chances and risks of circulation” (1991, p.79).

To guide them towards their goal, Marx knew that individual capitalists kept accounts and his analysis of ‘cost prices’, the cost of production, is consistent with him theorising their underlying, but inchoate, principle of ‘costs attach’, which for Marx meant measuring capital at the money value of socially necessary labour time. This, we shall see, gave him an accounting solution to his transformation problem, his ‘law of one cost’, a social law of capitalism and of accounting that all identical commodities have the same long-run socially necessary cost. Parts 3 and 4 argue that this discovery gave Marx his accounting solution. Part 3 introduces Marx’s problem and his solution, but the focus is how economists understand it, and the criticisms and the response of the NI. Having understood the accounting limitations of the NI, Part 4 presents Marx’s solution.

Part 3: The ‘transformation problem’ and the NI

In Volumes 1 and 2 of *Capital* Marx assumes that the exchange (market) price of all commodities equals (or fluctuates around) their ‘value’, the money price of the socially necessary labour time it takes to make them. From part two of Volume 3, Marx drops this assumption. He knew from political economy that it conflicted with the demand that all capital must earn the risk-adjusted general rate of profit, and probably from Engels that in practice capitalists added it to the cost of production to get the minimum prices of production, the familiar cost-plus-profit pricing formula. However, as Marx claimed that labour is the source of all value, if commodities sold at their values, capitals with a low organic composition of capital – using a high proportion of variable capital (v) (productive wages) to constant capital (c) (the means of production) – would get higher rates of return on their capital than capitals having a high organic composition. The challenge was to show how, even though commodities did not exchange at their values, “the law of value regulates the prices of production” (Marx, 1981, p.281).

Marx gave an example of the transformation, apparently from value to price, with five different capitals with different organic compositions (1981, pp.255-256) that we will return to in part 4:

| Capitals | Organic composition of capitals of 100 | Rate of surplus value % | Surplus value (s = 100% x v) | Rate of profit % | Used up c (c) | Value of commodities (c+ v + s) | Cost price (c + v) | Price of commodities [1 + r](c + v) | Profit (price - cost) | Rate of profit r | Divergence of price from value |
|----------|--|-------------------------|------------------------------|------------------|---------------|---------------------------------|--------------------|-------------------------------------|-----------------------|------------------|--------------------------------|
| I | 80c + 20v | 100 | 20 | 20 | 50 | 90 | 70 | 92 | 22 | 22 | +2 |
| II | 70c + 30v | 100 | 30 | 30 | 51 | 111 | 81 | 103 | 22 | 22 | -8 |
| III | 60c + 40v | 100 | 40 | 40 | 51 | 131 | 91 | 113 | 22 | 22 | -18 |
| IV | 85c + 15v | 100 | 15 | 15 | 40 | 70 | 55 | 77 | 22 | 22 | +7 |
| V | 95c + 5v | 100 | 5 | 5 | 10 | 20 | 15 | 37 | 22 | 22 | +17 |
| Totals | 390c + 110v | | 110 | | | 422 | 312 | 422 | 110 | | 0 |

Marx explained his solution was that

“... although the capitalists in the different spheres of production get back on the sale of their commodities the capital values consumed to produce them [i.e., cost price], they do not secure the surplus value and hence profit that is produced in their own sphere in connection with the production of commodities. What they secure is only the surplus-value and hence profit that falls to the share of each aliquot part of the total social capital, when evenly distributed, from the total surplus-value or profit produced in a given time by the social capital in all spheres of production” (1981, p.258).

He said the “really difficult” question to answer was the formation of the general rate of profit: “The really difficult question here is this: how does this equalisation lead to the general rate of profit, since this is evidently the result and cannot be a point of departure” (Marx, 1981, p.274). Marx criticised Ricardo for not attempting to explain the formation of the general rate of profit, but merely assuming it (Moseley, 1995, p.20). To derive rather than assume the general rate of profit Marx says the equalisation must result from the exchange of commodities as “products of capital” (1981, p.275), but economists ignore the word ‘capital’, and conclude that Marx really meant that the general rate of profit resulted from exchanges of commodities as use-values, as we shall see below.

Marx does not say he derived the general rate of profit from the technical conditions or use-values of production. He says his point of departure into the real world of total social capital and competition in Volume 3 was its history, implying that this history is the “really difficult” question, and that the general rate of profit was its result. He says that

“The rates of profit prevailing in the different branches of production are ... originally very different. These different rates of profit are balanced out by competition to give a general rate of profit which is the average of all these different rates” (1981, p.257).

By ‘originally’, he means historically, because to bring out the “salient point” of the “whole difficulty” he imagines the historical absence of total social capital and hence the absence of the general rate of profit:

“Let us suppose the workers are themselves in possession of their respective means of production and exchange their commodities with one another. ... Under these conditions, the differences in the profit rate would be a matter of indifference, just as for a present-day wage labourer it is a matter of indifference

in what profit rate the surplus-value extorted from him is expressed ...” (1981, pp.275-277).

In other words, without capitalism and its history there is no general rate of profit. He concludes, therefore, that the general rate of profit is the product of the history of capitalism, the history of its social relations:

“The exchange of commodities at their values, or approximately these values ... corresponds to a much lower stage of development than exchanges at prices of production, for which a definite degree of capitalist development is needed. ... [I]t is ... quite apposite to view the values of commodities not only as theoretically prior to the prices of production, but also as historically prior to them. ... Capital arrives at this equalization [of the rate of profit] to a greater or lesser extent, according to how advanced capitalist development is in a given national society” (1981, pp.277, 297).

History supports Marx view. The history of the general rate of profit is the history of the socialisation of capital – beginning in England in the late 16th century, growing from the late 17th century, but flowering from the middle of the 19th century, and spectacularly as total social capital from its end (Bryer, 1991; 1993a; 1997, 2000a; 2000b; 2004). The history of social capital is the ‘really difficult’ interconnected histories of merchants, farmers, landlords, peasants, workers, industrialists, joint stock companies, capital markets and accounting (Bryer, 2004, 2005, 2006a, 2006b, 2007). With total social capital came competition for capital and with this the formation of the general rate of profit. The competition is for capital between the different spheres: “competition of capitals in *different* spheres ... brings forth the production price that equalizes the rates of profit between those spheres” (Marx, 1981, p.281). Under total social capital, investors hold the market portfolio and care only for the general rate of profit (adjusted for risk), and their preference for rates of profit above average and intolerance of those below, acts as a selective mechanism in levelling up disparate rates of profit towards the moving, value-weighted general rate of profit. In those sectors offering over the average, capital flows in thereby reducing its rate of profit and increasing it in those sectors now relatively neglected where supply falls (Marx, 1981, p.297). Part 3 argues that we must understand Marx’s history of the formation of total social capital to explain his solution to the ‘transformation problem’ and to understand how it is consistent with the determination of value by labour time.

The criticisms of Marx’s solution

Not surprisingly, perhaps, Marxist economists ignore history and focus on the apparent inconsistencies, incompleteness, and vagueness of Marx’s quantitative solution, and they are unhappy with his qualifications. The major complaint is that Marx did not attempt to deal with the apparent contradiction in his table that, as he himself put it,

“the elements of productive capital are generally bought on the market in capitalist production, so that their prices include an already realized profit and

accordingly include the production price of one branch of industry together with the profit contained in it, so that the profit of one branch goes into the cost price of another” (1981, pp.261-262).

The same applied to the commodities workers buy, but he appeared to dismiss the issue with the thought that “Under capitalist production, the general law acts as the prevailing tendency only in a very complicated and approximate manner, as a never ascertainable average of ceaseless fluctuations” (Marx, 1998, p.160). He apparently confesses that it was “only an accident if the surplus value, and thus the profit, actually produced in any particular sphere of production, coincides with the profit contained in the selling price of a commodity” (Marx, 1998, p.167). Do these and other comments show that Marx gave only “perfunctory” attention to the transformation problem, effectively dodging the “crucial question” of how, after the transformation of values into prices of production, he could still claim that value regulated prices (Meek, 1977, pp.109, 107)? Is it true that Marx “resorts to evasion to bring closure”; that he “retreat[ed] to a position that there is no general rigorous quantitative relation between surplus-value and unpaid labour time” (Foley, 2000, pp.12, 13)?

In the 1970s, following the lead of Sraffa, but originally based on Bortkiewicz (1907), many Marxist economists abandoned the idea that value was socially necessary labour time and accepted the impossibility of a mathematical solution to what they took to be Marx’s transformation problem, seeing the economy as a system of ‘commodities producing commodities’. The ‘givens’ in Marx’s theory were supposed to be physical quantities of use-values, technical coefficients of their conversion from one use-value to another, and the real wage defined as a given bundle of use-values for workers (Mohun, 1994, p.400). From these assumptions, the neo-Ricardians derive a physical rate of profit simultaneously with prices of production and claim to disprove Marx’s theory of value in the process (Moseley, 2000, p.283). Consider a two-sector economy comprising agriculture producing the means of subsistence (call it ‘wheat’) and industry producing the means of production (call it ‘steel’) (taken from Roemer, 1990). The technical givens are that to produce wheat and steel requires steel and labour in definite proportions. If relative labour hours determine the exchange prices of steel and wheat, and capitalists get an equal return on all capital, according to the neo-Ricardians Marx should have solved the following simultaneous equations:

$$p_s = (1 + r)(p_s a_s + w l_s) \quad (1)$$

$$p_w = (1 + r)(p_s a_w + w l_w) \quad (2)$$

Where:

| | | |
|----------------|---|--|
| r | = | required return on capital; |
| p _s | = | price of steel; |
| p _w | = | price of wheat; |
| a _w | = | amount of steel required for wheat production; |
| a _s | = | amount of steel required for steel production; |
| l _w | = | labour hours producing wheat; |
| l _s | = | labour hours producing steel; |
| w | = | money wages. |

We have two equations and four unknowns (p_s , p_w , r , and w). To reduce the unknowns, dominant solutions impose a ‘normalisation condition’ (for example, which requires aggregate price to equal aggregate value or that total profit equals total surplus value) and assume a constant real wage. The solutions, however, are the kiss of death.

“It is well-known that this interpretation leads to the following damaging criticisms of Marx’s theory of prices of production: (1) Marx’s determination of prices of production is logically inconsistent because Marx failed to transform the inputs of constant and variable capital. (2) Marx’s error can be corrected...but this correction implies Marx’s two aggregate equalities (aggregate price = aggregate value, and aggregate profit = aggregate surplus value) cannot both be true simultaneously. (3) This correction also implies that the rate of profit changes in the determination of prices of production, so that the price rate of profit is in general not equal to the value rate of profit. (4) Finally, the entire Volume 1 value analysis is ‘redundant’ because the same price of production and rate of profit that are derived by transforming values into prices of production could also be derived direct from the given physical quantities” (Moseley, 2000, p.283).

The New Interpretation

The NI begins from Marx’s idea of ‘capital in general’ and the claim that over a defined period the money value of all the new commodities produced equals the money value of the total labour hours worked in that period, which must equal those that society has deemed ‘socially necessary’. If so, we could say that each commodity consumes a particular share of the total social labour and that money gives the owner the right to a particular share of that social labour. If the money value of the share of social labour consumed in every commodity equals its money price, we have what Marx called ‘equal exchange’, but it could as easily not be equal as he recognised. Foley and others therefore conclude that “the labor theory of value is valid for *any* commodity producing system, no matter what deviations of price from labor values that economy exhibits” (1982, p.38). They mean *could* be valid. If the prices of commodities are proportional to embodied social labour we get Marx’s “extremely simple and powerful ... way of looking at capitalist production” (Foley, 1982, p.40). As this is not the case, the issue for the NI becomes which of Marx’s propositions to maintain in making the transformation (Foley, 1982, p.40). One proposition is that the value of money equals its claim to a proportion of total social labour; the other is that the value of labour power equals the bundle of use-values it commands. The NI makes its choice by maintaining Marx’s core claim that labour adds value in production by limiting its application to total value added and the value of labour power. Mohun (1996) summarises Marx’s ‘basic claims’ according to the NI:

$$MVA = \frac{LVA}{VM}$$

$$LVA = \sum V + \sum S$$

$$w = \frac{VLP}{VM}$$

$$W = wH = \frac{VLP.H}{VM}$$

$$\Sigma W = \frac{\Sigma V}{VM}$$

$$\Sigma \Pi = \frac{\Sigma S}{VM}$$

$$MVA = \Sigma W + \Sigma \Pi$$

$$MVA = \frac{\Sigma V}{VM} + \frac{\Sigma S}{VM}$$

Where:

| | | |
|-----|---|---|
| MVA | = | aggregate money value added. |
| LVA | = | aggregate labour value added (hours). |
| VM | = | value of money. |
| w | = | wages per hour. |
| H | = | hours worked. |
| VLP | = | value of labour power per hour (hours). ¹⁹ |
| V | = | variable capital (hours). |
| S | = | surplus value (hours). |
| W | = | money wages. |
| Π | = | money profit. |

To maintain these claims the NI only partially abandons the neo-Ricardian assumption, that prices should be proportional to the use-value of labour hours embodied in commodities, by dropping the requirement for a given real wage, replacing it with a given money wage determined by class conflict before consumption (Mohun, 1994, p.403). That is, the NI drops the requirement to transform variable capital to maintain the real wage (Foley, 1982; Mohun, 1994, pp.400-402, 405). It justifies this new interpretation as consistent with Marx's core idea, namely, that the value which labour 'embodies' in commodities is the 'money value of socially necessary labour time', not the use-value of the labour (Foley, 1982).²⁰ Unlike the commodities they sell, on which capitalists realise variable amounts of surplus, they do not produce and sell workers for profit (Foley, 1986, pp.43-44). Labour reproduces itself, which means that unlike other commodities, on average labour power always sells at its 'socially necessary' value, the money price of the socially necessary labour time for the workers' reproduction, whatever real wage (the outcome of class conflict) or the price setting process for produced commodities (Mohun, 1994a; 1996). The 'money price of socially necessary labour time' is therefore the NI's measure of the value of labour power and its measure of the value of money. Part 4 shows that Marx concluded that this was the core idea underlying capitalist accounts.

¹⁹ The socially necessary labour time (variable capital) produced per hour to reproduce the worker.

²⁰ The NI accepts the common view that in Marx's theory there are two sets of accounts of constant capital to reconcile, one in kept labour time and the other in money (e.g., Moseley, 1993; Loranger, 2004). We discuss the accounting problems this creates below.

According to the NI, therefore, we can solve equations (1) and (2) by taking the money wage (w) as given and only requiring society's total value added at market prices to equal the total socially necessary labour time value added, converted into a money value using the aggregate 'money value added per productive labour hour' (m):²¹

$$S(p_s - p_s a_s) + W(p_w - p_s a_w) = m(l_s S + l_w W) \quad (3)$$

Where:

S = Total production of steel.

W = Total production of wheat.

$$m = \frac{S(p_s - p_s a_s) + W(p_w - p_s a_w)}{l_s S + l_w W} = \text{Money value added per productive labour hour.}$$

Given S, W, m, and w, mathematically at least, "prices and the profit rate are given" (Roemer, 1990, p.1728). Foley shows that value added, surplus value, and the aggregate rate of surplus value are unchanged by this transformation; that total value added at market prices equals the money value of total social labour time; and surplus value equals unpaid labour time in money (1986, p.101). He concludes the "basic claims of the labor theory of value" are met (Foley, 1986, p.101).

An accounting critique of the NI

However, the NI transformation does not meet all Marx's claims because it corrects the claimed 'defect' in Marx's method, that commodities sell at prices of production whereas Marx's table assumes that purchasers buy them at cost. The NI transforms the labour value of constant capital by adding a profit, and therefore the money value of the social labour time of constant capital differs from the money value of constant capital (Moseley, 2000, p.313). This means that the NI can only require equality between total profits and total surplus value and between money value added at market prices and labour value added, but not between the total labour value of production and total production in prices (Moseley, 2000, p.284). Dumenil says we should maintain total value added because this avoids 'double-counting' the labour input in constant capital. That is, the socially productive labour embodied in one commodity becomes constant capital in the commodities to which it is an input (Foley, 1982, p.39). However, as Moseley says, this is irrelevant (2000, fn.13) to measuring the total current labour in the net output for a period. Moseley says that Marx had no need to transform constant capital into prices of production because he took this as a given money magnitude from Volume 1, just as he took variable capital as given in money. He is right that Marx takes both variable and constant capital as given money amounts, but not because they come from Volumes 1 and 2. First, to be consistent with the rules of consolidated accounting, at the aggregate level we should account only for the cost to an entity (here society) of transfers of assets within the entity. "[I]f the sum of the cost prices of all commodities in a country is put on

²¹ Foley calls the money value-added per hour of productive labour the "monetary expression of labor time" (MELT) (Foley, 2000, p.7, fn1).

one side and the sum of profits or surplus values on the other, we can see that the calculation comes out right” (Marx, 1981, p.260). Second, there is no need to transform constant capital at the sector or firm level either because, as we shall see in part 4, for Marx the transformation is not from a technically determined cost to the price of production. Rather, the transformation is from the historically given general rate of profit and prices of production to the accountant’s ‘standard’ or ‘target cost’, Marx’s ‘cost-price’, the maximum socially necessary cost of production to allow each capitalist to earn the general rate of profit, regardless of its components and how much of the supplier’s profit the cost includes.

If we do not transform constant capital, Foley’s MELT becomes the total value realised from production (sales revenue) per hour of social labour time, both direct and indirect labour time (Foley, 2000, p.24). Marx’s aggregate identities hold then, exactly as they do in the NI, as we can see from adapting Fine et al’s ‘simple formal presentation’ of the NI (2004, pp.5-6). If TR = total revenue, P = profit, w = the money wage rate, Cm = the money value of the constant capital advanced, CLT = the social labour time embodied in constant capital, L = total social labour time, S = surplus value and m = the MELT including constant capital:

$$TR = Cm + wL + P$$

$$P = TR - Cm - wL$$

$$S = (L + CLT) - (wL + Cm)m$$

As

$$m = \frac{L + CLT}{TR}$$

$$S = P \frac{(L + CLT)}{TR} = Pm$$

In this interpretation, money remains the social expression of value, but of the whole commodity, of its sales price and not just the value-added. Consistent with this, as we shall see in part 4, in Marx’s accounting theory capitalists use the same principle, that the cost of each identical use-value is equal, to account for both labour and the means of production. Foley does not think it is possible to add the labour in the constant capital to the labour freshly added “since these measures will in general be equal neither to the historical labor embodied in the means of production, nor to the labor that would be required to reproduce them with contemporary technology” (2000, p.24). The accountant resolves this problem using current cost accounting, the underlying model of capitalist accounting, which Marx theorises in Volume 2 (Bryer, 1999b).²²

²² Mohun says the NI defines the value of money excluding constant capital “to avoid the difficulties surrounding both the effects of technical change and the effects of changing interest rates on the valuation of the existing stock of constant capital” (1996, fn.4), implying that capitalists account for constant capital at its present value! Fine et al say we cannot transform any capital into a meaningful monetary amount equivalent because of “forcible and violent changes of valuation of capital” (2004, p.14).

Foley accepts that the NI “is a set of definitions rather than an empirical hypothesis” (2000, p.28). The NI is a tautology (Fine et al, 2004, p.5). Therefore, when Foley and others say the labour theory of value is valid for any price system, they mean it could be valid. All the equations say is that “LVA is by definition the sum of aggregate variable capital ... and aggregate surplus value ..., and ... MVA is by definition the sum of the aggregate wages of productive labor ... and aggregate profits” (Mohun, 1996, p.41). Foley is right that the definitional advance of the NI is to “regard as the key Marxian insight, the quantitative equivalence between capitalist gross profit and unpaid labor” (2000, p.22). However, as neither he nor anyone else has theorised ‘capitalist profit’, that is, explained the principles capitalists use to measure it, how do we know that in total and without correction (e.g., for earnings management, ‘fair value accounting’, etc), it equals surplus value? We cannot observe surplus value or the labour value of commodities that would exist without total social capital and competition as this is a counter-factual. How, therefore, do we know (to use Marx’s table) that the sum of profits equals 110 because it is the sum of surplus values, or that the sum of the prices of production equals 422 because this is the sum of commodity values? Marx’s answer was that we know that profit is a fragment of total surplus value because the capitalist account for all capital as the NI does for variable capital, at the ‘money value of socially necessary labour time’. This is the real definitional advance of the NI, as we shall see in part 4.

Marxist economists generally rest content with a circular definition of profit as ‘revenues minus costs’ (e.g., Fine, 1977), or the equally unhelpful tautology from the NI that profit = money value-added (i.e., profit + wages) – wages. Shaikh and Tonak (1994) implicitly criticise the NI for this omission, but they do not rectify it. They say that whereas Marx argued that price and profits were monetary forms of value and surplus value, the NI “abandons this altogether by defining surplus value to be a form of profit. The whole relation between surplus value and profit is turned on its head” (quoted in Foley, 2000, p.25). In other words, we shall see, whereas Marx defines individual profits as fragments of surplus value, the NI effectively defines individual surplus values as fragments of total ‘profits’, but without defining ‘profits’.

Foley says that we can make the NI operational “in terms of accounting data from capitalist firms” (1982, p.37), that the NI’s categories “have measurable correlatives” (p.38); that (following Gillman (1957) and Shaikh (1980)) we can “test hypotheses in the labor theory of value framework by looking at the actual accounts of capitalist firms” (1982, fn.1). Although he is right that accounting categories do not necessarily “*directly* correspond to the relevant labor theory of value categories” (he means those concerning the division of surplus value and the identification of productive labour), he does not probe into these “subtle issues” (Foley, 1982, fn.1). Instead, he says Marx’s breakthrough was to “translate flows of money in real world capitalist accounts into flows of labor-time and vice versa” (Foley, 2000, p.20). Mosley goes further and claims, “Marx’s key concept of capital is defined in terms of *money*, not in terms of labor time” (2000, p.289).²³ These views are misleading because capitalists do not primarily account for flows of money, of cash or its equivalent, but for flows of capital, money that

²³ Elson also thinks there is “pressure on commodity producers to represent labour-time expended in production in money terms, to account in money terms for every movement” (1979, p.170).

circulates as commodities, as use-values with exchange-value – into and through production and out to the market to return with a profit. The quotations Moseley (2000) gives make this abundantly clear. Marx did not therefore translate flows of money in real capitalist accounts into flows of labour time and vice versa, but in the accounts he studied he found labour time already translated into money value, into capital, which he theorised.

Understanding the commodity as a fragment of capital in general was for Marx a necessary preliminary to dissolving the transformation problem: “The whole difficulty arises from the fact that commodities are not exchanged simply as *commodities*, but as *products of capital*”, i.e., as “capitalistically modified” commodities (1999, p.174). The problem was that in reality exchange occurred at ‘prices of production’ based on ‘cost price’, the value of the capital embodied in commodities, not necessarily at the money value of socially necessary labour time to produce them, his assumption in Volumes 1 and 2, where ‘socially necessary’ meant at average technical and social efficiency. Part 4 argues that it was understanding commodities as fragments of capital in general, as the theoretical equivalent of the accountant’s assets – as the unity of exchange values and use-values in circulation – that gave Marx his solution to the transformation problem.

Part 4: Marx’s accounting solution to the ‘transformation problem’

Under simple commodity production where price equalled value and all costs were labour costs, the sum of the surplus values of all the individual producers must equal the consumable money surplus. This needed no demonstration. However, to prove that the sum of capitalist profits equals society’s surplus value Marx had to show that an individual capitalist’s profit, interest and rent were “particular fragments of surplus value” (Marx and Engels, 1987, p.514); that “in its essence profit consists of surplus value” (Marx, 1991, p.97). Marx had to show that

“Just as the surplus value of the individual capital in each particular sphere of production is the measure of the absolute magnitude of the profit – in so far as this is merely a converted form of surplus value – so is the *total surplus value* produced by the total capital, hence the whole class of capitalists, the absolute *measure of the total profit of the total capital*” (Marx, 1991, pp.98-99).

In saying that individual surplus value is ‘the *measure* of the absolute magnitude’ of individual profits that are its ‘converted form’, Marx cannot mean that surplus value sets the limit of the individual profit, because these can diverge, profit can be greater or smaller than surplus value. What he means is that because individual capitalists *measure* profit as a converted form of surplus value, that is, *calculate* profit using principles consistent with the labour theory of value, that total profits equal total surplus value – why total surplus value becomes ‘the absolute measure of the total profit’ and here sets its limit. Thus, he continued, the distribution of total surplus value “only represents the result of the *particular mode of calculation*”, forced on capitalists because of “*competition of capitals* with each other” (Marx, 1991, pp.99-100, first emphasis added). That the key to the equalisation of the rate of profit was, therefore, that “individual

capitalists ... *calculate* the same ... profit ... in proportion to ... production costs, so that the division of the total surplus value as it is present in empirical profit can take place” (Marx, 1991, p.103, emphasis added). In short, Marx says that under the pressure of competition individual capitalists calculate their results – keep accounts – according to the profit they realise, measured as a converted form of surplus value. The outcome, he claims, is that each capitalist’s profit is a share of total surplus value proportional to the capital each advances.

Marx understood the importance of measurement and calculation in 1857-8 when he was writing the *Grundrisse*, where he first formulated the idea that competition distributed surplus value (Meek, 1977, pp.99-101), and proposed the solution that the capitalist transformed surplus value into profit by calculations. There he says, “The transformation of surplus value into the form of profit, *this method by which capital calculates surplus value*, is necessary from the standpoint of capital, regardless of how much it rests on an illusion about the nature of surplus value, or rather veils this nature” (Marx, 1973, p.767, emphasis added). In *Grundrisse* Marx does not say whether he thinks the redistribution of surplus value is consistent with the labour theory of value. In early August 1862, shortly before he worked out the theory of depreciation accounting, Marx wrote to Engels giving him a long example of the transformation of surplus values into profits. Again, “there is no reference whatever in this letter to the question of whether, after the transformation, one can say that the ‘law of value’ still remains operative” (Meek, 1977, p.102). This is interesting because in the later parts of the *Economic Manuscript of 1861-1863*, written shortly after Marx reached theoretical closure on depreciation accounting, he brings out for the first time the apparent complication that capitalist’s acquire constant capital at cost prices including a profit, not at their values. Now, for the first time, Marx makes what Meek thinks is the “bald statement” that “this important deviation of cost-prices from values brought about by capitalist production does not alter the fact that cost-prices continue to be determined values” (Marx, 1972, pp.167-168). However, as Marx had recently worked out his theory of capitalist accounting, we could read this statement not as ‘bald’, but confident. It is consistent with Marx now believing that capitalists accounted for costs and revenues using an inchoate labour theory of value, as though their profits were the surplus value they had appropriated from their own workers.

As he had spent Volume 1 and the first two parts of Volume 2 explaining the underlying principle for the individual (i.e., general) circuits of capital, he did not need to repeat this in Volume 3 to deal with social capital and competition. As he said immediately after presenting his solution, the average rates of profit shown for each sphere of production must “be deduced out of the values of the commodities” (Marx, 1998, p.156), that is, using the accounting theory of capital in general developed in Volumes 1 and 2. This is consistent with the reason Marx gave for deferring competition to Volume 3 that first the reader must “have a clear conception of the inner nature of capital”, the “laws immanent in capitalist production”, that then “assert themselves as coercive laws of competition” (1996, p.321). In other words, to understand capitalist competition it was first necessary to know the rules of the game for capital in general, to understand the calculative mentality of the ideal-typical individual capitalist. Thus, Marx dealt with capital in general, its circuit of capital, free from the complexities of the phenomenal forms of

profit, interest and rent that arose in competition, in Volumes 1 and 2. In doing so, he did neglect the individual capitalist. Marx himself said that he grasped the whole – “the aggregate capitalist” – by understanding its parts: “The aggregate capital appears as the capital stock of all individual capitalists combined” (Marx, 1997, p.432).

In *Grundrisse* Marx claimed but had not demonstrated that

“The fundamental law in competition ... is that it [the price of the commodity] is determined not by the labour contained in it, or by the labour time in which it is produced, but rather by the labour time in which it can be produced, or, the labour time necessary for production” (Marx, 1973, p.657).

He also claimed in Volume 3 that capitalist competition works to create and then eliminate differences between the socially necessary costs of production (the money costs of socially necessary labour time embodied in a commodity) for the average capitalist and the cost to the individual capitalist (Marx, 1998, p.42).²⁴ Now, however, he knew he could back this up by using the ‘general form of surplus value’ he found in accounts to explain how the production of surplus value was its simultaneous distribution to capitalists (and then to landlords, shareholders and creditors) and workers. To simplify the presentation, therefore, Marx initially leaves competition to one side and assumes that value equals price to leave him free to focus on explaining the origin or production of surplus value (that here equals profit) as the money value of unpaid socially necessary labour time. Marx explained his decision to start with the situation where price equalled value, in a letter to Engels discussing a review of Volume 1:

“Curiously, the fellow has not detected the ... fundamentally new element ... in the book...that in contrast to *all* previous political economy, which *from the outset* treated the particular fragments of surplus value with their fixed forms of rent, profit and interest as already given, I begin by dealing with the general form of surplus value, in which all these elements are undifferentiated, in solution as it were” (Marx and Engels, 1987, p.514).

He made the same point when he wrote explaining to Engels “the method by which the rate of profit is determined” (Marx and Engels, 1988, p.21) in Volume 3. Central to it was that in Volume 1 “Profit is for us, for the time being, only *another name* for or another category of *surplus* value” (1988, p.21). These explanations reinforce the view that Marx knew when he wrote Volumes 1 and 2 that the basis of capitalist accounting for profit under competition – the principles underlying the practical accounts of individual capitalists that he saw, discussed with Engels, and used – was accounting for the money value of socially necessary labour time. This was the ‘general form of surplus value’, the theoretical ‘solution’ into which Marx claimed he had dissolved the phenomenal forms. He claimed, in short, that he could explain the capitalist’s calculation of profit– the major modern ‘phenomenal form’ – and show how under competition this distributed surplus value evenly across all capitals, using the labour theory of value.

²⁴ For an individual capitalist to earn an excess return, the labour-time expended on his commodity must be less than the socially necessary time.

In one sense Moseley is right that the “assumption throughout Volume 3, which is repeated many times, is that the total amount of surplus-value is determined prior to its division into individual parts” (2000, p.287). It is true, as Marx pointed out, that “What is available for them to divide among themselves is only determined by the absolute quantity of the total profit or surplus value” (1991, p.99), but capitalists did not first determine the total and then distribute it. Rather, the production of surplus value was simultaneously its distribution as profit, as he concluded in Volume 3. Capitalist production and competition – and the calculations they stimulate – simultaneously determine, i.e., distribute, individual profits and total surplus value:

“a general rate of profit ... presupposes that the rates of profit in every individual sphere of production taken by itself have previously been reduced to just as many average rates. These particular rates of profit = s/C in every sphere of production, and must ... be deduced out of the values of commodities. Without such a deduction the general rate of profit (and consequently the price of production of commodities) remains a vague and senseless conception” (Marx, 1998, p.156).

To show that Marx’s idea of prices or production is not vague or senseless we must understand his solution to the transformation problem for the individual capitalist firm. That is, his explanation of how “the laws, immanent in capitalist production ... assert themselves as coercive laws of competition, and are brought home to the mind and consciousness of the individual capitalist as the directing motive of his operations”. How “the laws of the production of value are...realised for the individual producer” (Marx, 1996, pp.321, 329). Given the importance of calculation to achieving the simultaneous production and distribution of surplus value as profit, his theory was that these laws are realised because individual capitalists keep their accounts as though socially necessary labour time is money.²⁵

The cost of production

This key principle first appears in Volume 1 when Marx turns to “examine production as a creation of value”, that is, the valorization process. His “first step is to calculate the quantity of labour realised” in production (Marx, 1996, pp.196-197). This, Marx says, is the significant common property of commodities that was “capable of expression in quantitative terms and w[as] ‘contained in’ and yet ‘distinguishable from’ the commodity”, whereas “the utility of a commodity is not directly measurable” (Meek, 1973, p.161). To measure the labour contained in a commodity Marx reckons all the inputs to production in money valuations (costs) of socially necessary labour time, theorising the principle of capitalist accounting that ‘costs attach’. This is the idea (also called ‘full-absorption costing’) that we should measure the cost of production by summing the costs of production workers, materials and production overheads. Wells noted that the ‘costs attach’ principle “bears a striking resemblance to that enunciated

²⁵ This tightening of the capitalist saying that ‘time is money’ – redefining ‘time’ to be ‘socially necessary labour time’ – follows from the NI’s definition of the ‘value of money’ as the socially necessary time required to produce one monetary unit (\$, £, etc) of value (Foley, 1986, p.15).

earlier by classical economists”, particularly by Marx, in whose idea of socially necessary labour, he thought, we find its “ultimate expression” (1978, p.106). However, neither accountants nor accounting scholars have a theory that explains the “power of cohesion” (Paton and Littleton, 1940, p.13) of the costs of production (Bryer, 2007). However, if we can operationalize it, Marx’s ‘money value of socially necessary labour time’ does because it give the capitalist something “cardinally measurable [that] can be added or subtracted to one another, not merely ranked” (Elson, 1979, p.137). Marx stressed this feature of his theory when he gave it its first public outing in *Value, Price and Profit* in 1865. To know whether such things as wages were ‘high’ or ‘low’, he said, we need a theory comparable to the theory of temperature that revealed their natural limits (Marx, 1985a, p.117).²⁶ In Marx’s theory, costs ‘attach’ if we can reckon all the necessary costs of production – those that produce use-values for sale – as the money value of socially necessary labour time.

This is the lesson from the first example in Volume 1 in which the cost of materials and the wear and tear of a spindle used in yarn making “amounts to twelve shillings or the value of two day’s work” (1996, p.199), assuming the cost of a day’s labour power is 6s. Throughout his examples, Marx works from accounts to derive the equivalent socially necessary labour time.²⁷ In his example, 10lbs of cotton cost 10s and the accountant calculates that the wear and tear of the spindle cost 2s which, given the money wage of 6s for a 12 hour day, “we have here ... two day’s labour already incorporated in yarn” (1996, p.197). These labour values together with the labour hours of spinning give the cost or money value of the labour time attaching to the yarn. Just like capitalist accountants, for Marx, “viewed as a *value-creating process*, the ... labour process presents itself under its quantitative aspect alone”, and the cost of labour, materials and wear and tear only count as “so many hours or days” useful labour, or so much money (1996, p.206). As he said, and we shall see in part 4 that capitalist accountants inchoately agree, it is only because all value-creating labour is equal that production costs attach, “that cotton planting, spindle making and spinning, are capable of forming the component parts, differing only quantitatively from each other, of one whole, namely, the value of the yarn” (Marx, 1996, p.199).

Foley is therefore right that “Marx’s theory implies the existence of a quantitative equivalence in any particular period between the monetary unit and social labour time” (Foley, 2000, p.7), but he is wrong that “Marx constantly uses this conception to move back and forth between money and labour accounts” (Foley, 2000, p.7). In Volumes 1

²⁶ The same applies to the question whether other costs and profits are ‘high’ or ‘low’. The same question arises when Marxist economists debate whether we can measure constant capital in labour time equivalents. Their worry is that “these measures will in general be equal neither to the historical labor embodied in the means of production, nor to the labor that would be required to reproduce them with contemporary technology” (Foley, 2000, p.24; Cohen, 1981, cf. Mohun, 2004). However, Marx agrees with capitalist accountants that when input prices change we should use current cost accounting (Bryer, 1999b).

²⁷ As Marx assumes in Volume 1 that the money value of socially necessary labour time equals price, he could have accounted wholly in imaginary labour times. He chooses to work from given values (prices) in the capitalist’s accounts and derive from these the equivalent socially necessary labour time given the price of labour power, just as he will in Volume 3 when arguing that cost price is an element of the money value of socially necessary labour time and profit is a form or fragment of surplus value, as we shall see.

and 2 Marx works *in* monetised labour time accounts, that is, with accounts based on the ‘money value of socially necessary labour time’.²⁸ In Volume 3 he uses this approach to analyse ‘cost price’ and its relationship to ‘value’, to the money value of socially necessary labour time, and to analyse the effect of turnover on the rate of profit, which lead to his discovery of ‘target cost’, his and the accountant’s solution to the transformation problem.

Marx’s accounting solution to the transformation problem: ‘cost price’ is ‘target cost’

Marx said the big change in Volume 3 was that whereas “In Books I and II we dealt only with the *value* of commodities”, “the *cost price* has now been singled out as a part of this value, and ... the *price of production* of commodities has been developed as its converted form” (Marx, 1959, p.163). If cost price (cost of production) is ‘part of value’ and prices of production are ‘converted’ values, it follows that profit is a converted value, a share of total surplus value. In *Grundrisse* Marx defined profit as simply “the excess over the advances made by capital”; “the excess of the price of the product over the price of the production costs”, without spelling out what ‘production costs’ are exactly (1987, p.144). In *Capital* by contrast, while Marx says that an individual capitalist’s “cost prices are specific” (1959, p.159), may be more or less than those socially necessary, he says that how capitalists account for the ‘cost of production’ is not specific to any particular capitalist; that the capitalist accounts for ‘socially necessary costs’.

“The real value of a commodity is ... not its individual value but its social value; that is to say, the real value is not measured by the labour time that the article in each individual case cost the producer, but by the labour time socially required for its production” (Marx, 1996, p.322).

Foley is right that Marx does not “propose any particular method for the measurement of labor time” (2000, p.17). Marx defines socially necessary labour time in Volumes 1 and 2 as the production time required under the normal technical and social conditions of production (e.g., 1971, p.31). However, in Volume 3 of *Capital* Marx develops the idea in the *Grundrisse* that under competition total social capital imposed an overriding, specifically capitalist definition of ‘socially necessary’ to mean what accountants today call ‘standard cost’ or ‘target cost’, the level of cost necessary to give the capitalist the required return (e.g., Drury, 2000, p.891).²⁹ Today, what counts as the cost of production to accountants are not specific costs, but ‘standard’ or ‘target’ costs, predetermined maximum costs of production (Drury, 2000, p.671). Typically, the capitalist builds up a standard cost from detailed study of the necessary technical and labour inputs using cost prices, using design and ‘value engineering’ studies, observation based on trial runs, and

²⁸ Elson (1979) is right that the conventional wisdom incorrectly supposes that Marx operated two accounting systems, one in labour time and the other in market prices (e.g. Desai, 2002, p.61). Naturally, it concludes that we cannot (and capitalists do not) keep labour time accounts as these are ‘invisible’ and, in any event, the two sets of accounts are incommensurable (Elson, 1979, p.120; Desai, 2000). However, Elson is not right that Marx’s “specific examples are always couched in money terms, *never* in terms of hours of labour-time” (1979, p.139).

²⁹ Another important example of this overriding definition is that Marx insisted that capitalist should account in current costs not the specific historically socially necessary costs (see: Bryer, 1999b).

work-study. Most firms set standards that are ‘difficult’ but ‘achievable’ or base them on an average of past performance (Drury, 2000, p.680). However, as historical averages must be such that the firms earned the required return on their capital, these averages are likely to be ‘difficult’ as well. Target costing takes standard costing to its logical conclusion that the commodity and capital markets determine what ‘socially necessary labour’ is because its “cardinal rule”, “do not launch products that cannot be manufactured at their target cost”, applies equally to existing products, which, like a new product project, “is scrapped” if they violate it (Cooper and Slagmulder, 1999, p.180).³⁰

Marx had realised in *Grundrisse* that under competition with total social capital demanding a general rate of profit, the law of value apparently worked in reverse: in competition, it seemed, value did not determine price; price determined value:

“[T]he individual capital is in reality only placed within the conditions of capital as such, although it seems as if the original law were overturned. *Necessary* labour time as determined by the movement of capital itself; but only in this way is it posited ... [;] the positing of a general rate of profit. As a consequence of the market price, capitals then redistribute themselves among different branches. Reduction of production costs etc. In short, here all determinants appear in a position, which is the *inverse* of their position in capital in general. There price determined by labour, here labour determined by prices etc. etc” (1973, p.657).

In Volume 3, Marx considerably expanded on the idea that under competition “labour [was] determined by prices etc. etc”, where “*Necessary* labour time [w]as determined by the movement of capital itself”. There he says that to secure the general rate of profit, the capitalist must take control of the valorisation process and engineer the costs down to the socially necessary level to earn the general rate of profit, to target cost, or if not the capital must exit the field:

“In capitalist production it is not simply a matter of extracting, in return for the mass of value thrown into circulation in the commodity form, an equal mass in a different form – whether money or another commodity – but rather of extracting for the capital advanced in production the same surplus-value or profit as any other capital of the same size, or a profit proportionate to its size, no matter in what branch of production it may be applied. The problem therefore is to sell commodities, and this is a minimum requirement, at prices which deliver the average rate of profit, i.e. at prices of production” (Marx, 1981, p.297).

In other words, the individual capitalist must produce at a cost and sell at a price to deliver at least the average rate of profit, that is, produce at the standard or target cost. Target cost underlies Marx’s analysis of the rate of profit and turnover. Given the market

³⁰ Japan was the first to use the label of ‘target costing’ as a recognised technique, but the idea is implicit in capitalist accounting’s focus on the rate of profit, which, if insufficient, tells capitalists that the actual costs exceed the target. There is evidence of the idea in the mid-eighteenth century in the Scottish Carron Company (Bryer, 2006) and today target costing “is widely used among different industries round the world” (Horngren, et al, 1999, p.386).

price of the commodity ($S(t)$) and the required return on capital (r), the maximum cost of production is that which gives the required return. The appendix shows Marx's decomposition of the rate of profit into sales margin and turnover of capital:

$$r = \frac{\frac{qS(t)}{[1+q]}}{C(t)[Tf + Tp + Tr + FC(t)]}$$

If r , $S(t)$ and Tf , Tp and Tr are given, $C(t)$ becomes the target cost:

$$\begin{aligned} As \\ \frac{qS(t)}{[1+q]} &= S(t) - C(t) \\ r &= \frac{S(t) - C(t)}{C(t)[Tf + Tp + Tr + FC(t)]} \\ C(t) &= \frac{S(t) - rFC(t)}{1 + r[Tf + Tp + Tr]} \end{aligned}$$

For example, if $r = 0.2$, $S(t) = \text{£}12$, $FC(t) = 0$, and $Tf + Tp + Tr = 1$ year, the target cost is:

$$C(t) = \frac{\text{£}12 - 0.2 \times 0}{1 + 0.2 \times 1} = \text{£}10$$

In general, the higher the required annual return and the longer the turnover period, the lower the required target cost.³¹ Target cost is the 'cost price' ($c + v$) in Marx's example solution to the transformation problem where the capitalist sees only market prices and the general rate of profit:³²

| Capitals | Organic composition of capitals of 100 | Rate of surplus value % | Surplus value ($s = 100\% \times v$) | Rate of profit % | Used up c (c) | Value of commodities ($c + v + s$) | Cost price (c + v) | Price of commodities $[1 + r](c + v)$ | Profit (price - cost) | Rate of profit R |
|----------|--|-------------------------|--|------------------|-----------------|--------------------------------------|--------------------|---------------------------------------|-----------------------|------------------|
| I | 80c + 20v | | | | 50 | 70 | 70 | 92 | 22 | 22 |
| II | 70c + 30v | | | | 51 | 81 | 81 | 103 | 22 | 22 |
| III | 60c + 40v | | | | 51 | 91 | 91 | 113 | 22 | 22 |
| IV | 85c + 15v | | | | 40 | 55 | 55 | 77 | 22 | 22 |
| V | 95c + 5v | | | | 10 | 15 | 15 | 37 | 22 | 22 |
| Totals | 390c + 110v | | | | | 312 | 312 | 422 | 110 | |

³¹ For example, if the required annual rate of profit increased to a 30% return, the target cost must fall to

$$C(t) = \frac{\text{£}12}{1 + 0.3 \times 1} = \text{£}9.23. \text{ For turnover periods greater than one year, the required rate of profit equals the}$$

turnover period multiplied by the required annual return, further reducing the target cost. For example, if the turnover period was three years and the required annual rate of profit was 20%, the total required rate of

$$\text{profit is 60\% over the three years and the target cost falls to: } C(t) = \frac{\text{£}12}{1 + 0.6 \times 3} = \text{£}4.29$$

³² Marx gives the formula $p = k + kp'$, where p = the price of production, k = cost price and p' = the required return (1981, p.265), i.e., $k = p/[1 + p']$.

For example, the target cost for capital I:

$$(c + v) = \frac{92 - 0.22 \times 30}{1.22} = 70$$

Under developed capitalism, dominated by total social capital and competition, neither individual capitalists nor anyone else can see or work out the original surplus value, the rate of surplus value, or the value rate of profit. Nobody can calculate these values because they are hypothetical, the values that would exist assuming the absence of total social capital, competition and the general rate of profit. Under total social capital, the “form in which capital becomes conscious of itself as a *social power*” (Marx, 1981, p.297), the individual capitalist neither cares for, nor needs to calculate, these hypothetical values because, given the general rate of profit and market prices, “The cost price is a given precondition, independent of his, the capitalist’s, production” (Marx, 1981, p.265). Capitalists see only the market prices of commodities (prices of production), costs (variable capital and used up c), profit, and the general rate of profit. In Marx’s solution, therefore, total social capital and the commodity markets effectively hand down the cost price to the individual capitalist through the required general rate of profit that implies the maximum standard or target cost given the market price of the commodities. Target cost is the maximum cost of production because competition spurs the capitalist to pursue relative surplus value that requires an excess return.

Marx argued that not simply competition enforced target costing, but active management by the capitalist to hit targets:

“The rule, that the labour time expended on a commodity should not exceed that which is socially necessary for its production, appears, in the production of commodities generally, to be established by the mere effect of competition; since to express ourselves superficially each single producer is obliged to sell his commodity at its market price. In manufacture, on the contrary, the turning out of a given quantum of product in a given time is a technical law of the process of production itself” (Marx, 1996, p.350).

Accounting enforces this ‘technical law’ by controlling the production of value through a budgeted profit and loss account and balance sheet based on standard or target costs (Bryer, 2006a). Consistent with this, Marx thought, “the cost price of the commodity is by no means simply a category that exists only in capitalist bookkeeping”, even though the specific costs the capitalist incurs does not create value.

“The category of cost price has nothing to do with the formation of a commodity value or the process of capital’s valorization ... [but,] cost price does none the less, in the economy of capital, present the false semblance of an actual category of value production” (Marx, 1981, pp.118-119).

For Marx, cost is the ‘false semblance’ of value production because as a category it hides the origin of surplus value, disguising it as profit produced by the total capital advanced.

However, he thought that cost is nonetheless an “actual category of value production” because costs are outlays of *capital*, money advanced by total social capital to finance production and return with at least the average rate of profit. “The capitalist cost of the commodity is measured by the expenditure of *capital*, while the actual cost of the commodity is measured by the expenditure of *labour*” (Marx, 1998, p.28). Like accountants today, Marx thought the capitalist saw cost price as “part of the commodity value” (1998, p.32), because like them he measured capital at the ‘money value of socially necessary labour time’, at standard or target cost. As accounts holds the capitalist accountable for profit measured using rules consistent with this, under competition the capitalist not surprisingly sees

“Profit ... [as] the excess of the value of the product or rather the amount of money realised in circulation for the product ... *above* the value of the capital that entered the formation of the product ... [which] appears as *costs of production of the commodity*” (1991, p.81).

Like the accountant today, Marx thought the “capitalist is inclined to regard the cost price as the true *inner* value of the commodity, because it is the price required for bare conservation of his capital” (Marx, 1998, p.42, emphasis added), that is, the price required for what accountants call ‘capital maintenance’:

“But there is also this, that the cost price of a commodity is the purchase price paid by the capitalist himself for its production, therefore the purchase price determined by the production process itself. For this reason, the excess value, or the surplus value, realised in the sale of a commodity *appears to the capitalist an excess of its selling price value over its value*, instead of an excess of its value over its cost price, so that accordingly the surplus incorporated in a commodity is not realised through its sale, but springs out of the sale itself” (1998, p.42, emphasis added).

Like the accountant, Marx’s capitalist regards cost price as ‘value’ and “a certain value is capital when it is invested with a view to producing profit” (Marx, 1998, p.41), that is, in short, ‘value’ equals standard or target cost. This explains why Marx defines profit as “the excess of the money recovered at the end of the circulation of capital over and above the cost price that is ‘presupposed’ ...” (Moseley, 2000, p.298), and is why capitalists account for costs over standard cost as a loss, as a ‘period cost’ (Drury, 2000, p.680), not as a value-creating cost of production.

Understood as standard or target costs, Marx had no need to transform either variable or constant capital. Marx knew that when capitalists bought their inputs at prices of production, value and cost would diverge.³³ However, he argued that “the most

³³ Moseley (2000) also argues that Marx takes constant and variable capital as givens from Volumes 1 and 2 to solve the transformation problem in Volume 3, but on the erroneous ground that Marx does this because for him ‘capital’ was only ever money capital that carried its nominal aggregate values into competition unchanged. Moseley argues that Marx takes the general rate of profit as given because total surplus value “is determined prior to its division into individual parts” (2000, p.287), but we have seen that

important thing in determining surplus value is not whether these figures are expressions of actual values, but how they are related to one another, i.e., whether $v = 1/5$ of the total capital, and $c = 4/5$ " (1998, p.205). In other words, as an accountant would argue today, what matters to the capitalist is not the 'value' of constant capital before its transformation into the price of production, or its components, but its cost that the capitalist treats as value; and, therefore, the profits that the capitalist treats as surplus value. If the capitalist treats profit as surplus value "the price of production = cost price + profit = $k + p = k + s$; i.e., in practice it is equal to the value of the commodity" (Marx, 1998, p.205). This is Marx's accounting solution to the transformation problem. With it, he did not need to perform a mathematical transformation to know that under total social capital and competition capitalists would value constant and variable capital at the cost price necessary to equalise the required return on capital. In short, by accounting for standard or target cost, Marx's theory was that capitalists would transform the general rate of profit and prices of production into the money value of socially necessary labour in production.

The 'law of one cost'

Standard and target costing is only one manifestation of what we could call Marx's 'law of one cost'. This is the accounting principle that, assuming constant prices, the costs of production of all identical commodities must be equal, both across and within firms. This follows from the conclusion that if "the magnitude of the value of a commodity represents only the quantity of labour embodied in it, it follows that all commodities, when taken in certain proportions, must be equal in value" (Marx, 1996, p.55). The same must therefore be true of their components, costs on one side and profit on the other. On the cost side, the long-run average socially necessary cost of production of each identical commodity must therefore also be equal. Accountants agree by valuing commodities at standard or target cost, which (assuming constant prices) requires that the cost of each identical commodity must be equal. This is clearly the case for the costs of productive labour and materials, but it also applies to accounting for production overheads, fixed capital and joint costs, all unnecessary sources of theoretical difficulty for Marxist economists.

In calculating the cost of production, accountants distinguish between 'production overheads' – expenditures that produce the use-values embodied in commodities or services – and 'non-production overheads', those necessary for capital to function, but which do not produce use-values for sale. Accountants call expenditures on factory buildings, machinery, rent, etc., 'production overheads' because they provide use-values for production. They add these costs to the cost of production, even though they do not necessarily create embodied use-values in the commodity or service. Factory buildings, for example, provide shelter and other use-values for production. Administering workers' pay is a cost of the use-value of productive labour. Clearly, as a classic accounting text puts it, "The making of goods would be impossible without the

Marx takes the notion of the general rate of profit and its impact on market prices as given products of history. Once these become established, capitalism functions by presupposing and changing them based on experience.

incurrence of such overhead costs as depreciation, material handling, janitorial services, repairs, property taxes, heat, light, and so on” (Horngren, 1977, p.87).

Consistent with Marx’s definition of the cost price as the socially necessary cost, capitalist accountants allocate production overheads to the cost of production using the principle that each use-value (commodity or service) produced has the same cost regardless of the actual pattern of expenditure. They study the consumption of production overheads (called ‘activity-based-costing’) and allocate expenditures evenly according to the use-values they provide (Drury, 2000, p.23).³⁴ This is why the full costs of production “are more properly called *normal* costs, rather than actual costs, because they include an average or normalized chunk of overhead” (Horngren, 1977, p.89). Capitalist accountants do not count as the cost of production the actual (Marx’s ‘specific’) expenditures on productive use-values, but for the average cost of a planned mass of commodities. If, for example, “management has committed itself to a specific level of fixed costs in the light of foreseeable needs far beyond the next thirty days ...[, f]ew people support the contention that an identical product should be inventoried ... [with] different overhead rates ... not representative of typical, normal production conditions” (Horngren, 1977, p.89). Similarly, “[i]t would be illogical to load any single month with costs that are caused by several months operations” (Horngren, 1977, p.90), for example, expenditures on repairs, just as it would be illogical to charge heating expenditures only to winter production. Instead, to calculate the full cost of productive labour, the accountant’s allocations apply Marx’s law of one cost.

Productive fixed assets are prominent production overheads. Fixed capital, like many other production overhead, are problematic for economists because they involve ‘joint costs’ (or production). In other words, because their use produces two or more use-values, the commodities it co-produces, and the now partly worn fixed asset. Simply because “inventories can be carried over from one production period to another has long been a source of great trouble for Marxist economists” (Duménil, 1983, p.442). This causes no trouble for capitalists who account for fixed assets according to Marx’s law of one cost by allocating the total costs of acquiring and using it equally across all use-values (Bryer, 1991, 1994, 1999a). The total costs of providing the services of a fixed asset over its useful economic life are (a) the once-and-for-all initial outlay (purchase price or production cost) less the residual value at the end of its useful life (at current prices). In addition, (b) the total operating expenditures for maintenance, repairs, fuel, etc., and any effects the age of the asset may have on deterioration in product or service quality (e.g., depress prices). The depreciation method must result in a constant total charge per unit of service over the asset’s useful economic life (Baxter, 1971, p.26). For the straight-line method (i) operating costs for maintenance etc., per period must be constant, and (ii) the services provided by the asset must be equal each period (either

³⁴ Although “For decades, textbooks used in cost and managerial accounting courses have pointed out the fallacies in relying on full cost numbers for any purpose” (Hemmer, 1996, p.419). That is the ‘fallacies’ of traditional accounting, at least some in the accounting community have begun to wonder why, in the face of a gale of “such criticism, traditional practices of cost allocation appear to have remained in use” (Hemmer, 1996, p.419). Bryer (2006) argues they do because capitalists continue (unconsciously) to base their accounting systems on the labour theory of value.

because the units of output are equal, or because the asset's services available each period are equal). If, as is usual for machines, other costs increase over the asset's useful life a declining balance method is appropriate.

Marx understood depreciation accounting (Bryer, 1994), but Marxist economists do not. A common mistake is to say that Marx "assume[s] ... that machines retain equal efficiency throughout their lives so that the same number of use-values is produced in each period of their operation" (Armstrong, et al, 1994, p.106). Marx often assumes equal efficiency meaning equal operating costs in each period, or producing the same number of use-values for the same cost in each period. The absurdity of neglecting operating costs becomes immediately apparent when we drop the assumption of equal efficiency because "the total value of each unit of the commodity produced on some machines would exceed that of each unit produced on others. This would be at odds with the fundamental idea that all units of a commodity have equal values" (Armstrong, et al, 1994, p.106). Capitalist accountants would not find it acceptable to treat "labour operating old machines ... as creating less value than that operating new machines...[because] it permits a straightforward and intuitive treatment of fixed assets" (Armstrong, et al, 1994, p.108)! It is not intuitive to assume the worker transfers the use-value of the machine to the finished commodity, rather than its socially necessary value. However, this does not mean, as Perelman claims, that it is "impossib[le to] ... correctly measur[e]...the transfer of value from constant capital to the final products" (1999, p.719). Like a neoclassical economist, he thinks we "require knowledge about future economic conditions before we could calculate the amount of abstract labour transferred from constant capital to the final commodity" (Perelman, 1999, p.721). It is true that "Reproduction costs shift in unpredictable patterns" (1999, p.723), but Perelman makes the elementary mistake of believing that capitalists hold management accountable according to their expectations of future prices, obsolescence, etc. rather than using current evidence and prices (Bryer, 1999b).

The 'joint cost' problem of allocating the cost of one production process to multiple outputs exists only in the minds of neoclassical economists for whom value means economic value (present value). For them, joint costs raise the incorrigible problem of allocating cash flows to use-values. This is also true for some Marxist economists (e.g., Itoh, 1981, Armstrong, et al, 1994, p.102; Foley, 2000, p.16). Although Marx was aware of joint costs (1976, p.313; 1981, chapter 5), he did not explicitly deal with them (Armstrong, et al., 1994, p.126), perhaps because he knew that the solution comes straightforwardly from his theory once we understand that its aim is to explain how capitalists control the valorisation process.³⁵ If we think of costs in the way that Marx and accountants do, they are not 'joint' at all, but socially necessary costs of production, and this is how capitalists account for them. It is obvious to a capitalist that if a production process produces two or more use-values, the capital (variable and constant capital) embedded in each use-value is the target cost. With joint production, we cannot say that production consumes the use-values required equally, but, from the control viewpoint, we can say that each use-value produced consumes capital. Capitalists are

³⁵ The New Interpretation has nothing to say about joint costs because it does not concern itself with the level of the firm (Mohun, 1994a, p.409).

indifferent to the technical processes underlying production (except when they reduce the cost of production):

“the use-value of labour-power to the capitalist as a capitalist does not consist of its *actual* use-value, in the usefulness of this particular concrete labour ... What interests him in the commodity is that it has more exchange-value than he paid for it; and therefore the use-value of the labour is, for him, that he gets back a greater quantity of labour-time than he has paid out in the form of wages” (Marx, 1963, p.156).

In short, the value of any commodity to a capitalist is its value as capital, a sum of money to return with the average profit.

Take the classic example of sheep, from which the farmer gets both meat and wool. The cost of the meat and wool will be the socially necessary cost of their production in that combination that produces the maximum rate of return on capital. Suppose that the variable and constant capital required to produce one sheep ready for market in one year is £10, and the required return on capital is 20%. It costs the farmer £2 per sheep to process the wool for market (shearing, cleaning, etc) and £3 to send the sheep to market for meat. The capital of £15 produces two commodities. To earn the required return the selling prices of the meat and the wool together must be £18. Say the market price of wool is £3 and the market price of the meat is £15, and the farmer has the wool at the financial year-end. The accountant’s ‘net realisable method’ allocates the joint cost of £10 using the actual or estimated net realisable values (or market prices) at the split off point and assigns the further costs to each product to calculate the profit from each:

| Product | Sales value | Costs beyond split off point | Net realisable value at split-off point | Proportion to total | Joint costs allocated | Profit | Gross profit |
|---------|-------------|------------------------------|---|---------------------|-----------------------|--------|--------------|
| | £ | £ | £ | % | £ | £ | % |
| Meat | 15 | 3 | 12 | 0.9230 | 9.23 | 2.77 | 18.40 |
| Wool | 3 | 2 | 1 | 0.0769 | 0.77 | 0.23 | 7.66 |
| Totals | 18 | 5 | 13 | 1.0000 | 10.00 | 3.00 | 16.66 |

The relevance of these calculations to controlling the valorization process is that they show, in these circumstances, that the farmer should not incur the extra costs, but should sell the sheep on his farm unshorn for £13 and earn a return of 30% on his capital of £10. If the required return from processing meat and wool is also 20%, assuming (for simplicity) it takes a year to complete the work and realise the processed meat and wool, the purchasers of the sheep would have to do the processing for £2 instead of the £5 it costs the farmer, inputting a capital of £15 and selling for £18.³⁶ If the farmer had no choice but to incur the extra costs (e.g., if no market existed for the commodities at the

³⁶ The rate of return on capital depends on the turnover time of capital (Marx, 1981, chapter 4). If the turnover time were, say, six months so the processors’ capital turned over two times in a year, the processors would only need to reduce processing costs to £3.36, making two separate profits off 1.64 on a capital of £16.36 [£13 + £3.36]. In general, if the turnover rate (n) is given, the maximum cost of processing (£x) is given by $r = [\£5 - \£x]n / [\£13 + \£x] = 0.2$.

split-off point), then all costs would become joint costs and there would be no point in calculating a profit margin for each individual output. If so, accountants simplify the calculations by allocating the total costs such that each commodity earns the required return.

Using this ‘constant gross profit percentage method’ the farmer allocates $\frac{£15}{£18} \times £15 = £12.50$ of the total cost to the meat and $\frac{£3}{£18} \times £15 = £2.5$ to the wool so that when the farmer sells them he reports profits of 20% on the cost for each commodity. To limit the costs of accounting, accountants often allow the ‘physical measures method’. In our example, the farmer could allocate the £10 cost of the sheep equally to wool and meat (£5 each), clearly wildly inaccurate here, although it may not be in practice, or according to the relative weight of the wool and the meat, which may not be far out in the circumstances. Theoretically, the best we can say of the physical measures method is that it is simple (Drury, 2000, p.177). Accountants agree that market based measures of joint costs are theoretically correct. Hemmer (1996), for example, concludes that “in settings where joint products result in fixed expected proportions from a common input, the optimal method of allocating joint costs is based on the net realizable values of the final products” (Hemmer, 1996, p.429).

Concluding comments

To rescue Marx’s labour theory of value from Marxist economists we must not understand him as simply an economist, even a political economist, and not even as this plus a historian, philosopher and sociologist. He was all of these, but to understand the generality, rigour, and relevance of his theory, we must see Marx as a theoriser of the business reality he confronted, particularly its preoccupation with accounts, and understand that he theorised capitalism by first theorising capitalist accounting. Although the NI is an advance on the neo-Ricardian approach, it fails to deal consistently with constant capital, a limitation imposed by its commitment to modelling physical production systems (Moseley, 2000), rather than modelling social control systems. To understand Marx’s theory of capitalist control and his solution to the ‘transformation problem’, Marxists must understand his history and his theory of accounting. Only then can they follow him into production, out to the market and to total social capital, and back, over the tough intellectual terrains that he takes us in *Capital*, and fully appreciate the views.

Marx’s accounting solution to the transformation problem is that because the market price of all identical commodities is equal, for the labour theory of value to work the same must be true of its components, socially demanded profit and socially necessary cost. Marx certainly ‘asserted’ that what was equal between commodities was the ‘money value of the socially necessary labour time’ they contained. However, as this principle underlies capitalist accounting practices, scholars need look no further for a rich source of evidence in support of his labour theory of value, and Marx had no need to provide any more. Understanding the importance of accounting in Marx’s theory could help to resolve other apparent weaknesses in his theory, particularly the controversies surrounding the primacy of the material or social (Bryer, 2000a and 2000b) and the

distinction between ‘productive’ and ‘unproductive’ labour (Bryer, 2007). It could also form the foundation of a critical social and economic research programme with radical intent that would demonstrate what Marxists often take as self-evident, that profit is evidence of exploitation. Accounting is conspicuous by its absence in the discussions and empirical research of Marxist scholars, yet it holds out the prospect of clarifying and articulating Marx’s theory of capitalist control in modern conditions, and the promise that understanding will help to construct the radical critiques necessary to abolish it. It is time critical accountants took Marx seriously, and that Marxists took accounting seriously, just as Marx did.

Appendix

Marx’s accounting model of the circuits of capital and the ‘Du Pont’ formula

Adapted from Foley (1986, pp.69-77).

Turnover and the rate of profit

Marx defines the rate of profit “as $\frac{S}{C} = \frac{S}{c + v}$, as distinct from the rate of surplus value $\frac{S}{v}$ ” (1959, p.42),

where:

- s = surplus value;
- C = total capital;
- c = constant capital;
- v = variable capital.

For one turnover of circulating capital and no fixed capital, the amount of capital advanced as constant and variable capital equals the amount consumed: $C = c + v$. With fixed capital and/or more than one turnover of circulating capital, we must distinguish between the rate of profit on sales (sales margin), the mark-up on the cost of production (cost margin), and the rate of profit on total capital employed, including fixed capital. We first consider the effect of turnover on the rate of profit (i.e., no fixed capital), and then turn to fixed capital, dealing finally with the measurement of the capital in the denominator of s/C .

The circuit of capital starts with expenditures ($F(t)$) on constant and variable capital ($C(t)$) T_p periods before time t that reappear in the cost of the finished product ($P(t)$) at time t :

$$P(t) = C(t - T_p)$$

Sales of finished products in time t ($S(t)$) occur T_r periods after their production as finished stock. The capitalist gets a profit by marking up $q\%$ on cost:

$$S(t) = [1 + q]P(t - T_r)$$

The profit at time t ($s(t)$) is therefore:

$$s(t) = [1 + q]P(t - Tr) - P(t - Tr)$$

$$s(t) = qP(t - Tr)$$

$$s(t) = \frac{qS(t)}{1 + q}$$

The stock of productive capital at time t ($N(t)$), e.g., raw materials, work-in-progress) is the capital advanced less the capital withdrawn from production as finished stocks at time t :

$$N(t) = C(t) - P(t)$$

The stock of finished goods at time t is the flow of capital arriving from production ($P(t)$), the finished stock, less cost of those sold:

$$X(t) = P(t) - \frac{S(t)}{[1 + q]}$$

Assuming the circuit is in motion, and that sales are for cash, the stock of money at time t ($F(t)$) is the difference between the money recovered from sales less any the distributions to the capitalist (p is the proportion reinvested) and the money re-advanced to production ($C(t)$):

$$F(t) = S(t) - (1 - p)s(t) - C(t)$$

Assuming no external finance, the capital returned from sales in t ($P(t - Tf)$) plus the proportion of any surplus ($s(t)$) the capitalist reinvests (p), after a lag of Tf periods, provides the capital advanced to production in time t , $C(t)$:

$$C(t) = P(t - Tf) + ps(t)$$

In simple reproduction, $p = 0$, and $C(t) = P(t) = X(t) = S(t) - s(t) = F(t)$. The total capital ($TC(t)$) reported in the balance sheet is therefore the sum of the capital in the means of production ($N(t)$), finished stocks ($X(t)$) and money ($F(t)$), each for their turnover time:

$$N(t) = C(t)Tp$$

$$X(t) = P(t)Tr = C(t)Tr$$

$$F(t) = S(t) - s(t) = C(t)Tf$$

Marx decomposed the rate of profit into the mark-up on cost (cost margin) and the turnovers of capital measured as cost of production in chapter 4 of Volume 3:

$$r = \frac{qC(t)}{C(t)[Tf + Tp + Tr]}$$

$$r = \frac{q}{Tf + Tp + Tr}$$

$$\text{As } Tf = \frac{F(t)}{C(t)}, Tr = \frac{X(t)}{C(t)}, Tp = \frac{N(t)}{C(t)}, \text{ and } q = \frac{s(t)}{C(t)}$$

$$r = \frac{s(t)}{C(t)} \times \frac{1}{\frac{F(t)}{C(t)} + \frac{X(t)}{C(t)} + \frac{N(t)}{C(t)}}$$

$$r = \frac{s(t)}{C(t)} \times \frac{C(t)}{TC(t)}$$

Capitalists usually decompose the rate of profit into the sales margin and the turnover of capital measured as sales, the 'Du Pont' formula:

$$r = \frac{\frac{qS(t)}{[1+q]}}{C(t)[Tf + Tp + Tr]}$$

$$r = \frac{\frac{q}{[1+q]}}{\frac{C(t)Tf}{S(t)} + \frac{C(t)Tp}{S(t)} + \frac{C(t)Tr}{S(t)}}$$

As

$$\frac{q}{[1+q]} = \frac{s(t)}{S(t)}$$

$$r = \frac{s(t)}{S(t)} \times \frac{S(t)}{TC(t)}$$

Fixed capital

To adjust the formulae for fixed capital (FC), Marx includes depreciation (an additional source of constant capital) in C(t) and in (P(t)) and deducts it from FC to give the net FC(t) in TC(t):

$$r = \frac{\frac{q}{[1+q]} \times S(t)}{C(t)[Tf + Tp + Tr] + FC(t)}$$

$$r = \frac{\frac{q}{[1+q]}}{\frac{C(t)Tf}{S(t)} + \frac{C(t)Tp}{S(t)} + \frac{C(t)Tr}{S(t)} + \frac{FC(t)}{S(t)}}$$

$$r = \frac{s(t)}{S(t)} \times \frac{S(t)}{TC(t)}$$

In simple reproduction, the balance stocks remain constant when the capitalist uses fixed capital because the capitalist must either withdraw the capital recovered from wear and tear and TC falls as FC falls, but the capitalist's TC is constant, or invest it and consume any returns and the TC of the enterprise remains constant. As Marx said in Volume 3,

“The actual value of the product depends on how large the fixed part of constant capital is and on how much of it goes into the product as depreciation. But...this fact is completely immaterial so

far as the rate of profit is concerned...” (1981, p.254).

Alternatively, if the capitalist reinvests the capital from recovered wear and tear and/or some of the surplus in the enterprise $TC(t)$ and $s(t)$ increase through time, but Foley shows that expanded reproduction leads to the same decomposition of the rate of profit (1986, p.pp.76-77).

Calculating turnover

Marx uses the cost of production rather than sales in calculating turnover, but if we are consistent in the definition of the margin (cost or sales) and the definition of the capital turnover (cost of production or sales), we arrive at the same return on capital and proportional margins and turnovers. This is textbook wisdom. For example,

“Return on capital employed is frequently used as a measure of profitability Should we use opening balance sheet figures, closing balance sheet figures or some average for the year? Many combinations are possible ... [but] [i]t is essential ... that the numerator and denominator of each ratio are logically consistent” (Lewis and Pendrill, 1996, p.378).

Consider Marx’s second example in chapter 4 of Volume 3 that includes fixed capital, where $FC(t) = £10,000$, $C(t) = £2,500$, $S(t) = £26,520$, $s(t) = £4,160$, $TC(t) = £12,500$. We can either calculate the cost margin and the turnover on cost of production ($£26,520 - £4,160 = £22,360$):

$$r = \frac{£4,160}{£22,360} \times \frac{£22,360}{£12,500}$$

$$r = 0.186046511 \times 1.7888$$

$$r = 33.28\%$$

Alternatively, using the sales margin and the turnover on sales:

$$r = \frac{£4,160}{£26,520} \times \frac{£26,520}{£12,500}$$

$$r = 0.156862745 \times 2.1216$$

$$r = 33.28\%$$

The difference is not relevant mathematically as the ratio of the margins ($0.186046511/0.156862745$) equals the inverse of the ratio of the turnovers ($2.1216/1.7888$) = 1.186046512.

Within Marx’s theory of capitalist control, choosing between the different turnover figures could be rationalised as choosing different measures of accountability for capital. That is, holding management accountable for cost or for profit as well, even in production and the warehouse, presumably to generate ‘profit consciousness’ (like allocating non-production overheads to production to generate ‘cost consciousness’, see Bryer 2006), and even though managers and workers in production and the warehouse control costs only and therefore only one side of profit.

Calculating the denominator

As Marx assumes simple reproduction where the capitalist withdraws the surplus when it is realised, and realisation occurs at the end of the turnover period, it would be wrong for him to calculate the rate of profit including the profit in the capital. Marx’s first example in chapter III of Volume 3 of *Capital* therefore excludes the profit from $TC(t)$:

“Now let us take a capital A composed of $80c+20v = 100C$, which makes two turnovers yearly at a

rate of surplus value of 100%. The annual product is then: $160c+40v+40s$. However, to determine the rate of profit we do not calculate the 40s on the turned-over capital of 100, and obtain a capital value of 200, but on the capital advanced of 100, and obtain $p' = 40\%$ " (1959, pp71-72).

Marx assumes that the capitalist withdraws the surplus at the end of each turnover when realised.

If profit is realised evenly throughout the year and the capitalist does not distribute it as it is realised, we should calculate the denominator in the rate of profit as the average of the opening capital and the closing capital including the retained profit, a view apparently shared by at least some in conventional accounting (I suspect the majority). For example: Spiller says the "commonly used formulas ... define ... investment as average total assets" (1977, p.653) and Drury says the "accounting rate of return (also known as the return on investment and return on capital employed) is calculated by dividing the average annual profits from a project into the average investment cost" (2000, p.474).

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