Alfredo Saad-Filho – An alternative reading of the transformation of values into prices of production

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This article analyses the transformation of values into prices of production from the point of view of differences in the organic composition of capital. Marx's transformation has two stages. In the first, the value of the means of production used up is irrelevant; in the second, the economy is analysed at the level of price. The transformation helps to explain the distribution of labour and surplus value across the economy, and substantiates the claim that value is produced by labour alone. However, it does not allow the vector of prices of production to be calculated.

IN THE FIRST CHAPTERS of Capital III, Marx presents his transformation of values into prices of production. The transformation is necessary because, unless all capitals have the same organic composition or profits are uniformly zero, a theory of value and price based on social labour cannot explain the exchange ratios between commodities. The transformation marks an analytical shift in Capital, from the analysis of capital-in-general to many capitals. At this level of analysis, the organic composition of capitals in different branches may be distinct, and capital migration is possible. For Marx, these are the most important factors underlying the tendency towards the equalization of profit rates across the economy. Competition between capitals in different branches implies that the surplus value produced is pooled, and distributed as profit according to the size of each capital. As a result, commodities receive prices of production that are not proportional to values.

The centrality of the transformation, given the structure and aims of Marx's work, and his seemingly counter-intuitive approach, have brought this issue to the attention of a vast array of writers of widely different persuasions. Interest on this problem remains alive even after one hundred years of the publication of Capital III, and the polemic with respect to its analytical status and the impact of the various 'solutions' has become increasingly sophisticated.[1] Some writers claim that the transformation reveals fundamental flaws in Marx's method, and shows that analyses based on his value theory are doomed (see, for example, Bohm-Bawerk 1949 [1896], Samuelson 1957, 1971 and Steedman 1977). Writers from within the Marxian tradition have tended to attribute the difficulties to minor problems or ambiguities in Marx's analysis, that can be rectified easily (although in different ways), or claimed that Marx's approach to the transformation is cogent and needs to be understood properly rather than corrected (see, for example, Dumenil 1980, Foley 1982, Kliman and McGlone 1988 and Yaffe 1974).

In this article, I approach the transformation from a different angle. Most writers have discussed this problem as if the transformation were due to differences in the value composition of the advanced capitals. In contrast, it is well-known that Marx attributes it to differences in their organic composition. I have already compared and contrasted these concepts in a previous CeSC article (Saad-Filho 1993b), and will now outline their implications for the transformation. The reading presented here follows an approach first proposed by Fine (1983). In taking this route I do not seek to deny the importance of the previous literature, that has greatly advanced our understanding of Marx's critique of the capitalist economy. On the contrary, my aim is to enrich our understanding of Marx by building on a cogent, interesting, and relatively undeveloped reading of his transformation procedure. As I am not claiming that this reading is the only correct one, nor that it is better than any other, only a small part of this paper confronts other interpretations of Marx.

This article has six sections. The first briefly introduces the concepts of surplus value, profit, and rate of profit. The second reviews the differences between the *organic* and *value compositions of capital*. The third and fourth explore the implications of OCC differences for the transformation. The fifth discusses the transformation of input values. The sixth concludes this study with an assessment of the implications of this reading of Marx, and its implications for traditional views.

Section 1. Surplus Value, Profit, and the Composition of Capital

Marx outlines the background of the transformation in the first part of Capital III. This volume begins with the distinction between the concepts of surplus value (S) and profit (II). **Surplus value** is the difference between the newly produced value and the value of the labour power purchased, and **profit** is the excess of the value of the product over the value of the constant (C) and variable (V) capital advanced. (I call 'value' the money-expression of the labour time socially necessary to reproduce commodities, and 'price' is a shorthand for price of production. Both are measured in money. Therefore, the transformation of value into price is a change in the form of expression of social labour in money, rather than a transformation of labour time into quantities of money (Elson 1979, Kliman and McGlone 1988). The reader should beware of the possible confusion caused by the need to conform with the literature.)

From these definitions, it follows that the value of constant capital is irrelevant for the determination of surplus value, but it affects the magnitude of profit. The same holds for their rates. The rate of surplus value, e = S/V, measures the surplus value created per unit of variable capital; in contrast, the rate of profit (R) measures the increase in capital's size, and ultimately in its ability to produce value. R does not reflect the distinct role of the means of production (MP) and labour power (LP) in (surplus) value production. It is given by: where C/V is the value composition of capital (K/III: 161).[2] Marx subsequently considers the effect of changes in the quantity, quality and value of the inputs, and of changes in turnover time and the rate of surplus value, upon the rate of profit. In chapter eight of Capital III, Marx points out that the same factors that affect the general rate of profit may also lead to differences between the profit rates of capitals in distinct sectors:

[T]he rates of profit in different spheres of production that exist simultaneously alongside one another will differ if, other things remaining equal, either the turnover times of capitals invested differ, or the value relations between the organic components of these capitals in different branches of production. What we previously viewed as changes that the same capital underwent in succession, we now consider as simultaneous distinctions between capital investments that exist alongside one another in different spheres of production. (K/III: 243, emphasis added)

This is a very important passage, because it marks a shift in the level of analysis, from capital-in-general to many capitals. This shift posits the logical necessity of the transformation (Burkett 1986, Rosdolsky 1977 [1968]). It may therefore come as a surprise that Marx does not immediately address this issue. Rather, he dedicates the following pages to the analysis of (differences between) the technical, organic and value composition of capital (TCC, OCC and VCC). It is only after this apparent detour that Marx presents his transformation, in chapter nine of Capital III.

Section 2. Technical, Organic and Value Compositions of Capital

This section briefly reviews the meaning and significance of the concepts of technical, organic and value composition of capital (for a more detailed analysis, see Saad-Filho 1993b). This will substantiate my claim that, while Marx presumes that the transformation is due to the *diverse organic compositions* of the advanced capitals, most writers see it as being caused by their distinct *value compositions*.

Marx defines the **technical composition of capital** as the material ratio between the means of production used up and the labour time socially necessary to transform them into the output. Even though the TCC is conceptually clear, the ratio between a heterogeneous bundle of commodities and a number of hours of labour cannot be calculated easily. It may therefore be impossible to compare the technical composition of capitals invested in different sectors (e.g., agriculture and shipbuilding) directly, because of the distinct use value of the MPs used up. Marx bypasses this difficulty through his definition of the **organic composition of capital** (OCC). For him, the OCC is the '[d]ifferent ratios in which it is necessary to expend constant capital in the different spheres of production in order to absorb the same amount of labour' (TSV/III: 387; see also p.382 and TSV/II: 276). In other words, the *OCC* is the *ratio between the value of the* (fixed and circulating) *constant capital and the* (paid and unpaid) *labour time socially necessary to transform the inputs into the output*.

The concept of OCC is very important for value analysis.

However, Marx's definition is problematic. The value of the MP consumed per hour of labour is the product of the quantities used up and the values of its components. It seems therefore impossible to tell whether a change in the organic composition of one particular capital stems from a change in the productivity of labour in this firm (such that a different quantity of MP is processed in one hour of labour), or from a change in the productivity of labour in other industries (which changes the value of the MP used up by our firm). How does Marx eliminate this potential ambiguity? He does two things. First, he defines the OCC more clearly. For Marx, the **OCC** is a ‘technological composition', or a **value-reflex of the TCC**. It follows that the OCC does not vary if the underlying technology of production is kept constant, even if the value of the elements of capital changes (see, for example, TSV/III: 382-6).

Second, he introduced in Capital the concept of value composition of capital (VCC). The **VCC** is the **ratio** *between the value of the circulating part of the constant capital* (inclusive of the depreciation of fixed capital) *and the variable capital* (paid labour) *required to produce a unit of the commodity* (thus, the VCC is the ratio between the two components of the commodity's cost price).[3] This allows Marx to distinguish between the effects of the application of distinct technologies (using the OCC), and the consequences of the use of inputs with different values (using the VCC). Following the traditional terminology, the OCC is a concept of production, while the VCC is a concept of circulation.

Marx uses several examples to distinguish the OCC from the VCC. In many of them, he discusses the same basic problem: suppose that two capitals used exactly the same technology to produce wool and cotton clothes (or iron and copper instruments). What can be said about their TCC, OCC and VCC? Whenever he poses this problem, Marx always draws the same conclusion. As the technologies of production are identical, these capitals have equal TCCs. Therefore, says Marx, their OCCs are also equal. However, because of the different value of the MP used up, their VCCs are different.[4]

The question that naturally comes to mind at this point is, which values does Marx use to calculate the OCC, such that capitals producing wool and cotton clothes have the same OCC, even though wool is more expensive (say) than cotton? In this (static) comparison of capitals employing the same technology but producing different goods, Marx abstracts from (differences in) the values of the inputs, such that differences in their TCCs can be brought to light, even if only intuitively. In contrast, in the dynamic case matters are different, and both the OCC and VCC of a capital undergoing technical change can be calculated (this case is the relevant for the derivation of the law of the tendency of the rate of profit to fall; see Fine 1992).

In sum, the distinction between OCC and VCC corresponds to the contrast between differences in the TCC and differences in the values of its components (the differences between fixed and circulating capital, and between paid and unpaid labour, are also taken into account). The contrast between OCC and VCC is important, because the OCC allows the study of technical differences

in production regardless of the distinct value of the elements of capital, while the VCC synthesizes both effects. If one takes into account Marx's well-known view that the sphere of production predominates vis-a-vis circulation, distribution and consumption, it comes as no surprise that he considers differences in TCCs and OCCs more significant than differences in VCCs.

Section 3. The OCC and the Transformation Problem

The profit rates of capitals invested in distinct sectors may be different because of their distinct organic or value compositions. The OCC connects the rate of profit to the sphere of production, where living labour produces (surplus) value, while the VCC links this rate to the sphere of circulation, where the growth of the advanced capital is measured by the newly established values (see Saad-Filho, 1993a). Marx describes the impact of differences or changes in the OCC and the VCC on the rate of profit saying:

Fluctuations in the rate of profit that are independent of changes in either the capital's organic components or its absolute magnitude are possible only if the value of the capital advanced... rises or falls... If the changed circumstances mean that twice as much time, or alternatively only half as much, is required for the same physical capital to be reproduced, then given an unchanged value of money... the profit is also expressed accordingly in twice or only half the monetary sum. But if it involves a change in the organic composition of the capital, the ratio between the variable and the constant part of the capital, then, if other circumstances remain the same, the profit rate will rise with a relatively rising share of variable capital and fall with a relatively falling share. (K/III: 237-8; see also pp. 142-5 and 246-8, and TSV/II: 28, 383-8 and 426-7)

Thus, a variation in the value of the MP consumed in one hour of labour (because of technical changes in another sector, say) immediately modifies the VCC, the value of the output and the rate of profit, but it does not affect the TCC nor the OCC. In contrast, the effect of a change in the quantity of simple labour necessary to produce one unit of the output (because of technical changes in this industry) is more complex; first, it modifies the TCC, the OCC and the quantity of (surplus) value created; in the sequel, it changes the value of the output and the rate of profit.

If Marx was primarily interested in the impact on prices of differences in the value of the elements of the advanced capital, or the effect on the rate of profit of the distinct expenditure ratios in constant and variable capital, he would focus on the VCC in the transformation. Even though most of the literature approaches the problem from this angle (see section 6), Marx's procedure is different. His emphasis on the OCC shows that he is primarily concerned with the effect on prices of the distinct (surplus) value-creating capacity of the advanced capitals, or the impact on prices of the different quantities of (paid and unpaid) labour necessary to transform the means of production into the output, regardless of the value of the (fixed or circulating parts of the) MP.[5] This is only natural for a labour theory of value; but let us discuss this point in more detail.

As we have seen in section 2, when OCCs are compared differences in the value of the MP and LP, and the impact of the conditions of circulation upon the rate of profit, are netted out, and only differences in the conditions of production are influential. This leads Marx to a very simple yet powerful conclusion: the capital with the lowest OCC employs relatively more workers, produces more surplus value, and has the highest profit rate, regardless of the commodity produced.[6]

This is very important for Marx, and it points to two reasons why the analysis of profit through the OCC is important; first, because it pins the source of surplus value and profit firmly down to unpaid labour performed in production. This helps Marx to substantiate his argument that machines do not create value, and that industrial profit, interest and rent are merely shares of the surplus value produced. Second, it connects the concepts being introduced (rate of profit, distribution of labour and surplus value, and price of production) with the sphere of production. This is important because for him production is the determinant sphere, both in reality and in analysis. For Marx, these concepts cannot be grounded upon circulation or distribution because these spheres are relatively less important, and express in a possibly distorted manner categories determined in production (see Marx 1981b [1953]: 85-108). In the aftermath, Marx illustrates how the general rate of profit is formed, and how prices of production are determined, through a comparison of five capitals with distinct OCCs.

Section 4. From Values to Prices of Production

In his transformation tables in chapter 9, Marx works with five capitals worth 100. He states that these capitals have different profit rates because of their distinct OCCs. From the individual rates of profit he calculates an average and, from this average, Marx derives the prices of production. In spite of its importance, the reason why Marx uses capitals of 100 in the transformation has escaped the literature; this has probably been attributed to convenience or ease of exposition. However, since Marx is interested in the OCC, this is a necessity:

[T]he organic composition of capital...must be considered in percentage terms. We express the organic composition of a capital that consists of four-fifths constant and one-fifth variable capital by using the formula 80c + 20v. (K/III: 254, emphasis added)

Marx uses the percent form several times, in the transformation and elsewhere. He does this because this is the only way to assess the OCC in the static case, when it cannot be measured directly (as shown in section 2 above). If we assume, as Marx does, that all workers are equally skilled and that the rate of surplus value is identical across the economy,[7] when capitals are put into the percent form (60c+40v rather than 180c+ 120v; 80c+20v rather than 240c+60v, etc.) the consequences are striking:

variable capital becomes an index of the quantity of simple labour power purchased, labour performed, and value and surplus value created (see KIII: 137, 146, 243-6).

In addition, there is a direct relationship between the quantity of (paid and unpaid) labour put in motion, the value of the output and the rate of profit (see appendix). This is precisely what Marx wants to emphasize in the transformation; all else is secondary. As these relations are established in production, they involve the organic (not the value) composition of capital:

As a result of the differing organic compositions of capitals applied in different branches of production, as a result therefore of the circumstance that according to the different percentage that the variable part forms in a total capital of a given size, very different amounts of labour are set in motion by capitals of equal size, so too very different amounts of surplus labour are appropriated by these capitals, or very different amounts of surplus-value are produced by them. The rates of profit prevailing in the different branches of production are accordingly originally very different. (K/III: 257)

The use of the percent form in the transformation has three interesting implications, other than those mentioned in the previous paragraph. First, the 'adjusted' surplus value extracted in each industry (surplus value per 1 of advanced capital, si*) is equal to the profit rate, and it can be determined from the quantity of labour power purchased. The analysis of profit from the point of view of the adjusted surplus value is important, because it illustrates the principles that profit is created in production, and that the rate of profit depends primarily upon the quantity of labour power put in motion. Second, the output of every 1 of advanced capital has the same price, regardless of the commodity produced.' This substantiates the argument that competition between capitals in different branches determines prices of production such that the average capital of every branch has the same profit rate. For Marx, this shows that profit is a 'dividend' drawn from the social surplus value (see K/III: 258, 298-9). Finally, the adjusted or percent form can help demonstrate that total value equals total price of production, and total surplus value equals total profit.

These aggregate equalities are essential for Marx. They should not be understood as two independent conditions, for they are one and the same (albeit influential at distinct levels): total price is equal to total value because total profit is equal to total surplus value. The abstraction of the transformation of the value of the inputs and the value of the money-commodity (see below) shows that these equalities should be understood in the conceptual (rather than algebraic) sense; they express the relationship between value and surplus value with their own forms of appearance, price and profit. Total profit = total surplus value because profit is redistributed surplus value, while total price = total value because price is merely a form of value. In other words, the prices of production derived by Marx are a relatively complex form of value, where price-value differences redistribute surplus value across the economy until all capitals have the same profit rate (see Weeks 1981:171).

We have seen above that the percent form is convenient, because it highlights the effect of differences in the OCCs on the profit rate. However, because it equalizes all capitals to 1 the percent form changes the average rate of profit and modifies the quantities produced by each capital. Consequently, the adjusted value and price of the product of a capital may be different from the actual, and total adjusted surplus value, price and profit are different from the original magnitudes. It is therefore impossible to calculate the price vector, unless the technologies of production are specified – which Marx does not consider to be necessary for the analysis of the transformation.[9]

As the percent form is necessary to assess the OCC, and since its use precludes the calculation of prices, it cannot be argued that Marx's primary objective in the transformation is to devise a method for the calculation of the price vector, given the value of the means of production and labour power. Although some may find this disappointing or worse, it is hardly surprising, for the issue in the transformation is not quantitative (the calculation of unit prices), but qualitative (the claim that price is a more complex form of expression of social labour than value, since it takes into account the distribution of labour and surplus value across the economy).[10] The input values are irrelevant to this end. In the light of the ensuing controversy, Marx's objectives are important for another reason: they can be fulfilled only if the transformation departs from differences in the OCC, and not the turnover times or the VCC. One problem remains to be addressed: the transformation of the value of the inputs.

The Transformation of Input Values

The distribution of surplus value is such that profit rates are equalized, and the consequent determination of prices of production is the first logical stage of the transformation, the only one which Marx discusses in detail. The second logical stage involves the transformation of the input values and the value of money. It received much less attention from Marx, and it has been the source of most disagreement about the meaning and significance of his approach. It is often argued that Marx ignores the transformation of the input values in his procedure. However, this statement is at best incomplete. Marx abstracts from the input values themselves (as far as an OCC-analysis allows him to do), for two reasons. First, because they are irrelevant for the argument that profit is the form of appearance of surplus value; second, because the simultaneous transformation of input and output values would make undetectable the process of distribution of surplus value, which is the core of the transformation. If inputs and outputs are transformed simultaneously, only two opposing and seemingly unrelated systems would be visible, one measured in values and the other in prices. Price and profit could not be assessed in the former, and value and surplus value would be absent in the latter; their mutual relationship would be invisible. In contrast, if we follow Marx and abstract from the value of the MP, the dichotomy is broken and the change in the level of abstraction can be 'seen' through the shift of surplus value across the industries.

In other words, the abstraction from the value of the MP reveals the process of distribution of surplus value and the ensuing determination of prices of production, regardless of the systematic modification of the exchange ratios brought about by the transformation. In addition, it nets out the effect of the transformation of the value of the money-commodity, that would complicate further the relationship between values and prices and obscure the concepts being introduced (see K/III: 142). To sum up, there are three reasons why the price vector cannot be calculated from Marx's transformation procedure: (a) because Marx works with the price of production of the mass of commodities produced per i advanced, and not unit prices; (b) because he abstracts from the transformation of input values, and (c) because he abstracts from the transformation of the value of the money commodity.[11] It follows that the age-old objection that Marx's transformation is wrong because he failed to transform the value of the inputs is beside the point. For, if the value of the MP is immaterial in the transformation, their (changing) level cannot affect the result. The same argument can be used to dismiss the critique that Marx 'forgot' to transform the value of the money-commodity (or was mathematically incompetent to handle this problem), or that he 'unwarrantedly' failed to define the problem in terms of unit values and unit prices of production. Marx's procedure is adequate for the derivation of the concept of price of production (although not for its calculation), because it separates cause (the performance of labour in production and exploitation through the extraction of surplus value) from effect (the existence of a positive rate of profit, which tends to be equalized across branches). When the concept of price of production is introduced, Marx's analysis reaches a more complex level; the second stage of the transformation may then be analysed. When the realm of the OCC is superseded and the prices (no longer values) of the MP and LP enter into the picture, there are two reasons why the price of the commodity may be different from its value:

1) because the average profit is added to the cost price of a commodity, instead of the surplus-value contained in it; **2)** because the price of production of a commodity that diverges in this way from its value enters as an element into the cost price of other commodities, which means that a divergence from the value of the means of production consumed may already be contained in the cost price, quite apart from the divergence that may arise for the commodity itself from the difference between average profit and surplus-value. (K/III: 308-9)[12]

This change in the point of view, from the conceptual derivation of price to the study of the economy at the level of price, leads to the further determination of the concept of price of production, concludes the transformation and signals a major step forward in the analysis.[13] Whilst the derivation of the concept of price departs from the distribution of the surplus value produced in abstraction from the value of the MP and LP, the calculation of the price vector involves (as is well-known) the current price of the inputs and the (price-) rate of profit.[14] In sum, Marx's method involves not only the progressive transformation of some concepts into others, but also gradual shifts in the meaning of each concept, whenever necessary to accommodate the evolution of the analysis.[15] Having done this, Marx can now claim that his prices of production are:

the same thing that Adam Smith calls ‘natural price', Ricardo ‘price of production' or ‘cost of production', and the Physiocrats ‘prix nécessaire', though none of these people explained the difference between price of production and value... We can also understand why those very economists who oppose the determination of commodity value by labour-time... always speak of prices of production as centres around which market prices fluctuate. They can allow themselves this because the price of production is already a completely externalized and prima facie irrational form of commodity value, a form that appears in competition and is therefore present in the consciousness of the vulgar capitalist and consequently also in that of the vulgar economist. (K/III: 300; see also p.268 and K/I: 678-9).

The impact of the transformation on the structure of Capital is two-fold; first, it explains why market exchanges are not directly regulated by the labour time socially necessary to reproduce each commodity; second, it shows that price is a relatively complex form of social labour. The virtue of Marx's approach, as it has been outlined here, is that it accounts for both aspects of the problem, even though it does not lend itself to the calculation of unit prices or the general rate of profit. In the context of Capital, Marx's procedure is important because it develops further the reconstruction in thought of the capitalist economy, and substantiates the claim that living labour alone (and not the dead labour represented by the value of the means of production) creates (surplus) value.

In contrast, approaches that argue that the input values should be taken into account from the start, and that they should be transformed together with the output values, often conflate the roles of living and dead labour in the production of value, and can hardly distinguish between workers and machines in production. It follows that the ‘non-transformation of the inputs' cannot be considered a defect; it is, rather, a feature of Marx's method. By abstracting from (changes in) the value of the inputs and the money-commodity, Marx locates the source of profit in the performance of labour in production, and carefully builds the conditions in which circulation may be brought safely into the analysis and add positively to its development.

Section 6. Concluding Remarks

This article has shown that Marx's presentation of the transformation of value into price of production has **two distinct stages**. In the **first**, he abstracts from (differences in) the value of the means of production, to highlight the principle that value is produced by labour alone. His unambiguous conclusion is that the greater is the quantity of living labour put in motion, the higher is the profit rate. The averaging out of these rates distributes surplus value according to the size of each capital, and this forms prices different from values. In the **second** stage, the economy is analysed at the level of price; all commodities are sold at price, and the input prices are taken into account. The role of transformation is to allow a greater determination in the form of social labour, and explain the distribution of labour and surplus value across the economy.

The use of the organic composition of capital is essential to distinguish these stages, because it helps to identify the cause of the transformation, and describe the process that gives rise to prices distinct from values. In addition, it shows that Marx's interest lies in the conceptual relationship between labour, price and profit, and not the algebraic calculation of prices nor the rate of profit. Moreover, it indicates that equilibrium (or simple reproduction) assumptions are unwarranted in the study of the transformation. It follows from Marx's transformation that, even though workers are exploited as they produce specific commodities, the capitalist class as a whole (and not individual capitalists) is the agent of exploitation, and the results are evenly divided among its members. The reading of the transformation outlined here shows that the presentation in Capital III is consistent with Marx's method, and is part of his reconstruction of the main categories of the capitalist economy. In contrast, the use of the value composition of capital in the transformation would tend to conflate these stages, in which case the process would collapse. The transformation would appear to be the external relation between two contrasting exchange value systems, one in which the exchange ratios are determined by the labour time socially necessary to produce the commodities, and another where an equal (price-) rate of profit prevails (similar criticisms can be found in Fine 1980, Kliman and McGlone 1988, Moseley 1993b and Wolff, Roberts and Callari 1982, 1984). Because of the arbitrary separation of value from its form of appearance, this type of approach may lead to irrational relations between the value produced and its expression as price, and/or between surplus value and its form of appearance as profit.

Most of the literature has investigated the transformation through the VCC. Whilst this is not in itself wrong, and may lead to important theoretical developments, this approach has no direct implications with respect to Marx's own problem. The various solutions to which this approach has led can be distinguished from each other by the processes that they contemplate, the relations that are put to the forefront, and the treatment which is given to them (in other words, the nature and form of the normalization condition adopted, the use of interactions or simultaneous equations, etc). In my view, most transformation procedures found in the literature are alternative to Marx's; they cannot claim to 'correct' the latter, because they address different issues and conceive of the relation between values and prices distinctly from Marx.

The inadequate understanding of Marx's own transformation procedure has often led to the complaint that he unwarrantedly omitted the specification of the technologies of production or, more often, that he did not transform the value of the inputs.[16] This article demonstrates that these objections are misplaced, because they emphasize issues that are not the primary object of Marx's concern in the transformation, and may obscure, rather than reveal, the subject of his inquiry.

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1. The literature on the transformation is vast, and there is no need nor space for a survey in these pages. See, however, Desai (1989), Dostaler and Lagueux (1985), Fine and Harris (1979), Freeman and Carchedi (1996), Mohun (1991), Steedman (1981), and Sweezy (1949).

2. In this article, I refer to Capital (Marx 1976 [1867],1981a [1894]) as K, and to the Theories of Surplus Value (Marx 1969 [19591,1972 [1962]) as TSV. All italics in quotations are original, unless otherwise stated.

3. Clarke (1994) compares Marx's thoughts on the composition of capital with the relatively less developed approach of Ricardo.

4. 'In the case of capitals of equal size...the organic composition may be the same in different spheres of production, but the value ratio of the primary component parts of constant and variable capital may be different according to the different values of the amount of instruments and raw materials used. For example, copper instead of iron, iron instead of lead, wool instead of cotton, etc.' (TSV/III: 386; emphasis omitted; see also p.387 and TSV/II: 289). In K/III: 244 Marx says: '[I]t is possible for the proportion [the TCC] to be the same in different branches of industry only in so far as variable capital serves simply as an index of labour-power, and constant capital as an index of the volume of means of production that labour power sets in motion. Certain operations in copper or iron, for example, may involve the same proportion between labour-power and means of production. But because copper is dearer than iron, the value relationship between variable and constant capital will be different in each case, and so therefore will the value composition of the two capitals taken as a whole.' Marx discusses the opposite situation, in which capitals with different TCCs and OCCs have equal VCCs, in K/III: 50-51 and pp. 900-01.

5. Ben Fine (1983: 522) was the first to point out this essential feature of Marx's transformation: 'Because Marx discusses the transformation problem in terms of the organic composition he is concerned with the following problem: what is the effect on prices of differences across sectors in the quantities of raw materials worked up into commodities irrespective of the value of those raw materials? The transformation problem as traditionally concerned would wish to take account of differences in the values of raw materials. Usually, following on from this, account is also taken of the differences in the prices of raw materials (which differ from the differing values).' Fine concludes (p.523) that 'Marx did not get wrong the problem that he posed, although it differs from the one which he is presumed to have failed to solve.'

6. 'When the rate of surplus-value...is given, the amount of surplus-value depends on the organic composition of the capital, that is to say, on the number of workers which a capital of given value, for instance 100, employs.' (TSV/II: 376)

7. 'The rate of surplus value exists as a social aggregate, independently of any particular industry. This follows from the social nature of the value of labour power, so that it is incorrect to conceive of the rate of surplus value varying across industries and the aggregate to be a mere weighted average of rates in different industries' (Weeks 1981: 170).

8. See K/III: 264. This conclusion holds as long as the sum of variable plus circulating constant capital is equal in all sectors. It lends support to the argument that the OCC (that does not distinguish between the fixed and circulating parts of constant capital, not between paid and unpaid labour) is the pivot of the transformation, instead of the VCC (where only circulating constant capital and paid labour are influential).

9. Marx was aware of this limitation: 'In our previous illustration of the formation of the general rate of profit, every capital in every sphere of production was taken as 100, and we did this in order to make clear the percentage differences in the rates of profit and hence also the differences in the values of the commodities that are produced by capitals of equal size. It should be understood, however, that the actual masses of surplus-value that are produced in each particular sphere of production depend on the magnitude of the capitals applied...it is evident that the average profit per 100 units of social capital, and hence the average or general rate of profit, will vary greatly according to the respective magnitudes of the capitals invested in the various spheres.' (K/III: 261-2)

10. This has been recognized by the more careful interpreters of Marx. Schefold (1994: 8), for example, rightly argues that '[w]ages, interest and rent appear as the revenues derived from the supply of labour, capital and land, justified by work and abstinence, but they are revealed [by Marx] to derive all from labour and its exploitation through a chain of transformations in which the substance of a deeper layer takes forms closer to the surface: the value of labour power takes the form of the wage, the surplus value that of profit etc.' (emphasis added).

11. See Mattick, Ir. (1991-92: 51-52). Lack of understanding of these features of Marx's approach is partly responsible for the results obtained by transformation procedures that follow Bortkiewicz (1949 1907], 1952 [1906-7]). For a critique, see the contributions in Freeman and Carchedi (1996).

12. By the same token the cost price, previously equal to the value of the inputs, is now their price: 'It was originally assumed that the cost price of a commodity equalled the value of the commodities consumed in its production. But...[as] the price of production of a commodity can diverge from its value, so the cost price of a commodity, in which the price of production of others commodities is involved, can also stand above or below the portion of its total value that is formed by the value of the means of production going into it. It is necessary to bear in mind this modified significance of the cost price, and therefore to bear in mind too that if the cost price of a commodity is equated with the value of the means of production used up in producing it, it is always possible to go wrong.' (K/III: 264-5; see also pp.1008-10, TSV/III: 167-8, Mattick, Jr. 1991-2: 47-51, Moseley 1993b: 168, and Yaffe 1974: 46).

13. 'It is of the essence of dialectical theories that simple and abstract determinations (prices proportional to values) lead to more complex and concrete ones (prices that are not so proportional) that cannot be simply reduced to the former.' (Smith 1990: 167). The (changing) meaning of concepts in dialectical theory is discussed in Arthur (n.d.), Engels' Preface to K/III, Murray (1988; 1993) and Shamsavari (1991).

14. Whether or not this is a limitation of Marx's procedure depends on one's judgement of the purpose of the exercise and the theoretical status of value. These issues have been debated at length and need not be considered here (see, however, Elson 1979 and Steedman 1981). The calculation of the (price-) rate of profit and the price vector is not discussed here either, but it is well-known that it can be made without reference to value (which, of course, does not mean that the concept of value is either irrelevant or wrong; see K/III: 259-65, 308-09 and 990-920, Dumenil 1980, and Fine 1980).

15. The concepts of price of production and general rate of profit are modified again when Marx discusses commercial capital: 'Commercial capital thus contributes to the formation of the general rate of profit according to the proportion it forms in the total capital... We thus obtain a stricter and more accurate definition of the production price. By price of production we still understand, as before, the price of the commodity as equal to its cost (i.e. the value of the constant and variable capital it contains) plus the average profit on this. But this average profit is now determined differently. It is determined by the... total productive and commercial capital together... The real value or production price of the total commodity capital is therefore k+p+m (where m is commercial profit). The price of

production, i.e. the price at which the industrial capitalist sells as such, is therefore less than the real production price of the commodity; or, if we consider all commodities together, the price at which the industrial capitalist class sells them is less than their value ... In future we shall keep the expression "price of production" for the more exact sense just developed.' (K/III: 398-99; emphasis added)

16. See, for example, Bortkiewicz 1949 [1907]: 201 and 1952 [1906-071: 9, Desai 1989, Dobb 1967: 532-3, Dumenil 1980: 8,22-23, 51, Lipietz 1982: 64, Sweezy 1949: xxiv and 1968 [1942]: 115, and de Vroey 1982: 47.

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