MARXIAN ECONOMICS
A REAPPRAISAL

Volume 2

Essays on Volume III of *Capital*
Profit, Prices and Dynamics

Edited by
RICCARDO BELLOFIORE

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Introduction

Riccardo Bellofiore

As we approach the end of the century, if not the end of history, a reappraisal of Marx's critique of political economy may seem a rather odd topic for a group of social scientists, especially if, like the contributors to this volume, they are mostly economists. Nevertheless in early 1994, taking advantage of the centenary of the publication by Engels of the third volume of *Capital*, Marco Guidi and I decided to take the risk of proposing two conferences on Marx: the first, in Teramo, to be devoted to the past and present position of the Italian debates; the second, in Bergamo, to provide a forward-looking assessment of the more lively international research programmes. The Bergamo conference, whose participants were partly guest speakers and partly selected through a call for papers, met with unexpected success and a timely interest by Macmillan. The proceedings are now collected in this and a companion volume, with the papers arranged thematically.

As in all human intercourse, a conference is rife with questions and answers, the latter very often outnumbering the former. I know for sure that the motives that urged me to undertake this endeavour were surpassed by the enriching contributions of all the participants. The result is always up to a point unintended, and has a life of its own which only the reader may test and judge. In the following I confine myself first to a personal note, a short description of the theoretical bias behind the preliminary design of the conference, and then provide a more neutral summing up of the papers included in this volume.

MARX IN QUESTION

Volume III of *Capital* is a good starting point to check the state of health of Marx's theory. Most of the controversies about (and the endless history of the alleged final refutations of) Marx began just after its publication. The two most famous instances are the discussions about the so-called 'contradiction' between the labour theory of value and the determination of prices of production, and about the

meaning and validity of the law of tendential fall in the rate of profit. The old and new debates on Marx invariably seem to have two centres of gravity – price theory and crisis theory – the monetary aspects of volume III (Marx's analysis of bank money and fictitious capital) are generally neglected. The renewal of interest in Marx during the 1960s and the 1970s again followed these well-trodden paths, both of which ended in blind alleys.

Take the 'transformation problem'. After volume III was published, the race was on, starting with Dmitriev and Bortkiewicz, through Sweezy, Dobb and Meek, to Seton's simultaneous 'solution' which is formally identical to Sraffa's model in *Production of Commodities by Means of Commodities*. With Marxian value theory reduced to a theory of the determination of relative prices, as both Marx's followers and critics maintained for almost a century, the solution that was eventually reached looks rather like a dissolution. Once the conditions of production are known and the real wage quantified, relative prices and the equal rate of profit may be fixed without the need to start from exchange values, and hence collapses any possibility of a prior determination of the rate of profit in value terms. If, as a consequence, Marx's value theory is rejected, then the notion of exploitation runs into trouble. Having glanced at Marx in the 1950s and 1960s, in the mid-1970s mainstream economists found unexpected allies among some of Sraffa's followers, who declared that 'after Sraffa' not very much of Marx's original building stood up – and they soon passed to other themes.

The tale is not very different with crisis theory. Here again the basis was established at the turn of the century in the German–Russian debate. The discussion about the law of tendential fall in the rate of profit became muddled up with the controversy over volume II's schemes of reproduction, and became just one of several instances of the alleged presence in Marx of a *Zusammenbruchtheorie* (collapse theory), to be either defended or rejected. Hence there were those who stressed the law itself and those who stressed 'the counteracting factors', just as there were those who saw in the schemes of reproduction the analytic tool with which to build an underconsumption version of the collapse theory and those who made the first steps towards a balanced growth theory. Up to a point Marx again became fashionable for the mainstream as a forerunner of Harrod and Domar's 'knife-edge' model; the turmoil in capitalist economies in the late 1960s and early 1970s breathed new life into crisis theory. However, as capitalist restructuring went on, and as the consequent remaking of

the working class on a world-wide scale began to meet one success after the other, Marx was once more relegated to the attic by most of the academic world.

If Marx's record as an economist was deemed low in the 1980s, the breakdown of the Soviet Union and its Eastern satellites apparently came as the final blow – sanctioning the idea that there are no alternatives to the capitalist model, and that the few remaining exceptions are on their way to being assimilated into the world market. But after the initial enthusiasm that followed the fall of communism it has become clear that capitalist contradictions are far from resolved. Capitalism's victory, it is claimed by some, signals the danger of a universal 'commodification' and that there is a need to return to Marx as the most powerful moral critic of capitalism. The collapse of state communism in Europe, others add, has helped rather than hindered a new appraisal of Marx's legacy. Freed from spurious correlation with political realities and passions, Marx's work may at last be approached as one of the great 'classics', and can now be studied with the cool distance reserved, say, for Aristotle, Machiavelli or Smith.

My aim with the conference was quite different. I intended to gather together those – whether Marxian or not – who were interested in Marx as a scientific analyst of capitalism, as an author whose lessons for doing social science (and political economy) are still relevant today. My impression – most likely a minority view, as I am aware – was that traditional debates on Marx have misrepresented the 'core' of his approach – value theory – because it has been disconnected from the essential link with money and reduced to an equilibrium notion – a slide that has been eased by a restricted knowledge of his method and philosophical background. Marx's method was not one of successive approximations, but of moving gradually from the abstract to the concrete in the presentation of capital as the totality whose interior driving power is the dynamics of the valorization process. Rather than being the first, imperfect, approximation to the determination of normal relative prices (with prices of production seen as the centre of gravity of market prices) the notion of value, as introduced by Marx in the first chapters of *Capital*, accurately captures the essence of the capitalist mode of production which is hidden behind the exchange ratios set in circulation. Hence it is something which does not need any further, more precise, determination.

The notion of value requires, from the start, the notion of money as the general equivalent: value is the eventual social validation of

private labour in general exchange. Since the production of value for general exchange is at the same time the production of surplus value, and since exchange is generalised only in capitalism, the capitalist process is depicted by Marx as a money 'cycle' or 'circuit', a sequence of concatenated acts starting from the advance of money finance to industrial capital, going through production as the valorization process where (potential) abstract labour – that is (potential) value – is formed, and ending with the coming into being, the actualisation, of value on the market. It is easy to see that money is at the beginning and at the end of the capitalist cycle, and that the capital–labour confrontation over the pumping out of abstract labour is at the centre of the picture, whatever the determination of individual prices. The notion of labour as substance and the notion of money as the expression of value, as well as the laws of capitalist motion, are modified by Marx in the course of his presentation of capital's totality. Labour as substance is the living labour of wage workers commanded by money capital, and hence is subject to a process of commensuration by industrial capital prior to exchange. In Marx, money must be seen as a dual and inherently dynamic, and sequential notion (though Marx's presentation is the reverse of this sequence): first, money as capital – the buying of labour power by money capital, which gives way to industrial capital command over living labour – which allows a prevalidation of private labours within capitalist firms; then, money as the universal equivalent, which eventually sanctions in the final exchange of commodities the indirect sociality of those same dissociated labours.

The theory of value then, is at once a theory of money and a theory of the origin of surplus value – a theory of exploitation in a monetary economy – before being a theory of prices. Value theory encompasses, on the one hand, the 'formation' of economic magnitudes, that is the process that lies behind the formation of capitalist 'equilibria' and/or the explosion of crises, and on the other hand the essentiality of money even in equilibrium. Thus what have been taken as the data in the 'transformation debate' are dependent from the path marked by the powerful forces and struggles surrounding money, production proper and competition. The basic categories are inherently dynamic in the Schumpeterian sense. As Schumpeter himself emphasized, Marx's theory was in a sense the first genuinely evolutionary economic theory, where the capitalist process incessantly brings about states that will by themselves generate the next ones – a structural morphogenesis that is lost in the unilinearity of balanced growth or of collapse theories.

This is not the place to go into the details of this view about Marx – the view behind the questions that prompted me to organise the conference. What matters here is rather if and how the process of capital as a whole, which is the object of Volume III of *Capital* may be read without the straitjacket imposed by interpretations that omit the monetary and sequential aspects of the Marxian system, and that underplay the weight of the philosophical foundations of Marx's critique of the political economy. This volume and its companion are a tentative step in this direction. It is my hope that the contributions, each in its own way, may help provide a deeper understanding of Marx, as well as of present-day capitalism.

PRICES AND VALUES

Part I of this volume begins with the first of two contributions by Meghnad Desai. Chapter 1 deals with the transformation problem and it provided the theoretical ground for the paper that Desai submitted at Bergamo, which is more concerned with the morphology of contemporary capitalism. (The latter is reproduced as the final chapter of this volume.) In Chapter 1 Desai tackles the first two parts of volume III of *Capital* on the conversion of surplus value into profit and the conversion of profit into average profit. He does not interpret the 'problem' as mainly one of transforming values into prices, but rather as the problem of providing a theory of profits – namely how, in a world of voluntary contracts and free labour, exploitation can be translated into profits without invoking any kind of 'imperfection'. Desai insists that it is not very clear whether the notion of the rate of profit in chapter 9 of volume III refers to the unobservable 'value' rate of profit. Similarly, when Marx spoke of price of production he meant the price per unit of time contained in the commodity, not the dollar price per unit of physical output. Desai carefully specifies the units of account – labour time and money – so as to make them commensurate, and then defines a unit of account (unit price) for labour time so that Marx's identity of value and price is satisfied. This unit price for (direct and indirect) labour time exceeds the money wage. The rate of exploitation may now be expressed in a meaningful way, with only observed magnitudes involved. Desai is then able to account for the money-form deviation of surplus labour from profit, while at the same time answering the question of why Marx did not extend the deviation to labour power.

According to Fred Moseley (Chapter 2), the long and continuing controversy over Marx's theory of prices of production in volume III has not paid sufficient attention to Marx's overall logical method in *Capital*. The currently dominant neo-Ricardian interpretation of Marx's theory likens it to Sraffa's logical method of linear production theory. Moseley argues that this theory differs in two fundamental respects from Marx's own logical method: in the order of determination between aggregate magnitudes and individual magnitudes; and in the nature of the fundamental givens, whether physical quantities or quantities of money. In Marx, the total magnitudes (total price and total surplus value) are determined prior to the individual magnitudes, and hence the same is true for the general rate of profit. Moreover, in the transition from volume I to volume III the money quantities of constant and variable capital are held invariant and this gives rise to changes to the physical quantities of means of production and wage goods that the given constant and variable capital will purchase. As a consequence, both of Marx's aggregate equalities (between prices and values, and between profits and surplus value) are simultaneously true, and the determination of individual prices does not alter the general rate of profit. If Marx's logical method is correctly interpreted, then the long-standing neo-Ricardian criticisms of Marx's theory of prices of production can not in fact be applied to Marx's theory, but rather are a result of the misguided attempt to interpret Marx's theory in terms of linear production theory.

For Andrew Kliman too (Chapter 3), Marx's critics are wrong. As Kliman reminds us, the logic of Marx's accounts of the transformation of values into production prices and the tendency of the rate of profit to fall has been challenged for nearly a century, and his critics' refutations are almost universally accepted. It is shown here, however, that in both cases the critics' refutations rest on a conception of value as relative price (exchange value), where the magnitude of value is of no importance. After documenting Marx's break with this conception, Kliman shows that, once the notion of value as substance is reinstated (and, relatedly, time is reintroduced) into the analytical picture, Marx's approach to the falling rate of profit and the value-price transformation is vindicated. The chapter concludes with a methodological contention: for Kliman, his reinterpretation of Marx's value theory has a *prima facie* claim to be regarded as superior to traditional formalizations, precisely because it is able to make sense of key aspects of Marx's work while the other's can not.

Still on the same topic, in Chapter 4 Antonio Callari, Bruce Roberts and Richard Wolff offer a unique Marxian formulation of the transformation of values into prices of production. The authors adhere to an Althusserian 'overdeterministic' perspective and to a postmodernist stance. It is not production as such that determines the shape of capitalist relations and fixes the determination of value as a code for those relations. On the contrary, value should be read as the 'condensation' of production, distribution and circulation processes, and is a code for a multifaceted class determination of economic processes. Based on a new notion of value, their formulation permits a conception of the transformation problem that is radically different from conceptions that depend on the notion of value as labour embodied. Their contribution thus emphasizes a difference not only with the Ricardian approach to prices and reading of Marx, but also with the more traditional, and still operative, Marxian formulations. The idea is formalised that capitalist commodity circulation is partially constitutive, and is not a simple reflection of the value of the commodity as a product of capital. Once again, the resultant solution to the transformation problem restores the simultaneous equality of prices and values and of profits and surplus value. It also functions as an analytical expression of a non-essentialist Marxism and, in opposition to empiricist concepts of price, of the operation of the entry point of class in the construction of economic concepts.

Carole Biewener (Chapter 5) also contributes to the 'overdeterminist' understanding of value and value forms by considering the constitution of money prices when non-commodity money predominates as the medium of exchange in domestic economy. According to Biewener, value and value forms are 'socially contingent', both quantitatively and qualitatively. With value defined in terms of socially necessary abstract labour time, she emphasises that the determination of what is 'socially necessary' depends on the particular set of social circumstances under consideration. Therefore, from this perspective, the value of a commodity in exchange is not reducible to the physically embodied labour time expended to produce it, nor to the technological requirements of commodity production. Rather the labour time expended in production is but one element of a commodity's value in exchange and other economic, political and cultural processes should be included in the value and exchange value of a commodity. Such 'socially contingent' value holds true for the money commodity as well as for non-money commodities, and therefore for money prices as well as for exchange values. In considering non-commodity money,

money is still seen as giving command over some amount of socially necessary abstract labour time, thereby maintaining the link between money prices and labour. But the amount of labour time the money exchanges for is 'arbitrary' or socially contingent. The chapter concludes by showing the implications of this understanding of non-commodity money on monetary and financial processes.

A very different point of view on the issue is put forward in Chapter 6 by Paul Cockshott and Allin Cottrell. They examine the argument by Farjoun and Machover that the 'transformation problem' is a false problem, because of the empirical falsity of the assumption that the rate of profit tends towards equality across industries. The chapter is partly theoretical (concerning the concept of equilibrium and its relation to the formation or non-formation of an equalized rate of profit) and partly empirical (offering a comparison of 'simple' labour values and prices of production as predictors of market prices). The results of the empirical investigation confirm that the simple labour theory of value correspond to the facts. The labour theory of value, though developed at a higher level of abstraction than the theory of prices of production, gives predictions that are just as close, if not closer, to observed reality.

In Chapter 7 Chai-on Lee addresses the link between value and market price, accounting for all the intermediary categories: individual value, market value, social value, individual price of production, market price of production and so on. The discussion of value and price is undertaken in three steps. First, value and price are interpreted as 'substantive' categories in the context of a totality where supply and demand are irrelevant to determining them. Second, the 'relational' categories of individual value, market value and market price are indeed determined by supply and demand as they are given in the context of individual entities. Finally, a distinction is made between social value as a 'substantive' category and price as a 'relational' category in the context of value transfers, which allows us to detect the source of sectoral surplus profits in the unilateral transfer of value.

Part I ends with Chapter 8, in which Guglielmo Carchedi criticises a specific version of neoclassical price theory, that which is taught to undergraduate students in standard textbooks. Carchedi shows that partial equilibrium theory is internally inconsistent, and that general equilibrium theory unrealistically bans time from the model. The defects of neoclassical price theory are then traced back to its hidden social content. For Carchedi, the assumption of equilibrium, which is the ground of mainstream theory, is just a myth. The market cannot

have the function ascribed to it, namely that of bringing about the optimal utilization of resources. But if the market cannot bring about equilibrium, it also cannot perform another function attributed to it by neoliberalism, that of ensuring the reproduction of the capitalist economy and social system. In contrast Marx's production prices cannot be theorised as equilibrium prices to be computed on the basis of a system of simultaneous equations. Mirroring the actual processes going on in reality, prices of production are determined by Marx with a method based on chronological time, rather than on logical time. Thus price formation is explained through a real sequence of production and distribution periods. According to this alternative view, society is kept together by social relations – that is, relations among people that reproduce themselves independently of which specific individuals become bearers of those relations. In Marx the notion of equilibrium has a much more limited role than it has in neoclassical economics, and does not stand in the way of an inquiry into the law of movements of the capitalist mode of production.

DYNAMICS

Part II opens with Heinz Kurz's appraisal of Marx's views on technological change and his law of the falling rate of profit. For Kurz, Marx singled out from Ricardo's chapter 'On Machinery' in the third edition of *Principles* the situation where the introduction of new machinery lowers 'gross produce'. Here technological change entails an increase in labour productivity, raises the organic composition of capital and brings into existence, as well as constantly renewing, the industrial reserve army of the unemployed. For Marx this peculiar form of technological change dominates the long-term development of the capitalist economy and marks its fate. Marx wanted to show a necessary eventual vanishing of the maximum rate of profit without resorting to diminishing returns in primary production. According to Kurz, Marx's argument is wrong. As Bortkiewicz proved, the introduction and generalisation of a new method of production can never reduce the rate of profit, given the real wage, and will raise it whenever the new method contributes directly or indirectly to a cheapening of wage goods.

A very different judgement on the law is passed by Alan Freeman (Chapter 10). As Freeman reminds us, Okishio's celebrated theorem, published in 1961, rigorously establishes that, if the real wage stays

constant, the rate of profit will rise as a result of productivity-enhancing technical change, contrary to what Marx believed. Okishio determines prices and profits from a system of simultaneous linear inequalities and assumes that each individual capitalist will adopt a new technique if it will lead to a fall in his or her unit costs at the prices prevailing before the new technique is introduced. All attempted refutations of this theorem work only if capitalists invest according to special rules that are less general than Okishio's, or on the basis of special assumptions concerning the real wage. However, in agreement with Kliman and Carchedi in this volume, Freeman shows that simultaneous equation systems represent neither Marx nor the actual observed formation of values or prices. Using a differential equation formalism, he aims to prove fully generally that under Okishio's assumptions the rate of profit must fall continuously. It is further suggested that this can be offset only when capitalist consumption replaces investment, as occurs in a slump. Freeman contends that this more accurately reflects observed reality, and hence concludes that simultaneous equation systems cannot provide the basis for representing a capitalist economy.

The law of the tendency for the rate of profit to fall is also at issue in Chapter 11, by Stephen Cullenberg. The objective of this chapter is to disentangle the long-standing Marxist debate over this 'law' by examining the way in which its various participants conceptualize the relationship between the social totality and its constituent parts. It is argued that the debate has been between two distinct Marxist theories of totality and methodology. Each theory can be distinguished by whether it reduces the social totality to the sum of a set of preexisting parts (the Cartesian totality), or whether the parts are understood simply as expressions of the inner nature of the pregiven totality (the Hegelian totality). The former approach is associated with those currently advocating a microfoundation or 'analytical' approach to Marxist social theory. The latter is associated with the broadly defined Hegelian tradition in Marxist theory. These social theories impart irreducibly different meanings and significance to the various individual concepts that constitute each theory. This irreducibility occurs even though the individual concepts are often called by the same name. Against this background Cullenberg – in methodological continuity with Callari, Roberts, Wolff and Biewener's postmodern standpoint and stress on Althusserian 'overdetermination' – presents an alternative reading based on a decentred totality, wherein neither the part nor the whole is reduced to a mere

effect of the other but are instead understood as mutually constituting each other.

A fresh view on the law of the tendency for the rate of profit to fall comes from Geert Reuten (Chapter 12). Marx's 1894 Law of Profit was the apotheosis of his exposition of the internal logic of the capitalist system: the valorization–devalorization contradiction. Reuten takes the theory of the falling rate of profit in *Capital* (part 3 of volume III) as the starting point from which to articulate its exposition at a less abstract level, taking into account the technological stratification of capital in various branches of production (part 2 of volume III) as well as finance capital (part 5 of volume III). Because of accounting practices, devalorization is expressed either by a fall in the profit rate or by the devaluation of capital. Two important manifestations of this are the destruction of means of production and the unemployment of labour. While the law is manifest in cycles, its actual exhibition – via economic crises or continued inflationary reproduction – is determined by the institutional make-up of the banking system.

In Chapter 13 Joseph Halevi and Peter Kriesler conduct a comparison between volume III and the other two volumes. They argue that in volume I there is a basically different dynamic theory than the one put forward in volume III. The former falls within the framework of what Hicks in *Capital and Growth* called 'primitive growth models'. As a consequence, Marx's most innovative dynamic intuition, that is, the transformation of the naturalistic approach adopted by classical economics into a functional relation between accumulation and the reserve army of unemployed, is obtained at the price of ruling out realisation crises as well as crises due to structural disproportionalities. The latter appear as mere accidents in volume II. Halevi and Kriesler maintain that structural disproportionalities have a much more systemic character than Marx thought. In this way, the position of the German and Russian Social Democratic Parties is vindicated, since Russian–German Marxism gave virtually no importance to cyclical process based on the volume I reserve army mechanism in a one-sector framework. In volume II Marx showed the unlikely conditions under which capitalist economies could grow, without crises, along a balanced path. From some hints in volume III, a sequence may be suggested that goes from an initial crisis caused by structural disproportionality to a general underconsumption crisis. However in the bulk of volume III Marx abandoned the sectoral approach of the reproduction schemes, and stuck to the assumption of competition

(uniform rate of profit), which – according to Halevi and Kriesler – in a multisectoral approach is only consistent with balanced growth. The chapter concludes by arguing that the work of Löwe and Hicks on the structural traverse must be seen as a necessary supplement to Marx's insights.

EMPIRICAL APPROACHES

The topics in Part III are of a more empirical and less abstract nature. In chapter 14 Gérard Duménil and Dominique Lévy inquire into the theoretical and factual relevance of the dynamic historical tendencies described by Marx in volume III. In particular, the law of the tendency of the rate of profit to fall is approached as one component of a system of reciprocal relationships among several economic variables: labour cost, labour productivity and the composition of capital. This system is interpreted as a crucial element in the understanding of the history of capitalism. Two historical trajectories of the kind suggested by Marx are apparent in the late nineteenth century and second half of the twentieth century. In between, however, the progressive shift to the new stage, 'managerial capitalism', a major metamorphosis of the relations of production, is manifested by an upward trend of the profit rate during the first half of the twentieth century. The decline of the profit rate in the first and third periods was followed by two 'large crises', with unusual clusters of recession, unemployment, sluggish technological progress and, in particular, labour productivity.

In Chapter 15 Anwar Shaikh deals with the empirical relevance of Smith and Ricardo's natural prices and Marx's prices of production. According to Shaikh, classical Marxian theories interpret these prices as centres of gravity of actual market prices, which are themselves dominated by the underlying structure of production, as expressed in the total (direct and indirect) labour time embodied in the production of the commodities. After formalising a Marxian model of prices of production normalised by means of a Marxian standard commodity, Shaikh shows that in principle there may be a reversal in the direction of deviations between prices and labour values, but that this is unlikely to be of any practical importance. Of greater significance is the linear approximation to normalised prices of production given by a vertically integrated version of Marx's own transformation procedure, where all the structural parameters depend only on labour value magnitudes. Actual market prices are then compared with labour

values, prices of production, and this latter linear approximation. The empirical backing for Marx's propositions appears to be strong enough, and has to be connected to the inner determination of observed relative prices by the structure of production.

Next Simon Mohun (Chapter 16) considers how the Marxian divide between productive and unproductive labour can be used in empirical work. Among the unproductive activities that consume value are supervisory labour and the intervention of productive and financial capital. It is often said that there is a rising trend of employment in unproductive labour, and that this is related to movements in the rate of profit. Mohun investigates this relation with the help of data drawn from the Australian economy. The effect exerted by a rising trend of unproductive labour upon the rate of profit seems to be different in the various periods considered, with a positive effect on productivity and hence on profitability in the 1980s.

The chapters by Shaikh and Mohun are followed by a comment by Alan Freeman, who also tackles the position taken by Cockshott and Cottrell (whose chapter could equally have been grouped here rather than in Part I).

Massimo De Angelis (Chapter 17) rejects an economistic interpretation of Marx's categories and provides a cursory political reading of volume III. He discusses some of the major categories (cost price, profit and competition) used in *Capital*, and shows how they are an expression of the capitalist relation of work, which is a relation of struggle, and how they are linked to the 'everyday consciousness of the agents of production themselves' and allow the reproduction and perpetuation of the class relation itself. He then assesses the great importance of Marx's theory of commodity fetishism as a theory of class perspective.

The book closes with the second contribution by Meghnad Desai, referred to above. Desai faces squarely the great theoretical and political question of the day. Following the collapse of socialism in Eastern Europe, capitalism seems to be flowering. Hence the question: are the methods and tools of *Capital* helpful in explaining what is going on? The point – Desai argues – is that we must look anew at Marx's theory of profit and see if it can accommodate recent developments. He deals with the globalisation of capital, the changing importance of mental versus manual labour and the revolution in the financial markets – issues that can all be incorporated into the 'good starting point' on profitability we have in the three volumes of *Capital* (the 'process of accumulation of capital' in part 7 of volume I,

the three cycles of capital and the schemes of reproduction in volume II and parts 1–3 of volume III). It is now time to reinterpret a world that has changed.

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Part I
Prices and Values

1 Profitability, Prices and Values[1]

Meghnad Desai

PROFITABILITY

Needless to say much of *Capital*, and not only Volume III, is concerned with profits and profitability. But it was in volume III that Marx came to the culmination of his value theory and theorised about the way in which the structural/underlying/invisible *value relations* translate into the phenomenal/overt/visible *price relations*. This is the contention of chapter 6 in volume I 'On the Buying and Selling of Labour Power'. It takes, however, a full and elaborate preparation with the help of the earlier two volumes to acquire the background required to attempt the final resolution of the problem. Although the 'problem' has been seen as one of transforming values into prices, it is, and has always been, a problem of providing a theory of profits, that is, how – in a world of voluntary contracts and free labour – exploitation can be translated into profits without in any way invoking coercion, false consciousness, market imperfections and so on (I have surveyed the literature on the transformation problem in Desai, 1991, detailing all the solutions except the most recent, which are discussed below.)

The first two parts of volume III of *Capital* are concerned with the conversion of surplus value into profit (and of the rate of surplus value into the rate of profit) (part 1) and then the conversion of profit into average profit (part 2). It is these two steps that dissimulate any direct and verifiable connection between surplus value and profits. This does not mean that the theory cannot be verified, but that a purely empiricist approach uninformed by prior theory will give misleading answers, as in all social science. Only by first articulating the precise ways in which surplus value is converted into profits while satisfying the equal profitability condition (converting profit into average profit) can we take observed data and link them back to the unobserved categories. (This procedure is not peculiar to Marxian economics but is at the heart of modern econometrics, where it is

called solving the identification problem, as I pointed out in Desai, 1974.) The two propositions that become clear in this regard are:

1. that the *value* rate of profit in any individual enterprise (on any individual capital) is determined by, but is less than, the rate of surplus value in that enterprise;
2. that in the process of equalising the *value* rate of profit across the economy, the *value* rate of profit of any individual enterprise is disguised and changed into an average rate of profit.

I emphasise the *value* rate of profit because one of the persistent problems both in Marx's own solution in volume III and in much of the subsequent discussion has been that the different accounting categories – labour time (value), money and physical quantities – have not been clearly kept apart. In part 1, of volume II Marx laid out the three circuits of capital in which these distinctions are clearly adhered to. But in much else this has not been observed. Let me explain.

Chapter 9 Volume III of *Capital* is the *locus classicus* of all the subsequent debates. In this chapter Marx spoke of the rate of profit without making it clear that this is the unobservable *value* rate of profit. He also spoke of price of production but since the quantities are the labour values of commodity inputs and outputs and hence measured in *labour time*, the price is not the dollar price per unit of physical output but the price per unit of time contained in the commodity. Such prices are never quoted but need to be computed *ex post* after calculating the labour values from the physical input–output data (the transformation from the circuit of physical capital to the circuit of commodity capital) and the price-cost data (the equivalence[2] between the circuit of money capital and the circuit of physical capital). It is only after these two operations that the transformation problem (the mapping between the – observable/phenomenal – circuit of money capital and the – unobservable/structural – circuit of commodity capital) can be posed and solved.

This failure to adhere to strict definition of the units in which the different circuits are measured is most apparent in the overall conditions that Marx imposed, that is, the condition either that total value equals total price (meaning total revenue) or that total profits equals total surplus value. Now it is obvious that these two pairs of magnitudes are incommensurate. One is in time units and the other in monetary units. They can be made equivalent by assuming a unit value of time (not the same as wage unit but similar) which will bring

the two magnitudes into one to one relationship. Thus let $\lambda = \Sigma\lambda_i$ be the sum of individual commodity values λ_i and $P = \Sigma P_i$ be the sum of prices (or rather, and more accurately, the sum of total revenues). λ is defined in hours of direct and indirect labour and P in dollars. Then we say that

$$P = q\lambda \tag{1.1}$$

where q is the normalising unit value of time, which could be unity but let us leave it open to be any value. The other aggregation condition, total profits equal to total surplus value, can be written similarly as

$$F = qS \tag{1.2}$$

F being total profits and S total surplus value. In what follows I will take equation 1.1 as the aggregation condition.

It is possible to proceed in a straightforward way and explicitly make the unit of account clear at each stage. Proceeding in this way the transformation problem is easy to solve.

The first step is to use the standard input output framework of an n sector model. Assume however that these n sectors are individual firms/capitals. It will be helpful however to separate out the x vector of commodity outputs into capital goods X_R and consumption goods X_c. The standard inverse of the IO table gives us the *values* in terms of labour (l) of the commodities (equations 1.3 and 1.4). This step is uncontroversial in joint or non-joint production cases. In the three circuits of capital framework in volume 2 this corresponds to going from the circuit of physical capital to that of commodity capital. We can denote the values of capital and consumption goods appropriately (λ_k, λ_c).

Computing labour values:

$$x = Ax + l$$

$$x = n^*n,\ A = n^*n$$

where x=vector of commodities and l=labour. (1.3)

$$x = (I - A)^{-1}l = \lambda$$

$$x' = (x'_k,\ x'_c) \tag{1.4}$$

where λ =labour values = $\lambda = n^*1, x_k = n_1^*1, x_c = n_2^*1,\ n_1 + n_2 = n$

The next step is the crucial one for the separation of variable capital and surplus value. Equation 1.5 says that the money wage m allows the workers to buy a vector x_c of consumption goods at prices p_c. This wage need not be a subsistence wage as Roemer showed long ago (Roemer, 1981). Equation 1.6 then gives the value equivalent of the wage goods basket using equation 1.4 suitably partitioned. Thus λ_c is the value content in terms of labour time of the consumption basket. But note that the terms ml and v in the two equations are not commensurate.

Computing variable capital:

$$p_c' x_c = ml \tag{1.5}$$

$$\epsilon \lambda_c = \nu \tag{1.6}$$

$$\epsilon' = (1, \ldots 1), \ \lambda_c = n_2 * 1$$

where $\lambda_c$labour values of consumption goods and ν variable capital

Given equations 1.5 and 1.6 we can define the rate of exploitation as the difference between total labour input l and the labour content of the basket of wage goods λ_c divided by λ_c. This is equation 1.7. Those e_i may be identical or different, but for the time being we can take them to be identical.

Rate of surplus values:

$$e_i = (l_i - \nu_i)/\nu_i = e\nu_i \tag{1.7}$$

$$l_i = \alpha_i l$$

Price equation:

$$p_i = (1 + R_i)A_i p_k + (1 + R_1)ml_i \tag{1.8}$$

where $A_0 = n_1 * 1$, vector of i^{th}sector's material input coefficients and R=rate of profit.

Equation 1.8 is the standard price equation. The price of the ith enterprise product recovers profit rate R above the total cost, consisting of the cost of materials $A_i p_k$ and the wage bill ml_i. The value equivalent is written as equation 1.9, where the labour value per unit of output λ_i is made up of constant capital $A_i \lambda_k$ and the necessary and

surplus labour is expressed as $(1 + e)v_i$. (Of course, in any actual data for a particular time period, the profit rate of an enterprise is not equal to the average, but the equilibrium assumption of equal profitability is not only convenient but common to classical, Marxian and neoclassical economics. The empirical problem of reconciling observed profits with equilibrium theory is another problem altogether.)

Value equation:

$$\lambda_i = A_i\lambda_k + (1 + e)\nu_i \tag{1.9}$$

If we follow the volume I, chapter 6 notion of commodity fetishism, the rate of surplus value is not directly observable, although it is *ex post* computable. Equation 1.9 is commensurate. But note also, and here comes a crucial step, that equation 1.9 is indistinguishable from

$$\lambda_i = A_i\lambda_k + l_i \tag{1.9a}$$

since, by definition $(l + e)v_i = l_i$. Thus in calculating labour time contained in commodities (that is, in the transformation from the circuit of physical capital to the circuit of commodity capital), the separation of total labour input into necessary and surplus labour is *irrelevant* (Samuelson, 1957, 1971, has emphasised this repeatedly).

This is shown easily in the following way. Suppose we start by assuming that $q = m$, that is, that the money wage is the monetary price of an hour of labour directly or indirectly contained in a commodity. This is done in equation 1.10. Now in equations 1.8 and 1.10 we have commensurate quantities in terms of money. The money equivalent of labour time (value) can be labelled exchange value.

Exchange value equation:

$$m\lambda_i = mA_i'\lambda_k + (1 + e)\, mv_i = mA_i'\lambda_k + ml_i \tag{1.10}$$

Now we come to the first crucial result. Equation 1.11 gives us the difference between price and exchange value (now both defined in money terms) for the ith sector. It decomposes the difference between the sum attributable to material inputs and the mark-up on *all costs*. *Note that the labour input is absorbed into* λ_i but the wage bill remains part of the costs on which mark-up is charged. The absorption of l_i is

due to $(l+e)v = l$ being tautologically true. But if equation 1.11 is correct then *prices will always exceed exchange values*, as equation 1.12 shows. If so, total prices cannot equal total values, and so on.

$$(p_i - m\lambda_i) = A_i\,(P_k - m\lambda_k) + R\,(Ap_k + ml_i) \tag{1.11}$$

$$(p - m\lambda) = (I - A)^{-1}R\,(Ap + ml) \tag{1.12}$$

The obvious next step, then, is to say that what equation 1.12 shows is that $q \neq m$. The unit price of labour time, *direct and indirect*, is not the same as the money wage, the price of direct labour time. (Of course, as Roemer has cogently argued, the price of direct labour cannot be equal to its exchange value when for all other commodities there is a deviation.) Thus let us define q as that unit price of labour time at which prices will equal exchange values. Thus we say that instead of equation 1.10 we have

$$q\lambda_i = qA_i\lambda_k + q(l+e)l_i \tag{1.10a}$$

For equation 1.11 we get

$$(p_i - q\lambda_i) = A_i(p_k - q\lambda_k) + (m-q)l_i + R(A_ip_k + ml_i) \tag{1.11a}$$

Given equation 1.11a we can now impose Marx's condition of the equality of total values and total prices, as stated in our equation 1.1. Rearranging and summing 1.11a we get

$$\epsilon'(p - q\lambda) = \epsilon'(I - A)^{-1}([m-q]\,l + R[Ap + ml]) \tag{1.13}$$

This simplifies to

$$q\epsilon'(I - A)^{-1}l = \epsilon'(I - A)^{-1}(RAp\ +\ [l+R]\,ml) \tag{1.14}$$

Now equation 1.14 is equivalent to

$$q\Sigma\lambda_i = \Sigma P_i \tag{1.15}$$

Thus our q satisfies the Marx equation, unlike m. But in the process we have lost the rate of exploitation. Can we retrieve it? The answer is yes, but not in the way that Marx tried. Note that

in equation 1.5 we had the equivalence of money wage and consumer expenditure, and in equation 1.6 we derived the labour content of the basket of consumption goods. But ml and v are incommensurate. One obvious answer is that q is the appropriate unit of account, such that

$$ml = qv \tag{1.16}$$

or

$$q/m = l/v = 1 + e \tag{1.17}$$

Thus q/m and their relationship is defined as $l + c$. Rearranging 1.13 in a different way we have

$$\frac{(q-m)\epsilon'\lambda}{m\epsilon'\lambda} R\left[\frac{\epsilon'[I-A]^{-1}Ap}{m\epsilon'\lambda} + 1\right] \tag{1.18}$$

$$e = R\left[1 + \frac{\epsilon'[I-A)^{-1}Ap}{m\epsilon'\lambda}\right] \tag{1.19}$$

The expression for e in equation 1.19 is very similar to that for the *value* rate of profit. It will be recalled that the *value* rate of profit r is given as

$$r = e(l - g)$$

where g is the organic composition of capital in value terms. In equation 1.19 we have something very similar to the organic composition, but it is in money terms. It is the economy-wide expression of material costs divided by the exchange value of total output, with money wage rather than q as the unit of account.

We have thus shown that by carefully specifying the units of account (time, money) and making them commensurate, it is possible to define a unit of account (unit price) for labour time such that Marx's identity of value and price is satisfied. This unit price for (direct and indirect) labour time is shown to exceed the money wage. While the rate of exploitation is not directly involved as a parameter in the transformation itself, our solution yields a meaningful

expression for the rate of exploitation in which only observed magnitudes are involved.

INTERPRETING THE RESULT

What is q and why does this way of tackling the transformation problem seem so obvious, though new? Without in any sense claiming too much for this approach, let me argue that it relies on a simple but basic insight of Marx. This is the distinction between labour and labour power. Value is measured in labour time (λ) but labour is not the same as labour power. In capitalism, labour power becomes a commodity with the dual value form of use value and exchange value. It is the wedge between the exchange value and use value of labour power that allows the buyer of labour power (the capitalist) to convert it into profits. But profits belong to the money circuit; and normally in the case of all commodities exchange value and use value are not commensurate – the former being objective and the latter often, but not always, subjective (labour power is obviously one commodity whose use value is measurable in terms of labour time).

Marx's solution to this problem was to measure the dual forms of labour power in both labour time and in money terms. Thus money wages are the exchange value of labour power measured in money. The labour time equivalent of the basket of goods bought by the worker from the money wage is variable capital or necessary labour. This is measured in labour time. Thus in labour time metric the use value of labour power (once sold to the capitalist and employed by him or her in production) is equal to the length of the working day, that is, labour input in the physical circuit as well as the commodity circuit. Thus the difference between l and v is surplus value measured in labour time.

The contentious issue has been to transform surplus value in labour time metric to profits in the money metric. This has to be done while at the same satisfying the rule that profit rates equalise across the economy – a rule laid down in classical political economy but which Marx accepted since he was mounting an *immanent* critique of political economy.

The distinction resides in separating the dual value form of labour just as much as labour power. Labour time is the content of value as well as the measure of its own use value. But the exchange value of labour time is problematical, for what is sold is labour power, not labour. But since all commodities are sold and their separate hetero-

geneous forms can be made equivalent to each other by measuring their value in labour time, there is an equivalence to be made between the labour time expression of the value of a commodity and the exchange value of that commodity. It is the equivalence between the physical circuit and the money circuit that establishes this part of the argument. The proportion between exchange value and labour time for all commodities is q. It is the universal equivalent that equates all money values to labour time.

But since q is the proportion between the labour time measure of all commodities and their total exchange value, the same logic can be applied to labour power. Thus v is the labour content of the commodity labour power and ml is its exchange value. Then qv is the commensurate measure for labour power and $(ml - qv)$ is the divergence. If each commodity had to satisfy the equivalence $p_i = q_i\lambda_i$, then for labour power there would be no gap between ml and qv. But it is only over *all* commodities that the equivalence has to be established – the sum of values equals the sum of prices.

Thus we can assert that $(ml - qv)$ is the money form of deviation of price from value in case of labour power. But Marx chose not to extend the deviation to labour power. He could have (perhaps should have, as Roemer has argued) treated labour power symmetrically with all other commodities. But he chose not to do so. Why?

There are two strands to the answer. Since labour power is input into all commodity production, directly or indirectly, it is dissolved/absorbed into the commodities and hence does not stand out independently. If all commodities taken together satisfy the equality between values and prices, and since they are all products of labour power, directly or indirectly, the $ml = qv$ condition reflects in the case of that single unique commodity what is true of all the other n commodities. By this argument $q\Sigma\lambda_i = \Sigma p_i$ *requires* that $ml = qv$.

The second strand is instrumental. Equating qv and ml gives us an immediate and definite solution to the rate of exploitation and allows us to relate it to the rate of profit. This is the essence of the equation (1.19) above, linking e to R.

Of course a 'more general' solution would be to 'endogenise' labour power as part of the production system and then apply the aggregate equivalence of values and prices for the $(n + l)$ commodities x and l (say, in order to treat the problem of housework). But this is for another occasion. In the meantime, even this solution, if correct, is only partial.

Of course this is not the full story of profitability. R is only the mark-up over costs and not the rate of profit over capital. This requires the treatment of joint production which I shall take up in subsequent papers.

CONCLUSION AND AFTERWORD

Until this section, this chapter appears much as it was submitted to the Bergamo Conference, with one major correction. My contribution had been written in a great hurry and I was aware that it needed many more references than I had given in the text. The one reference I had given was to an article by Ian Steedman where he criticised the Dumenil–Lipietz–Foley (DLF) solution (Steedman, 1992; Duménil, 1980, 1984; Lipietz, 1982; Foley, 1982). But at the conference I realised that I could have been wrong about taking Steedman's critique of DLF without further examination, and Gerard Dumenil has subsequently convinced me of my error in taking Steedman's version of DLF as correct (see also Dumenil and Levy, 1994)

Let me conclude by saying that I am aware that perhaps what I say here is not original in the sense that others may have said it before, perhaps DLF, but I did arrive at it before I had read these writings. It is perhaps the strength of Marxian economics in the century after the publication of volume III of *Capital* that different people working separately and independently of each other can arrive at similar answers.

Notes

1. This is a revised version of the paper submitted at the Bergamo Conference, but not read. I am grateful to Gerard Dumenil for saving me from egregious errors.
2. This is equivalence and not transformation because both the circuits are directly visible and at the phenomenal level.

References

Desai, M. (1974) *Marxian Economic Theory* (Oxford: Martin Robertson).
Desai, M. (1979) *Marxian Economics* (Oxford: Basil Blackwell).
Desai, M. (1991) 'The Transformation Problem', in G. Caravale (ed.), *Marx and Marxian Economic Analysis* (Aldershot: Edward Elgar).

Duménil, G. (1980) *De la Valeur aux Prix de Production* (Paris: Economica).
Duménil, G. (1984) 'The So-called "Transformation Problem" Revisited: A Brief Comment', *Journal of Economic Theory*, vol. 33, pp. 340–48.
Duménil, G. and D. Lévy (1994) 'A Note on the New Interpretation of the Transformation Problem', Paris, unpublished.
Foley, D. (1982) 'Value of Money, the Value of Labour Power and the Marxian Transformation Problem', *Review of Radical Political Economy*, vol. 14, pp. 37–47.
Lipietz, A. (1982) 'The So-called "Transformation Problem" Revisited', *Journal of Economic Theory*, vol. 26, pp. 59–88.
Roemer, J. (1981) *Analytical Foundations of Marxian Economic Theory* (Cambridge: Cambridge University Press).
Samuelson, P. (1957) 'Wages and Interest: A Modern Dissection of Marxian Economic Models', *American Economic Review*, December.
Samuelson, P. (1971) 'Understanding the Marxian Notion of Exploitation: A Summary of the So-called Transformation Problem Between Marxian Values and Competitive Prices', *Journal of Economic Literature*, vol. IX, pp. 399–431.
Steedman, I. (1992) 'Joint Production and the "New Solution" to the Transformation Problem', *Indian Economic Review*, special number in memory of S. Chakravarty, vol. XXVII, pp. 123–8.

2 Marx's Logic in *Capital* and the 'Transformation Problem'[1]

Fred Moseley

One of the most important controversies over volume III of *Capital* is of course the 'transformation problem' – Marx's theory of equal rates of profit and prices of production in part 2 of volume III. This chapter argues that the long and continuing controversy over the 'transformation problem' has not paid sufficient attention to the precise nature of Marx's logical method. The most common interpretation today of Marx's theory is based on the work of Bortkiewicz (1952), Seton (1957), Morishima (1973), Steedman (1977) and so on. This interpretation of Marx's theory will be referred to here as the 'neo-Ricardian' interpretation. The logical method attributed to Marx's theory by this interpretation is essentially the same as Sraffa's theory, that is, the method of linear production theory. This chapter argues that the logical method of linear production theory differs in fundamental respects from Marx's own logical method and that the neo-Ricardian criticisms of Marx's theory do not apply to Marx's theory, but instead are a misguided attempt to interpret Marx's theory in terms of linear production theory.

NEO-RICARDIAN INTERPRETATION

According to the neo-Ricardian interpretation, the fundamental givens in Marx's theory are the physical quantities of the technical conditions of production and the real wage. These technical conditions and real wage provide a system of simultaneous equations that determine the unknown variables of the exchange values (labour values or prices) of the commodities produced and the rate of surplus value or the rate of profit (depending on the equilibrium condition assumed).

According to this neo-Ricardian interpretation, volume I of *Capital* is concerned with the 'value system' in which the primary variables

determined are the labour values of individual commodities. The quantities of constant capital, variable capital and surplus value (either for individual industries or for the economy as a whole) can then be derived from these individual labour values in the following way: constant capital is assumed to be equal to the labour value of producer goods, variable capital is assumed to be equal to the labour value of wage goods, and surplus value is assumed to be equal to the labour value of surplus goods. Finally, the 'value' rate of profit is defined as the ratio of surplus value to the sum of constant and variable capital, with the absolute magnitudes in both these ratios defined in terms of labour value, as above.

Volume III, according to this interpretation, is concerned with the 'price system', in which Marx attempted to transform the labour-value variables determined in volume I into the corresponding price variables. In the volume III analysis, the technical conditions and the real wage are again taken as given, as in volume I, as are the value magnitudes derived in volume I. From these givens a set of 'transformation multipliers' can be derived, which can then be used to convert the labour value of each commodity (or each department) into its corresponding price. The rate of profit in price terms is also determined simultaneously with the prices of individual commodities. The quantities of constant capital, variable capital and surplus value are 'revalued' in price terms as the price of producer goods, wage goods and surplus goods, respectively.

I argue in the next two sections that this logical method assumed in the neo-Ricardian interpretation of Marx's theory differs in two fundamental respects from Marx's own logical method.

PRIOR DETERMINATION OF TOTAL PRICE, TOTAL SURPLUS VALUE AND THE GENERAL RATE OF PROFIT

The first important difference between the neo-Ricardian interpretation and Marx's method has to do with the order of determination between total price and total surplus value on the one hand, and individual prices and individual profits on the other hand. The neo-Ricardian interpretation generally ignores the magnitudes of total price and total surplus value, but it implicitly assumes that these total magnitudes are determined subsequent to the determination of individual prices and individual profits, as the sum of these individual magnitudes. I argue, to the contrary, that according to Marx's method

the total magnitudes are determined prior to and independent of the individual magnitudes. The individual magnitudes are then determined at a later stage of the analysis with the predetermined total magnitudes taken as given.[2]

According to this interpretation, volume I of *Capital* is concerned with the total magnitudes for the economy as a whole. More precisely, the main question addressed in volume I is how the total amount of surplus value in the economy as a whole is determined, that is, how the total capital invested in the economy as a whole increases its magnitude. Marx introduced the general framework for his theory of surplus value in chapter 4 of volume I ('The General Formula for Capital'). This general analytical framework is expressed in terms of the familiar formula $M - C - M'$, where $M' = M + \Delta M$. In this formula, M represents the total money capital invested in the capitalist economy as a whole and M' represents the total money capital recovered after some period of time. ΔM represents the total amount of surplus value produced during this period in the capitalist economy as a whole, which includes not only industrial profit, but also merchant profit, interest and rent. The remainder of volume I is primarily devoted to an analysis of the determination of the magnitude of this total ΔM. The general rate of profit is also determined at this aggregate level of analysis by the ratio of ΔM to the total initial capital invested (M).

Volume III is concerned primarily with the division of this total amount of surplus value among individual capitalists and into individual component parts. In other words, volume III is concerned with the distribution of surplus value, subsequent to the production of surplus value. Part 2 of volume III analyzes the distribution of surplus value among the individual branches of production and parts 4–6 analyze the further division of surplus value into industrial profit, merchant profit, interest and rent. This chapter is concerned with the first of these two questions: the distribution of surplus value among the branches of production. Since the distribution of surplus value is accomplished primarily by means of the prices of individual commodities, the analysis of the distribution of surplus value also necessarily involves the determination of these individual prices. In this analysis of individual prices and individual components of surplus value, the total price of all commodities together, the total surplus value for the economy as a whole and the general rate of profit are *taken as given*, as determined in the prior analysis of volume I. The next section will discuss further the

precise nature of the fundamental givens in Marx's theory in volumes I and III.

GIVENS IN TERMS OF MONEY

A second important difference between the neo-Ricardian interpretation and Marx's method has to do with what precisely is taken as given, first in Marx's theory of the production of surplus value in volume I and then in his theory of the distribution of surplus value and prices of production in volume III. The neo-Ricardian interpretation assumes that the fundamental givens in both these stages of Marx's theory are the same as those in linear production theory: the physical quantities of the technical conditions of production and the real wage. I argue, to the contrary, that the fundamental givens in Marx's theory are *quantities of money* invested as capital, and also quantities of current abstract labour and the quantity of money that represents one hour of abstract labour. This chapter emphasizes the quantities of money capital that Marx took as given.

As discussed above, the general analytical framework for Marx's theory of surplus value in volume I is the 'general formula for capital': M–C–M'. It is important to note that the *starting point* in this formula is M, that is, the sum of money invested as capital to purchase the means of production and labour power. I argue that the magnitude of M, which initiates the circulation of capital, is *taken as given* in Marx's theory of surplus value, which explains how this given amount of money increases its magnitude, that is how 'money is transformed into capital'. The inputs to this valorization process are sums of money that are to be valorized. This interpretation is supported first of all by the very structure of Marx's general formula for capital, which begins with a sum of money, not with the technical conditions of production.

This interpretation is further supported by the logical development of Marx's key concepts in parts 1, 2 and 3 of volume I. In part 1 Marx derived the necessity of money from an analysis of commodities. In part 2, as we have seen, Marx defined capital in terms of this previously derived concept of money: as money that becomes more money. The title of part 2, it should be recalled, is 'The Transformation of Money into Capital', not the transformation of means of production (or wage goods) into capital.

Part 3 then analyzes the origin of the increment of money, which is characteristic of capital, with the initial money capital taken as given.

In part 3 Marx did not suddenly ignore the prior logical development of money and capital in parts 1 and 2 and introduce out of nowhere the technical conditions of production and the real wage as the givens in his theory of surplus value. Instead, parts 1 and 2 provide the logical presuppositions for his analysis of surplus value in part 3 and beyond. The starting point for the transformation of money into capital are the sums of money to be transformed into capital, not the technical conditions of production. The neo-Ricardian interpretation, on the other hand, has no explanation for Marx's analysis in parts 1 and 2 or for the logical relation between these two parts and the theory of surplus value in part 3.

Finally, this interpretation is also supported textually by the numerous passages throughout the various drafts of *Capital* in which Marx repeatedly referred to the *money capital*, which initiates the circulation of capital, as the '*given* capital', the '*presupposed* capital', the '*postulated* capital', the '*pre-posited* capital', or the '*point of departure*' for the production process or the valorization process (see for example chapter 4, volume I of *Capital* and the several earlier drafts of this chapter in Marx, 1973, pp. 250–64; Marx and Engels, 1987, pp. 501–7; and Marx and Engels, 1988, pp. 9–20, 66–70). Nowhere did Marx say the 'presupposed means of production' or the 'postulated means of production'. Either Marx, who it should be remembered had a doctorate degree in philosophy and paid great attention throughout the various drafts of *Capital* to issues of logical method, was extremely sloppy in these numerous passages or he applied the usual methodological meanings to the terms 'given', 'postulated', 'presupposed' and so on, that is, that they are the fundamental data with which a theory begins. What Marx meant by 'given' was essentially the same as what the neo-Ricardians mean when they say that the technical conditions of production are 'taken as given'. An especially clear passage is the following, from the manuscript entitled 'Results of the Immediate Process of Production':

> Here, where we are concerned with money only as the *point of departure* for the *immediate process of production*, we can confine ourselves to the observation: capital exists here as yet only as a *given quantum of value* = *M* (money), in which all use-value is extinguished, so that nothing but the monetary from remains.... Thus in this originally simple expression of capital (or capital to be) as money or value, every link with use-value has been broken and entirely destroyed. But even more striking is the elimination of

> every unwelcome sign, all potentially confusing evidence of the *actual process of production* (the production of commodities, etc.). It is for this reason that the character, the specific nature of capitalist production, appears to be so simple and abstract. If the original capital is a quantum of value = x, it becomes capital and fulfills its purpose by changing into $x + x$, i.e. into a quantum of money or value = the original sum + a balance over the original sum. In other words, it is transformed into the given amount of money + additional money, into the *given value* + *surplus-value* (Marx, 1977, pp. 976–7, emphases in original).

This passage suggests that Marx's methodological procedure was to take a sum of money as given and to analyze how this given sum increases its magnitude, that is, is transformed into capital. Note that in this analysis of the transformation of money into capital 'all use-value is extinguished, so that nothing but the monetary form remains ... every link with use-value has been broken and entirely destroyed'.[3]

The initial money capital that Marx takes as given in his theory of surplus value is assumed to be the objective 'form of appearance' of abstract social labour. This function of money as the form of appearance of abstract labour is the main conclusion of Marx's prior analysis of commodities in part 1 of volume I. This important conclusion is then presupposed in the remainder of *Capital*, and in his theory of surplus value in particular. Thus the total money capital taken as given in part 2 of volume I, like any other quantity of money, is assumed to represent a definite quantity of abstract social labour. The precise quantity of abstract social labour represented by a given quantity of money depends on the value of money (more on this in the next section), which Marx also took as given (Marx, 1977, p. 214).

THEORY OF TOTAL PRICE AND TOTAL SURPLUS VALUE

It has been argued above that the givens in Marx's theory of surplus value in volume I are total sums of money invested as capital in the capitalist economy as a whole. Marx divided the given money capital (M), which initiates the circulation of capital, into two component parts: constant capital (C), invested in means of production, and variable capital (V), invested in labour power. According to Marx's theory, these two given quantities of total money capital play entirely

different roles in the determination of the total price of commodities and thus in the determination of total surplus value.

The quantity of constant capital, which is precisely equal to the price of the means of production, is transferred to the price of the final product, that is, it becomes one component of the price of the final product. For machines and so on that last more than one production period, the constant capital is transferred to the price of the final product over the expected lifetime of such equipment. For any one period, the constant capital transferred is the depreciation costs of these machines.[4]

On the other hand, the variable capital, which is equal to the price of labour power, is not transferred to the price of the final product, that is, it does not become a component of the price of the final product. Instead the variable capital is replaced by current labour and this labour produces new value, which becomes the second component of the aggregate price of commodities. This new value both reproduces the variable capital invested in labour power and provides the surplus value of capitalists.

In addition to these sums of money capital, in his theory of the total price of commodities Marx also took as given two additional variables: (1) the total amount of current abstract labour required to produce commodities (L_C) and (2) the quantity of money that represents one hour of abstract labour, or the rate at which abstract labour produces new value per hour (m). Marx defined abstract labour as homogeneous labour in which concrete labours of different skills and different intensities are reduced to equivalent quantities of skilled labour of average intensity. Marx's concept of current abstract labour thus differs from the current labour requirements taken as given in linear production theory because the latter treats all kinds of labour as equal and does not take into account labour of different skills and different intensities. The quantity of money that represents one hour of abstract labour is equal to the inverse of the labour value of a unit of money (Marx usually assumed for purposes of illustration that $m = 0.5$ shillings per hour). These two variables together determine the aggregate amount of new value (N) produced during the current period ($N = mL_C$).

Marx's theory of the total price of commodities can thus be represented by the following equation:

$$P = C + N = C + mL_C \tag{2.1}$$

where P represents the total price of commodities and C represents total constant capital consumed.

Thus, according to Marx's theory, the constant capital transferred from the means of production to the price of the final product is not derived from, nor is it necessarily proportional to, the labour required to produce the means of production. Instead this transferred value is assumed to be equal to the constant capital invested in the means of production, which as we have seen above is taken as given. This constant capital, like every other quantity of money, represents a definite quantity of abstract social labour.

The precise quantity of 'past' abstract labour (L_p) represented by constant capital depends on the value of money ($1/m$) and is determined by the equation:

$$L_P = C/m \tag{2.2}$$

In general this quantity of 'past' abstract labour will not be equal to the labour required to produce the means of production, or the labour 'embodied' in the means of production, because the price of the means of production is generally not proportional to their labour value. However this inequality makes no difference to the quantity of money value transferred from the means of production to the price of the final product. The value transferred is equal to the *given* constant capital, whether or not the price of the means of production is proportional to their labour values. Authors who have argued that the 'value transferred' from the means of production to the price of the final product is equal to the *price* of the means of production, regardless of whether this price is proportional to the labour 'embodied' in the means of production, include Carchedi (1984), Mattick (1981) and Mage (1963, Appendix A).

From this theory of total price, Marx derived the total amount of surplus value (S) produced in a given period of time. This derivation may be briefly summarized algebraically as follows:

$$S = P - K \tag{2.3}$$

$$P = C + N \tag{2.4}$$

$$K = C + V \tag{2.5}$$

$$S = (C + N) - (C + V) = N - V = mL_C - mL_n = m(L_C - L_n) = mL_S \tag{2.6}$$

where K stands for total costs of production, L_n for the necessary labour time or the time required for current labour to reproduce the equivalent of variable capital ($= V/m$), and L_S for surplus labour time. The main points about this derivation for our purposes are: (1) the givens in this theory are C, V, L_C and m, as discussed above, (2) the total amount of surplus value is derived as a function of the total amount of surplus labour, and (3) the total amount of surplus value determined in this way is *taken as given* in Marx's subsequent analysis of the distribution of surplus value (volume III). The general rate of profit is then determined by the ratio of the total amount of surplus value and the given total amount of capital invested ($R = S/M$), and is also taken as given in the subsequent analysis of prices of production in part 2 of volume III.

THEORY OF PRICES OF PRODUCTION

In addition to the general rate of profit just discussed, Marx's theory of prices of production also takes as given the individual quantities of constant capital and variable capital invested in each industry, as quantities of money. The price of production of each commodity is then determined in a straightforward way by the following equation:

$$P_i = (C_i + V_i) + RM_i \tag{2.7}$$

where P_i stands for price of production of each commodity, C_i and V_i for the periodic flows of constant capital consumed and variable capital expended in each industry, R for the general rate of profit, and M_i for the total stock of money capital advanced in each industry.

The amount of profit included in the price of each commodity ($= RM_i$) will in general not be equal to the amount of surplus value actually contained in that commodity, and hence the price of production of each commodity will in general not be proportional to the labour time required to produce it. However the total amount of surplus value is not altered by this redistribution of surplus value among the individual industries according to the total amount of capital invested. Taken all together, the divergences of individual profits from individual surplus values balance out so that the sum of

individual profits is equal to the total amount of surplus value (S), as determined in volume I. This can be trivially shown as follows:

$$\Sigma(RM_i) = R\,\Sigma(M_i) = RM = (S/M)M = S \tag{2.8}$$

Similarly, the sum of the prices of production of individual commodities is equal to the aggregate price of commodities, as determined in the Volume 1 analysis of capital in general:

$$\begin{aligned} E(P_i) &= \Sigma([\mathrm{C_i} + \mathrm{V_i}] + \mathrm{RM_i}) \\ &= \Sigma(C_i) + \Sigma(V_i) + R\Sigma(M_i) \\ &= C + V + S \\ &= C + N \\ &= P \end{aligned} \tag{2.9}$$

Thus Marx's two aggregate equalities hold simultaneously, according to his own logical method.

Finally, in contrast to the neo-Ricardian interpretation, the general rate of profit obviously does not change in Marx's determination of prices of production, since it is taken as given in this analysis and is *not* determined simultaneously with the prices of production, as in the neo-Ricardian interpretation. According to Marx's method there are not two rates of profit; there is only one, the 'price rate of profit', which is determined in volume I and taken as given in volume III.

RESPONSE TO NEO-RICARDIAN CRITICISM

According to the neo-Ricardian interpretation, Marx's theory of prices of production is logically incomplete and contradictory because Marx failed to transform the amounts of constant capital and variable capital invested in each industry from value magnitudes to price magnitudes. According to this interpretation, it is possible to correct Marx's 'error' and to complete the transformation of the inputs of constant capital and variable capital from value magnitudes to price magnitudes. However three important implications follow from this neo-Ricardian 'solution': (1) in general only one of Marx's two aggregate equalities can hold at the same time, (2) the 'price' rate of profit will not be equal to the 'value' rate of profit, and (3) the volume I analysis of the value system is 'redundant' or an 'unnecessary detour'

because the same prices and rate of profit can be derived directly from the given technical conditions of production and real wage.

I argue that these criticisms are based on a neo-Ricardian interpretation of Marx's theory that assumes a different logical method from Marx's own method, as discussed above. In particular, this criticism assumes a different method of determination of the individual quantities of constant capital and variable capital invested in each industry. According to the neo-Ricardian interpretation, the quantities of constant capital and variable capital invested in each industry are *derived from the technical conditions and real wage*, which are taken as given. In Volume I the quantities of constant capital are determined as the labour values of the given means of production employed in each industry. In volume III these quantities of constant capital in value terms are taken as given and then transformed into the corresponding prices of the same means of production. Thus in the transition from volume I to volume III the quantity of the means of production remains the same (taken as given), but the quantity of constant capital derived from these given means of production changes. A similar method is followed for variable capital. Variable capital in each industry is first determined as the labour values of the given wage goods and then transformed into the prices of these same wage goods. It is precisely these transformations of constant capital and variable capital from value magnitudes to price magnitudes that Marx is accused of having failed to make.

However it has been argued above that, according to Marx's own logical method, the individual quantities of constant capital and variable capital invested in each industry are *not* derived from the technical conditions of production and the real wage, but are instead *taken as given in terms of money*. In the volume I analysis of capital in general, these quantities of constant capital and variable capital invested in each industry are not considered at all; more precisely, they are not determined as the labour values of given quantities of means of production and wage goods in each industry. Only the total quantities of constant capital and variable capital are considered in the volume I analysis, and these total quantities are taken as given. Thus the individual quantities of constant capital and variable capital in value terms cannot be taken as given in volume III since they are not even considered in volume I. Instead the individual quantities of constant capital and variable capital are taken as given in the subsequent volume III analysis as quantities of money. According to

Marx's method, these quantities of constant capital and variable capital do not have to be transformed from value terms into price terms: *they are already in price terms because they are taken as given in price terms*. The transition from volume I to volume III is not a transition from labour values to prices; it is a transition from total prices to individual prices. Thus Marx did not 'fail to transform the inputs' from values to prices. According to Marx's method *there is no such transformation to be made*. Carchedi (1984) and Mattick (1981) also emphasize that – in the determination of prices of production – the inputs of constant capital and variable capital are taken as given in price terms and thus do not have to be 'transformed' from value magnitudes to price magnitudes.

On the other hand the quantities of means of production and wage goods that the given quantities of constant capital and variable will purchase will differ according to whether or not the prices of the means of production and wage goods are proportional to their labour values. For example if the price of the means of production is greater than their price proportional to labour, then the given amount of money/constant capital will purchase a smaller quantity of means of production than if these two prices were equal. Similarly, if the price of wage goods is less than their price proportional to labour, then the given amount of variable capital will purchase a greater quantity of wage goods than if these two prices were equal (Marx, 1973, pp. 436–8).

Thus Marx's method is essentially the *opposite* of the neo-Ricardian interpretation: in moving from volume I to volume III Marx held the money quantities of constant and variable capital invariant, and this transition results in changes in the physical quantities of means of production and wage goods that the given constant and variable capital will purchase. (This change does not refer to an *actual* change, but rather to a change from the *hypothetical* quantity of means of production and wage goods that the given constant and variable capital *would* purchase *if* prices were proportional to their labour values, to the *actual* quantity of means of production and wage goods that the given constant and variable capital actually purchase with prices that are not proportional to their labour values.) The neo-Ricardian method, on the other hand, holds the quantities of means of production and wage goods invariant and the transition to volume III results in changes in the quantities of constant capital and variable capital (again, not an actual change). Thus the failure to transform the quantities of constant capital and variable capital can only be a

problem within the neo-Ricardian interpretation of Marx's theory; it is not a problem within Marx's own logic.

Finally, the three important implications of the neo-Ricardian 'solution' to the transformation problem discussed above do not follow from Marx's own logical method. As discussed in the previous section, (1) both of Marx's aggregate equalities are true simultaneously and (2) the determination of individual prices does not alter the rate of profit; instead the rate of profit is taken as given in the determination of individual prices. (3) With respect to the 'redundancy' criticism of the neo-Ricardians, it follows from Marx's logical method discussed above that the values of commodities, as defined by Marx, cannot be derived from the technical conditions of production, for two main reasons. First, Marx's concept of abstract labour differs from the current labour requirements included in the technical conditions of production because the latter do not take into account different skills and different intensities of labour. Second, the 'past labour' represented by constant capital is in general not equal to the labour 'embodied' in the means of production. Therefore the values of commodities, as defined by Marx, are not an 'unnecessary detour' from the technical conditions of production to the prices of commodities, but are instead an indispensable assumption in Marx's theory of surplus value.

CONCLUSION

I therefore conclude that the long line of neo-Ricardian criticism of Marx's theory of prices of production, from Bortkiewicz onwards, does not in fact apply to Marx's theory, rather this criticism applies only to the misguided attempt to interpret Marx's theory in terms of linear production theory.

Notes

1. This chapter is a condensed version of Moseley, 1993. Readers are asked to refer to this earlier paper for further elaboration of the arguments presented here, and especially for textual support in Marx's writings for these arguments.
2. Marx expressed this assumed order of determination between aggregate magnitudes and individual magnitudes in terms of the distinction

between the levels of abstraction of 'capital in general' and 'competition' (or 'many capitals'). See Moseley, 1995 and 1997 for a further discussion of this crucial distinction in Marx's theory. This distinction has been previously emphasized by Mattick (1969) and Rosdolsky (1977), upon whom my interpretation relies heavily.

3. The interpretation of the givens in Marx's theory presented here is similar to the 'new solution' to the transformation problem presented by Foley, Duménil and so on in that the latter also argue that Marx takes the initial *variable* capital as given in money terms. However the 'new solution' interpretation is different in that it argues that *constant* capital is not taken as given in money terms, but is instead derived from given technical conditions of production. Therefore there is a methodological inconsistency in this 'new solution'. Since both constant capital and variable capital are component parts of the general concept of capital, these two components should be treated in a parallel, consistent fashion. Either they should both be taken as given in terms of money, as I argue they are in Marx's theory, or they should be derived from given physical quantities, as in linear production theory. Nowhere in Marx's theory is there a suggestion that constant capital and variable capital should be determined in different ways. See Moseley, 1993, for a further discussion of the 'new solution'.
4. The constant capital that is taken as given and transferred to the price of the final product is the *current replacement cost* of the existing means of production, not the actual historical cost of these means of production (C.I Marx (1977) 317–18, 677; C.III Marx (1981) pp. 112, 139–41, 206–7) The current replacement costs may differ from the actual historical costs for two reasons: technological change in the production of means of production and/or changes in the value of money. Carchedi (1984) discusses at length the case of technological change.

References

Bortkiewicz, Ladisluas von (1905/1952) 'Value and Price in the Marxian System', *International Economic Papers*, vol 2, pp. 5–60.

Carchedi, Guglielmo (1984) 'The Logic of Prices as Values', *Economy and Society*, vol. 13, no. 4, pp. 431–55.

Dumenil, Gerard (1980) 'Beyond the Transformation Riddle: A Labor Theory of Value', *Science and Society*, vol. 47 (Winter).

Mage, Shane (1963) 'The Law of the Falling Tendency of the Rate of Profit', PhD dissertation, Columbia University, New York.

Marx, Karl (1973) *Grundrisse*. (Harmondsworth: Penguin).

Marx, Karl (1977) *Capital*, vol. I (New York: Random House).

Marx, Karl (1981) *Capital*, vol. III (New York: Random House).

Marx, Karl and Frederick Engels (1987) *Collected Works*, vol. 29 (New York: International Publishers).

Marx, Karl (1988) *Collected Works*, vol. 30 (New York: International Publishers).

Mattick, Paul Sr (1969) *Marx and Keynes* (Boston: Porter Sargent).

Mattick, Paul Jr (1981) 'Some Aspects of the Value-Price Problem', *Economies et Societies*, vol. 15, nos 6–7, pp. 275–81.
Morishima, Michio (1973) *Marx's Economics* (New York: Cambridge University Press).
Moseley, Fred (1993) 'Marx's Logical Method and the "Transformation Problem', in Moseley (ed.), *Marx's Method in Capital* (New Jersey: Humanities Press).
Moseley, Fred (1995) 'Capital in General and Marx's Logical Method: A Response to Heinrich's Critique', *Capital and Class*, No. 56, summer, pp. 15–48.
Moseley, Fred (1997) 'The Development of Marx's Theory of the Distribution of Surplus-Value', in Moseley and M. Campbell (eds.), *New Investigations of Marx's Method* New Jersey: Humanities Press.
Rosdolsky, Roman (1977) *The Making of Marx's 'Capital'* (London: Pluto Press).
Seton, F. (1957) 'The "Transformation Problem"', *Review of Economic Studies*, vol. 24, pp. 149–60.
Steedman, Ian (1977) *Marx After Sraffa* (London: New Left Books).

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3 Value, Exchange Value and the Internal Consistency of Volume III of *Capital*: A Refutation of Refutations

Andrew J. Kliman

INTRODUCTION

For a full century, critics have tried to show that Marx's value theory is internally inconsistent. Yet these critics invariably reduce *value* to *exchange value*, whereas Marx increasingly stressed their difference. Once this reduction is rejected, key aspects of Marx's value theory – the transformation of values into production prices and the law of the tendential fall in the profit rate – reemerge as internally consistent.

A number of other recent works defend the internal consistency of Marx's value theory broadly along the lines suggested here.[1] This chapter is, however, the first to emphasize the centrality of value/exchange value to the debate.

THE CRITICS' REDUCTION OF VALUE TO EXCHANGE VALUE

Marx showed that competitive prices are compatible with the law of value, since value–price differences cancel out in the aggregate. In complaining of a 'great contradiction' in Marx's work, Böhm-Bawerk (1984, pp. 34–5) did not dispute Marx's demonstration, but declared it irrelevant because

> the chief object of the 'law of value'... is nothing else than the elucidation of the exchange relations of commodities.... The internal relative differences of price do compensate each other in the

> sum total. For instance, what the tea is worth more than the iron the iron is worth less than the tea [but this] is simple tautology.

For Böhm-Bawerk, then, only *relative* prices matter, and Marx's work was self-contradictory simply because relative prices differ from relative values.

Often overlooked is the fact that Bortkiewicz's seminal (1952) intervention also presupposes that only relative prices matter. When referring to '[t]he quantitative incongruity of value and price', this article begins,

> value can have no other meaning than that of a magnitude which indicates how many units of the good serving as a measure of value are obtained in exchange for a commodity.... In this sense, value is merely the *index of an exchange relationship* and must not be confused with... 'absolute value' (Bortkiewicz, 1952, p. 5).

Bortkiewicz thus interprets the values and prices in Marx's account of the transformation as different sets of exchange ratios, and finds Marx guilty of suggesting that they coexist simultaneously.

Bortkiewicz and subsequent critics 'correct' Marx by separating values and production prices into dichotomous systems. The relative values and rate of exploitation in the former, and the relative prices and rate of profit in the latter, are determined independently of the 'numeraire'. In both systems, then, the magnitude of value ('absolute' value) is wholly irrelevant.

The result, as Samuelson (1971) recognised clearly, is simply two discordant systems of exchange ratios. Most authors try, however, to link values to prices by invoking an 'invariance postulate' of their choice, and justify this by asserting that some numeraire is needed (Seton, 1957, p. 152).

Yet a numeraire may be selected arbitrarily only if the choice of numeraire is irrelevant to the problem, only if exchange ratios alone matter. Because, moreover, the price–value linkage is indeed arbitrary, none of the critics' solutions actually demonstrates any relation of values to prices. Finally, *pace* Seton, it is not possible to determine 'absolute' prices and link the price and value systems with a single invariance postulate, because there are two unknowns. If values and prices are measured in the same units, one value and one price are unknown. If values are measured in labour time, one price and the amount of money (or numeraire) equivalent to one labour hour are

unknown. Both cannot be solved with one equation of invariance (Rodriguez, 1996). Thus the arbitrary linkage of value and price aggregates is wholly distinct from the determination of absolute prices, and the former cannot be justified by the need for the latter.

The Böhm-Bawerk/Bortkiewicz tradition presupposes that only relative prices and values matter. It is thus not really surprising that, when the Bortkiewiczian model is given the added burden of yielding conclusions regarding the magnitudes of values and prices, the conclusions are arbitrary, indeterminate and inconsistent.

MARX'S DEVELOPMENT OF THE DISTINCTION BETWEEN VALUE AND EXCHANGE VALUE

I wish to indicate here how the distinction between value and exchange value, a distinction undeveloped (though implicit) in Marx's work through the *Critique of Political Economy*, became increasingly important to him as he confronted Bailey's critique of Ricardian value theory.[2] In particular I emphasize Marx's development of a concept in which value is *intrinsic* to each commodity, yet *historically relative*. This concept will be fundamental to the reinterpretations undertaken in the fourth and fifth sections of this chapter.

Rubin (1973, p. 107) called attention to the conceptual breakthrough contained in *Capital*'s distinction between value and exchange value; the *Critique of Political Economy* makes a 'smooth and imperceptible' passage between the two and uses the term 'exchange value' to cover both concepts. Apparently independently, Dunayevskaya (1988, p. 100) later recognised that

> insofar as economic *categories* were concerned, [Marx had] accepted them, more or less, as worked out by classical political economy. That is true as late as the publication of *Critique of Political Economy* in 1859, when he still used exchange-value in the sense of [a synonym for] value and not in the sense of value-*form*. He still was 'taking for granted' that 'everyone knows' that production relations are really involved in the exchange of things.

Dunayevskaya locates Marx's development of the distinction between value and exchange value within a more general shift in emphasis. He at first stressed the fantastical *form of appearance* of production relations under capitalism. Yet increasingly he came to emphasize the

perverted nature of capitalist production relations that give rise to the fantastical appearance. This was particularly the case in the 1872–75 French edition of *Capital*, written after his experience with the 'free and associated' labour of the Paris Commune.

A formative element in Marx's change in emphasis was his reading of Bailey's *Critical Dissertation*. Rubin (1973, p. 108) argues persuasively that Bailey – who argued that a thing's value is merely the amount of another thing for which it is exchanged – was the 'opponent' Marx had in mind when he distinguished value from exchange value in *Capital*.

Marx first excerpted the *Critical Dissertation* only after the *Critique* was published. His notebooks of 1861–63 contain extended discussions of Bailey's work (and that of the anonymous author of *Observations on certain Verbal Disputes in Political Economy*).

In light of Bailey's polemic against Ricardo, Marx rejected the latter's distinction between 'absolute' and 'relative' value, arguing that 'absolute' value is relative in another sense: 'all commodities, in so far as they are exchange values, are only *relative* expressions of social labour-time and their relativity consists by no means solely of the ratio in which they exchange for one another, but of the ratio of them all to this social labour which is their substance' (Marx, 1968, p. 172; cf. Marx, 1971, pp. 132–3).

Marx's point is not only a 'technical' one, but stands in opposition to the fetishization of things he detected on the part of Bailey and the author of *Observations*. In making, apparently for the first time, the famous value-as-'third thing' argument,[3] Marx indicated that 'relative value' in the second sense calls into question the independence generally attributed to the world of things. The 'third thing' argument does not transform value 'from something *relative* into something *absolute*. On the contrary, as a use-value, the commodity appears as something independent. On the other hand, as value it appears as something merely *contingent*, something merely determined by its relation to... labour-time' (Marx, 1971, p. 129).

Marx thus charged that his *opponents* had absolutised value. The author of *Observations* 'transforms value into something absolute, "a property of things", instead of seeing in it only something relative' (ibid., p. 130). Similarly 'Bailey is a fetishist in that he conceives value... as a *relation of objects to one another*, while it is only a representation in objects, an objective expression, of... the relationship of men to their reciprocal productive activity' (ibid., p. 147).

Marx's point is not simply that these authors failed to recognise that value is determined by labour time. He was likewise beginning to transform the concept of value. Whereas exchange value is an object–object relationship, a relationship between things, Marx was beginning to flesh out a concept of intrinsic value, in which value is expressive of the subject–object relationships of commodity *production*.

Marx's development of a second meaning to relative value – the relation between the commodity and labour time – was also closely related to his developing emphasis on the historic (or diachronic) character of value. He stressed the historicity of value in opposition to Bailey's argument that '[v]alue is a relation between *contemporary* commodities' (quoted in ibid., p. 154). Since, in Bailey's view, the concept of an intrinsic value is otiose, he concluded that a commodity's 'own' value cannot be said to rise or fall. One commodity is simply exchanged for more or less of another at different times; it is also futile and meaningless to attribute their changed relationship to a change 'within' either.

Via the 'third thing' argument, Marx held fast to the concept of intrinsic value. Having rejected Bailey's premise, he rejected Bailey's conclusion as well. Values at different times can certainly be compared, and Bailey was a 'fool' to think otherwise: 'in the process of circulation or the process of reproduction of capital, the value of one period is constantly compared with that of another period, an operation upon which production itself is based' (ibid., p. 154). Indeed Marx (ibid., pp. 131, 137, 154) situated the whole process of circulation of capital in the notion of an historically variable intrinsic value, 'value in process' or 'dynamic value'.

The same concept figures prominently in chapter 4, volume I of *Capital*, where Marx (1977, p. 256) also called it 'value... as a self-moving substance' and, as endowed with an aim, '*Verwertung*' (value self-expansion) (ibid., p. 252). And in a passage in volume II, in which Marx (1981a, pp. 185–6) again criticised Bailey for denying the intertemporal comparability of values, the same concept appears, this time as '*Verselbstständigung*' (autonomization) of value. Here Marx (ibid., p. 185) was concerned not only with the self-expansion of value, but especially with the temporal relativity of a commodity's value:

> The more acute and frequent these revolutions in value become, the more the movement of the independent value, acting with the force of an elemental natural process, prevails over the foresight and

> calculation of the individual capitalist.... These periodic revolutions in value thus confirm what they ostensibly refute: the independence which value acquires as capital, and which is maintained and intensified through its movement.

Rather than implying that the concept of intrinsic value is a mirage, the changes in commodities' values over time imply the opposite. Value is no 'mere abstraction [from exchange relations]... the movement of industrial capital is this abstraction in action' (ibid.)

THE 'TRANSFORMATION PROBLEM'

The foregoing has shown that, in their refutations of Marx, his critics have reduced value to exchange value, and that this runs counter to his increasing emphasis on and development of their difference. Here I will show that, when value is reconceived as *intrinsic* and *historically relative*, the alleged internal contradictions in Marx's account of the value–price transformation disappear.

First, to situate value within historical time, one must permit input prices (and values) to differ from output prices (and values). Second, Marx's propositions that commodities possess an intrinsic value, the substance of which is socially necessary labour, and that the quantum of value in existence is redistributed through exchange, together imply that commodities can *contain more or less value than the labour currently needed to (re)produce them.* If, for example, the price of means of production rises above their value, the value of the constant capital in the next period – the sum of value advanced for means of production – will exceed the value of the means of production themselves.[4] That exchange does not alter the sum of value in existence implies that the capital advanced does remain a sum of value, even when it differs from the values of its material elements. The new value of the constant capital is the amount of labour represented by its (money) price. The same reasoning holds for the variable capital.

The vector of constant capital per unit of output at time t is thus $C_t = p_t A$ (assuming, for simplicity, that no fixed capital exists), where P_t is the vector of unit prices prevailing at time t. This vector may differ from λ_t, the vector of unit values in time t.[5] The constant capital is thus a sum of value that may not equal the value of the means of production ($\lambda_t A$). Similarly the variable capital vector is $V_t = p_t wl$, and the vector of surplus values is $S_t = l - p_t wl$ the 'unpaid' labour time.

New unit values are the sum of the dead labour transferred from the constant capital and the living labour newly extracted:

$$\lambda_{t+1} = p_t A + l \tag{3.1}$$

and the new unit production prices are those that yield a uniform rate of profit on the capital advanced:

$$p_{t+1} = p_t(A + wl)(1 + r_t) \tag{3.2}$$

where r_t is the profit rate in period time t.[6] Whereas solutions to the transformation problem make the rate of profit endogenous to the price formation process, Marx argued that the general rate is determined upon completion of the production process, before commodities go to market. Competition merely tends to equalise profit rates at the already determined general rate, given by

$$r_t = S_t X/(C_t + V_t)X = (lX - p_t wlX)/p_t(A + wl)X \tag{3.3}$$

with X being the vector of gross outputs.

Together, equations 3.1–3.3 imply, as Marx argued and as his critics deny, that (1) the sum of prices equals the sum of values

$$p_{t+1}X = \lambda_{t+1}X$$

(2) the sum of profits equals the sum of surplus values:

$$p_{t+1}X - p_t(A + wl)X = lX - p_t wlx$$

and (3) the 'price' rate of profit equals the 'value' rate of profit:

$$\frac{p_{t+1}X - p_t(A + wl)X}{p_t(A + wl)X} = \frac{lX - p_t wlX}{p_t(A + wlX)}$$

Because the rate of profit is determined exogenously to the pricing process, these equalities are obtained without the invocation of an 'invariance postulate'. To express the above labour-time sums in money terms, premultiply each p_t and λ_t by a scalar (a single number rather than a vector) indicating the money equivalent of a labour hour (and similarly for period $t + 1$). This scalar is determined exogenously

to the transformation – the redistribution of value by itself does not affect its monetary expression. Hence, to compute money prices (and values) a normalization is needed, yet no arbitrary postulate of invariance between *values and prices* is made.

Although values according to this interpretation differ markedly from the technologically determined magnitudes commonly associated with the 'labour theory of value', they conform fully to Marx's own theory. New value is created solely in capitalist production, used up constant capital merely transfers its already existing value, and exchange redistributes but does not alter the sum of already existing value.

THE FALLING RATE OF PROFIT

The Okishio (1961) theorem purports to show that mechanised techniques of production that are introduced by profit-maximizing capitalists cannot themselves cause a fall in the rate of profit. Only if mechanization is accompanied by a rising real wage can the profit rate fall – but then it is the rising real wage, not mechanization *per se*, that is the cause of the falling rate of profit.

It is noteworthy that Okishio's proof employs the same price model as that used to find inconsistency in Marx's account of the transformation of values into production prices. Again, only *relative* prices matter in this model. As Ernst (1982) and Naples (1989) have recognised, profitability is here measured in physical or quasi-physical terms, as the 'self-expansion' of use value. In a one-sector (corn') model, the profit rate is the ratio of surplus corn (corn output minus corn input) to corn invested. Yet in multisector versions, too, profitability is computed solely from physical data and relative prices – which are themselves only ratios of physical quantities – without reference to either money or labour time.

Hence if corn is the numeraire, the terms of the profit rate reduce to corn equivalents and the profit rate is computed as the rate of self-expansion' of corn equivalent. Such profitability measures implicitly assume that *a unit of corn at harvest time is worth exactly as much as a unit at planting time (and at the moment of investment), irrespective of any changes over time in the labour time needed to produce it or in its money price.*

Two interpretations of this assumption are possible. First, as a metaphysical materialist primitive: value is a veil, only relative prices

(ratios of things) matter. A thing's 'value' *is* the quantity of another thing it commands. A unit of corn commands a unit of corn, so it is always the self-same economically and physically.

A second interpretation of the Okishio theorem is possible, however. It is a comparative static equilibrium exercise. 'Absolute' values (and prices) play no role in static equilibrium measurement, so even if values (and prices) are determined by labour time, the profit rate is still expressible in terms of relative prices (physical quantities) alone. This is correct. Yet treated as a comparative static equilibrium exercise, the theorem sorely lacks the generality that would be needed to refute Marx. It treats mechanization as a one-time-only disturbance', while even a cursory reading of Marx's law of the falling tendency of the profit rate reveals that it refers to *continuous* mechanization:

> Since the mass of living labour applied continuously declines in relation to the mass of objectified labour that it sets in motion... the part of this living labour that is unpaid and objectified in surplus-value must also stand in an ever-decreasing ratio to the value of the total capital applied. But this ratio... constitutes the rate of profit, which must therefore steadily fall (Marx, 1981b, p. 319)

By failing to treat mechanization as continuous, the Okishio theorem neither refutes this law nor even bears any clear relationship to it. Given continuous mechanization, moreover, the Okishian profit rate is a defective measure of the rate of 'self-expansion' of value. The theorem uses the same price vector to value fixed capital,[7] inputs and outputs. Outside of static equilibrium, this is illegitimate, tantamount to a retroactive revaluation of old fixed capital and preproduction inputs at post-production prices. Since mechanization itself tends to lower values over time, it is inadmissible to ignore intertemporal changes in values when assessing the impact of mechanization on profitability. If preproduction inputs and (especially) old fixed capital are revalued according to lower, post-production values, the capital advanced to production – the denominator of the profit rate – is reduced artificially, raising the profit rate artificially. To ignore intertemporal reductions in values is to sweep under the rug a key immanent obstacle to capital's self-expansion of already existing values.

To formalise this point and illustrate its implications for the law of the falling rate of profit, I will make a number of simplifying

assumptions. Although the resulting example is not realistic (more realistic ones can be constructed), it will suffice for the purpose of refuting the Okishio theorem, since even a single counterexample is enough to disprove a theorem.

Thus assume a single capital producing a single output (X). This eliminates the problem of prices deviating from values. Assume also that this capital produces using only nondepreciating fixed capital (F) and living labour (L). The real wage rate (w) is constant. To subject Marx's law of the falling rate of profit to a very strong test, assume a form of mechanization that keeps the (constant) capital/output ratio unchanged. Thus X and F grow at the same rate, $b(> 1)$; that is, $F(t) = F_o\exp(b)t$ and $X(t) = X_o\exp(b)t$. Since mechanization is assumed, L grows more slowly, at rate c; $L(t) = L_o\exp$ (c)t. Thus output per worker and the technical composition of capital both rise continuously. Finally, assume instantaneous production: no time elapses between input and output.

As noted above, only relative prices matter in the Okishio theorem, and since a single capital and one output are assumed, there are no relative prices. Thus the theorem in this case computes profitability on the basis of *material* quantities alone:

$$r_m(t) = (X[t] - wL[t])/(F[t] + wL[t])$$

or, making explicit use of growth rates and dividing by $X(t)$,

$$r_m(t) = (1 - wl.\exp\,[c - b]t)/(f + wl\,\exp[\mathrm{c} - \mathrm{bt}]) \tag{3.4}$$

where $l = L_O/Xo$ and $f = F_o/X_o$. Since $c < b$, this profit rate rises continuously throughout time.

As emphasized above, however, Marx was concerned with the historical relativity of intrinsic value; the movement of unit value (price) matters even apart from relations of exchange among different commodities. The instantaneous production assumption enables one to write

$$p(t).X(t) = L(t)$$

or

$$p(t) = l.\exp(c - b)t \tag{3.5}$$

indicating a continuous decline in the price. Even though input yields instantaneous output here, this decline is still significant, because equal physical increments to *fixed capital* will add different sums of value to the capital stock at different times. At any moment, investment is

$$I(t) = p(t) \cdot (dF/dt) = blF_o exp(c)t$$

and, integrating, one obtains the value of the capital stock:

$$K(t) = (b/c)lF_o \exp(c)t - (b/c - 1)lF_o \tag{3.6}$$

since $K(0) = lF_o$

The Marxian rate of profit can thus be written as

$$r(t) = (p[t] \times [t] - p[t]WL[t]/(K[t] + p[t]WL[t])$$

Using equations 3.5, 3.6 and the solutions for X and L, and simplifying terms, one can write

$$\frac{r(t) = 1 - wl.\exp(c - b)t}{(b/c)f - (b/c - 1)f \cdot \exp(-c)t + wl \exp(c - b)t} \tag{3.7}$$

which can fall as well as rise, even though the real wage rate and the (constant) capital/output ratio are constant. Indeed it can be shown that if $b > 2c$, or $wl < f/(2f + 1)$, and if $b > 2c$ then the rate of profit undergoes a consistent fall throughout time. Again, while this is by no means a realistic model, it does refute the Okishio theorem, and precisely by taking seriously Marx's concept of value as intrinsic and historically relative.

CONCLUSIONS

If the interpretation of Marx's value theory developed above is admitted to be internally consistent, then one must reject the claims that Marx's own value theory is simply self-contradictory. The issue becomes one of interpretation. In this regard, it is noteworthy that the present interpretation is able to 'make sense of' the very aspects of Marx's work that the conventional view has not been able to.

Marx's critics have made his alleged 'logical' errors *the* ground upon which the economics profession has debated his work for a full century. Intellectual honesty requires that they either find error in the above interpretation or renounce claims to have refuted Marx on logical grounds.

Too many theorists have jumped to conclusions, rejecting or revising (or in some cases simply accepting) various aspects of Marx's *oeuvres* without taking care to internalise them, to learn from them, to work out the apparent contradictions. Indeed the persistence of the 'transformation problem', the Okishio theorem and positivist 'rational reconstructions' of Marx result largely from this tendency.

Yet precisely because such tendencies have characterised the history of post-Marx Marxism, the Marxism of Marx remains largely unexplored; there is much more for us to learn.[8] To do so, however, it is necessary to work out the apparent contradictions in the context of Marx's work, rather than in that of his critics.

Notes

1. See, for example, Ernst, 1982; Wolff, Callari and Roberts, 1984; Kliman and McGlone, 1988; Kliman, 1988, Naples, 1989, Giussani, 1991–92, Moseley, 1993, Maldonado-Filho, 1995; and the articles in the Freeman and Carchedi (1996) collection. These works, however, do not represent a homogeneous viewpoint.
2. In a companion piece (Kliman, 1995) I discuss the importance of this distinction to Marx's argument in the first chapter of *Capital*. Where Marx is typically thought to be proposing a labour theory of value, I argue that he is instead establishing the difference and relationship between value and exchange value.
3. 'To estimate the value of A in B, A must have a value independent of that value in B, and both must be equal to a third thing expressed in both of them' (Marx, 1971, pp. 128–9).
4. See, for example, Marx, 1977, p. 317, and Marx, 1981b, pp 261, 265, 309, for his distinction between capital values and the value of the material elements of the capital.
5. Values and prices here refer to sums of value contained in commodities before and after redistribution through exchange, respectively. For convenience, both are measured in labour time (but both can likewise be expressed in money terms). Period t values and prices are treated as given, initial conditions, or perhaps as computed from period t -1 data.
6. The above equations treat constant capital as the current cost of the means of production at the moment when production commences, not their original cost. This conforms to Marx's notion that constant capital

is determined by the labour time needed to reproduce the means of production. A contrary view of the reproduction cost concept implies that constant capital must be revalued after production, according to the post-production prices of means of production. This, however, confuses the value of the *capital* with the value of its *material elements* (see Marx, 1977, pp. 317–18). Although the values of the material elements can change over the production period, constant capital is constant, 'a definite quantity of *past*, materialized labour, which *passes into* the value of the product as a *determining* factor' (Marx, 1969, p. 109, emphases altered).

7. Okishio's original theorem ignores fixed capital, but Roemer's (1981, ch. 5) later generalization includes it.
8. Dunayevskaya (1991) judges the whole of post-Marx Marxism, beginning with Engels, as having fallen short of comprehending the totality of Marx's Marxism. She suggests that truncation of his body of ideas, and the disregard of such works as his *Ethnological Notebooks*, has had far-reaching theoretical and practical consequences.

References

Böhm-Bawerk, E. von (1984) *Karl Marx and the Close of His System* (Philadelphia: Orion Editions).

Bortkiewicz, L. von (1952) 'Value and Price in the Marxian System', *International Economic Papers*, vol. 2.

Dunayevskaya, Raya (1988) *Marxism and Freedom: From 1776 until today*, 5th edn (New York: Columbia University Press).

Dunayevskaya, Raya (1991) *Rosa Luxemburg, Women's Liberation, and Marx's Philosophy of Revolution*, 2nd edn (Urbana and Chicago: University of Illinois Press).

Ernst, J. R. (1982) 'Simultaneous Valuation Extirpated: a contribution to the critique of the neo-Ricardian concept of value', *Review of Radical Political Economics*, vol. 14, no. 2.

Freeman, A. and G. Carchedi (eds) (1996) *Marx and Non-equilibrium Economics* (Chettenham: Edward Elgar).

Giussani, P. (1991–92) 'The Determination of Prices of Production', *International Journal of Political Economy*, vol. 21, no. 4.

Kliman, A. J. (1988) 'The Profit Rate Under Continuous Technological Change', *Review of Radical Political Economics* vol. 20, nos 2, 3.

Kliman, A. J. (1995) 'Marx's Development of the Concept of Intrinsic Value, 1859–1872', paper presented at Eastern Economic Association Convention, New York City, March.

Kliman, A. J. and T. McGlone (1988) 'The Transformation Non-Problem and the Non-Transformation Problem', *Capital and Class*, vol. 35.

Maldonado-Filho, E. (1995) 'Release and Tying up of Productive Capital and the "Transformation Problem"', paper presented at The Allied Social Sciences Association conference, Washington, DC, January.

Marx, K. (1968) *Theories of Surplus-Value*, part II (Moscow: Progress Publishers).
Marx, K. (1969) *Theories of Surplus-Value*, part I (Moscow: Progress Publishers).
Marx, K. (1971) *Theories of Surplus-Value*, part III (Moscow: Progress Publishers).
Marx, K. (1977) *Capital: A critique of political economy*, vol. I (New York: Vintage Books).
Marx, K. (1981a) *Capital: A critique of political economy*, vol. II (New York: Vintage Books).
Marx, K. (1981b) *Capital: A critique of political economy*, vol. III (New York: Vintage Books).
Moseley, F. (1993) 'Marx's Logical Method and the Transformation Problem', in F. Moseley (ed.), *Marx's Method in 'Capital': a reexamination* (Atlantic Highlands, NJ: Humanities Press).
Naples, M. I. (1989) 'A Radical Economic Revision of the Transformation Problem', *Review of Radical Political Economics*, vol. 21, nos 1, 2.
Okishio, N. (1961) 'Technical Changes and the Rate of Profit', *Kobe University Economic Review*, vol. 7.
Rodriguez, A. (1996) 'Money, the Postulates of Invariance and the Transformation of Marx into Ricardo', in A. Freeman and G. Carchedi (eds), *Marx and Non-equilibrium Economics* (Chettenham: Edward Elgar).
Roemer, J. (1981) *Analytical Foundations of Marxian Economic Theory* (Cambridge: Cambridge Univ. Press).
Rubin, I. I. (1973) *Essays on Marx's Theory of Value* (Montreal: Black Rose Books).
Samuelson, P. A. (1971) 'Understanding the Marxian Notion of Exploitation: a summary of the so-called transformation problem between Marxian values and competitive prices', *Journal of Economic Literature*, vol. 9, no 2.
Seton, F. (1957) 'The "Transformation Problem"', *Review of Economic Studies*, vol. 24.
Wolff, R. D., A. Callari and B. Roberts (1984) 'A Marxian Alternative to the Traditional "Transformation Problem"', *Review of Radical Political Economics*, vol. 16, nos 2, 3.

4 The Transformation Trinity: Value, Value Form and Price

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The 1970s saw a flurry of activity, generated by Sraffa (1960), re-examining Marx's theory/theories of value and price. Sraffa's work seemed to confirm the reservations about the Marxian relationship between values and prices that a well-known list of authors had proclaimed as the (in)famous 'transformation problem'. The Sraffian system, exploring fully the mutual determination of production costs and prices of outputs, and capturing the essence of this mutual determination through the device of a standard system, supported the view that Marxian values were either wrong or redundant. This history is rather well known.

In the 1980s a series of responses began to appear. These responses tried to differentiate and rescue Marxian theory from its neo-Ricardian grid. At that time the Althusserian reading of Marx provided a fresh impetus to differentiate the Marxian class-analytic approach to economic theory from the naturalist approach that had structured the discourse of classical political economy. A number of contributions (for example, Gerstein, 1976, and Hussain, 1979) had pointed out that the conception of 'value' as a technologically (naturally) determined quantity of 'embodied labour time' – at that time, still virtually the only analytical definition of value assumed in all treatments of the transformation problem – was strongly reminiscent of the classical, naturalist discourse and seemed inconsistent with Marx's insistence that products of labour come to have a 'value' dimension only under specific social conditions. These contributions strongly suggested a concept of value that would serve as a representation, a condensation, of the ensemble of conditions of production and conditions of circulation (we would later add conditions of distribution) that represented the complex unity of the capitalist

duction of commodities. Our specific contribution (Wolff, Roberts and Callari, 1982, 1984) was to extend these insights in order to transform the terms of the transformation problem. We made novel use of the concept of 'value form' and developed a three-dimensional quantitative scheme (value, value form, price) to counter the traditional two-dimensional scheme (value, price).

This novel quantitative treatment of value, value form and price still represents a significant departure from the structure of the traditional Marxist theory developed by generations of Marxist economists who laboured within the protocols of modernist science and thus filtered the Marxian analytical project through the differently structured concepts of the 'discourse' of economics. In this representation Marxist theory was reviewed as simply an alternative answer to the 'same' question: what is the essence of 'the economy'? Witness Maurice Dobb's masterful argument that the difference between neoclassical and Marxist (neo-Ricardian) theories was the former's choice of 'preferences' in contrast to the latter's choice of technology and distribution as the 'essence' of 'the economy'.[2] This methodological habit of attempting to reduce complex social processes to manifestations of some single underlying force has come to be known as essentialism.

In opposition to the essentialist tendencies of traditional Marxism, the discussions initiated by Althusser (1970) and Althusser and Balibar (1970) posed Marx's theoretical contribution in a very different light: all economic processes (not just production but also circulation and distribution, and others, including consumption, lending and so on – see Resnick and Wolff, 1987) must be viewed through a class-analytic 'lens', so that each of these processes singly and the ensemble of them as a whole are understood as 'class process/es'. In this 'overdeterminist' perspective, it is not production *per se* that determines the shape of capitalist relations and fixes the determination of 'value' as a code for those relations. Rather, Marx's value relations represent the 'condensation' of production, distribution and circulation processes that constitutes 'commodities as products of capital'. For us, then, the reconstruction of a Marxian analysis of capitalist relations is an *expansive* project that aims to reconstruct the concept of value as a code for the *multifaceted* class determination of economic processes. So long as production conditions in a narrow sense are allowed to define a one-dimensional concept of value, Marxism cannot clearly break with the naturalistic and ultimately a-historical representation of society found in the classicals' discourse on labour that Marx philosophically criticized.[3]

In the remainder of this chapter, we present the salient features of Wolff *et al.*'s rendition of the transformation process and then briefly sketch the current conceptual implications of that work (Wolff *et al.*, 1982, 1984). The third section offers a comparison with some other recent approaches to the transformation problem, followed by a brief concluding note.

MARX'S TRANSFORMATION OF VALUES

Our reconceptualization of the transformation problem presumes a basic distinction between Marx's and Ricardo's values, unlike the traditional interpretation ('the labour theory of value') in which value in all cases refers to the quantity of labour time directly and indirectly embodied in commodities. While the classicals viewed capitalism as a natural system of production, Marx's emphatic rejection of this view suggested to us the need to distinguish between a Ricardian concept of value referring uniquely (unidimensionally) to conditions of production in a narrow technical sense and a Marxian concept referring more broadly to the social conditions under which production occurs and products of labour are 'endowed' with a value content.

Marx made it clear in a number of passages that there is a complex weaving of historical and analytical issues in his discourse. In line with this, Wolff *et al.* (1984, pp. 122–3) argued that,

> for Marx, each commodity has *two* quantitative dimensions, two numbers simultaneously "attached" to it; the value of the commodity, on the one hand, and the form taken by that value in exchange, on the other. *Value* is the quantity of social labor time "attached to" the commodity in production, given the nature and functioning of the processes involved in commodity circulation.... *Value form*, as a magnitude, is the quantity of labor time "attached to" the commodity in circulation, given the particular processes of production.

On the one hand, the specification of capitalist class relations of circulation (say, the uniform rate of profit) requires as a precondition the specification of capitalist commodity production; on the other hand, the specification of capitalist relations of production has as its own precondition the recognition of the extended circulation of commodities. This interdependence of production and circulation, rather

than any derivation of the latter from the former, is what Marx was representing with his relational distinction between these *value* and *value-form* concepts. Thus, in our view, Marx presented the relation between value and value form as one of *constitutive interdependence*.

In applying this framework to the transformation problem we took it as a premise that Marx's oft-stated pair of aggregate equalities (between value and surplus value on the one hand, and their respective capitalist forms – production price and profit – on the other) had the status of conceptual identities – properties of the very *meaning* of Marx's categories rather than potentially falsifiable statements. On that basis, the transformation problem is one of definitional application: what do the categories of value and value form *mean* in the presence of a specifically capitalist sphere of circulation, as well as production, in which commodities exchange not as values *per se* but as 'products of capital'? As a quantity of social labour, a commodity's value is definitionally the sum of two terms: the value directly added by living labour plus the value transferred by consumed means of production. Assuming, for simplicity, homogeneous living labour, the former is unproblematic – irrespective of the terms of exchange between capital and labour power, value is constituted by the labour (L) actually extracted from workers in the production process. But the latter component, consumed constant capital, and additionally the division of L into variable capital and surplus value, are open to interpretation. When commodities are produced and exchanged as products of capital, the labour time socially necessary to produce a commodity – its value – is no longer identical to the labour time represented by the money equivalent for which it exchanges, the money advanced by firms *as capital* to procure their inputs. It was our innovation to insist on the constitutive effects of the form taken by value in capitalist exchange: the constant capital component of output is measured not by the labour embodied in the means of production, as if only production conditions mattered, but by the labour time expended by capitalists, in the form of money, as their equivalent. Similarly the division of L into paid and unpaid portions is a matter of the labour-time equivalent paid for labour power rather than the labour embodied in the commodities acquired by the two classes on the basis of that payment.

Marx made these points in numerous places, perhaps most explicitly when referring specifically to the proper measure of means of production used to produce a new commodity: 'the difference between [price of production] and value, in so far as it enters into the

price of the new commodity independently of its own production process, *is incorporated into the value of the new commodity as an antecedent element*' (Marx, 1971, p. 167, emphasis added). In other words, when a commodity has passed through exchange to become an input, thus functioning 'independently of its own production process', the (labour time) production price *paid* for it is now the 'antecedent element' relevant to 'the value of the new commodity'. Accordingly Wolff *et al.* (1982 and 1984) posed the value of new output as the sum of the direct living labour expended in its production plus the production price of its means of production, measuring in labour-time terms the money equivalent advanced as constant capital. Similarly, surplus value was measured as the *unpaid* portion of the value added by living labour, the residual of labour performed over and above the labour-time equivalent paid for labour power.

The formal model of the value–price transformation is then as follows. Assuming n single product industries (and no fixed capital):

- $A = [a_{ij}]$ a matrix of physical commodities inputs per unit of output.
- $L = [L_j]$ a row vector of direct (living) labour inputs per unit of output.
- $b = [b_i]$ a column vector of commodities (means of subsistence) per unit of direct labour (the 'real wage bundle' that workers must be able to purchase with their money wages).[4]
- $X = [X_i]$ a column vector of gross output levels in physical units.
- $Y = [Y_i]$ a column vector of net output levels in physical units, such that $Y = [I - A]X$.
- $V = [V_j]$ a row vector of unit values in labour-time terms.
- $\rho = [\rho_j]$ a row vector of unit prices of production in labour-time terms.
- r = the uniform rate of profit.

A, L, b, X and Y are historically determined and given at a point in time. V, r and ρ are the variables. The transformation system is expressed in the following three equations.

$$\rho = (\rho\,\mathrm{A} + \rho\,\mathrm{bL})\,(1 + \mathrm{r}) \tag{4.1}$$

$$\mathrm{V} = \rho\mathrm{A} + \mathrm{L} \tag{4.2}$$

$$r = \frac{LX - \rho\, bLX}{\rho AX + \rho\, bLX} \tag{4.3}$$

Equation 4.1 is a standard price equation, distinctive only in that prices are specifically denominated in labour-time units. Equation 4.2 expresses the value of each commodity as defined above. Equation 4.3 expresses the uniform rate of profit as a ratio of aggregate quantities of labour time: the ratio of total unpaid labour time to total paid labour time.

Equation 4.3 directly satisfies Marx's postulated equality between total profits and total surplus value, but it also implies the other aggregate equality postulated by Marx between total value and total prices of production. Adding 1 to both sides of equation 4.3 and multiplying through yields

$$(\rho AX + \rho bLX)(1 + r) = LX + \rho AX \tag{4.4}$$

Applying equations 4.1 and 4.2 yields

$$\rho X = VX$$

stating that total prices of production equal total values.

Given further information on the nature of money, one could easily derive money expressions for both production prices and values, but here both ρ and V are explicitly measured in terms of labour time. Of course, under well-known conditions equation 4.1 can be solved directly for r and relative prices; 4.2 and 4.3 then jointly imply a normalization condition with a labour-time unit of account: substituting 4.1 into 4.4 yields

$$\rho X = LX + \rho AX$$

implying that

$$\rho Y = LX$$

the (now) familiar net product normalization for production prices. Thus the fact that ρ appears in equation 4.2 in no way problematizes the labour-time units in which values were conceived by Marx. Indeed, in Roberts (1994) these same labour-time values (V) are derived in an alternative fashion directly from the data without *any* explicit reference to or solution for prices, and ρ itself can then be obtained from V as an explicit expression of social labour.

A further feature of this system is worth stressing. The premise of a given real wage (b) was chosen mainly for fidelity to Marx and is by no means necessary; any specification of distributional conditions permitting determinate prices is compatible with our basic approach. Still, given the formulation here, it is worth noting the quite deliberate symmetry between the determination of prices and values: both ρ and V depend upon and vary with changes in all the data, real wages (b) and the composition of output (X), as well as the technological conditions of production.[5]

THEORETICAL AND PHILOSOPHICAL IMPLICATIONS

In this approach, value and value form are removed from the technologically defined space of labour embodied and mapped onto an overdetermined social space. Value and value form exist as 'quanta' of social labour time *condensed* into particular commodities in accordance with circulation and distribution as well as production conditions, all of which participate to quantify the amount of labour-time that is 'socially necessary' to reproduce a commodity. This, for us, gives concrete meaning to Marx's volume I thesis that value is not embodied in products of labour as such, but in products of labour as commodities, as well as his argument that the failure to understand this distinction was at the heart of the ideological character and analytical difficulties of classical (and, we could add, modern) economics.

This approach, and especially the conception of society underlying our reinterpretation of the 'social necessity' of labour time, has implications for Marxian theory *beyond* the transformation problem. A dominant tradition in Marxism (one still much cited and admired, as in, for example, the work of Rubin) views capitalism as a system that subordinates communities to a logic of production. This view, despite its inversion of neoclassical subjectivism into a (Marxian?) productivism, has much in common with the neoclassical view of capitalism as the logical answer to the problem of how best to organize the social division of labour in the face of naturally given desires and constraints. Our shift from a production-focused, labour-embodied approach to value is a shift away from this perspective. It focuses attention on a different set of questions concerning the multiple ways in which capitalism controls human communities and imposes its own constantly changing forms of

'social necessity' on commodities, as crystals of human labour, and on the humans in these communities, as 'historically constituted economic agents'. Amariglio and Callari (1989) began to reinterpret value categories in this fashion, not as vehicles for theorizing the 'expression in circulation' of the logic of production, but instead as a means of understanding the reciprocal interdependence of the capitalist valorization process and of the criteria of equivalence enforced by specifically bourgeois constructions of rationality, equality and proprietorship.

Moreover this reconceptualization of the meaning of Marx's analysis also suggests a parallel reconceptualization of the problem of 'labour heterogeneity' in Marxist discourse. The traditional problem of labour heterogeneity has amounted to a search for the production conditions of labour power, as if the social commensuration of concrete labour could be reduced to a one-dimensional production problem. But once 'value' is reconceived along the lines we have proposed, it is no longer necessary to base the reduction of heterogeneous quantities of labour to a homogeneous dimension purely on the basis of data referring to production conditions. Roberts (1995) presents a formal system, consistent with our argument here, in which initially heterogeneous labours are made commensurate as uniform, social – abstract – labour by means of relations of equivalent exchange among capitalist commodities; as Marx argued, 'the labor of the individual asserts itself as part of the labor of society *only by means of* the relations which the act of exchange establishes directly between the products, and indirectly through them, between the producers' (Marx, 1967, p. 73, emphasis added). This approach, we anticipate, can be further developed to incorporate the not exclusively economic determinations affecting the valorization of the labour of different 'segments' of the labour force, for example the differential rates of exploitation embedded in gender, race and/or ethnic differentiations of labour power.

A COMPARISON WITH OTHER TREATMENTS OF THE VALUE–PRICE QUESTION

The 'new solution' of Duménil (1984) and Lipietz (1982) and the related approach of Foley (1982) have some characteristics in common with Wolf *et al.*'s solution (Wolf *et al.*, 1982 and 1984). The defining innovation of the new solution is a break with the use of

embodied labour magnitudes in distinguishing the 'paid' and 'unpaid' labour components of the value added by living labour. Surplus value no longer expresses the labour embodied in any physical commodity or commodity bundle; it is instead defined purely as a residual – labour performed in excess of the time for which the workers receive an equivalent in the form of wages. While proponents of the new solution typically abjure the notion of a given wage bundle for workers, preferring instead to take as distributional data a given rate of exploitation or money wage, this formal difference from our solution is minor in comparison with the common premise: to understand surplus value as *unpaid* labour, one must represent in labour time the *equivalent paid* to workers for their labour power, and this representation is not a matter of simply calculating the labour embodied in some physical commodity bundle. There are thus several characteristics of the new solution that we view as congenial to our approach, including the simultaneous-equation approach to determining production prices, Lipietz's 'net product normalization' for production prices in terms of labour time (this relation is explicit in Wolff *et al.*, 1982 and 1984, as well), and Foley's focus on the ratio of total direct labour to total net income in money terms, which he problematically calls the 'value of money',[6] as the social labour time equivalent of the money unit (this relationship between money and social labour is also implicit in Wolf *et al.*, 1982 and 1984).

Nevertheless, significant differences remain between the approach of these authors and our approach. The problem we see in the new solution is the conception of *value* itself. Despite their break with traditional labour-embodied calculations in conceiving surplus value, the Duménil, Foley and Lipietz treatments retain the traditional notion of commodity value as the labour time directly and indirectly embodied, with the result that value, unlike surplus value, is entirely determined by technological conditions of production, without reference to the nature of exchange equivalence. Thus the problem is, minimally, a problem of *incompleteness*: the proponents of the new solution fail to pursue the implications of their fundamental insight into the world of the social representation of labour. If the 'paid labour' component of value added is not a labour-embodied magnitude but rather a labour-time equivalent for the payment made to purchase labour power, then why should the other 'paid' component of output value – the consumed constant capital – still be measured as a labour-embodied magnitude? Means of production, like means of subsistence, are acquired through capitalist exchange at prices of

production that are different from values, and as we have argued it is the labour time represented by the former that expresses those means of production *as capital* and therefore measures the value they transfer to output. This point is important because it has consequences: retention of the traditional labour-embodied conception of value makes it impossible for the new solution to fulfill Marx's requirement of equality between the value and price of the *gross* product. The new solution downplays the significance of this problem, but we think that our own alternative resolves (instead of downplaying) the difficulty.

Moseley (1993) also notes the failure of the 'new solution' to extend to the elements of constant capital the fundamental insight about the representation of labour time in capitalism. On this score the wolff *et al.* and Moseley solutions are quite compatible: nevertheless important differences remain. Moseley's formalization of value theory is, both for better and for worse, tightly constrained by a reading of 'Marx's method' that entails, for us, problematic assertions. For example the idea that volume I of *Capital* deals *only* with aggregate magnitudes ('capital in general' as opposed to 'many capitals') without reference to the values of particular commodities strikes us as insupportable. Moreover Moseley's formal transformation system rests on a claim that the rate of profit and the aggregate amount of surplus value are determined prior to and independent of the formation of commodity prices and values, independent of exchange equivalence, by amounts of money that are simply 'taken as given'. The effectively exogenous status of these variables precludes the sort of constitutive interdependence between value and value form that is at the heart of our understanding of Marx. Ultimately, Moseley's hostility towards anything resembling linear algebra – which he mistakenly, in our opinion, equates with a neo-Ricardian approach – and his insistence of fidelity to a purist reading of Marx's method strikes us as limiting rather than expanding the potential development of Marxian value theory.

Finally, another group of contributions shares a different set of affinities with Wolff *et al.* Kliman and McGlone (1988, forthcoming) and Freeman (1993) exemplify a recent trend towards dynamic or 'sequential' solutions to the transformation problem in which time subscripts distinguish the prices paid for inputs from the (typically different) prices of the outputs that emerge later from the production process. With appropriate assumptions, the sequential approach can lend itself to an iterative calculation of prices (and values) that is formally, although not conceptually, analogous to the procedure of

Shaikh (1977). In fact Kliman and McGlone (1988) present such an iteration, one that (although they do not note it) ultimately converges to precisely the values and prices that emerge out of Wolff *et al.*'s simultaneous equation system. This numerical correspondence confirms the presence of common premises. Kliman and McGlone and Freeman share our view that the constant capital component of commodity value is constituted by the capital advanced for means of production, the equivalent paid for those commodities rather than their values when each is considered simply as the product of its own production process. Similarly they calculate surplus value as the residual of value added over and above the equivalent paid for labour power. But the sequential approach is itself, in our view, a problem because it introduces a dynamic, temporal dimension into what is essentially an issue of conceptual *definition*. The conceptual interrelation of value, value form and price of production is no more a dynamic or historical problem than is the initial examination of value-equivalent exchange in volume I, part 1. Given the production and distribution conditions obtaining at a point in time, the issue in transformation is simply the nature of exchange equivalence in competitive capitalism and the redistribution of unpaid labour time made necessary by that sort of circulation sphere. The dynamics of capitalist competition are an important area for exploration in themselves, but dynamic problems by their nature involve responses to *changes* in the technical and distributional data that, for the purposes of transformation, we take as given at a point in time.

Freeman and others favouring the sequentialist approach emphasize the historical time dimension of capitalist price formation because they want to immunize Marxism against the virus of equilibrium economics that they suspect lurks in simultaneous equation systems and that they identify with bourgeois economics. We can sympathize with this concern, even if we do not agree that the use of a system of simultaneous equations *necessarily* entails a representation of equilibrium relations. Ultimately the differences between their approach and our own may well represent different methodological preferences, and such methodological differences are, we suspect, connected to different understandings of the overall structure of Marxian theory and of the ways in which it can and should be demarcated from bourgeois discourse.[7] While this remains an important issue for further exploration, we are encouraged by the fact that this exploration can begin from a shared ('non-dualist') conception of value and price.

CONCLUSION

Looking back at our work of the early 1980s, we are pleased that at least some aspects of our then unconventional approach have been also proposed by others. Marxian value theory has changed immensely, and for the most part for the better, in the generation since Dobb and Meek struggled to come to terms with the Sraffian critique. But the process of change continues, and we hope it will continue in the directions we have proposed.

We have argued that commodity exchange, and the broader sphere of circulation encompassing all exchanges, are not merely 'surface' features of the economy to be stripped away in the first instance and treated as mere phenomena of production in the last, or at least never analyzed in their specificity. Indeed, at the level of the mathematics of transformation, our approach has the (still) radical implication that *none* of the fundamental categories of Marx's value theory are quantitatively determinate prior to or independent of the specification of the relations of exchange equivalence between commodities. Even more broadly, as a matter of first principles, the quintessentially Marxist choice to give priority, in theoretical discourse and political analysis, to the production sphere, the labour process as the site of extraction of unpaid surplus labour, does not and should not require a denial of the constitutive effects of non-production spheres of the economy of non-economic spheres of society. Old habits of thinking may die hard, but some old habits definitely deserve that fate. The point of our work, past and current, has been to contribute to the development of a Marxian theory of value that is no longer bound by its critics' inability to see it as anything more than 'the labour theory of value'.

Notes

1. We have benefited from discussions of the issues with Stephen Cullenberg, Alan Freeman, Andrew Kliman, Peter Matthews and David Ruccio; but of course we remain responsible for any remaining errors. The authors are Professors of Economics at, respectively, Franklin and Marshall College, The College of William and Mary, and The University of Massachusetts at Amherst.
2. Of course we mention the work of Maurice Dobb out of respect, for his history of economic thought is arguably amongst the most rigorous of the history of economics texts produced by Marxist scholars. Dobb certainly can be placed in a circle of accomplished and distinguished

Marxist economists without whom Marxist theory could not have survived. To point now to what we see as methodological weaknesses in Dobb's work should in no way be interpreted as detracting from his major contributions to Marxism.

3. This is not the proper forum for pursuing this point, but we should state that what is at stake here goes well beyond an abstract, methodological point. Clear (although not necessary) links can be drawn between, on the one hand, the unidimensional construction of 'value' and of capitalism as a system of production and, on the other hand, the construction of 'really existing socialism' that marked the socialist experiment of our century from the mid 1920s, through the Stalinist phase, to its collapse in 1989.
4. It is worth stressing that this vector *b* need not be taken to impose any assumption about the *actual* consumption pattern of workers. Vector *b* simply expresses the historically contingent outcome of a 'wage bargain' – so that workers are paid so as to *permit* a certain standard of real consumption. Their actual pattern of demands is an entirely separate question.
5. They vary in the sense that, given the new data, a different set of relative and/or absolute values and prices of production is now uniquely compatible with the terms of capitalist equivalent exchange; our system exemplifies the 'slice of time', comparative structure, method of analysis. This notion of variation should of course be kept distinct from the sequential responses precipitated *(in) real historical time* by a change in one of the variables of the system.
6. The problem derives from the fact that, unless we restrict ourselves to a 'commodity money' world, money can *represent* value and function as a medium for the exchange of values, without itself having value. The expression 'value of money' fails to connote this distinction.
7. Wolff and Resnick (1987) and Roberts (1988) summarize the pedagogical advantages of a Marxian accounting and contrast it with neoclassical conceptions without recourse to a 'real historical time' method of analysis. Besides, the analysis of dynamic issues in real historical time is no more Marxist than it is post-Keynesian, and its incorporation *per se* does not certify a discourse as Marxist.

References

Althusser, Louis (1970) *For Marx* (New York: New Left Books).

Althusser, Louis and Etienne Balibar (1970) *Reading Capital* (London: New Left Books).

Amariglio, Jack and Antonio Callari (1989) 'Marxian Value Theory and the Problem of the Subject: the Role of Commodity Fetishism', *Rethinking Marxism*, vol. 2, no. 3 (Fall), pp. 31–60.

Duménil, Gérard (1984) 'The So-Called "Transformation Problem" Revisited: A Brief Comment', *Journal of Economic Theory*, vol. 33, pp. 340–8.

Foley, Duncan K. (1982) 'The Value of Money, the Value of Labor Power, and the Marxian Transformation Problem', *Review of Radical Political Economics*, vol. 14, no. 2, pp. 37–47.

Freeman, Alan (1993) 'Reappraising The Classics – The Case for a Dynamic Reformulation of the Labor Theory of Value', Mimeograph School of Social Sciences, University of Greenwhich.

Gerstein, Ira (1976) 'Production, Circulation, and Value: The Significance of the "Transformation Problem" in Marx's Critique of Political Economy', *Economy and Society*, vol. 5, no. 3, pp. 243–91.

Hussain, Athar (1979) 'Misreading Marx's Theory of Value: Marx's Marginal Notes on Wagner', in Diane Elson (ed.), *Value: The Representation of Labour In Capitalism* (Atlantic Highlands, NJ. Humanities Press).

Kliman, Andrew and Ted McGlone (1988) 'The Transformation Non-Problem and The Non-Transformation Problem', *Capital and Class*, vol. 51 (Autumn), pp. 139–51.

Kliman, Andrew and Ted McGlone (forthcoming) 'One System or Two? The Transformation of Values Into Prices of Production vs. the Transformation Problem', in A. Freeman and G. Carchedi (eds), *Marx and Non-Equilibrium Economics* (Aldershot: Edward Elgar).

Lipietz, Alain (1982) 'The So-Called "Transformation Problem" Revisited', *Journal of Economic Theory*, vol. 26, pp. 59–88.

Marx, Karl (1971) *Theories of Surplus Value*, volume III (Moscow: Progress Publishers).

——(1967) *Capital*, volume I (New York: International Publishers).

Moseley, Fred (1993) 'Marx's Logical Method and the "Transformation Problem"', in F. Moseley (ed.), *Marx's Method in Capital* (Atlantic Highlands, NJ: Humanities Press), pp. 157–84.

Resnick, Stephen and Richard D. Wolff (1987) *Knowledge and Class. A Marxian Critique of Political Economy* (Chicago, ILL: University of Chicago Press).

Roberts, Bruce (1988) 'What Is Profit?', *Rethinking Marxism*, vol. 1, no. 1 (Spring), pp. 136–51.

Roberts, Bruce (1994) 'Embodied Labor and Competitive Prices: A Physical Quantities Approach', Mimeo, Williamsburg, VA: College of William & Mary.

Roberts, Bruce (1995) 'Value, Abstract Labor, and Exchange Equivalence', Mimeo, Williamsburg, VA: College of William & Mary.

Shaikh, Anwar (1977) 'Marx's Theory of Value and the Transformation Problem', in J. Schwartz (ed.), *The Subtle Anatomy of Capitalism* (Santa Monica, CA: Goodyear Publishing).

Sraffa, Piero (1960) *Production of Commodities by Means of Commodities* (Cambridge: Cambridge University Press).

Wolff, Richard and Stephen Resnick (1987) *Economics: Marxian versus Neoclassical* (Baltimore, MD: The Johns Hopkins University Press).

Wolff, Richard, Bruce Roberts and Antonino Callari (1982) 'Marx's (not Ricardo's) Transformation Problem: A Radical Reconceptualization', *History of Political Economy*, vol. 14, no. 4, pp. 564–82.

Wolff, Richard, Antonino Callari and Bruce Roberts (1984) 'A Marxian Alternative to the Traditional Transformation Problem', *Review of Radical Political Economics*, vol. 16, nos 2, 3, pp. 115–36.

5 Socially Contingent Value

Carole Biewener

Acceptance or rejection of some notion of a labour theory of value is often a litmus test for whether one accepts or rejects a distinct Marxian economic analysis. Indeed some economists have given up a labour theory of value altogether, and in so doing place their work outside the Marxian tradition (Lavoie, 1983). Others, however, continue to embrace this project by formulating new ways of conceptualizing the performance of paid and unpaid labour relative to prices and other forms of value (Carchedi, 1991; Kliman and McGlone, 1988; Moseley, 1993). Among the Marxist economists working within a labour theory of value approach, several have offered new ways of conceptualizing value and prices such that values are not simply reduced to direct labour equivalents (Amariglio and Callari, 1989; Kristjanson, 1994; Roberts, 1988; Wolff, Roberts and Callari, 1984). Influenced by Althusser's critique of reductionist and deterministic modes of reasoning (Althusser, 1970; Althusser and Balibar, 1970) these latter Marxists have emphasized the *social* determination of value such that when considering Marx's conception of socially necessary abstract labour as the 'substance' of value, the 'socially necessary' modifier of abstract labour takes on new significance and import. By highlighting the social aspect of value determination, Amariglio, Callari, Kristjanson, Roberts and Wolff have laid the foundations of what may be called a socially contingent value approach.

This chapter outlines the basis for such a socially contingent perspective on value by distinguishing this approach from a more traditional, embodied labour approach to value theory. It indicates that two of the traditional problems encountered by Marxian value theorists – the transformation problem and the numeraire – may be seen as problems for those working from an embodied labour perspective rather than from a socially contingent perspective. The chapter concludes by considering some of the implications of a socially contingent value approach for addressing non-commodity money and how monetary and financial processes are implicated in the negotiation of value and value forms.

EMBODIED LABOUR APPROACH TO VALUE

Ian Steedman offered one of the first comprehensive renditions of the embodied labour approach to value. Basically, in Steedman's model the technical conditions of production are posed as the essential determinants of commodity values (Steedman, 1977). The technical conditions seem to capture the class aspects of value determination, since they influence the amount of labour time necessary to produce a particular commodity, along with the division of the working day between paid and unpaid labour. This is the case for the value of the money commodity as well as the non-money commodities. Therefore, from this perspective, changes in money prices result from changes in the technical conditions of gold mining whereby more or less socially necessary abstract labour time is required to produce a requisite amount of gold. In this manner, value and value forms (for example exchange values and gold prices) are essentially determined by the amount of labour time embodied in the particular commodity; and value and value forms are understood in terms of the same system of accounting – with value as the representation of direct labour time (socially necessary abstract labour time) and exchange values or prices as the form that socially necessary abstract labour time takes in exchange or circulation.

Reliance on this embodied-labour line of argumentation, however, has caused many authors serious difficulties when moving to Marx's volume III world of capitalist commodity production and a developed credit system. Two separate but related 'problems' have been identified. First, there is the long-debated 'transformation problem', whereby difficulties are encountered in systematically translating labour times into prices of production. Second, with the emergence of fiat money, there is the problem of the numeraire or general equivalent since debt money has no intrinsic embodied-labour value.

It may be argued, however, that both of these 'problems' arise because of the way in which value and value forms are conceived, that is, as embodied labour time for value and as signs of these physical quantities for value forms (for example exchange values and money prices). These problems may be associated, therefore, with the attempt to reduce or explain value and value forms solely in terms of direct labour equivalents. Alternatively a project that conceptualizes value and value forms as socially contingent does not encounter the same transformation problem nor the same problem of the general equivalent. Different problems arise with a socially

contingent value approach, thereby shifting the focus to different avenues of inquiry.

SOCIALLY CONTINGENT VALUE AND VALUE FORMS

Let us first consider a socially contingent value approach by briefly addressing the work of Wolff, Roberts and Callari (1984). Wolff *et al.* consider what I am calling the embodied labour approach as neo-Ricardian Marxism, exemplified in the work of Borkeiwicz and Steedman. It is the work influenced by this neo-Ricardian tradition that argues that the 'transformation problem' invalidates Marxian value theory.

Yet for those who consider values and value forms to be two different systems of accounting (Roberts, 1988), there is no such insoluble transformation problem. From this perspective, value 'is the quantity of social labor-time attached to the commodity in production', given the nature and functioning of processes of commodity circulation, while the 'value form as a magnitude is the quantity of social labor-time attached to the commodity in circulation' given the particular processes of production (Wolff *et al.*, 1984, p. 123). Thus 'the form of value in exchange... is a market equivalent for the value of the commodity' (ibid.). The task, therefore, is to specify the 'rule' of exchange equivalence so as to understand the basis of equivalent exchange and to root this in the behaviours of the market exchangers (ibid.).

In volume I of *Capital*, Marx made assumptions about the circulation processes that result in the value form of a commodity (its exchange value) being identical to its value (Marx, 1977; Wolff *et al.*, 1988, p. 123). In volume II, however, value takes the form of market value, as competition between different capitals is considered in the negotiation of exchange equivalence and value in exchange is no longer simply reducible to value in production (Marx, 1981a). Further, in the volume III world of capitalist exchange equivalence, interindustry competition 'transforms' values into prices of production (Marx, 1981b). Wolff *et al.* show how interindustry competition redefines or reconstitutes what is accounted for as socially necessary paid and unpaid labour. 'As a magnitude the price of production... will deviate from the value of the commodity, though dimensionally they are the same, they are both magnitudes of social labor-time' (Wolff *et al.*, 1988, p. 125).

Here the magnitude of value attached to a commodity in exchange (the price of production) is understood as partially determined by the non-class process of capitalist competition. Consideration of a new social contingency, capitalist competition with the rule of equal profitability, redefines exchange equivalence in terms of value form rather than value by redefining what is socially necessary in terms of processes of circulation and exchange.

Further, the new value form, prices of production, reconstitutes value itself:

> This new form of value, as a constitutive element of the capitalist economy, enters directly into the determination of the commodity value, i.e., into the determination of the abstract labor-time 'socially necessary' to produce the commodity (ibid.).

The substance of value remains as socially necessary abstract labour-time, but what this represents is different quantitatively and qualitatively because the scope of social relations under consideration has been changed to include the effects of capitalist competition. In this manner what value and value form are is changed by the social circumstances under consideration. The negotiation of an exchange equivalence is contingent upon the particular set of social relations or processes theorized.

Kristjanson has further extended this socially contingent approach to value and value form. He shows how conditions of excess demand or excess supply produce a new form of value, that of market prices of production:

> The market price of production is the new value form of the commodity. It represents in units of money the abstract labour which is socially necessary for the production of the commodity under conditions of excess demand and supply. Here the labour must be socially necessary in two senses: It must be both technically required and necessary to fulfill existing social need as expressed by effective demand (Kristjanson, 1994, p. 29).

Once again, then, we see that consideration of new social circumstances, new 'contingencies', influences what is considered to be 'socially necessary' abstract labour time in both a quantitative and a qualitative sense. Theorization of these new social circumstances produces a new form of value as well as a new notion of what value

is, a new understanding of what constitutes socially necessary abstract labour time.

Thus from a socially contingent value perspective the transformation problem is one of specifying what *socially necessary* abstract labour time is in each circumstance or social contingency, and thereby considering the consequences for exchange equivalence and the form that value takes in exchange. Therefore this is a different transformation problem from that posed by those neo-Ricardian Marxists who define value in exchange relative to quantities of embodied labour time.

What then are the implications of such a socially contingent value perspective for the consideration of money prices and the second 'problem' encountered in value theory, that of the numeraire or general equivalent?

SOCIALLY CONTINGENT VALUE AND THE COMMODITY MONEY PRICES

A traditional rendering of the problem of the general equivalent is that money can only act as a general equivalent if it takes the bodily form of commodity money because commodity money is produced by labour, and therefore the amount of labour time incorporated in the money commodity (for example gold) acts as the standard (the numeraire) by which to measure the value of all other goods.

Consider Marx's initial definition of an ideal money price in volume I of *Capital* (Marx, 1977, pp. 188–98). In this volume I world of simple commodity production and circulation, value is the labour time that is socially necessary to produce a commodity and the form of value in exchange is exchange value. Money exists in the form of commodity money (gold) and money prices are defined as the value of the non-money commodity relative to the value of the money commodity. Thus the ideal money price of a commodity may be represented as follows:

$$P = \frac{\text{nonmoney commodity value}}{\text{money commodity value (gold)}}$$

$$= \frac{\text{exchange value/use value of nonmoney commodity}}{\text{exchange value/use value of money commodity}}$$

$$= \text{socially necessary abstract labour time embodied in } \frac{\text{nonmoney commodity}}{\text{socially necessary abstract labour time}}$$

Once the state establishes a monetary value for each unit of the money commodity (for example 1 ounce of gold = US$ 1), ideal money prices are 'determined'.

Marx's initial consideration of money prices certainly enables a determinist reading of value and price that reduces them both to physically embodied labour time and the technological requirements of commodity production. Yet as Amariglio and Callari (1989) have shown, even in a volume I world of simple commodity production and circulation, an alternative reading is also possible in which the amount of socially necessary abstract labour time attached to commodities in production is socially contingent, or even arbitrary, rather than determined by some definitive amount of embodied labour time. Amariglio and Callari argue that the amount of labour time attached to a commodity is that which is 'socially necessary' rather than that which is actually embodied.

Amariglio and Callari ask, what is equivalent in exchange? They argue that even in the first chapter of *Capital* the actual amounts of labour time expended by the two exchanging parties are not necessarily equivalent; rather it is the amount of *socially necessary* abstract labour time that is equivalent (ibid., pp. 45–6). '[E]qual exchange of actual labor times [could be conceptualized] only if two very strict conditions were satisfied: first, that there be an actual state of equilibrium in each market; second, that for the production of each commodity there prevail one, and only one, technique of production' (ibid., p. 46). Marx did not consider either of these conditions 'as a normal state of affairs in a capitalist social formation' (ibid., p. 47). Therefore, 'in general ... exchange involves a trading of unequal quantities of actual labor time' (ibid.)

Thus Marx posed a 'theoretical problem' whereby 'trades of *unequal* magnitudes of *actual* labor time' must be conceived of as 'an exchange of equivalents' (ibid., p. 45). As Amariglio and Callari argue, 'nothing in trade per se requires' equal exchange (ibid., p. 44). Rather, 'specific social conditions are required for this equality of exchange to be operative in trade ... [And,] for us, the concept of the "individual" summarizes just these conditions' (ibid.) In order for equal exchange to occur, agents engaged in trade must be constituted in a particular fashion; that is, they must have a particular subjectivity – that of isolated, equal individuals who are capable of objectifying human activity and who act as rational economic beings (ibid., p. 41). Amariglio and Callari show that the consciousness of these agents (a cultural process) is a necessary condition for the development of

commodity trade on an extensive scale. The social agency of individuals is part of what constitutes equal exchange. 'Exchange (of equivalents) is made theoretically necessary by the presence of individuals' (ibid., p. 49). Thus not only must there be the expenditure of particular amounts of labour time in order for there to be commodity circulation and exchange equivalence, but the labour time must also be performed in particular circumstances, that is, with agents having a particular consciousness (as equals, as individuals, as owners of private property and so on). In this manner, then, cultural processes can be understood as constituting value and value forms.

Amariglio and Callari establish the concept of *socially necessary* labour time as Marx's discursive manner of theorizing a 'standard of equality' (ibid., pp. 48, 57):

> In a capitalist social formation, given the existence of individuals, trade is constructed as an equal exchange, There are, however, different bases for conceiving or enacting that equality. Marx conceptually constructed a basis for equal exchange with the concept of socially necessary labor time. Neoclassical theorists conceive equal exchange on the basis of utility (ibid., p. 57).

Thus we see that even with Marx's initial consideration of value and forms of value, the meaning of value is contingent upon the multitude of processes present in any particular conceptualization. Value, in Marxian economics, may then always be defined as socially necessary abstract labour time, but what this refers to will depend upon the particular circumstances under consideration. With new social processes included in the analysis, the negotiation of what is 'socially necessary' changes and, thereby, so does the meaning of value and value forms. The concept of what value is understood to be, both qualitatively and quantitatively, is in this sense, socially contingent.

Recognition of the socially contingent nature of value and value forms has important implications for the consideration of money prices. If one accepts the line of argument put forth by Amariglio and Callari, then the exchange value per unit of use value of a commodity is contingent and even arbitrary in the sense that no *necessary* exchange value per unit of use value is attached to a particular commodity in exchange. Exchange equivalence is negotiated with each exchange such that what is understood as 'socially necessary' is constantly constituted and reconstituted, and thereby the exchange value

attached to any particular commodity is socially constituted or socially contingent. This social contingency holds for both the numerator and the denominator of the ideal money price expression. Therefore even in a volume I world of simple commodity production, there is no numeraire in the sense of a pregiven standard of value that exists separate from its social construction. Exchange equivalence is always negotiated and constructed and its construction is constituted by the social circumstances or contingencies in which the equivalence is negotiated. Thus Marx's numeraire in volume I does not 'exist' as a pregiven artifact. Rather it is constructed as a discursive device, as a way of understanding the world. Marx recognized this when he specified some of the cultural, political and economic conditions necessary for the existence of this ideal money price (Marx, 1973). For instance commodities had to be products of private labour and produced by independent commodity producers who 'recognize each other as owners of private property' (Marx, 1977, p. 178).

In volume I of *Capital*, Marx's particular formulation of commodity money acting as a general equivalent allowed him to discuss commodity circulation without money playing a role in value determination. Money was neutralized in this sense. By assuming that the value attached to commodities in exchange (exchange values) reflects the value attached to them in production (socially necessary abstract labour time), Marx was able to focus initially on the class processes of producing and appropriating value and surplus value, leaving his analysis of how commodity circulation may influence value determinations for later consideration in volume III (Wolff *et al.*, 1984, p. 122). Thus in volume I Marx's initial discursive strategy was to establish money as a means by which private labour is socialized such that the values attached to commodities in exchange might be understood in relation to the labour expended in production. As many Marxists have noted, 'a primary function of money is to act socially to validate independent private labor as socially necessary' (De Vroey, 1981, p. 178). Yet at the same time Marx's initial set of assumptions concerning the social circumstances or contingencies under which commodity production and circulation occurred 'neutralized' the effects of monetary processes on value determinations.

In volume III Marx introduced new social processes that reconstitute value and value forms. In the second section above we briefly considered the implications of interindustry competition and conditions of excess demand or excess supply for the reconstitution of value and value forms. Let us now consider the emergence of non-

commodity money and capitalist credit from a socially contingent value perspective.

SOCIALLY CONTINGENT VALUE AND NON-COMMODITY MONEY

A socially contingent value perspective has at least three implications for our understanding of non-commodity money in particular, and for monetary and financial processes more generally. First, from a socially contingent value perspective the existence of non-commodity money is not problematic in itself since a numeraire is not posited in a determinate sense. Second, when considering monetary processes the project becomes one of specifying the social conditions for money to take the form of fiat money or debt money. Third, monetary and financial processes may be theorized as partially constituting value and value forms. I conclude by considering each of these briefly.

First, the non-problematic positing of the existence of non-commodity money or fiat money is a rather simple proposition. Fiat money is not produced by the expenditure of paid and unpaid labour as in the case of commodity money. It therefore has no direct physical labour component by which to ground a numeraire. However, from the perspective of socially contingent value the problem of the numeraire or general equivalent is not that of 'grounding it' in expenditures of labour time by reducing money prices to direct amounts of labour performed. Rather the problem is to specify how an exchange equivalence is established, which means defining the terms or conditions by which this equivalence is negotiated. From this perspective the challenge is that of determining how what is 'socially necessary' is constituted or negotiated. In so doing monetary and financial processes need to be considered.

Second, in exploring the particular ways in which monetary processes constitute (and are constituted by) value and value forms, we need to elaborate the social conditions for money to take the form of fiat money or debt money. In the past decade some very interesting work has looked to the functions that money performs to theorize fiat money's existence in the form of debt money. This is a form-theoretic line of argument. Reuten (1988), for instance, has developed an analysis of the conditions for the emergence of money whereby the existence of money is theorized separately from its bodily form. The first condition is for money to act as a measure of value and to be a

'measure of value beyond accidental exchange, and if value is to be anticipated before production, money necessarily has to be a fiduciary store of value' (Reuten, 1988, p. 127).

Money's second condition of existence is as a medium of circulation. As an expression of a commodity's exchange value, money has no essential content; 'in this sense, money has no value, only an infinite number of exchange-values, one against each commodity' (ibid.) Then, with capitalist production and the circuit of capital, money acts as a means of payment. Finally, with the generalization of commercial credit and investment credit, money acts as money of account and as money capital. This enables the emergence of private bank debt money.

Lapavitsas (1991) reasons in a similar fashion, but he argues more explicitly that the form that money assumes is dependent upon the dominant function of money at a particular level in the development of exchange. When money acts as a measure of value in the early stages of market development, gold coins are adequate. As exchange becomes more extensive and money begins to act as a means of circulation, convertible paper money emerges (coins lose value due to abrasion and fraud). Then, with the credit system and fully developed capitalist production and exchange, money functions as a means of payment and banknotes act as money. Thus non-commodity money arises out of the integration of commercial credit and investment credit (finance credit for Lapavitsas, and trade credit and production credit for Reuten).

Reuten and Lapavitsas both explore how credit money originates in the private relationships banks have with their clients when they lend to finance the circulation of commodities at either the beginning or the end of the production process. They show, however, that a private banknote is theoretically inadequate as a form of money. Since the private nature of debt obviates the role of the banknote as a social validation of labour, the full development of non-commodity money requires a state to act as a guarantor of bank debts to provide social sanction for banknotes as money (Kristjanson, 1994, p. 29). As Lapavitsas explains, state-issued credit money arises out of the 'contradiction in banknote circulation between the universality inherent in the means of payment and the particularity of private banknotes' (Lapavitsas, 1991, p. 313).

The final step in the evolution of non-commodity money comes with the emergence of debt money as deposit money. This corresponds to the elevation of the hoarding function of money. With the concen-

tration of hoards, money deposits are formed that serve as the basis for private bank lending. This is extended with branch banking, which enables systematic hoard collection and thereby the supersession of banknotes by deposit accounts. In this manner, then, Marxists have theorized the conditions that enable the emergence of debt money or non-commodity money, highlighting the role of private bank lending and deposit creation.

This brings us to the third issue, the question of how monetary and financial processes are implicated in the negotiation of value and value forms. In terms of monetary processes, it seems that Marxist work is most developed with respect to inflation and how it is linked to the endogenous creation of money with private bank lending (Kristjanson, 1994; Lipietz, 1983). This focus is not surprising considering the focus on private bank lending and deposit creation in the analysis of non-commodity money. With private bank lending, debt money is created and advanced prior to the circulation of the commodities whose labour it is supposed to validate. Money prevalidates the expenditure of labour, yet the successful social validation of such labour is not guaranteed. If commodities do not sell at their anticipated value and banks do not absorb the private losses such that the money supply does not contract, then the private loss is socialized and shifted to money holders via a decline in the purchasing power of money (Kristjanson, 1994, pp. 18–21).

This raises the possibility that inflation born of bank lending and the character of debt money may be an element in the negotiation of what value is and in the constitution of socially necessary abstract labour. For instance, if such inflation affects the monetary prices of constant capital there may be a systematic renegotiation of what is constituted as socially necessary abstract labour time, leading to a redistribution of surplus labour among industrial sectors. Or, in another vein, when considering international exchanges, relative rates of inflation may be theorized as influencing the exchange equivalence between internationally traded commodities, and thereby the amount of socially necessary abstract labour time attached to a commodity. For example the unsuccessful social validation of labour in France may lead to inflation, which would affect the value of the French franc relative to the Deutschmark. This in turn may mean that in international (French–German) exchanges more French workers' labour is exchanged for German workers' labour (Salama, 1984). In this manner, what is established as socially necessary labour time is constituted by international as well as national circumstances. This

argument remains to be made fully, but the general direction is clear; and the important point here is that monetary processes are conceptualized as an element in the constitution and negotiation of value in both a quantitative and a qualitative sense.

In terms of financial processes, one avenue for further consideration is the affect of financial markets on value and value forms. For instance the proliferation of financial assets and the use of money as a speculative asset on foreign exchange markets affects the hoarding and dishoarding of money, and thereby the endogenous creation of money. This in turn may be shown to influence the constitution of value and value forms.

In sum, then, with a socially contingent value approach the concern becomes that of showing the interconnections between monetary and financial processes and the class processes of producing, appropriating and distributing a surplus that, in the case of capitalist exploitation, takes a value form. The existence of non-commodity money *per se* is not problematic from this perspective. But the challenge remains of showing how this non-commodity money and monetary and financial processes constitute and are constituted by value and value forms in particular and class processes more generally.

References

Althusser, L. (1970) *For Marx*, trans. B. Brewster (New York: Vintage).

Althusser, L. and E. Balibar (1970) *Reading Capital*, trans. B. Brewster (London: New Left Books).

Amariglio, J. and A. Callari (1989) 'Marxian Value Theory and the Problem of the Subject: The Role of Commodity Fetishism', *Rethinking Marxism*, vol. 2, no. 3, pp. 31–60.

Bellofiore, R. (1989) 'A Monetary Labor Theory of Value', *Review of Radical Political Economics*, vol. 21, pp. 1–27.

Carchedi, G. (1991) *Frontiers of Political Economy* (New York: Verso).

De Vroey, M. (1981) 'Value, Production and Exchange', in I. Steedman *et al.* (eds), *The Value Controversy* (London: Verso), pp. 173–201.

Foley, D. (1982) 'The Value of Money, the Value of Labor Power and the Marxian Transformation Problem', *Review of Radical Political Economics*, vol. 14, no. 2, pp. 37–47.

Kliman, A. and T. McGlone (1988) 'The Transformation Non-Problem and the Non-Transformation Problem', *Capital and Class*, vol. 51 (Autumn), pp. 139–51.

Kristjanson, D. (1994) 'Effective Demand and the Value of Credit Money: A Marxian Approach', mimeo, Amhers, MA: Department of Economics, University of Massachusetts.

Lapavitsas, C. (1991) 'The Theory of Credit Money: A Structural Analysis', *Science & Society* vol. 55, no. 3, pp. 291–322.

Lavoie, D. (1983) 'Some Strengths in Marx's Disequilibrium Theory of Money', *Cambridge Journal of Economics* vol. 7, no. 1, pp. 55–68.
Lipietz, A. (1983) *Le monde enchanté. De la valeur à l'envol inflationniste* (Paris: La Découverte/Maspero).
Lipietz, A. (1986) 'Marx, the Quantity Theory and the Theory of Value', *History of Political Economy*, vol. 18, no. 1, pp. 155–70.
Marx, K. (1973) *Grundrisse*, trans. M. Nicolaus (New York: Vintage).
Marx, K. (1977) *Capital*, vol. I, trans. B. Fowkes (New York: Vintage).
Marx, K. (1981a) *Capital*, vol. II, trans. D. Fernbach (New York: Vintage).
Marx, K. (1981b) *Capital*, vol. III, trans. D. Fernbach (New York: Vintage).
Moseley, F. (ed.) (1993) *Marx's Method in Capital: A Reexamination* (Atlantic Highlands, NJ: Humanities Press).
Ong, N. (1983) 'An Inquiry Into the Logic of Marx's Theory of Money', *Social Concept*, vol. 1, no. 1, pp. 30–54.
Reuten, G. (1988) 'The money expression of value and the credit system: a value-form theoretic outline', *Capital & Class*, vol. 35, pp. 121–41.
Roberts, B. (1988) 'What is Profit?', *Rethinking Marxism*, vol. 1, no. 1, pp. 136–51.
Rubin, I. I. (1973) *Essays on Marx's Labour Theory of Value* (Montreal: Black Rose Books).
Rubin, I. I. (1978) 'Abstract Labour and Value in Marx's System', *Capital and Class*, vol. 5, pp. 107–38.
Salama, P. (1984) 'France: le taux de change et sa manipulation', *Critiques de l'économie politique*, no. 29 (Oct.–Dec.), pp. 33–46.
Steedman, I. (1977) *Marx After Sraffa* (London: New Left Books).
Wolff, R., B. Roberts and A. Callari (1984) 'A Marxian Alternative to the Traditional "Transformation Problem"', *Review of Radical Political Economics*, vol. 16, nos 2–3, pp. 115–35.

6 Does Marx Need to Transform?

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INTRODUCTION

Almost all of the voluminous literature on the Marxian 'transformation problem' is predicated on the assumption that, whether or not he succeeded, what Marx was *trying* to do in part 2, volume III of *Capital* – namely to derive a set of prices consistent with the equalisation of the rate of profit across all capitals – was correct. Those neo-Ricardians who argue that there is really no transformation problem as such (on the ground that labour values are theoretically redundant – see Steedman, 1977) most emphatically share this assumption.

A rare exception to this orthodoxy is Farjoun and Machover's *Laws of Chaos* (1983). Farjoun and Machover, like Steedman, conclude that there is no transformation problem, but for a very different reason, namely that the assumption of a tendency towards equalisation of the rate of profit is both empirically false and theoretically untenable. Rather, they claim, the predictions of the simple labour theory of value, as in volume I of *Capital*, are in better accord with the facts.

Our aims in this chapter are to explain this claim, to present some empirical data by means of which the claim may be assessed (based mainly on analysis of UK input–output tables) and to offer some (tentative) thoughts on the economic mechanisms that might be responsible for generating the observed data. We should point out that *if* the transformation problem is conceived as a purely logical exercise – a matter of showing how an aggregative labour theory of value can be reconciled with the assumption of an equalized rate of profit – then our chapter has nothing to say about it. Our belief is that the transformation from labour values to prices of production was a live issue for Marx because he thought there really was a strong tendency for the rate of profit to be equalised, so that the simple labour theory of value would yield seriously counter-

factual predictions. We will argue that Marx was wrong on this point.

We begin with a brief examination of the logic of the standard equalised-profit assumption.

THE TENDENCY TOWARDS AN EQUALISED RATE OF PROFIT

Supporters of the assumption of an equal rate of profit for the purposes of theoretical analysis would surely admit that rates of profit, in any particular economy at any particular time, show quite a wide dispersion. Their claim is not that a single rate of profit actually exists, but that there exists a definite *tendency* to produce equalisation, and that for theoretical purposes it is legitimate to assume that this tendency is fully realised.

But what exactly is the status of such a tendency? According to this theory, should we expect to see the dispersion of rates of profit narrowing over time in actual capitalist economies? If that is the idea, it seems to be empirically false. Farjoun and Machover produce evidence that the empirical frequency distribution of profit rates is broadly stable over time, with no observable tendency to collapse towards degeneracy. The alternative is to claim that the tendency towards equalisation is something inherent in the process of competition among capitals, but that it is 'masked' by the continuous occurrence of external shocks or disturbances. This theory relies on a partitioning of the causes operating on the dispersion of profit rates. Internal to the logic of the system is a competitive process that drives towards equalisation, while the dispersion-enhancing disturbing factors are exogenous. What are the latter factors? If they were sunspots, hurricanes, earthquakes and so on, the theory would be coherent (but even so, if the net result of the endogenous equalisation process and the exogenous shock process is the maintenance of a roughly steady degree of dispersion, the equalised-rate assumption would not be very useful for analysis of real economies). But surely the most *significant* factors making for increased dispersion of profit rates are just as endogenous to the process of capitalist competition, or rivalry, as the equalizing factors: the development and application of new technologies; the development of new products; the exploitation of new markets or new sources of labour supply or raw materials.

In the classical analysis – shared by Smith, Ricardo and Marx – the primary force working towards equalisation is the mobility of capital between sectors of the economy in response to profit-rate differentials. If industry *X* is showing above- average profit, capital will move in, increasing the supply of the product and hence driving down both price and profit rate. If industry *Y* shows below-average profit, capital will tend to exit the industry, reducing supply and hence raising price and profit rate. This mechanism makes sense in itself,[2] but it represents only one aspect of capitalist competition, understood broadly as the restless search for the greatest possible profit. Admit the other aspects of intercapitalist rivalry (alluded to above), and it becomes an empirical question whether competition produces (1) an actual tendency towards equalisation, (2) a tendency towards ever greater dispersion, or (3) a roughly stable probability distribution for the rate of profit. As we have noted, the available data favour conclusion (3).

Why, then, does the equalised-profit assumption exercise such a hold over theorists? It may be that there is a temptation to think of competition among productive capitals according to the model of arbitrage in financial markets. But this model is very misleading. The equalisation of returns on financial assets comes about almost instaneously via revaluation of securities, while the equalisation of returns on industrial capital is at best a very slow process, dependent upon on the rate of depreciation and the speed with which new production facilities can be financed, built and brought into production. There is also the syndrome of looking for one's keys under the lamp post. Suppose the equalisation assumption is false – all the same, how else is one supposed to derive determinate theoretical results? If one assumes a non-equalised set of profit rates, how can one reach any conclusions? Indeed, will this not undermine the simple labour theory of value just as severely as it undermines the theory of prices of production? The problem here is the restriction of the search to *determinate* results: a *stochastic* version of the labour theory of value can manage quite well without an equalised profit rate, and still generate interesting and testable predictions regarding the 'laws of motion' of capitalism. Farjoun and Machover (1983) show how this can be so. In chapters 5 and 6 of their book they explain why it might be that prices tend towards proportionality with labour content for broadly defined groups of commodities, in a context where the rate of profit is far from equalised, while in chapter 7 they offer an interesting discussion of the dynamic-historical 'law of decreasing labour-content'.

THE STOCHASTIC APPROACH

Farjoun and Machover make a distinction between the realm of production, where matters are relatively determinate, and the realm of price formation and profits, where the 'anarchy of the market' prevails and the relevant magnitudes must be thought of as random variables. The search for the 'correct' determinate linkages between these variables is displaced by an analysis of the relevant probability distributions, their respective degrees of dispersion and their interconnections. In this spirit we offer below a list of the most important distributions to be examined in order to assess the relative merits of the simple labour theory of value and the theory of prices of production (either Marxian or Sraffian).

1. The distribution of ratios of market prices to labour values, $f(\psi)$, where $\psi = P/\Lambda$. (P denotes market price and Λ denotes embodied labour time.)

2. The distribution of rates of profit, $f(r)$, where $r = S/(C + V)$. (As usual, S, C and V denote, respectively, surplus value, constant capital and variable capital.)
3. The distribution of ratios of market prices to prices of production, $f(\phi)$, where $\phi = P\Pi$. (Π denotes prices of production.)
4. The distribution of organic composition of capital, $f(o)$, where $0 = C/(S + V)$.
5. The distribution of rates of surplus value, $f(s)$, where $s = S/(S + V)$.

A word on the definitions of these distributions. First of all, we should emphasise that the magnitudes S, C and V are all expressed in money terms. Thus while we refer to the ratio $S/(S + V)$ as the 'rate of suplus value' for the sake of brevity, it should properly be called the *money*-rate of surplus value. The only magnitude above whose dimension is labour hours is Λ, the denominator of the price–value ratio. Conceptually, $f(r)$ is the probability density function such that $\int_a^b f(o)do$ gives the fraction of the total social capital earning a rate of profit $a < r < b$ percent. Similarly $\int_a^b f(o)do$ gives the fraction of capital with an organic composition $a < o < b$, and $\int_a^b f(s)ds$ gives the fraction of capital displaying a rate of surplus value $a < s < b$. For the ratio of market price to value, $\int_a^b f(\psi)d\psi$ gives the fraction of the total social product (measured in embodied labour time)

Table 6.1 Predictions of labour theory of value and theory of prices of production

Distribution	LTV	TPP
$\psi = P/A$	narrow	wide
$r = S/(C + V)$	wide	narrow
$\phi = P/\pi$	wide	narrow
$o = C/(S + V)$	wide	wide
$s = S/(S + V)$	narrow	wide

exchanging for a price $a < \psi < b$ per unit of embodied labour; and $\int_a^b f(\phi)d\phi$ gives the fraction of the total product (measured in terms of its price of production) exchanging for an observed price $a < \phi < b$ per unit price of production.

Table 6.1 shows the respective predictions of the simple labour theory of value (LTV, understood as the claim that commodities exchange in proportion to the socially necessary labour time required to produce them) and the theory of prices of production (TPP, that is, the theory that prices are formed so as to ensure an equalised rate of profit) with regard to these distributions. In the table, 'narrow' indicates that the distribution in question ought, according to the particular theory, to have a relatively small standard deviation (taken literally, the prediction in these cases is degeneracy of distribution, but nobody expects to find that in practice). The entry 'wide' indicates that the theory places no restriction on the degree of dispersion of the distribution in question.

In principle, the simple LTV restricts only the distribution of price-to-value ratios. Given the auxiliary assumption that the dispersion of wage rates across industries is relatively narrow, however, the LTV also predicts a narrow dispersion of money rates of surplus value. A word of explanation here: suppose that the wage is uniform across industries, as are the intensity of labour, working hours and average skill levels. (Or, somewhat less restrictively, suppose that the wage per hour of simple labour of average intensity is uniform across sectors, with skilled labour counting as a suitable multiple of simple labour.) In that case it is true by definition that the rate of surplus value in *labour-time* terms is uniform. Now, if prices are simply proportional to values, the money rate of surplus value (which is what we are measuring will also be uniform. Since we have built the assumption of a uniform wage (per hour of simple labour) into our measurements, by using the wage bill of

each sector as a proxy for hours worked, we place the prediction 'narrow' against the money rate of surplus value, s, in the LTV column.

The theory of prices of production restricts only the distributions of rates of profit and, correspondingly, the ratios of actual prices to prices of production.

THE DATA

We now turn to the empirical probability distributions for these variables. Our data are derived from UK input–output tables for 1984 (Central Statistical Office, 1988). As mentioned above, S, C and V are all expressed in monetary terms. Values, Λ, and prices of production, Π, were calculated by an iterative procedure. The input–output tables give a single, discrete observation on S, C, V, P, Λ and Π for each sector of the economy. The statistics of interest (mean, standard deviation and coefficient of variation) were calculated from these discrete observations using appropriate weights. For instance, in calculating the standard deviation for $\psi = P/\Lambda$ the weight given to each sector is $w_i = \Lambda_i / \sum_i \Lambda_i$, while for the rate of profit the weight is $w_i = (C_i + V_i) / \sum_i (C_i + V_i)$. The graphs showing the shape of the various distributions were derived via the application of a convolution function to the discrete data. Let $\hat{x}_i, i = 1, ..., n$ denote the discrete observations on some variable of interest, x, for each of the n sectors in the input–output table. We compute the continuous pdf given by

$$f(x) = \sum_{i=1}^{n} w_i N_{x_i, \sigma_c}(x)$$

where $N_{\mu,\sigma i}(x)$ is the value of the normal pdf, with mean μ and standard deviation σ_c, at point x. The assumption here is that each of the sectoral observations in fact represents the mean of a normal distribution. (The rationale for this is that each sector represents the aggregation of many firms, producing a great variety of particular products. Within a given sector such as 'oils and fats' it will not be the case that every firm has the same organic composition of capital, or every product the same ratio of price to value. We assume that the distribution of such variables *within* each sector is similar in shape to the distribution *across* the sectors, but centred on the observed sectoral mean.) The degree of smoothing of the resulting curve

depends on the value chosen for x, the standard deviation employed in the convolving function. (In the plots shown, σ_c was set at one fifth of the standard deviation of the relevant distribution as a whole.)

The UK tables comprise 101 sectors, five of which we excluded from our analysis (agriculture, extraction of oil and gas, mineral oil processing, gas, and banking and finance). The rationale for excluding the first four of these sectors is that they exhibit strong rent effects. Ricardo and Marx were very clear on how rent produces a deviation from the simple labour theory of value, and the rent effect is not at issue between the labour theory of value and the theory of prices of production. The rent effect is most apparent in the case of oil and gas extraction. Figure 6.1 shows, for reference, the distribution of ϕ, the ratio of market price to price of production, for all 101 sectors: the outlier to the right is the oil and gas sector. As regards the ratios of market prices to labour values, this induces a substantial second-round deviation for the oil processing and gas distribution sectors, since purchases from the oil and gas extraction sector account for approximately 50 per cent and 30 per cent, respectively, of the total input costs of these two sectors. In addition, the figure for income from employment in agriculture is likely to understate substantially the labour used in that sector, due to the existence of family farms. Finally, the banking and finance sector is excluded on the grounds that most of its receipts from the other sectors are composed of interest payments, rather than payments for goods or services that take labour to produce.

We should point out that due to the limitations of the available UK data, our figures for constant capital, C, are in flow rather than stock

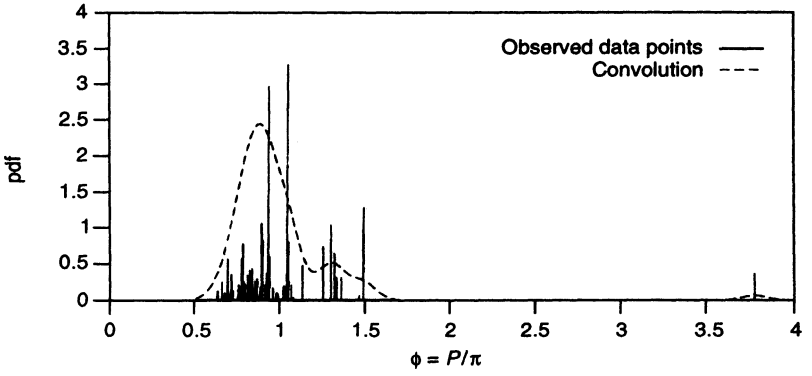

Figure 6.1 Ratios of actual prices to prices of production, 101 sectors

terms throughtout. Correspondingly, our rates of profit, of production and orgnic compositions are all on a flow basis. We recognise that this constitutes a series limitation of the present study, and we plan to calculate these variables on a stock basis, using data from the United States, in future work.

Two other details of our calculation methods may be noted: we evaluated the output of each sector at producer prices; and we counted the payment of interest to the banking sector as part of the surplus value in each sector.

Table 6.2 shows the summary statistics for the observed distributions of o, r, s, ϕ and ψ, ranked in order of coefficient of variation. Thus o, our measure of organic composition, has the greatest degree of dispersion and ψ, the ratio of market prices to values, has the least. Note that the rate of profit, r, has a somewhat higher coefficient of variation than the rate of surplus value, s, and the ratios of actual prices to prices of production are slightly more broadly dispersed than the ratios of actual prices to values.

Table 6.2 Summary statistics for empirical distributions

Distribution	*Mean*	*Std. dev.*	*C. V.*
$o = C/(S+V)$	0.846	0.636	0.752
$r = S/(C+V)$	0.211	0.129	0.608
$s = S/(S+V)$	0.315	0.134	0.423
$\phi = P/\Pi$	1.000	0.114	0.114
$\psi = P/\Lambda$	1.000	0.104	0.104

These findings are also illustrated in Figures 6.2, 6.3 and 6.4. Figure 6.2 shows both the sectoral data points and the convolved probability density function for the organic composition of capital. The outliers to the right are all sectors involved in food processing – oils and fats, sugar, grain milling, and so on. These industries, it appears, take as their major input large quantities of agricultural commodities, and process them with relatively little labour input, per unit value of raw materials. It may be noted, though, that even if these industries are left out of the calculation, the coefficient of variation for organic composition still exceeds that of any other variable under consideration. On the other hand, the great bulk of the pdf lies within the range 0.2–2.0, which represents a considerably narrower distribution than is implicit in many of the examples drawn up by Sraffian theorists.

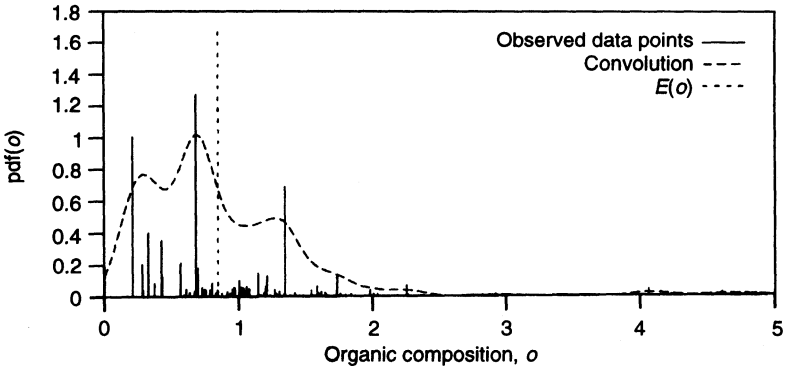

Figure 6.2 Empirical distribution of organic composition

Figure 6.3 shows the convolved density functions for both the rate of profit and the rate of surplus value. As can be seen, the distribution of the rate of profit is far from degenerate. Figure 6.4 shows the distributions for the ratios of actual prices to values, and of actual prices to prices of production. It is easily seen that the degree of dispersion is quite similar in the two cases. (Note that both of these distributions have a mean of unity by construction. In effect, we have chosen a unit of measurement of labour so as to satisfy Marx's stipulation that the sum of prices equals the sum of values.)

IMPLICATIONS OF THE DATA

Let us first consider the implications of the above data for the theory of prices of production. As we noted, the rate of profit is far from actual equalisation. On the other hand the distribution of ratios of actual prices to prices of production is relatively tight. So can we say that the theory of prices of production holds as a reasonable approximation? Not really. There are some important anomalies in the data, from the point of view of this theory. Note that the ratio of market price to value can be be decomposed as follows:

$$\frac{P}{\Lambda} = \frac{P}{\Pi}\frac{\Pi}{\Lambda}$$

In terms of logs, this can be rewritten as

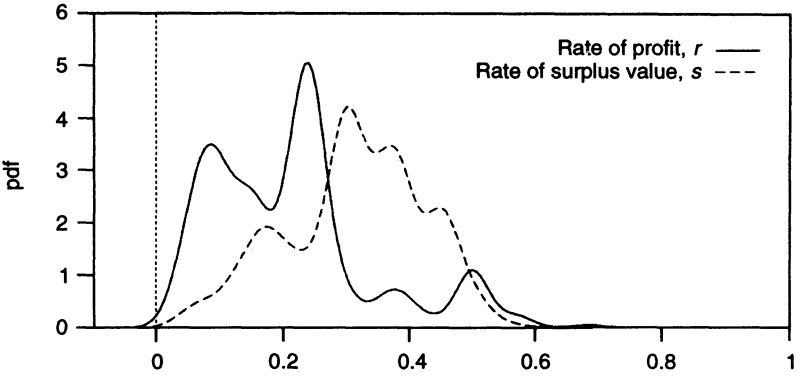

Figure 6.3 Distribution of rates of profit and of surplus value

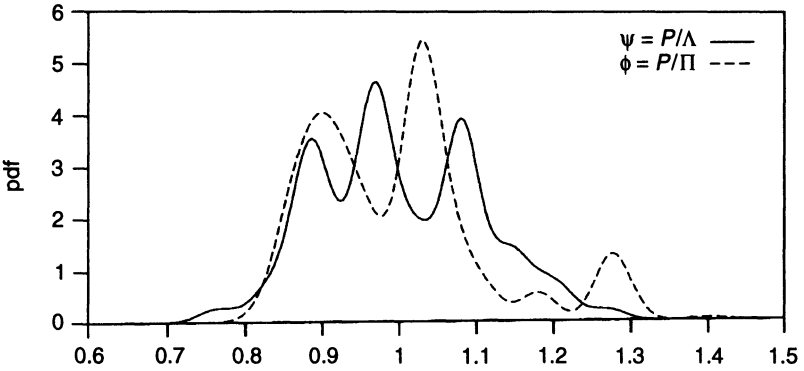

Figure 6.4 Ratios of actual prices to values, and to prices of production

$$log(P) - log(\Lambda) = (log[P] - log[\Pi]) + (log(\Pi) - log[\Lambda]),$$

which is to say that the deviation, in log terms, of price from value is the sum of (1) the deviation of price from price of production, and (2) the deviation of price of production from value. According to the theory of prices of production, these two elements ought to be independent of each other. Deviation (1) reflects the stochastic non-equalisation of the rate of profit, while deviation (2) reflects the dispersion of the organic composition of capital; and it is the whole point of this theory that prices ought to be formed so as to eliminate any systematic effect of differential organic composition on profit rates.

Now, if x and y are two independently distributed random variables, and if $z = x + y$, then $var(z) = var(x) + var(y)$. The implication is that, provided the distribution of the organic composition is not degenerate – and it clearly is not, in the actual data – the standard deviation of P/Λ ought to be greater than that of P/II. But this is not the case. It must be, then, that the distribution of profit rates is *not* in fact independent of the distribution of the organic composition of capital, that is, the theory of prices of production, even under a stochastic interpretation, is false.

A closely related anomaly from the standpoint of the price of production theory is the fact that the rate of surplus value (which according to this theory is not subject to any equalisation pressure) shows a *smaller* relative dispersion than the rate of profit.

A further perspective on these points is given by Table 6.3, which displays the correlation matrix for all the variables under consideration. Note the negative correlation (statistically significant at the 0.005 level) between the rate of profit and the organic composition of capital. It is this negative correlation that explains how simple labour values are able to provide as good a fit to actual prices (actually, on our data, a slightly better fit) as prices of production. The close fit between prices and labour values is in line with the results of a series of regression analyses, including those by Shaikh (1984), Petrovic (1987), Ochoa (1989), Valle Baeza (1994) and Cockshott, Cottrell and Michaelson (1995).

Table 6.3 Correlation matrix

	o	r	s	ϕ	ψ
$o = C/(S+V)$	1.000				
$r = S/(C+V)$	−0.288	1.000			
$s = S/(S+V)$	0.369	0.517	1.000		
$\phi = p/\Pi$	−0.224	0.930	0.491	1.000	
$\psi = P/\Lambda$	0.423	0.569	0.579	0.663	1.000

Note: For a sample size of 96, the 1 per cent critical value of the correlation coefficient, $\hat{\rho}$, is 0.262.

To reinforce this point, Figure 6.5 shows the data points for organic composition and rate of profit, along with the fitted line from the regression of the rate of profit on the inverse of the organic composition (which, as one would expect on the basis of the simple labour theory of value, gives a better fit than a linear relationship). This is a striking result; we should, however, remind the reader that it should

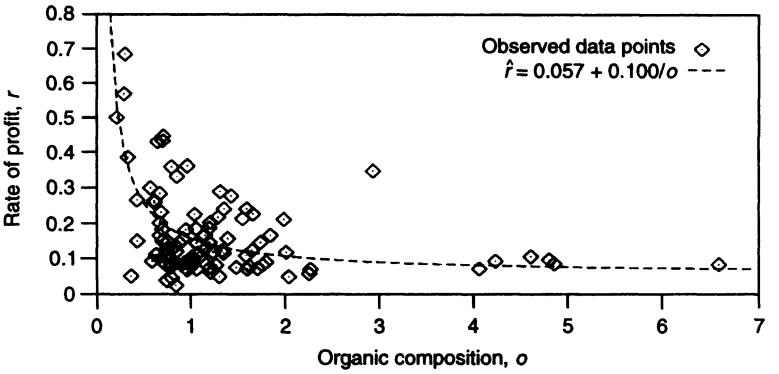

Figure 6.5 Organic composition versus rate of profit

be regarded as provisional, given that both the rate of profit and organic composition are calculated here using the flow rather than the stock of constant capital.

Let us now turn to the simple labour theory of value. The first point to notice here is the support the theory receives from the observed narrow distributions of the price–value ratio and of the rate of surplus value. On the basis of very general statistical considerations, plus the assumption that there should be a very small probability (no more than one thousandth) of a commodity selling for a price too low to cover the total wage costs of producing it, Farjoun and Machover (1983, ch. 5) predict that the ratio of price to value should be distributed approximately normally, with a coefficient of variation of no more than one sixth. From our data, it appears they were conservative: the coefficient of variation is closer to one tenth.

On the other hand, from this point of view it may seem puzzling that the ratio of market prices to prices of production, ϕ, has a considerably narrower distribution than that of the rate of profit. Why should prices of production function reasonably well as predictors of prices? This is comprehensible in terms of the fact that the rate of profit is considerably less than 1. Since profits make up only about 20 per cent of prices, a 50 per cent variation in the rate of profit will produce a variation of prices of about 10 per cent. Thus we would expect the coefficient of variation of ϕ to be about one fifth that of r. This is in fact what we observe from Table 6.2.

In addition, the data seem to indicate that some *partial* equalisation of the rate of profit is going on. Note that by this we do not mean

simply that the equalisation of the rate of profit is subject to random disturbance; rather we mean that reality seems to fall roughly half way between the simple labour theory of value and the theory of prices of production – half way, that is, between volumes I and III of *Capital*! Consider in this light some of the other entries in Table 6.3. There is a negative correlation between organic composition and profit rates: this is what would be predicted on the basis of the simple labour theory of value. But there is also a significant *positive* correlation between organic composition and the rate of surplus value (expressed in terms of money): this is predicted by the theory of prices of production. Thus while there seems to be some tendency for capitals with higher than average organic composition to realise a higher money rate of surplus value, this effect is not strong enough to 'compensate' fully for their higher proportion of constant capital. Essentially the same story emerges from the positive correlation between organic composition and the price – value ratio, ψ. The fact that a positive correlation exists is consistent with the price of production theory; but again the correlation is not strong enough to validate the theory. It is not strong enough to eliminate the negative correlation (statistically significant at the 0.05 level) between organic composition and the ratio of price to price of production, ϕ.

Table 6.4 Correlations with organic composition

Variable	*LTV Prediction*	*TPP Prediction*	*Observed*
$o = C/(S+V)$	1	1	1
$r = S/(C+V)$	–	0	–
$s = S/(S+V)$	0	+	+
$\phi = P/\Pi$	–	0	–
$\psi = P/\Lambda$	0	+	+

These points are summarised in Table 6.4, which displays the predictions of the labour theory of value and the theory of prices of production regarding the signs of the correlation coefficients involving the organic composition of capital, alongside the signs of the observed coefficients.

Taking the above results at face value, it appears that market prices behave under the influence of two competing attractors – values, and prices of production. How might we explain this? With regard to the

pull exercised by simple labour values, there is clearly a close mathematical relationship between the dispersion of rates of surplus value and the dispersion of price – value ratios. These distributions are either both wide or both narrow. This observation suggests two possible sorts of causal mechanism:

1. Suppose that for some as yet untheorised reason the simple labour theory of value – where labour input is measured in hours rather than indirectly as wages paid – holds. The narrow dispersions of s and ϕ could then be an effect of the equalisation of wage rates between industries.
2. Alternatively there may be a mechanism that operates on the rate of surplus value directly, acting to limit its dispersion. One can conceive of three subprocesses that might work this way. (a) High wage rates in an industry would provide an incentive for employers to improve productivity and thus restore the share of value going to capital. This would limit the degree to which workers could reduce the rate of surplus value through trade union struggle. (b) On the other hand, a high profit share in an industry strengthens the bargaining position of workers. Workers are more willing to strike if they know their employers are exploiting them intensively, while it also costs the employers more to resist a strike. This would limit the degree to which employers could increase the rate of surplus value. (c) If productivity-based wage bargaining were common this would tend to stabilise the wage share. These factors would all tend to limit the dispersion of s, and hence also of ϕ.

Finally it is possible that mechanisms (1) and (2) are both operative. Further empirical work would have to be done to determine which of these hypotheses is correct.

CONCLUSION

Our title poses the question of whether Marx needed to 'transform' from the simple labour theory of value to the theory of prices of production. Our results here suggest that the thinking that drove Marx in this direction does latch onto one aspect of the reality of capitalist economies. There seems to be some mechanism pulling prices above the prediction of the simple labour theory of value (LTV) in industries with high organic composition of capital. On the other

hand this 'transformation' is incomplete, and other aspects of reality are better accounted for by the simple LTV than the theory of prices of production (TPP).

It has been common among Marxian economists to regard the LTV as pertaining to a higher level of abstraction than the TPP; that is, the LTV in effect abstracts from differences in organic composition, while the TPP generates a set of 'modified values' taking these differences into account. This view of things has opened the way for some Sraffians to argue that the TPP is the primary and 'correct' theory, and that the LTV is in a sense parasitic: the LTV is expected to hold as a tolerable empirical approximation only to the extent that (1) the TPP holds and (2) differences in organic composition are not very great (and/or the average rate of profit is low). Our results lead us to reject any such formulation. The LTV is a 'deeper' theory than the TPP, yet its predictions are just as close, if not closer, to the observed reality of capitalism. Through the stochastic mêlée of the market, the set of prices predicted by the LTV provides one pole of attraction, while the set of prices of production provides another.

Against the background of the apparently interminable debate over the transformation problem at a purely theoretical level, one is led to ask why it has taken so long for economists to carry out relevant empirical investigations. The debate has not been subject to total ideological closure, in that the formulations arrived at via the Sraffian linear algebra are empirically testable, yet for a long time little or no testing was done. The necessary input–output data have been available for forty or more years, and the computer technology to process these data for thirty years, but empirical tests of the theories have had to wait until the last decade. The practice of political economy has in this area fallen far short of scientific standards. It cannot be too strongly emphasised that theorising in the absence of empirical data leads only to arid speculation, which, in a domain like political economy, will be driven primarily by ideological pressures.

Notes

1. Department of Computer Science, University of Strathclyde, and Department of Economics, Wake Forest University, respectively. This paper was prepared for the conference on 'Karl Marx's third volume of *Capital*: 1984–1994', University of Bergamo, 15–17 December 1994.

2. Although it raises the question of the conditions required for such migration to produce stabole convegence on an equalised rate of profit, on which topic see Steedman, 1984, Duménil and Lévy, 1993.

References

Central Statistical Office (1988) *Input–Output Tables for the United Kingdom 1984* (London: HMSO).

Cockshott, W. P., A. Cottrell and G. Michaelson (1995) 'Testing Marx: Some New Results from UK Data', *Capital and Class*, no. 55, pp. 103–29.

Duménil, G. and D. Lévy (1993) *The Economics of the Profit Rate* (Aldershot: Edward Elgar).

Farjoun, E. and M. Machover (1983) *Laws of Chaos* (London: Verso).

Marx, K. (1971) *Capital*, Vol. III (Moscow: Progress Publishers).

Ochoa, E. M. (1989) 'Values, Prices, and Wage–Profit Curves in the US Economy', *Cambridge Journal of Economics*, vol. 13, pp. 413–29.

Petrovic, P. (1987) 'The Deviation of Production Prices from Labour Values: Some Methodology and Empirical Evidence', *Cambridge Journal of Economics*, vol. 11, pp. 197–210.

Shaikh, A. (1984) 'The Transformation from Marx to Sraffa', in A. Freeman and E. Mandel (eds), *Ricardo, Marx, Sraffa* (London: Verso).

Steedman, I. (1977) *Marx After Sraffa* (London: New Left Books).

Steedman, I. (1984) 'Natural Prices, Differential Profit Rates and the Classical Competitive Process', *The Manchester School*, vol. 52, pp. 123–40.

Valle Baeza, A. (1994) 'Correspondence Between Labor Values and Prices: A New Approach', *Review of Radical Political Economics*, vol. 26, pp. 57–66.

7 The Distinction between Social Value, Individual Value, Market Value and Market Price in Volume III of *Capital*[1]

Chai-on Lee

INTRODUCTION

It was once widely acknowledged in the Marxian literature that Marx's value theory was not a theory of commodity price but a qualitative (not a quantitative) account of exploitative class relations. This acknowledgement has been stressed by the theoretical failure of Marxian economists in defending Marx's transformation from value into price. Once its role as a theory of price was reluctantly given up, however, its other role as a theory of exploitation was also bound to collapse. Among others, Roemer (1982), Bowles and Gintis (1981) and Samuelson (1982) have shown that a commodity value can also be determined by the amount of any certain kind of input material (like a peanut or steel theory of value) and to that extent any material power (peanut power or steel power) is no less exploitable than labour power. Roemer (1986) has gone a step further to show that exploitation can be analyzed even with no such (peanut or steel-like) value category, in which Marx's original notion of exploitation has been debased into a thing not founded on equivalent exchanges but on property relations. In the end Marx's value theory has been proved redundant in connection with both exploitation and price. But redundancy is recently attributed to the conventionally mistaken homogeneous labour theory of value.[2] And, in addition, a new position has emerged to the effect that Marx's original transformation was not wrong.[3] In view of this positive movement, it is high time that Marx's value theory itself is rehabilitated as a rightful price theory and also that a theoretical structure linking value with market price is

expounded for the sake of empiricism. This chapter is written for this purpose. For the theoretical structure linking value with market price, it will particularly account for the intermediary categories of individual value, market value, social value, individual price of production and market price of production.[4]

OVERVIEW

We discuss value and price both in terms of two categories: (1) as a substantive category and (2) as a relational category. In terms of the former, every commodity production is seen as a part of the commodity production as a whole and its position in the totality as represented in the value and price. In terms of the latter, however, every production is conceived as atomized into an independent entity and thus the external relation between the individual entities as denoted in the value and price (the so-called supply and demand play a role only in this latter case).[5] The value and price in terms of the former shall be distinguished from those in that of the latter. We term the latter ones differently from the former as in Table 7.1.

In the table below, value and price of production are both classified as substantive categories corresponding to which three interconnected concepts, individual value (individual prpr), market value (market prpr) and market price are classified as relational ones. The so-called transformation of values into prices of producion is seen within the context of the substantive categories. This means we do not see value and price of production differ in substance nor in their valuation terms. As will be seen later, we see both are of the same substance and so are to be valued in the same labour and/or money terms. They differ only in their principles of quantitative formation; one follows a resolution principle with equal rates of exploitation while the other

Table 7.1 The transformation of substantive categories into relational ones

Substantive categories	*Relational categories*		
	(*substantive in part*)		(*purely relational*)
Value Prpr	Individual value	Market value	Market price
(Price of production)	Individual prpr	Market prpr	Market price

follows a composition principle with equal rates of profit. Three relational categories that correspond to each of them can be distinguished as below.

- Market price ⇔ the (external) relationship between individual commodities.
- Market value (market prpr) ⇔ the relationship of market price to the whole commodity world.
- Individual value (market prpr) ⇔ the relationship of an individual commodity to the whole commodity world.

Among these three relational categories, the first one, market price, is purely relational to individual commodities. The two others, however, market value (market prpr) and individual value (individual prpr), are in relation to the whole commodity world and, to that extent, are substantitive in part. Such partially substantive ones, whose variations rest on the supply and demand though, are bounded by the totality context. But the genuinely relational category, the market price, is not bounded like those. We shall discuss this more in detail later.

Some Marxian economists[6] argue that value is determined in exchange (not in production) by reference to the amount of labour expended in production, and to what extent value has an 'instantaneous' existence that can evaporate outside exchange.[7] It is thus argued that supply and demand are not to be disregarded when determining value. This, of course, might be true for the case of relational categories but not for the substantive categories, because the social substance crystallized in commodity values would not be instantaneous. It is true that it is exchange, not production, that commoditizes products of labour and validates private labour as social. But all this applies only in the context of individual entities.

No doubt, as Marx noted, a commodity value cannot become a real one until the commodity is sold. This, however, is far from saying that, if a commodity fails to be purchased, a potential value of the commodity is realized as a non-value. Exchange relation alone cannot determine the reality of value. Only a potential non-value would be realized as the non-value. The words, 'potential' and 'realized' for Marx refer only to two *modes of existence*. He conceived value had such two modes. Why? Given that value cannot exist without its receptacle (the use-value) and the receptacle must pass through the two phases of production and exchange in sequence, the value contained in the use-value must also pass through the same two phases

despite it not being the object of exchange. Passing through the two phases, the value's existence is bound to be differentiated into the potential value and realized value. Because the existence of value is a social substance determined by the social relation of production and exchange, unlike the use-value, it cannot be the object of exchange. So, the exchange relation alone cannot determine the reality of value.

Exceptionally, even socially useful things often fail to be purchased. In such cases, however, their potential values are rather destroyed (or lost) than realized as non-values. By contrast, if a harmful (not useful) thing succeeds in its sale by fraud, it would count not as an exchange but as an imposture, a transfer of vlaue. It is absurd enough if potential non-values are transformed into real values by the exchange alone.

For all this, however, in the sphere of exchange, of course, value and price can change quantitatively (though not qualitatively from a potential value into a non-value). Such changes are due to a discrepancy between the production and the exchange relation. The supply and demand play an important role in such changes. The relational categories, market price, market value (market prpr), and individual value (individual prpr) are required on this occasion to categorize those changes. Conversely, however, if production relations coincide with exchange relations, we do not have to bother with this question. The substantive categories will directly apply to individual commodities. But, in reality, some production relations such as the rent to the landlords, the tax to the state, the offertory to the church and so forth have no corresponding exchange relations inasmuch as they are of a tributary rather than of an exchange character.[8]

Our distinction between the substantive and the relational category will be more significant in searching for the source of surplus profits later in this chapter.

VALUE AND PRICE AS SUBSTANTIVE CATEGORIES

Conventionally, value and price have often been distinguished in terms of their valuation terms. One in labour terms and the other in money terms. With this distinction, however, Marx's transformation of value into price cannot make any sense since it arithmetically mixes, in an equation, the two categories valued in different terms. To proceed with this mistaken transformation, many Marxian economists attempted to convert either value or price into the other's valuation

terms prior to the transformation.[9] But even after the conversion they still conceived each unit of account as distinctive and thus additionally imported an external numeraire (as an invariance postulate for the normalization) into the transformation procedure, assuming either that total price equals total value or that total profit equals total surplus value. Yet the external numeraire thus imported as the only relationship between value and price was again derived from the transformation, which makes it a circularity. In the transformation they showed a relationship between value and price by starting from the numeraire, 'total value = total price', and then arriving at the conclusion which repeats the value–price relationship, 'total value = total price'.

Such a circularity is not found in Lee's interpretation of Marx's transformation, however (Lee, 1990, 1993). He does not require an additional external numeraire by computing the value and price in the same labour terms. He presumes both value and price to be of identical substance. In so far as their substances were identical, both could be measured in the same labour terms and with an identical unit of account, as seen in Table 7.2. The reason why we measure them in the internal as well as the external forms is to identify the source of their quantitative changes.

The external form can change even when the intrinsic form is constant and so we have to take care not to misjudge the external disturbances. When the value of money undergoes a variation, all the external forms of value and price vary even if their intrinsic magnitudes remain constant. Those who do not conceive value and price in terms of these two forms but only distinguish them in the context of valuation terms, cannot make such distinctions. This criticism can still apply to the allegedly 'new' position taken by Mohun (1994), Foley (1982, 1986a, 1986b), De Vroey (1981) and so on. They also assume that value and price have different accounting units, and thus multiply prices by the value of monetary unit to compare the two quanta in the

Table 7.2 Two distinct forms of value and price with the same substance

		Form	
	Substance	*Internal form (content's own form)*	*External form (form)*
Value	Labour	Value	Value price (or direct price)
Prpr	Labour	Prpr	Money Prpr

Table 7.3 Value and price in the principle of quantitative formations

	Values	*(Capitalist) prices*
Newly produced value (production category)	$(v_i + s_i)$ $[= (1 + e_i)v_i]$	π_i $[= \rho_i(c_i + v_i)]$
Advanced value (exchange category)	c_i	$c_i + v_i$
Additivity of value (of v and s or of v and π)	No	Yes
Lawful principle	Equal rates of $e_i s$	Equal rates of $\rho_i s$

same value terms. They make the mistaken assumption that the value of money and the price of production of the money material are not distinguishable. This assumption is un-Marx-like because, for them, money is not counted in the category of the commodity.

Then, what is the difference between value and price if not in their valuation terms? We find no difference at all between the two categories except in their principles of quantitative formation. One is of a resolution principle, while the other is of a composition principle. This contrast is summarized in Table 7.3: c_i v_i s_i e_i are as usual, ρ_i is the rate of profit and π_i is the size of profit where $\pi_i = \rho(c_i + v_i)$; $\rho = \Sigma s \, \Sigma(v_i + s_i) \, \Sigma S_i$.[10]

Value is formed by adding the amount of direct labour (= newly created value) to the value consumed (= the value of production materials seen as the amount of indirect labour), whereas the price of production is figured out by adding the general profit (= the amount of value newly produced by capital) to the value of capital consumed (= the value of production materials plus the value of labour power employed). As shown in Table 7.3, the newly created value, $v_0 + s_0$, is determined by the amount of direct labour and hence it is not the *addition* of v_0 and s_0 but is split into v_0 and s_0. This we call a *resolution* principle. Steedman (1976) wrongly argues that the three elements, c, v and s, all add up to form a commodity value. This is a Smithian composition principle, the cost theory of price which applies to our capitalist prices in Table 7.3. This distinction has been ignored in previous debates on Marx's transformation, however.

Shaikh's transformation (1977) is a representative. When he multiplies v_i (the variable capital value) by Ψ (the value–price multiplier) into Ψv_i, he does not change the other part, s, into the same terms (into Ψs) but rather leaves it intact throughout the ergodic process. He

treats the two parts of direct labour (v_i and s_i) as if they were two independent elements. If he treated them as two *parts* of a single entity, he would have multiplied s_i by the same multiplier Ψ when transforming v_i into Ψv_i. The whole amount of $v + s$ ought to change into $\Psi(v_i + s_i)$ when v_i changes into Ψv.[11] As a result, the rate of exploitation, which rests on the production relation, is kept intact. In Shaikh's transformation, however, the rate of exploitation is bound to vary by the transformation itself.

MARKET PRICE AND MARKET VALUE AS RELATIONAL CATEGORIES

In this section, to begin with, we shall use the two terms, individual value and individual price of production interchangeably on the assumption that the individual organic compositions of capital in a given sector do not differ. And, assuming that the sectoral organic composition of capital are also identical across all sectors of production, we shall use the two terms, market value and market price of production interchangeably as well.

An individual value is determined in the sphere of production at the value that allows the individual producer a normal margin of price. Different producers with different conditions of production may well get different individual values. Of many different individual values, their representative acts as the market value. The market value is determined in the sphere of production (in the sense that it is chosen among the individual values) by reference to the market conditions (in the sense that the market situation determines which individual value is to be selected as the representative). It differs from market price in the sense that it is bounded by the totality context, by the highest and the lowest individual value, as it is a partially substantive one. Marx's distinction between market value and market price is better interpreted if we invoke Marshall's distinction between the market period, the short period and the long period as follows.

In the market period, it is assumed that competitive forces operate on prices only and substitution is only possible among the outputs that have already proceeded to the market (here, the volume of products in assumed fixed). In the short period, however, the competitive forces are assumed as operating even on the condition of production for better efficiency but not yet on the inter-sectoral movement of resources. The movement of capitals across sectors of

production is conceivable only in the long period. A general equilibrium is possible in this long period only. A stationary or a balanced growth equilibrium may obtain here, which could be easily disturbed by new inventions or new technologies.

In the first instance, in the market period, supply and demand balance out at the market price establishing as incidental, temporary equilibrium. It is incidental or temporary in the sense that the market price deviates from the market value. If the market price is higher than the market value, this implies even the worst condition of production in the given sector can supply the product at the price lower than the market price still enjoying normal profit. This characterizes the market situation of the given sector as having a strong tendency of excess demand. The market value in this case will be determined at the highest individual value (the individual value with the worst production condition) and will not go down below the highest individual value until the market price is lowered down to the market value by increased supply.

Conversely, if the market price is lower than the market value owing to the over supply of product, even the best condition of production cannot supply the commodity with normal profit. Then, the market value must be determined at the lowest individual value (the individual value with the best production condition) and the market situation can be characterized as a decline. Producers should like to leave for other sectors searching for better profitability but the inter-sectoral movement does not take effect in the short period. Instead, the producers will simply stop the production activity, or destroy inefficient units of production until the market price goes up to the market value. A normal equilibrium obtains when my excess supply or demand is cleared up at the market price equaled with the market value, as shown in Table 7.4.

Table 7.4 Three distinctive equilibria

	Market period	*Short period*	*Long period*
General equilibrium			$x_j = y_j = z_j$,
Normal equilibrium		$x_j = y_j\ (\neq z_j)$	
Temporary equilibrium	$x_j \neq y_j\ (\neq z_j)$		

Notes: x_j, y_j and z_j stand for, respectively, market price, market value (market prpr) and social value (average individual price of production); i, and j refer to the ith and the ith and the jth sector of production respecitvely.

Table 7.5 The relationship between the relational categories

Supply and demand at the price of market value	*Determination of market price*	*Determination of market value*
S > D	Market price < Market value	At the lowest individual value
S < D	Market price >Market value	At the highest individual value
S = D	Market price = Market value	Within the bounds of the two extremes

In the short period, the competition-inspired variation of the supply of commodities puts the market price on a par with the market value. From then on, the market value can fluctuate within the domain bounded by the highest and the lowest individual values. If the given sector is prosperous, the market value is determined at the highest individual value. If it is on the decline, it will be determined at the lowest individual value. If it is neither, it will be determined in the middle of the two extremes. Usually, it is determined at the (weighted) average of individual values (or the individual value with the dominant or normal condition of production). The later we call a social value.

In the long period, where the inter-sectoral movement of resources is feasible, a normal equilibrium can obtain for every sector of production. Then, we get a general equilibrium. All this can be summarized as in Table 7.5.

SURPLUS PROFITS

We shall show in this section that surplus profits are generated not only from unequal exchanges but also from equivalent exchanges. By by equivalent exchanges, we mean the exchanges based on the market prices equaled with the market values (or the market prices of production). As before, we shall assume for the sake of simplicity that the compositions of capital are all identical and so ignore any difference between the market value and the market price of production, and between the social value and the (weighted) average individual price of production.

In the case of unequal exchange, where the market price is higher than the market value as in (2) in Table 7.6, we have two kinds of

Table 7.6 The relationship between social value and market value

Market price	*Market value*	*Social value*
Market price < Market value	At the lowest individual value	(1) Market value < Social value
Market price > Market value	At the highest individual value	(2) Market value > Social value
Market price = Market value	Within the bounds of the two extremes	(3) Mkt. value = Soc. value (4) Mkt. value > Soc. value

surplus profit. One is a sectoral surplus profit occasioned by the unequal exchange itself, whose amount is the same as the difference between the market price and the market value. The other is an individual surplus profit occasioned by uneven conditions of production within sectors of production, the amount of which is equal to the difference between the individual value and the market value. If the differences of any of the two kinds are a minus, they should count as deadweight losses, however.

In the case of equivalent exchange, where the market price equals the market value, we can still have surplus profits of another two kinds. This takes place in the cases of both (3) and (4). It is like the individual surplus profit occasioned by uneven conditions of production. In the case of (3), it should have its source in the capital's own production, in 'the curtailment of the necessary labor time and the corresponding prolongation of the surplus labor' (Marx, 1976, p. 435). This is because the given sector appropriates no more than the surplus value produced within it. The individual producers whose product has its individual value less than the sector's average will have a deadweight loss while the other capitals in the same sector enjoy the surplus profit. Marx called this an extra surplus value. This, however, is not the case with the individual surplus profit generated in the case of (4). It takes place in the form of a transfer of value from outside. The 'individual' surplus profit though created by uneven conditions of production is sectorally provided from other sectors. Thus, the sum of the individual surplus profits in this case equaled with the difference between the market value and the social value. Marx explained it as follows.

> In connection with differential rent in general, it should be noted that the market value is always above the total production price for

the overall quantity produced. Let us take Table 1 for instance. The total product of 10qrs is sold for 600s., since the market price is determined by the production price of A, which comes to 60s. per qr. The actual production price, however, is:

A 1qr	= 60s.	1qr = 60s.
B 2qrs	= 60s.	1qr = 30s.
C 3qr	= 60s.	1qr = 60s.
D 4qrs	= 60s.	1qr = 15s.
10qrs	= 240s.	1qr = 24s. (average).

The real production price of the 10 qrs is 240s.; they are sold for 600s, 250 percent too much. The real average price for 1 qr is 24s; the market price 60s., similarly 250 percent too much.

This is determination by a market value brought about by competition on the basis of the capitalist mode of production; it is competition that produces a *false social* value. This results from the law of market value to which agricultural products are subjected (ibid., p. 799, italics added).

In the above, total production price is taken as (sectoral) social value. The market value (600s. in sum) thus exceed the social value (240s. in sum) by the amount of aggregate differential rent (360s. in sum). On this occasion, the market value is easily mistaken for the social value despite its deviation from the latter by 250 per cent. Why? Because a normal (not a temporary) equilibrium is established at the price of the market value (see Tables 7.4 and 7.5). Thus Marx called market value a *false* social value. And this constituted 'another' sectoral surplus profit.

After all, even in the equivalent exchanges at the normal equilibrium, the market value diverges from the social value due to a sort of differential rent. The surplus profit is generated in this case by means of the transfer of value from the rest of the economy. This is because no more than total individual value, 240s., is produced within the given sector and yet the sector appropriates 600s.

Lastly, what if we assume the compositions of capital are not identical, and thus the market prices of production and the individual prices of production are not identical with the market values and the individual values respectively? It is well known that, in the sector whose individual compositions of capital are lower than the average composition of capital of the whole society, individual prices of production are lower than their individual values and, as a consequence,

the sector's market price of production (as bounded by the two extremes of the individual prices of production) must be lower than the sector's social value (the average individual value). Then, the discussion so far we had on the premise of the identical compositions of capital shall be taken with a grain of salt.

In regard to this question, we have to note the distinction Marx made between those categories in the case of agricultural sector (1981, pp. 872–916). Assuming that the agricultural sector has a lower composition of capital, and thus the individual values are higher than the individual prices of production, Marx presumes that the sector's social value is higher than the sector's market price of production. Three occasions are shown to be possible in this case (1981, pp. 872–916).

(1) the sector's *market price* $\geq$ the sector's social value $\geq$ the sector's market price of production.
(2) the sector's social value > the sector's *market price* $\geq$ the sector's market price of production.
(3) the sector's *market price* = the sector's market price of production > the sector's average individual price of production.

According to Marx, monopoly rest is generated in the case of (1) amounting to the difference between the market price and the social value. An absolute rest occurs in that of (2) up to the amount of the difference between the market price and the market price of production. In the latter case, the difference between the social value and the market price goes to the other sectors so as to form normal profits of them as Marx's transformation of surplus value into profit depicts. But, in the case of (3), various differential rents are possible according to the differences between the market price of production on the one hand and the individual prices of production on the other, occasioned by the uneven conditions of production. Of the three rents above, only monopoly rent is provided from outside and the two others are from within since the social value is higher than the market price. Only when the market price is above its social value can the rent be worked out from the rest of the economy.

But it is not to be disregarded that, although they are produced from within, both the absolute and the differential rents are from the profit that would otherwise be appropriated by other sectors according to the law of the equal rates of profit. The two rents are obviously from the surplus value produced by the agricultural sector itself but are from the profit that should have been allotted to the

other sectors as the transformation procedure dictated. So, we can say, as far as the prices of production are concerned, all three rents are from the rest of the economy. Like a tribute or a gift paid by the rest of the economy, the agricultural sector enjoys them. This tribute is not confined to the agricultural sector only. If the market price of production is higher than the averaged individual price of production which is possible in prosperous sectors, the surplus profit can occur even in the normal equilibrium.

SUMMARY AND CONCLUSION

We have distinguished between value and price in three steps. First, between value and price of production as substantive categories. Second, between individual value (individual price of production), market value (market price of production) and market price as relational categories. Third, between social value as a substantive category and market price as a relational category in terms of the unilateral transfer of value. The unilateral transfer of value is seen in two ways, in the case of unequal exchange and in that of equivalent exchanges.

Notes

1. The author is indebted to the editor who kindly corrected my English and to two anonymous referees for their comments. Even so, however, any fault is mine.
2. Lee, (1993, pp. 466–9).
3. Yaffe, 1975; Lee, 1990, 1993; Moseley, 1993, 1994. But they do not agree with each other in every detail. Moseley (1993, 1994), for instance, considers that the value of a money unit is identical to its price of production, which is un-Marx-like as it does not include money in the category of the commodity.
4. The term 'individual price of production' is from Marx, 1981 (p. 800), as is 'market price of production' (p. 300).
5. 'Demand and supply imply a transformation of value into market value' (Marx, 1981, p. 296). The one is a substantive category while the other is a relational one.
6. De Vroey, 1981; Eldred and Hanlon, 1981. For them, money has a mysterious power that enables private labour to gain social recognition. This is a money fetish. Since they do not recognize that money is also a commodity, they have mystified the function of the means of exchange

as if it had a power that commoditizes products of labour enabling private labour to gain social recognition.

7. cf. De Vroey, 1981, pp. 178, 185.
8. Hence the services offered by land, the state or the church cannot have any value. But they nevertheless have a price and the semblance of commodity exchange since they are offered for sale in the society in which commodity production is predominant.
9. Shaikh, 1977; Okishio, 1974; Mohun, 1994. They convert the value into a direct price to compare it quantitatively with price of production, or the price of production into a quasi-value to compare it with value.
10. For further details see Lee, 1990, pp. 190–7 and Lee, 1993, p. 471, n. 1.
11. When we change v into Ψv, what we actually change is not the size of v but a mere calibration of direct labour, $v + s$. In other words, we change its unit of account.

References

Bowles, S. and H. Gintis (1981) 'Structure and practice in the labour theory of value', *Review of Radical Political Economics*, vol. 12, no. 4.

de Vroey, M. (1981) 'Value, production and exchange', in I. Steedman (ed.), *The Value Controversy* (London: Verso).

Eldred M. and M. Hanlon (1981) 'Reconstructing value-form analysis', *Capital and Class*, no. 13.

Foley, D. K. (1982) 'The value of money, the value of labour-power and the Marxian transformation problem', *Review of Radical Political Economics*, vol. 14, no. 2.

Foley, D. K. (1986a) *Understanding Capital; Marx's Economic Theory* (Cambridge, MA: Harvard University Press).

Foley, D. K. (1986b) *Money, Accumulation and Crisis* (Chur, London, Paris and New York: Academic Publishers).

Groll, S. (1980) 'The active role of "use value" in Marx's economic analysis', *History of Political Economy*, vol. 12, no. 3 (Fall).

Lee, C. O. (1990) 'On the three problems of abstraction, reduction and transformation in Marx's labour theory of value', PhD thesis, University of London.

Lee, C. O. (1993) 'Marx's labour theory of value revisited', *Cambridge Journal of Economics*, vol. 17, no. 4, pp. 463–78.

Marx, K. (1976) *Capital*, vol. I, trans. by Ben Fowkeo (London: Pelican).

Marx, K. (1981) *Capital*, vol. III, trans. by David Fernbach (London: Pelican).

Mohun, S. (1994) 'A re(in)statement of the labour theory of value', *Cambridge Journal of Economics*, vol. 18, no. 4 (August).

Morishima, M. (1974) 'Marx's economics in the light of modern economic theory', *Econometrica*, vol. 42, no. 4.

Moseley, F. (1993) 'Marx's logical method and the "transformation problem" in F. Moseley (ed.) 1993, *Marx's Method in Capital* (Humanities Press).

Moseley, F. (1994) 'Marx's logic in *Capital* and the "transformation problem"', paper presented at the conference on 'Marxian Economics: a centenary appraisal', University of Bergamo, Italy, 15–17 December.
Okishio, N. (1974) 'Value and production price', *Kobe University Economic Review*, no. 20.
Roemer, J. E. (1982) *A General Theory of Exploitation and Class* (Cambridge, Mass.: Harvard University Press).
Roemer, J. E. (1986) *Value, Exploitation and Class* (Chur, London, Paris and New York: Harwood Academic Publishers).
Samuelson, P. A. (1982) 'The normative and positive inferiority of Marx's values paradigm', *Southern Economic Journal*, vol. 49, no. 1.
Shaikh, A. (1977) 'Marx's theory of value and the transformation problem', in J. Schworts (ed.), *The Subtle Anatomy of Capitalism* (Santa Monica, CA: Goodyear Publishing).
Steedman, I. (1976) 'Positive profits with negative surplus-value: a reply', *Economic Journal*, vol. 86 (September).
Steedman, I. (1977) *Marx after Sraffa* (London: New Left Books).
Yaffe, D. (1975) 'Value and price in Marx's Capital', *Revolutionary Communist*, vol. 1, (January).

8 Time and Equilibrium in Neoclassical Price Theory and Volume III of *Capital*

Guglielmo Carchedi

INTRODUCTION

It is often argued by Marxist and non-Marxist authors alike (see, for example, Bronfenbrenner, 1968; Horverak, 1988) that Marx's production prices, the outcome of the transformation procedure in volume III of *Capital*, are equilibrium prices and that, as far as this is concerned, there is no substantial difference with equilibrium prices as in neoclassical price theory (hereafter NCPT). Conversely this chapter argues that neoclassical equilibrium prices have a radically different theoretical status and social content than Marxian production prices.[1]

Neoclassical economics is a variegated body of knowledge that only reluctantly lends itself to an all-encompassing definition. For the purposes of this chapter, I shall identify it with that type of economics which rests upon the assumptions that (1) the basic unit of analysis is an ahistorical individual, (2) this individual is equipped with some kind of inborn a historical rationality, and (3) the free exercise of the individual's rational behaviour results in the economy tending towards equilibrium.[2] This chapter will consider a specific version of NCPT, that which is taught to undergraduate students with the use of standard textbooks. The reason for this choice is twofold. First, this simplified rend- ition is sufficient to argue for the incompatibility between the neoclass- ical and the Marxian notion of equilibrium and thus between equilibrium prices and production prices. Second, this rendition has become a sort of common knowledge informing capitalist societies' collective consciousness. Thus, for example, it is this type of NCPT that provides both mass support for privatization and justification for some arguments in favour of market socialism. It is hoped that theoretical clarification will help put these most important policy issues into their proper perspective.

The structure of this chapter is as follows. The following section argues that partial equilibrium theory is both theoretically inconsistent and circular and that general equilibrium theory is based on the unrealistic assumption of a timeless reality. The third section uncovers the social content of partial and general equilibrium theory and argues that this contradicts the very tenets of Marxist theory. The final section concludes that, given this critique, Marxian production prices cannot possibly be the same as neoclassical equilibrium prices and highlights the different notions of equilibrium inherent in the two theories. Many of the criticisms expressed below are not new and have long been acknowledged both by Marxist and by methodologically sophisticated neoclassical theorists. However they are repeated here not only because of their importance for this chapter's argument, but also because they have never been properly answered.

PARTIAL AND GENERAL EQUILIBRIUM

The thesis that reality tends towards equilibrium is ingrained in NCPT, both in its partial equilibrium and in its general equilibrium approach. Yet neither approach stands critical examination. Let us begin with the former. To invalidate partial equilibrium NCPT, and thus its notion of equilibrium, a number of points can be mentioned. For reasons of space, I shall focus only on (1) the improper use of the *ceteris paribus* condition in theorizing the supply and demand curves and (2) the circularity inherent in the determination of the equilibrium price on the basis of these curves.

First, as is well known, the downwards sloping demand curve can be drawn only under the *ceteris paribus* condition. This applies to the supply curve too because the latter is only a specular image of the former. But it is sufficient for the critique to apply only to the demand curve in order for this critique to invalidate the whole partial equilibrium NCPT: if one of the two curves is indeterminate, no conclusions can be drawn about the tendency prices have to converge towards an equilibrium price. The *ceteris paribus* condition is thus vital for the shape of the demand and supply curves. However the use made of this condition is untenable.

Consider first people's behaviour. People do not react to a variation in a certain price by assuming the *ceteris paribus* condition. Rather, as both introspection and behavioural research show (Simon, 1976, p. 73), they react by taking into account the highest possible (although

limited) number of variables and 'promising alternatives', such as price changes in other goods, forecast future income, employment and so on. For example, given a fall in the price of a certain commodity, the consumer decides what to do with the extra disposable income not by assuming that everything else remains constant but by examining various alternative expenditure patterns, one of which might be to increase the purchase of (only) that commodity.

Consider now the theory. NCPT argues that the restrictions imposed by the *ceteris paribus* condition can be overcome by adding the effects of the own elasticity of demand to those of the cross elasticity of demand and to those of the income elasticity of demand. In this way, it is submitted, one arrives at the contemporaneous determination of changes in demand due to all these factors. But this procedure is internally contradictory. The superimposition of two *ceteris paribus* conditions implies that the same factor (for example a commodity's own price) is kept constant (for example under the hypothesis of cross elasticity of demand) and *at the same time* is made to vary (that is, under the assumption of own elasticity of demand). This method actually assumes that the same thing both changes and does not change. Because of this logical contradiction this method cannot account for contemporaneous determination.

In spite of this, NCPT cannot eject the *ceteris paribus* condition because without it the supply and demand curves cannot be drawn. NCPT must choose. Either it retains the *ceteris paribus* condition, where upon it can draw the supply and demand curves but is unable to theorize the actual movement of demand, supply and prices (that is, their contemporaneous determination by a multiplicity of factors); or it drops the *ceteris paribus* condition in order to theorize the real world but cannot draw (theorize) the supply and demand curves. NCPT cannot but choose the former alternative. The argument has been advanced that the supply and demand curves are only ideal types, that is, mental constructs that 'cannot be found empirically in reality' (Weber, 1949, p. 90; see also pp. 42–7, 89–102) and that abnormal behaviours can be explained as deviations from these ideal types (Walras, 1977, p. 71). But this argument is irrelevant, given that it does not answer the charge that this ideal type is internally inconsistent.

Second, neoclassical partial equilibrium price theory could not deliver a theory of price formation even if the above mentioned inconsistency could be overcome. By drawing the demand and supply curves, one first presupposes all possible prices corresponding to all possible quantities demanded and supplied, including that equilibrium price one

wants to find, and then proceeds to 'determine', that is, select, that pregiven price. Since one assumes what one wants to determine (the equilibrium price), neoclassical partial equilibrium price theory is circular and thus useless as a theory of price formation. The moment it attempts to analyze the formation of the equilibrium price, it falls into circularity. This price is, as all other prices, selected from a range of pregiven prices. NCPT has at most a theory of price selection, not a theory of price formation. It selects what already exists, but it does not explain how it has been formed. This is a consequence of the individualistic methodology upon which NCPT is based (Henry, 1990, p. 93).[3]

NCPT has an alternative option: general equilibrium analysis. Basically there are two versions of this: the Walrasian and the post-Walrasian. In essence, 'resources and technology define supply conditions; preferences and factor ownership define demand conditions. Variable quantities and prices are then determined by a general equilibrium of demand and supply' (Walsh and Gram, 1980, p. 177). Technically, general equilibrium is symbolized as a system of equations (in the Walrasian model) or of weak inequalities (in the post-Walrasian model) whose simultaneous solution provides the equilibrium prices and quantities.[4] Without going further into the differences between the two approaches,[5] it can be briefly mentioned that in its Walrasian formulation, general equilibrium analysis is an extension of 'the study of the exchange of two commodities... to the study of the exchange of several commodities.... In this connection all we need to do is to return to the case in which each party to the exchange is a holder of only one commodity and then generalize our formulae in a suitable way' (Walras, 1977, p. 153). The supply and demand functions, then, are still basically those of partial equilibrium price theory and are thus subject to the same critique.

In the post-Walrasian general equilibrium model, convergence towards equilibrium depends on the form of the excess demand functions. There is such a convergence only if a commodity's excess demand is negative when its price is higher than the equilibrium price, and positive in the opposite case. But recent work has shown that this is not necessarily the case and that, consequently, the excess demand functions can have any form (see Guerrien, 1989, ch. 3). The convergence towards equilibrium has no theoretical foundation in general equilibrium analysis either.

Moreover this application of the method of simultaneous equations would be unacceptable even if the above critique were disregarded. The reason is that this method cancels time, thus making the model unrea-

listic and useless. Instead of there being a determination of the prices of the production factors (inputs) at time $t1$ and of the prices of the products (outputs) at time $t2$, the prices of the inputs and outputs of the same production process are determined simultaneously. This is obvious in Walras's theory. Post-Walrasian theory, on the other hand, does in a way introduce time since it stresses that the same good at different points in time is actually a different economic object. But this does not counter the critique above that at any given point in time (and thus with any given endowment of economic objects), the prices of the inputs and outputs of the same production process are determined simultaneously.

If time is abolished, the model cannot be realistic. Neoclassical theory answers that all theories are based on unrealistic assumptions (Friedman, 1953). This calls for some methodological remarks. To perform their heuristic function, the hypotheses upon which a model is based must be abstractions from reality, that is they must be the result of previous observation and theorization of reality. They must compress, as it were, our view of that portion of reality into just one statement. But they are not reflections of reality. Rather they express the essential features of that part of reality we are concerned with. Unrealistic hypotheses, on the other hand, are abstractions *away from* reality, that is, they are not observations and theorizations of past, existing or possible states of reality. Rather they are hypotheses about situations that cannot possibly exist in reality.[6]

Since an abstraction from reality is a hypothesis that contains *in nuce* those elements of reality it has abstracted from, to drop that hypothesis means to 'decompress', that is, to reintroduce those elements that have been abstracted from to begin with. The model built upon that assumption, then, is not destroyed but enriched, given that more details have been added to it. An unrealistic assumption, on the other hand, having denied reality to begin with, cannot contain *in nuce* any elements of it. To drop that hypothesis implies replacing it with another one which, if realistic, cannot but explode the model built upon the original, unrealistic hypothesis.

The assumption of perfect competition is realistic because it can be dropped thus allowing us to reach a more realistic model in which competition is not perfect. One can theorize perfect competition and less than perfect competition within the same model. Perfect competition is a state of reality that could exist but need not exist in reality. The assumption of a timeless reality, on the other hand, is unrealistic, given that under no circumstances can reality ever be timeless: this assumption, once dropped, cannot but destroy the model because the

opposite hypothesis, that time is always and necessarily an element of reality, requires an inherently different model. One can first theorize perfect competition and then less than perfect competition, but one cannot first theorize lack of time and then a little bit less of lack of time. Time must be incorporated into the model from the very beginning. Once time has been banished it cannot be reintroduced into the same model.[7]

THE SOCIAL CONTENT OF NCPT

If the critique submitted above stands, the question that comes naturally to mind is: why are NCPT and the notion of equilibrium so unquestionably accepted? To provide an answer, we must introduce the notion of the social content of theories. In a society in which different social groups have conflicting interests and thus try to foster their own interests upon other social groups, the *social content* of a theory is its functionality for the fostering of the interests of some social groups upon other social groups. In other words, to enquire into the social content of a theory means to enquire into how specific social groups' interests have been transferred to a different realm of reality, that of knowledge, where they have taken a different form (a theory), and how this different form in its turn fosters those groups' interests. Given that ultimately the interests of some groups is the reproduction of the present social system while other groups have the opposite interest, the question can also be formulated as to how a specific social matrix has been transfigured into a theory such that this theory can foster the reproduction or supersession of that social matrix. Often, the social content of a social theory must be discovered by digging underneath the surface of the theory's apparently 'objective' and 'scientific' interpretation of reality. In the case of NCPT its social content is revealed by at least the following five points.

First, it has been mentioned above that NCPT rests on the generalization of the behaviour of the individual capitalists who react to pregiven price changes. But in NCPT the individual capitalist is at the same time the epitome of *the* individual, he or she *is* the individual. Therefore in NCPT the individual, while being the implicit theorization of a socially specific individual, appears as a socially undetermined individual: he or she can be a capitalist as well as a labourer because it is implicitly assumed that the capitalist's behaviour is everybody's rational behaviour. It follows that classes, and thus the

production of value and surplus value, are excluded *a priori* from the neoclassical analysis of production. If classes are excluded, so are class conflicts and ultimately the system's inner contradictions of which class conflicts are the expression.

Another way to put this is that production is seen simply as production of use values rather than of value and surplus value embodied in use values. The fundamental insight that commodities are the produce of labour under specific, that is, capitalist, conditions is irreparably lost. It becomes impossible to enquire into 'who labours for whom' at the level of production. Inasmuch as surplus is taken into account, it is the monetary expression of surplus product (not surplus value) at the level of distribution (not of production) which, moreover, disappears under equilibrium, when entrepreneurs make neither profit not loss.

Neoclassical economics need not deny classes, but the latter play no analytical role in the theory. This disregard is made easier by the way in which production is theorized. Production is instantaneous, that is, outputs emerge instantaneously from that combination of productive services which reflects the demands of the consumers. This combination, in its turn, is simply the exchange of initial resources. Production relations, then, are treated as a sort of exchange relation and the agents of production are dealt with as intermediaries in an exchange process. Hence this notion of production not only wipes out time but also hides, rather than revealing, the class nature of production and its internal contradictions.

Faced by this critique, neoclassical economists object that not only NCPT but also neoclassical economics in general is a general, ahistorical model that can, however, be applied to any historically specific socioeconomic system. To deal with this point I must introduce the notion of concrete and abstract individuals. Each member of a society is at one and the same time both a concrete and an abstract individual. Individuals seen in their uniqueness are *concrete individuals*. From this perspective they are different by definition and therefore cannot belong to any social group. But individuals also have socially significant common features and it is because of this that they can be members of certain groups. From this perspective they are *abstract individuals*, the opposite of concrete individuals. It is they who are carriers of social relations. Therefore to explain historically specific social forms one needs the notion of abstract individuals, not that of concrete individuals. The neoclassical model, on the other hand, is based on ahistorical concrete individuals (whose only common feature is an inherent ahistorical rationality). Since NCPT ignores the social, abstract

dimension of the individual, it cannot theorize general social categories in their socially determined and historically specific form. The introduction of societal forms into the neoclassical scheme disregards this theoretical inconsistency: the impossibility of summing up ahistorical, unique individuals into their historically specific social forms.

Second, NCPT is not only class blind, it is also gender blind. In 'advanced' capitalists societies, both women and men are seen through sexist lenses: men are deemed to be assertive, egoistic, rational and so on while women are seen as docile, altruistic, emotional and so on. These stereotypes, whose obvious economic content is that of reducing the value of women's labour power, influence the socialization, and thus the behaviour, of both men and women from cradle to grave, and this in turn contributes to the reproduction of those myths. The rational, self-interest pursuing individual of NCPT, then, is a 'he' in the sense that this is the stereotypical male, what capitalist ideology perceives men to be. The neoclassical image of the individual is supposed to apply equally to all classes as well as to both sexes because it is supposed to focus on what all people have in common, an ahistorical human nature and rationality. In reality this image is abstracted from both what capitalists really are and from what men are supposed to be, that is, from a socially determined reality (capitalist rationality) and from a socially determined myth (male rationality).

Third, NCPT implies an ideological notion of exchange. This theory presuppose individuals who, given some initial endowments, are free to exchange their goods and services, including 'labour'. But neither the origin and unequal size of these initial endowments nor the social (in)justice inherent in their original distribution are taken into consideration.[8] Moreover the individuals's freedom to exchange is purely formal. In reality this freedom does not exist for the great majority of wage and salary earners who must sell their labour power: they are like those who, having been pushed into the sea, are free to swim or 'sink like a stone'. Finally, time is absent from exchange relations too: in partial equilibrium because no change is allowed in the individual consumer (Robinson, 1962, p. 50) and in general equilibrium because, as seen above, the prices of the inputs and outputs of the same process are determined simultaneously.

Fourth, NCPT elevates the capitalist price system to the role of the most rational and most equitable allocation system. According to NCPT, the prices emerging from the 'free' interaction of demand and supply on the one hand signal consumer needs and, on the other, satisfy those needs through the production of goods up to the point

where marginal costs equal marginal revenues, that is, where each 'factor of production' receives exactly the same as it contributes. Society might want to interfere to protect those who cannot pay the 'freely determined' prices, but then it must face a trade-off between efficiency and equity. Inefficiency and more generally the malfunctioning of the economy (crises, unemployment and so on) are explained in terms of tampering with the forces of the market. The objection here is that if crises, unemployment and so on are endemic to capitalism (as business cycles show) and if malfunctioning is caused by tampering with the market forces, then tampering and malfunctioning must be endemic to the system. In reality prices reflect the most rational allocation of resources *for the capitalists*, that is, they are the best signposts to make profits, not to satisfy human needs. From the point of view the great majority of the world population who are living in absolute or relative poverty, there is nothing rational about a price system that puts most essential goods beyond their reach.

Fifth, as seen above, NCPT implies an equilibrating mechanism. If reality tends towards equilibrium, it tends towards stasis: movement, then, is a deviation from rest, from equilibrium. The static state becomes the economy's (and reality's) natural state. NCPT does have a notion of dynamics as the study of the path between two equilibrium points. This, however, does not change the static nature of the theory. This 'dynamic' path is a deviation from two equilibrium points, just as oscillations around the same equilibrium point are a deviation around that point. This is comparative statics, rather than dynamics. But if the system tends towards equilibrium it is inherently harmonious. It follows that equilibrium and harmony are implicitly associated with the *status quo* and that (social) change is associated with chaos and disorder. Of all the features of NCPT, this notion is perhaps most patently at odds with reality. In the face of recurrent crises, financial crashes, unemployment, poverty, environmental destruction and so on in the developed countries, not to mention the 'underdeveloped' ones, how can one keep claiming that equilibrium is the economy's gravitational point and harmony its essential feature?

METHODOLOGICAL CONSIDERATIONS AND CONCLUSIONS

The neoclassical and Marxist approaches are based on two radically opposed methodologies. Because of this, Marxian production prices

cannot be theorized as equilibrium prices to be computed on the basis of a system of simultaneous equations. For Marx, the individual value of a commodity is its value before transformation, that i.e. before part of that commodity realizes through the price system, a value equal to, larger than, or smaller than its own value. The value actually appropriated is the market price. It is only at this point that the production price is introduced in the analysis as the price towards which market prices tend (that is, the price at which the rates of profit of the average productive capitals are equalized). Marx conceived the transformation process as the actual redistribution inherent in the actual transformation of individual values into market prices and at the same time as the tendential redistribution inherent in the tendency market prices exhibit towards production prices, due to capital movement across branches. In their turn, once the commodities are sold (at their actual market price) to become inputs of the next process, they again become individual values that will realize their actual social value only when the output in which they are incorporated as inputs is sold.

Marx's method can thus be characterized as dialectical, chronological, dynamic and realistic. *Dialectical* because it analyzes the transformation of individual values into actual social values and vice versa, as well as, at each point in time, actual social values into tendential ones (production prices). *Chronological* because it examines the succession of production and distribution processes so that, at one and the same time, a commodity is the output of a production process and the input of a subsequent production process. *Realistic* because it theorizes real social processes, that is, because it abstracts from reality the elements it needs for its analysis rather than negating reality (that is, time in the system of simultaneous equations). It is because of its dialectical, chronological and realistic nature that the present approach is *dynamic*. It is because of this that this method is the antithesis of both the neo-Ricardian and the neoclassical method. These methodological remarks allow us to highlight some differences with alternative approaches.

First, it should be stressed that this method is based on real (chronological) time rather than on 'logical time'. 'Logical time' is time without time, a self-annihilating proposition. This is the 'iterative' approach to the transformation procedure. Logical time can be usefully employed in order to deliver an internal critique of neo-Ricardianism, but it is an obstacle to the development of a realistic picture of the process of price formation. Price formation should be understood as a chronological sequence of production and distribution periods. Reality

is not, and therefore cannot be understood as, a computational approximation of market prices to an unchanged production price (the method followed by the iterative approach); rather, as far as the tendential transformation is concerned, it is a real movement of market prices towards an ever changing average of themselves, the production prices. It follows that market prices emerge as already tending towards production prices. The transformation of 'values into prices', that is, price formation, either reflects this real movement or becomes irrelevant to an understanding of reality.[9]

Second, the present approach rests on the notion that value is the value a commodity has upon completion of production but before sale. Some, on the other hand, deny the existence of value as labour contained: 'value is not a substance given prior to exchange (as is use value), but one which develops only in and through the forms of exchange' (Arthur, 1994, p. 5). This is often called the 'value form approach'. But if one starts by asking, for example, why $1a$ exchanges for $1b$, the answer can only be that they have the same value. But why do they have the same value? Because, this approach submits, the value created through exchange is the same. But why should this value in exchange be the same for $1a$ and $1b$? Here the 'value form' approach has no answer. For all we know any other ratio between a and b could have emerged from exchange. Of course to submit that $1a$ and $1b$ have the same exchange value because they exchange in that ratio (that is, $1a = 1b$) only leads to circular reasoning. In other words, 'if value is determined in the market according to the amount of money against which it exchanges, how is it possible to maintain a distinction between value and price?' (Kristjanson, 1994). Of course, if one is willing to submit that Marxist economics does not have (or perhaps does not need) a price theory one has to abandon the whole of Marxist economics. Without a price theory there cannot be a distribution theory; without a distribution theory there cannot be a reproduction theory (given that reproduction is first of all the distribution of means of production and labour power according to certain prices); and without the latter there cannot be a production theory. If the 'value form' approach has no theory of price it is fatally attracted to either neoclassical or neo-Ricardian price theory.[10]

Third, if as argued above the neoclassical notion of equilibrium is theoretically untenable, there is no reason to assume that the capitalist economy tends towards equilibrium, as the recurrent economic and social crises show. This means that the market not only loses its economic function of ensuring equilibrium; it also loses its social

function of keeping the economy and, more generally, society together. It thus becomes impossible to keep arguing that society is the summation of individual monades, each striving to maximize his or her own utility and kept together by (a non-existent) equilibrium. Society is kept together not by equilibrium but by social relations, by relations among people that reproduce themselves independently of which specific individuals become carriers of those relations.[11] In the reproduction of these relations, that is, of society, the notion of equilibrium has no place whatsoever. It is only by throwing overboard this ideological constraint that we can hope to comprehend the dynamism of the process of price formation and of the transformation process that lies at its heart.

If this critique holds, production prices in Marxist economics cannot be made of the same theoretical stuff as neoclassical equilibrium prices. In NCPT, if actual prices were to coincide with equilibrium prices, movement would cease (sometimes it is even asserted that they do coincide). Lack of capital movement and of technological change become the essence of this (static) theory. In Marxist price theory, assuming average, above-average and below-average productivity capitals, if market prices were to coincide with production prices there would be no equilibrium situation: this situation would be immediately upset by the action of all capitals, including the high-productivity ones, searching for still higher rates of profit. At most we would have a 'touch-and-go' situation. The moment at which the average capital would realize the average rate of profit would also be the moment at which non-average capitals would realize more or less than the average rate of profit. Or, the tendency towards the realization of the average rate of profit (by average productivity capitals) would also, and at the same time, be the tendency towards the realization of higher or lower than average rates of profit (by higher or lower than average productivity capitals) and therefore could not be a tendency towards a static situation. The price movement is not chaotic, it has a direction, but this is not towards an equilibrium state (Carchedi, 1991, ch. 3).

But even when Marx assumed a lack of technological competition, his production prices were radically different from NCPT's equilibrium prices. Marx assumed only one technique in each branch in order to isolate the tendential effects of capital movement on profitability, that is, the equalization of the profit rates. For Marx, *technological equilibrium was a useful hypothesis to isolate a specific movement* (the tendential redistribution of surplus value due exclusively to capital movement) *not to theorize, as in NCPT, a system without movement.* This is the basic difference between the two notions of equilibrium. It is for this reason

that, contrary to the generally held opinion, the method of simultaneous equations cannot be used to compute Marx's production prices. Marx's production prices should be computed in terms of chronological successions of production and distribution processes in which the outputs of one process become the inputs of the following process rather then being, as in the method of the simultaneous equations, the inputs of the same process (see above). By realistically assuming that time is an essential element of reality and thus of any economic model, one reaches not only a different notion of equilibrium but a different computational method. NCPT's equilibrium, on the other hand, is based on the unrealistic hypothesis of lack of time and leads to the theorization of an inherently static reality through the application of the method of simultaneous equations.

Notes

1. The following two sections argue that a Marxist conceptualization and computation of market prices should likewise be different from the neoclassical one. Carchedi, 1995, presents such an alternative theory.
2. Thus the behavioural approach (for example Simon, 1976, 1979) is not included, while the game theory approach is usually regarded as part of neoclassical economics.
3. See also Horverak, 1988, p. 279. Neoclassical economics can also be criticized from a neo-Ricardian, an institutionalist and a game-theoretical viewpoint. From the point of view of this chapter, the neo-Ricardian school shares with the neoclassical school its emphasis on equilibrium while the institutionalists jettison the notions of value, class and dialectics, thus focusing on the reproduction rather than the supersession of the capitalist system. For a recent example of the institutionalist critique of (1) neoclassical economics, see Hodgson, 1992; of (2) neo-Ricardian economics, see Clark, 1992; and (3) of Marxian economics, see Klein, 1992. Carchedi, 1991, can be seen as providing an answer to Klein's critique. Morgenstein, 1972, provides a sustained attack of neoclassical economics from a game theoretical perspective.
4. Post-Walrasian theory is written in the form of weak inequalities because it allows for a situation in which 'the whole given supply of a factor service is not fully used up; and for the case of a product whose cost exceeds its price (and is therefore not produced)' (Walsh and Gram, 1980, pp. 158–9). Therefore this theory does not imply equality between demand and supply. There can be an excess supply of a factor but this requires a zero price for its services.
5. On this point see Walsh and Gram, 1980, chapters 6–10. Note, however, that 'the bare bony structure of [post-Walrasian theory] is in fact in Walras's *Elements*' (ibid., p. 161).

6. Friedman is right in stressing that hypotheses are never realistic 'in the immediate descriptive sense' (Friedman, 1953, p. 167) and that they therefore cannot be tested through a direct comparison with data (ibid., p. 177). However in the present meaning hypotheses are realistic because they are abstractions from, rather than away from, reality.
7. For an example of a price theory based neither on the *ceteris paribus*, nor on circular reasoning, nor on a timeless model of reality, see Carchedi, 1991, 1995.
8. This blindness is facilitated by the marginalist approach, by the focus on the last unit produced and exchanged, which conceals the unequal initial distribution of endowments.
9. The expression 'market prices fluctuate around production prices' or 'market prices tend towards production prices' could be interpreted as market prices fluctuating around, or tending towards, preexisting production prices. But this is not what is meant here. As soon as they emerge, market prices are pushed towards production prices by capital movements. Thus, logically, market prices exist before production prices. The latter exist only because and inasmuch as market prices tend towards an average of themselves. But chronologically both categories of prices exist contemporaneously.
10. Other writers seem to have been unaware of these consequences. Writing in 1968, Sweezy conceded (unnecessarily) that 'Orthodox economists ... have developed a kind of price theory which is more useful in this sphere than anything to be found in Marx or his followers' (p. 129). More recently Roemer submitted that 'there is no specifically Marxian theory of prices under capitalism' (quoted in Horverak, 1988, pp. 275–6). The claim of this article is that a Marxist price theory is possible, necessary and superior to alternative theories provided the link between value and prices, and thus between value contained and value realized, is not severed.

    If value is created in production but realized in exchange, the sphere of production is primary *vis-à-vis* that of exchange. Commodities can be exchanged because they have something in common that makes them exchangeable (value) before they enter the sphere of exchange (the market). They are exchangeable because they are commensurable before the act of exchange. Just as consumption does not create those qualities that allow goods to be consumed, exchange does not create the quality that allow goods to be exchanged.
11. See Carchedi, 'Determination, Individuality, and Structure in Marx' (1996).

References

Arthur, C. (1994) 'Engels, Logic and History', unpublished.

Bronfenbrenner, M. (1968) '*Das Kapital* for the Modern Man', in Horowitz, 1968.

Caldwell, B. J. (ed.) (1984) *Appraisal and Criticism in Economics* (London: Allen & Unwin).

Carchedi, G. (1991) *Frontiers of Political Economy* (London: Verso).

Carchedi, G. (1995) 'Non-Equilibrium Market Prices', in Freeman and Carchedi, forthcoming.
Carchedi, G. (1996) 'Determination, Individuality and Structure in Marx', unpublished.
Clark, C. M. A. (1992) 'An Institutional Critique of Sraffian Economics', *Journal of Economic Issues*, vol. XXVI, no. 2 (June), pp. 457–68.
Freeman, A. and G. Carchedi (1996) *Marx and Non-Equibrium Economics* (Aldershot: Edward Elgar).
Friedman, M. (1953) 'The Methodology of Positive Economics', in *Essays in positive economics*, reprinted in Caldwell, 1984, pp. 138–78.
Guerrien, B. (1989) *L'Economie Néo-Classique* (Paris: La Découverte).
Hahn, F. and M. Hollis (1979) *Philosophy and Economic Theory* (Oxford: Oxford University Press).
Henry, J. F. (1990) *The Making of Neo-Classical Economics* (London: Unwin Hyman).
Hodgson, G. M. (1992) 'The Reconstruction of Economics: Is there still a Place for Neo-Classical Theory?', *Journal of Economic Issues*, vol. XXVI, no. 3 (September), pp. 749–67.
Horowitz, D. (1968) *Marx and Modern Economics* (New York: Monthly Review Press).
Horverak, O. (1988) 'Marx's View of Competition and Price Determination', *History of Political Economy*, vol. 20, no. 2.
Klein, P. A. (1992) 'Institutionalists, Radical Economists and Class', *Journal of Economic Issues*, vol. XXVI, no. 2 (June), pp. 535–44.
Kristjanson, D. (1994) 'Effective Demand and the Value of Credit Money: a Marxian approach', unpublished.
Morgenstein, O. (1972) 'Thirteen Critical Points in Contemporary Economic Theory: an Interpretation', *Journal of Economic Literature*, vol. X, no. 4, pp. 1163–89
Robinson, J. (1962) *Economic Philosophy* (Harmondsworth: Penguin).
Simon, H. (1976) 'From Substantive to Procedural Rationality', in F. Hahn, and M. Hollis 1979, pp. 65–86.
Simon, H. (1979) 'Rational Decision Making in Business Organization', *The American Economic Review*, vol. 69, no. 4, pp. 493–513.
Sweezy, P. M. (1968) *The Theory of Capitalist Development* (New York: Monthly Review Press).
Walras, L. (1977) *Elements of Pure Economics* (Fairfield: A. M. Kelley).
Walsh, V. and H. Gram (1980) *Classical and Neo-Classical Theories of General Equilibrium* (Oxford: Oxford University Press).
Weber, M. (1949) *The Methodology of the Social Sciences* (New York: The Free Press).

Part II
Dynamics

9 Marx on Technological Change: The Ricardian Heritage[1]

Heinz D. Kurz

INTRODUCTION

Marx's view on the long-term development of the capitalist economy hinges crucially on his opinion on which form of technological change can be expected to dominate in capitalist economic conditions. He was of the opinion that the prevalent form of technological change will be characterised by a rising 'organic composition of capital' and argued that this form is the one that is 'congenial' to the very mode of production under consideration. With a rise in the organic composition, he continued, the trend of the general rate of profit is bound to be downwards. The fall in the rate of profit is in turn considered as an expression of the transient nature of the capitalist mode of production. Hence, given the importance of technological change in Marx's intellectual project – the analysis of 'bourgeois society' – there is hardly a need to justify a concern with his views on the bias of that change.

In this chapter Marx's views on technological change will be compared with those of Ricardo. It will be shown that the idea of a rising organic composition of capital consists essentially of an adaptation to Marx's own analytical framework of Ricardo's discussion of the case where the introduction of new machinery reduces 'gross produce' (analysed in the newly added chapter 'On Machinery' in the third edition of *Principles*, published in 1821). Indeed the case contemplated by Ricardo in that chapter as one possibility among several is singled out by Marx as the case that can be expected to govern the long-term development of the capitalist economy, and therefore decide its destiny. The case under consideration has all the features that became prominent in Marx's discussion of the 'law of motion' of modern society, especially in volume III of *Capital*: (1) technological change entails an increase in labour productivity; (2) it tends to raise

the organic composition of capital; and (3) it contributes to the generation and replenishment of an 'industrial reserve army of the unemployed'.

The structure of this chapter is as follows. The next section provides a summary of Ricardo's analysis of the gross-produce-reducing form of technological progress. The third section points out how this form of technological change, in combination with diminishing returns in primary production (agriculture), leads to a fall in the general rate of profit, given the real wage rate. The fourth section deals briefly with Marx's view on technical change in general and the specific form he assumed to dominate capitalist development in particular. It is shown that this form exhibits all the characteristic features of Ricardo's case where improved machinery tends to reduce the gross produce. The fifth section turns to Marx's 'law of the falling tendency of the rate of profit'. It is argued that his reasoning is logically flawed. The final section provides some evidence that in explaining a rising trend of the organic composition of capital, Marx's argument bears a close resemblance to Ricardo' explanation of a fall in the rate of profit in terms of diminishing returns in agriculture.[2]

RICARDO ON GROSS-PRODUCE-REDUCING TECHNOLOGICAL CHANGE

It has been widely acknowledged that the new chapter, 'On Machinery', contained a significant, perhaps *the* most significant, change to appear in the third edition of Ricardo's *Principles*. In it Ricardo retracted his former opinion on the subject, according to which 'the application of machinery to any branch of production, as should have the effect of saving labour, was a *general good*, accompanied only with that portion of inconvenience which in most cases attends the removal of capital and labour from one employment to another' (Ricardo, 1951, vol. I, p. 386, emphasis added). The essence of Ricardo's original position can be summarized as follows: technological progress of necessity reduces the quantity of labour that is needed (directly and indirectly) to produce one unit of the commodity in whose production the technological change occurs; it reduces 'the sacrifices of labour' (ibid., vol. IV, p. 397). If the demand for the sectoral output does not grow in proportion to the increase in labour productivity, some workers will be discharged. However, 'as the capital which employed them was still in being... it would be

employed in the production of some other commodity, useful to the society, for which there could not fail to be a demand' (ibid., vol. I, p. 387). Hence 'Say's Law' is assumed to hold. In Ricardo's formulation, Say's Law states 'that there is no amount of capital which may not be employed in a country, because demand is only limited by production' (ibid., p. 290). Any labour displacement due to the labour-saving character of technological progress is thus envisaged to be effectively and swiftly made good, thanks to Say's Law. The problem of (additional) persistent unemployment can not arise 'because the capitalist would have the power of demanding and employing the same quantity of labour as before, although he might be under the necessity of employing it in the production of a new or at any rate a different commodity' (ibid., p. 387).

The third edition of *Principles* came as a surprise both to friend and foe because of Ricardo's deliberate confession that he now thought his former views erroneous.[3] He no longer took it for granted that the working of Say's Law would, under all circumstances, prevent the displacement of workers: 'I am convinced, that the substitution of machinery for human labour, is often very injurious to the interests of the class of labourers' (ibid., p. 388). Ricardo explained:

> My mistake arose from the supposition, that whenever the net income [profits and rents] of a society increases, its gross income [net income plus wages] would also increase; I now, however, see reason to be satisfied that the one fund, from which landlords and capitalists derive their revenue, may increase, while the other, that upon which the labouring class mainly depend, may diminish, and therefore it follows... that the same cause which may increase the net revenue of the country, may at the same time render the population redundant, and deteriorate the condition of the labourer (ibid.).

At the bottom of Ricardo's argument there is, first, a 'choice of technique' problem. Then there is the problem of how the diffusion of a new method of production affects the general rate of profit and relative prices, taking the real wage rate as given or changing according to whether the introduction of the new method tends to accelerate capital accumulation. As regards the first problem, Ricardo gave an answer that was generally adopted by later writers, including Marx: a newly invented machine will be introduced, that is, the invention will become an innovation, if by reducing unit costs it raises

the rate of profit of the entrepreneurial 'pioneer'. In Ricardo's words, initially the capitalist 'who made the discovery of the machine, or who first usefully applied it' would reap extra profits (ibid., p. 387). The more controversial part concerns Ricardo's view as to the impact of the new method of production on the 'natural' rates of wages and profits and 'natural' prices. In his view the generalization of the new method throughout the economic system will, in competitive conditions and taking the real wage rate as given and constant, result in a fall in prices to new costs of production and establish a new 'normal' rate of profit. The latter will be higher than before if the technological change takes place in an industry that directly or indirectly contributes to the production of commodities entering the real wage rate ('necessaries'), whilst it will be the same if the technological change takes place in an industry that produces some other commodity ('luxuries'). Hence in Ricardo's view technical progress *alone* can never be responsible for any tendency of the rate of profit to fall. Any such tendency can always be traced back either to an increase in real wages or to diminishing returns in industries that directly or indirectly contribute to the production of wage goods. As is well known, in this regard Marx parted company with Ricardo.

Let us look more closely at Ricardo's special case of the gross-produce-reducing form of technical change. Setting aside for the time being the problem of scarcity of land and thus the problem of rent, Ricardo's argument can be put as follows. Let r_o be the original level of the general rate of profit and r_1 the new one, and assuming that the value of the social capital, K, is given and constant, the technique that produces and uses the machine will be adopted, if and only if

$$r_1 = \frac{Y_1 - W_1}{K} \geq \frac{Y_0 - W_0}{K} = r_0$$

where $r_i (i = 0, 1)$ is the rate of profit associated with technique i, Y_i is the corresponding 'gross produce' or 'gross revenue', consisting of profits and wages, and W_i is the sum total of wages. Obviously a fall in gross produce $(Y_1 < Y_0)$ does not of necessity prevent the introduction of the machine, since wages may also fall $(W_1 < W_0)$. If they fall by more than the 'gross revenue', that is,

$$(W_0 - W_1) > (Y_0 - Y_1)$$

then there are 'motives enough... to substitute the fixed [machine] for the circulating capital [wages]' (ibid., vol. VIII, p. 389). As Ricardo

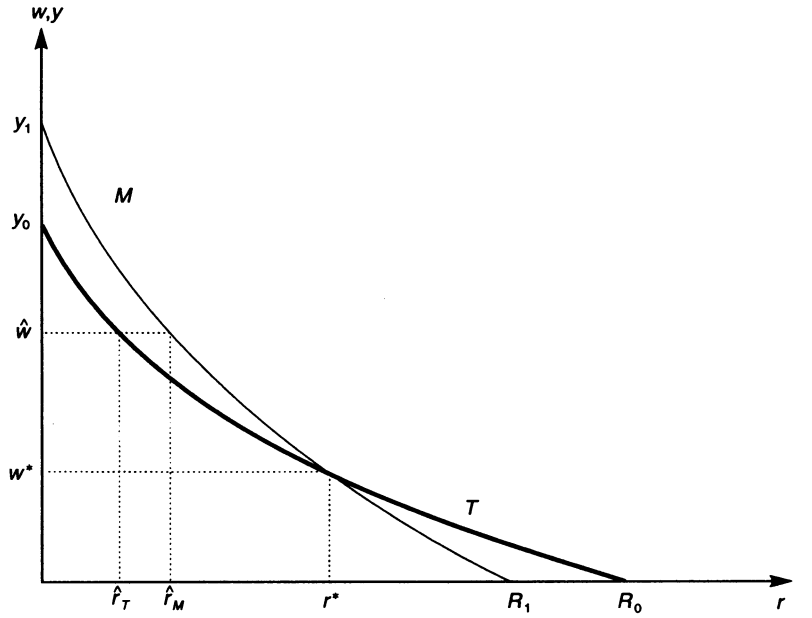

Figure 9.1 Two techniques, one using (improved) machinery

kept stressing, capitalists are interested in profits, that is, in (the no-rent part of) 'neat income', and not in 'gross income', that is, employment: according to the labour theory of value adopted by Ricardo in his social accounting, the value of the net product equals the total amount of labour performed during the year, that is, total employment.

The type of technological change under consideration can be illustrated by means of the inverse relationship between the real wage rate, measured in terms of a given basket of wage goods, w, and the rate of profit, r. This w–r relationship was discovered, though not consistently demonstrated, by Ricardo: 'The greater the portion of the result of labour that is given to the labourer, the smaller must be the rate of profits, and vice versa' (ibid., p. 194). He was thus able to dispel the idea, generated by Adam Smith's notion of price as a sum of wages and profits, that the wage rate and the rate of profit are determined independently of each other. Ever since the inverse relationship between the distributive variables has played a role in long-period analysis of classical descent. In Marx's

view that relationship reflects the antagonism of the different classes, workers and capitalists, in the conflict over the distribution of income.

In Figure 9.1 the rate of profit is measured on the horizontal axis, and the real wage rate and labour productivity with regard to the commodity bundle in which the real wage is expressed is measured on the vertical axis. (For simplicity the comparison between different techniques is carried out with respect to economic systems that are in a stationary state.) Let T represent the 'old' technique – that used prior to the invention of the machine – and let M represent the 'new' technique that produces and utilizes the machine. With wages paid at the beginning of the (uniform) period of production, that is, included among the capital advances, the w–r relationship associated with a given technique tends to be convex to the origin, as illustrated in Figure 9.1.[4] The characteristic features of the gross-produce-reducing form of technological change contemplated by Ricardo can now be illustrated as follows: the new technique exhibits a larger labour productivity, $y_1 > y_0$, and a lower maximum rate of profit (associated with a hypothetical wage rate of zero), $R_1 < R_0$.[5]

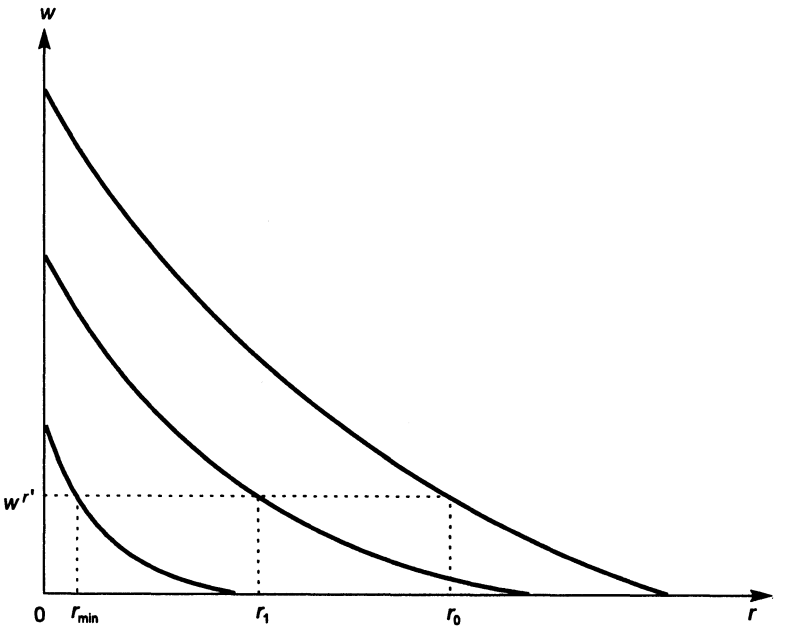

Figure 9.2 Diminishing returns in agriculture

As the diagram shows, the two w–r relationships representing the two techniques intersect once. The point of intersection is also known as a switch-point: at $r = r^*$ ($w = w^*$) the two techniques are equiprofitable and may coexist. With $r \neq r^*$ ($w \neq w^*$) one of the two techniques is superior, that is, yields the capital owners a higher rate of profit, given the real wage rate. Cost-minimizing capitalists seeking the largest rate of return on the value of their invested capital will therefore adopt the technique with the highest r, given w. In the case depicted, with $w > w^*$ this is technique M, whereas with $w < w^*$ it is technique T. This consideration informs us that the decision to introduce the machine, that is, whether or not technique M will supersede technique T, depends on the level of real wages. With $w = \hat{w}$ the new technique M is more profitable than the received technique T. Hence it will be adopted by profit-maximising capitalists. The introduction and gradual diffusion of the new technique and the replacement of the old one entails a rise in the rate of profit from $r = \hat{r}_T$ to $r = \hat{r}_M$. This rise in the rate of profit is accompanied by a change in 'normal' prices or 'prices of production'. In the new situation none of the prices of commodities that are common to both techniques are higher than in the old situation, and some or all are lower. Hence there is a new long-period position of the economic system.[6]

RICARDO ON THE FALLING TENDENCY OF THE RATE OF PROFIT

Ricardo, like Adam Smith before him, saw tendencies at work in the economic system that would necessarily lead to a fall in the general rate of profit. In his analysis of extensive and intensive rent he pointed out that due to diminishing returns in agriculture the rate of profit is bound to fall because an ever larger proportion of the net income, or *surplus* product, is appropriated by landowners to the detriment of capital owners. Figure 9.2 illustrates the case in which, due to diminishing returns in agriculture, the w–r relationship moves towards the origin. With the real wage rate taken as given at a level $w = w'$ the rate of profit will gradually fall to its minimum level, $r = r_{\min}$, at which point accumulation will come to an end.

However this process does not tell the whole story. The 'niggardliness of nature' is repeatedly overcome, at least temporarily, by technological innovations. As Ricardo stressed:

> The natural tendency of [the rate of] profits then is to fall.... This tendency, this gravitation as it were of profits, is happily checked at repeated intervals by the improvements in machinery, connected with the production of necessaries, as well as by discoveries in the science of agriculture which enable us to relinquish a portion of labour before required, and therefore to lower the price of the prime necessary of the labourer (ibid., vol. I, p. 120).

The effect of an economically successful new machine was illustrated in Figure 9.1. Let us now turn to the case in which the machine cannot be introduced immediately upon its invention because at the ruling real wage rate it would not be profitable to do so. Does this mean that at *this* level of the *real* wage rate the invention will never become an innovation? This question is also dealt with by Ricardo: after a discussion of what Hollander (1979, pp. 351, 355) called 'autonomous changes in process', Ricardo turned to the problem of 'induced changes in process'. The upshot of Ricardo's analysis is the famous dictum: 'Machinery and labour are in constant competition and the former can frequently not be employed until labour rises' (Ricardo, 1951, vol. I, p. 395). This statement is typically interpreted in the following manner: 'In this passage one *must* interpret "labour rises" as meaning an increase in the *real* wage rate' (Ferguson, 1973, p.6, emphases added). In terms of Figure 9.1, starting from a level of the real wage rate below the switch-point level w^*, it is a prerequisite that the real wage rate rises above that level in order for the new technique to become profitable.

This interpretation is difficult to sustain. While Ricardo was of the opinion that with a rapid accumulation of capital and the ensuing tendency towards an excess demand for labour the real wage rate will rise and could stay above its 'natural' level for a considerable period of time, his proposition does not imply a rising real wage. The proposition is true even if the *real* wage rate remains constant and only the *money* wage rate rises. This is indeed the constellation Ricardo appears to have had in mind. His reasoning can be summarised as follows. In the course of the accumulation of capital and the growth of population, less and less fertile land has to be taken into cultivation and/or given lands have to be cultivated more intensively in order to increase agricultural production as a whole and the production of corn in particular. Due to extensive and intensive diminishing returns in this sector, that is, an increase in the quantity of labour needed directly and indirectly per unit of (marginal) output, the price of food

and necessaries will rise relative to the price of manufactured goods, including machines, in which no diminishing returns are observed. In order to keep *real* wages at their previous level, *money* wages have to rise to compensate for the increase in the prices of wage goods.[7] According to Ricardo: 'The same cause that raises labour [money wages], does not raise the value of machines, and, therefore with every augmentation of capital, a greater proportion of it is employed on machinery' (Ricardo, 1951, vol. I, p. 395). In the course of the development of a capitalist economy, labour power tends to become more expensive relative to machine power. This acts as an incentive for cost-minimising producers to substitute the latter for the former.

Ricardo's considerations may again be illustrated with the help of the w–r relationships associated with different techniques (see Figure 9.3). In the purely hypothetical case in which the accumulation of capital is carried out without any further improvements in the methods of production, the w–r relationship related to each technique will gradually shift towards the origin due to diminishing returns in agriculture and the related rise in the rent(s) of land(s).[8] For example, in Figure 9.3 the w–r relationship associated with the old technique in the initial situation is given by T_0, whereas T_1 refers to a later stage of the development of the economy, that is, after some accumulation of capital and growth of population has taken place. With a given and constant real wage rate, $w = w^*$, the profit rate will fall from $r = r_{T0}$ to $r = r_{T1}$. This decline in the rate of profit will be accompanied by a rise in the money wage rate that is just sufficient to counterbalance the associated rise in the money prices of wage commodities.

In the initial situation there has already been the option of introducing a technique that produces and uses a new machine; in Figure 9.3 this is given by M_0. This technique has not been adopted on the ground that it would not be profitable to do so: at the given wage rate it would have yielded a lower rate of profit than that obtained with the old technique, that is, $r_{T0} > r_{M0}$. The question then is whether the new machine will ever be introduced into the economic system, that is, whether it will remain a pure invention and not become an innovation. To answer this question, the old technique has to be confronted with the new one at each stage of the development of the economy. This confrontation involves tracing the movement of the switch-point between the two techniques in the course of time. The basic idea is illustrated schematically in Figure 9.3, where it is assumed

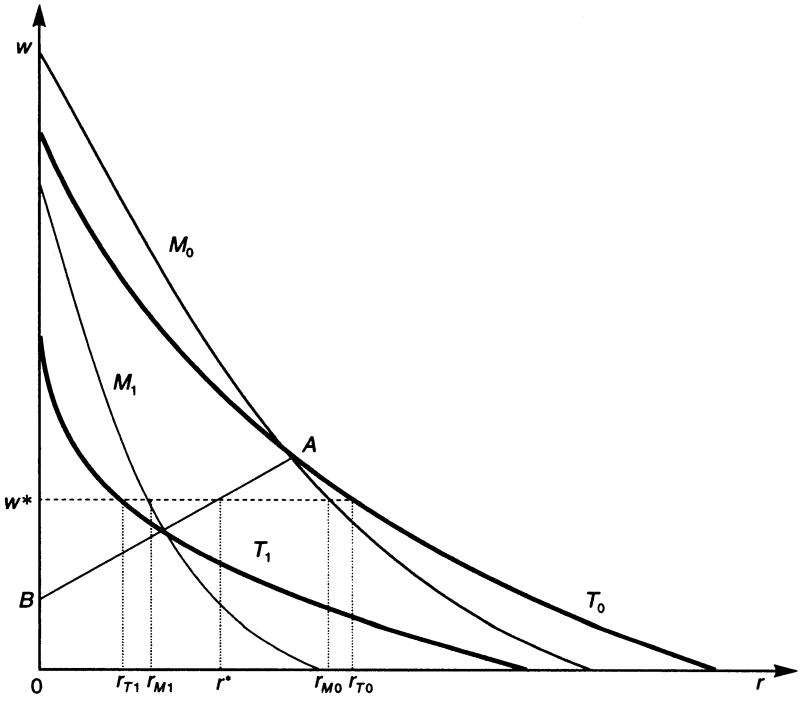

Figure 9.3 Machinery and labour are in constant competition

that the switch-point moves along the ray AB. This ray cuts the broken line that is parallel to the abscissa at $w = w^*$ at the level of the rate of profit $r = r^*$: to the right of that level the old technique is superior, whilst to the left of it the new technique is superior. For example, confronting the new technique with the old one at stage 1 of the development of the economy, that is, comparing T_1 and M_1, we find that the ranking of the two techniques is reversed relative to the initial situation, that is, $r_{M1} > r_{T1}$. With a rise in 'labour', that is, money wages, the new technique will eventually be rendered first equiprofitable and then superior to the old one, and thus will replace the latter. The falling tendency of the rate of profit can be retarded or decelerated by means of a switch to the technique that produces and uses the 'new' machine (which by now may already have been known for some time). Yet, as Ricardo emphasises, this switch is prejudicial to the interests of the labouring class, which suffers from the displacement of labour.

MARX ON TECHNICAL CHANGE

Marx was an attentive student of Ricardo's *Principles*. His own ideas were often derived from a critical investigation of what Ricardo had said on a particular problem under consideration. He studied Ricardo's chapter on machinery with great care and praised the 'scientific impartiality and love of truth' (Marx, 1954b, p. 412) and the '*honesty* which so essentially distinguishes him [Ricardo] from the vulgar economists' (Marx, 1954a, p. 555). It can be argued that the form of technical progress contemplated by Marx in terms of a rising 'organic composition of capital' reflects in important respects Ricardo's case of the introduction of a machine that reduces the gross produce: both are associated with (1) a fall in the maximum rate of profit; (2) an increase in labour productivity; and (3) the displacement of workers. However, whilst Ricardo was of the opinion that this kind of innovation would either increase the general rate of profit or leave it constant, given the real wage rate, Marx blamed this bias of technical progress for the tendency of the rate of profit to fall. He tried to ridicule Ricardo's explanation of any such tendency in terms of diminishing returns in primary production. In volume III of *Capital* we read: 'Those economists..., who, like Ricardo, regard the capitalist mode of production as absolute, feel at this point that it creates a barrier itself, and for this reason attribute the barrier to Nature (in the theory of rent), not to production' (Marx, 1977, p. 242). And in the *Grundrisse* he accused Ricardo of 'escaping from political economy to organic chemistry' (Marx, 1966, p. 639).

The question is whether Marx's view and his criticism of Ricardo are sound. We first deal with why Marx thought that in capitalism technical progress will, on average, exhibit the bias mentioned.[9] The argument is based on the following premises. First, the real wage rate is taken to be constant; as Marx stressed: 'Nothing is more absurd... than to explain the fall in the rate of profit by a rise in the rate of [real] wages' (Marx, 1977, p. 240). Second, the term 'organic composition of capital' (k) will be used in the sense of the ratio between the value of the means of production, c, and 'the aggregate mass of living labour operating the means of production' (ibid., p. 216), l, that is, $k = c/l$.

Like Ricardo, Marx saw that various forms of technical progress can be distinguished; he even attempted to characterize the history of capitalism in terms of a sequence of periods, each exhibiting a different dominant form (cooperation, division of labour and

manufacture, machinery and modern industry – Marx, 1954b, part IV). However, unlike Ricardo, he thought that in developed capitalism the form that would prevail would be the one that increased k. Hence what in Ricardo was a possibility, in Marx became a necessity. Why did he think that other forms of technical progress were less important?

Two alternative forms of technical progress are, for example, discussed in chapter XIII ('The Law as such') of part III ('The Law of the Tendency of the Rate of Profit to Fall') of volume III of *Capital*. There Marx contemplated two cases, one in which the rate of profit 'may remain the same', the other in which it 'could even rise'. In the first case 'the increase in productiveness of labour acts uniformly and simultaneously on all the elements of the commodity, so that its total price falls in the same proportion in which the productivity of labour increases, while, on the other hand, the mutual relation of the different elements of the price of the commodity remains the same' (Marx, 1977, p. 230). This case is reminiscent of Harrod-neutral technical change. In the w–r diagram it is characterised by an increase in labour productivity (and thus the maximum level of wages), while the maximum rate of profit remains the same. Obviously, with a constant positive real wage rate the rate of profit will *rise*, contrary to what Marx maintained. The second case contemplated by Marx exhibits 'a substantial reduction in the value of the elements of constant, and particularly of fixed, capital' (ibid.), which translates into an increase in the maximum rate of profit. The fact that Marx did not consider these cases important becomes clear in the introductory and concluding statements in the passage under discussion. The former begins with 'Considered abstractly...', and the latter states: 'But in reality, as we have seen, the rate of profit will fall in the long run' (ibid.). In the *Grundrisse* Marx had dubbed the first form of technical progress a 'malicious assumption' (*bösartige Voraussetzung*) (Marx, 1966, p. 293).

The reason why Marx thought that in the long run k is bound to rise is given in chapter 25 ('The General Law of Capitalist Accumulation') of volume I of *Capital*. In the first section of that chapter Marx discussed the accumulation of capital on the assumption that the 'technical' and 'organic compositions' of capital remain constant across the economy.[10] It is then argued, in the second section, that 'Once given the general basis of the capitalistic system, then, in the course of accumulation, a point is reached at which the development of the productivity of social labour becomes the most powerful lever

of accumulation' (Marx, 1954b, pp. 582–3). Yet revolutionizing the methods of production is said to involve an increase in the 'technical composition of capital' and is 'reflected' in an 'increase of the constant constituent of capital at the expense of its variable constituent' (ibid., p. 583). At the beginning of the third section it is then stated: 'The accumulation of capital, though originally appearing as its quantitative extension only, is effected, as we have seen, under a progressive qualitative change in its composition, under a constant increase of its constant, at the expense of its variable constituent' (ibid., p. 589). This view is echoed in volume III of *Capital*. In the following passage Marx talks about how the value of a single commodity (and implicitly the value of the gross social product) is affected by this kind of technical progress:

> The value of a commodity is determined by the total labour-time of past and living labour incorporated in it. The increase in labour productivity consists precisely in that the share of living labour is reduced [i.e., $\Delta l < 0$] while that of past labour is increased [i.e., $\Delta c > 0$], but in such a way that the total quantity of labour incorporated in that commodity declines; in such a way, therefore, that living labour decreases more than past labour increases [i.e., $\Delta l + \Delta c < 0$] (Marx, 1977, pp. 260–1).

What made Marx so confident that k would indeed rise? *Capital* and Marx's other writings, including *Grundrisse* and *Theories of Surplus Value*, are full of hints to the effect that the antagonism between wage labour and capital is at the bottom of this particular bias of technical progress, which, together with its alleged implication – the fall in the rate of profit – are said to be '*just an expression peculiar to the capitalist mode of production*' (ibid., p. 213; emphasis in original). The 'openness' of the wage contract is taken to involve a structural conflict: the capitalists are trying to get as much as they can out of the workers and the workers are trying to give as little as possible. The capitalists are said to attempt to solve this conflict in their favour by replacing the element that cannot be fully controlled and disciplined, the worker, by the element that can, the machine. As Nathan Rosenberg pointed out, historically there is some evidence in support of this view:

> The apparent recalcitrance of nineteenth-century English labor, especially skilled labor, in accepting the discipline of factory

> employment provided an inducement to technical change.... The most important point is that the threat of worker noncompliance – in the last resort, strikes – served as a powerful agent in focusing the attention of decision makers on obvious and major threats to their profit position.... The threat of such withdrawals, then was a powerful force in directing energies in a search for labor saving machines (Rosenberg, 1969, p. 12).

However this and similar kinds of 'institution-based' attempts to explain a particular bias of technical progress do not and in principle cannot provide a demonstration that a means adopted by individual capitalists in order to secure and possibly increase the profitability of their *individual* capitals, counterintuitively turns out to be the very source of the tendency of the *general* rate of profit to fall. Marx was quite clear about what was required: it had to be shown that the rational behaviour of the individual capitalist is 'irrational' from the point of view of the capitalist class as a whole. This brings us to Marx's explanation of the tendency of the rate of profit to fall.

MARX'S EXPLANATION OF THE TENDENCY OF THE RATE OF PROFIT TO FALL

The basic premise of Marx's argument is: 'No capitalist ever voluntarily introduces a new method of production, no matter how much more productive it may be, and how much it may increase the rate of surplus-value, so long as it reduces the rate of profit' (Marx, 1977, p. 264). Yet if no capitalist ever 'voluntarily' does so, how is it then possible that the general rate of profit declines? Like Ricardo, Marx assumed that in general the capitalist that carries out an innovation will reap extra profits. The chapter on 'The Law as such' ends with the remarkable statement: 'A capitalist working with improved but not as yet generally adopted methods of production sells below the market-price, but above his individual price of production; *his rate of profit rises until competition levels it out*' (ibid., p. 231, emphasis added). Levels it out at which level? The reader will be left wondering how, in these circumstances, competition could ever bring about an equalisation of the general rate of profit at a level *below* the original one.

In the context of his speculation on the long-term development of the capitalist economic system, Marx had to address the following closely related problems. First, he had to show that the two objectives

of capital accumulation, that is, adding to the value of the capital stock and increasing productivity, were not contradictory and mutually exclusive. To the extent to which capital accumulation increases productivity, it fails to add to the value of capital. This conflict, or contradiction, was expressed by Marx in terms of the distinction between the 'technical composition of capital' on the one hand and the 'organic composition of capital' on the other. In extreme cases an accumulation of capital (in the 'technical' sense) either adds nothing to productivity or it adds nothing to the value of capital. The latter case poses a potential threat to Marx's hypothesis of a rising k. For if an accumulation increases productivity in the same proportion as that accumulation bears to the original capital value, then that capital value will not be altered. Second, it had to be shown that a rise in the organic composition of capital translates into a fall in the general rate of profit. Obviously a rise in the ratio of 'materialized labour' (c) and 'living labour' (l) involves only a fall in the *maximum* rate of profit, that is, the rate that would obtain if wages were zero and thus labour power a free good. A fall in the maximum rate of profit, however, is not the same thing as a fall in the actual normal rate of profit. Therefore it had to be shown that k will rise *without limit*, that is, the maximum rate of profit vanishes.

We shall discuss Marx's answer to the first question in the following section. Here attention will focus on Marx's view of the implications of the introduction and diffusion of a new method of production on the general rate of profit. We shall first turn to Marx's idea that a rise in the profitability of individual capitals consequent upon the introduction of a new method of production is perfectly compatible with a fall in the general rate of profit consequent upon the diffusion and generalisation of that method. Marx's argument in support of this striking supposition is this. The general adoption of 'every such new method of production cheapens the commodities'.[11] This fall in prices depresses profit margins. 'There follows a fall in the rate of profit – perhaps first in this sphere of production [where the change took place], and eventually it achieves a balance with the rest – which is, therefore, wholly independent of the will of the capitalist' (ibid., pp. 264–5). Hence the general rate of profit is seen to fall as a consequence of the fall in prices to cost of production.

Ladislaus von Bortkiewicz, in the final instalment of his three-part treatise 'Wertrechnung und Preisrechnung im Marxschen System', found Marx's argument inconclusive. He accused Marx of having committed an elementary error by not taking into account the fact

that the price changes contemplated 'affect the product in the same measure as the capitalist's advances' (Bortkiewicz, 1907, p. 458), that is, a fall in prices affects both output prices and input costs. Bortkiewicz illustrated his objection in terms of a comparison of two methods of production by means of which a given commodity can be produced. In accordance with Marx, he started from the assumption that initially the 'prices (and thus also the price expression of the commodity bundle constituting the real wage) are still the old ones' (ibid., p. 457). The criterion is then whether a method incurs extra costs or yields extra profits: if it incurs extra costs it will not be adopted; if it yields extra profits it will be introduced and will gradually replace the old method. With the use of simple models Bortkiewicz then demonstrated that the introduction and generalisation of a new method of production can never reduce the rate of profit, given the real wage rate, and will raise it whenever the new method contributes directly or indirectly to a cheapening of wage goods (ibid., pp. 454–68). He thus vindicated Ricardo's views on the matter and refuted Marx's.[12]

The error of Marx's reasoning can also be illustrated in a schematic way in terms of the manner in which a technical change that increases the organic composition of capital shifts the w–r frontier of the economic system as a whole. Assume, with regard to Figure 9.1, that the system is originally using technique T and that the wage rate equals w^*. Obviously it may be profitable for cost-minimizing producers to adopt new techniques that exhibit higher organic compositions, that is, lower levels of the maximum rate of profit. However the introduction of techniques of this kind can never make the maximum rate of profit fall below the level indicated by r^*, for if it did, even a labour productivity tending towards infinity could not prevent the rate of profit from falling. A change to a technique exhibiting a higher organic composition of capital is thus only possible if the w–r relationship associated with the new technique intersects the old one at or to the right of the point whose coordinates are (r^*, w^*). Therefore the argument with which Marx tried to counter the objection that the negative impact on the rate of profit of a rise in the organic composition may be offset by a rise in the rate of surplus value is untenable. His argument was that while surplus value can at most be equal to total living labour, which implies that variable capital vanishes, constant capital can increase indefinitely with accumulation: there is no limit to the quantity of 'crystallised labour' that can be accumulated relative to living labour. As the above argument

shows, this presupposition is false. Marx's explanation of the falling tendency of the rate of profit cannot therefore be sustained. His attempt to demonstrate that the profit-seeking behaviour of individual capitalists is collectively self-defeating does not stand up to close examination.

MARX'S RETREAT TO RICARDO'S POSITION

So far we have taken it for granted that the organic composition of capital will rise. We have seen, however, that Marx was wrong to assume that it can rise without limit. In this section we shall address very briefly the first question mentioned above regarding a potential contradiction between the two objectives of accumulation, that is, adding to the value of the capital stock and increasing productivity. It will be seen that the reasons Marx gave in support of his claim that the increase in productivity will not fully counteract the first objectives amount to little else than to a retreat to Ricardo's position. In volume III of *Theories of Surplus Value* Marx stressed that:

> The development of productive power is not even. It is in the nature of capitalist production that it develops industry more rapidly than agriculture. This is not due to the nature of land, but to the fact that, in order to be exploited really in accordance with its nature, land requires different social relations. Capitalist production turns towards the land only after its influence has exhausted it and after it has devastated its natural qualities (Marx, 1971, pp. 300–1).

This view is echoed in volume III of *Capital* at the beginning of section IV, ('Supplementary Remarks') of chapter XV ('Exposition of the Internal Contradictions of the Law'):

> The fact that the development of the productivity in different lines of industry proceeds at substantially different rates and frequently even in opposite directions, is not due merely to the anarchy of competition and the peculiarity of the bourgeois mode of production. Productivity of labour is also bound up with natural conditions, which frequently become less productive as productivity grows – inasmuch as the latter depends on social conditions. Hence the opposite movements in these different spheres – progress here, and retrogression there (Marx, 1977, p. 260).

And earlier in volume III of *Capital* it is stated 'that the capitalist system works against a rational agriculture, or that a rational agriculture is incompatible with the capitalist system (although the latter promotes technical improvements in agriculture)' (ibid., p. 121).

While these passages belong basically to that part of Marx's analysis which was meant to show that a rise in the 'technical composition' of capital will be reflected in a rise in the latter's 'organic composition', they reveal – Marx's verbiage notwithstanding – that he himself had to take the natural conditions of production seriously. In short, in this regard Marx was forced to retreat to Ricardo's position.

Notes

1. Paper presented at the conference on 'Marxian Economics: A Centenary Appraisal. International Conference on Karl Marx's Third Volume of *Capital*: 1894–1994', University of Bergamo, 15–17 December, 1994. I am grateful to the participants of the conference, who provided useful suggestions, and to an anonymous referee for his comments.
2. In what follows, the (in)famous 'transformation problem' of values into prices of production is set aside, because the argument does not in a crucial sense depend on whether or not Marx's 'solution' of it is correct. (It is of course incorrect.) Even on the premise that the labour theory of value holds as a theory of relative prices, Marx's analysis of technical change and the long-term development of profitability can be shown to exhibit serious shortcomings.
3. For a detailed critical account of Ricardo's views on machinery, see Jeck and Kurz, 1983; see also Kalmbach and Kurz, 1986.
4. It would be more correct to talk of the w–r frontier, since with durable capital goods a choice-of-technique problem is always involved with each single 'technique'. However we shall set aside this complication.
5. The maximum rate of profit is the ratio between gross income (in Ricardo's terminology) and the capital stock when wages vanish. In conventional economics it is occasionally referred to as 'capital productivity'. Hence in this perspective the form of technological change discussed in Ricardo's chapter on machinery increases labour productivity and decreases capital productivity.
6. For a proof of the statements made above with regard to systems with and without fixed capital, see Kurz and Salvadori, 1995.
7. With gold as the commodity that performs the role of money, whether or not the money prices of wage goods will rise depends on the relative deterioration of conditions of production in agriculture and gold mining as output is increased. In the above it is assumed in line with Ricardo's argument, that additional quantities of gold are available at a constant

total labour cost per ounce of gold. However, irrespective of the assumption employed with regard to the provision of the money commodity (gold), in the given circumstances contemplated by Ricardo the money price of the real wage basket would always rise relative to that of manufactures, including machines.

8. It should be noted that in the above the usage of the term 'technique' is somewhat loose, since with the accumulation of capital there will be a continuous change in the methods of production employed in agriculture and thus a continuous change in 'technique'. With this in mind the above description of the process under consideration should not give rise to misunderstandings.
9. It hardly needs to be stressed that the discussion here can address only a few aspects of the many-faceted problems under consideration. For a summary account of the debate about Marx's law of the falling rate of profit, see, for example, Wolfstetter, 1978; see also Caravale, 1993.
10. It deserves to be mentioned that this section contains an interesting statement about the relationship between income distribution and the pace of capital accumulation: 'To put it mathematically: the rate of accumulation is the independent, not the dependent, variable; the rate of wages, the dependent, not the independent, variable' (Marx, 1954b, p. 581). As is well known, this view became prominent with the works of Kalecki, Kaldor and Joan Robinson and is a characteristic feature of the post-Keynesian approach to the theory of distribution and growth.
11. The commodity under consideration, in whose production the new method is employed, cannot be a 'luxury good' for otherwise the technical change could not affect the price of both that commodity and other commodities. Hence the technical change contemplated by Marx in the above passage must refer to a wage good or a means of production that is directly or indirectly needed in the production of some wage good(s).
12. It should be stressed that Bortkiewicz's counterargument does not depend on whether or not prices are proportional to labour values.

References

Bortkiewicz, L. von (1907) 'Wertrechnung und Preisrechnung im Marxschen System', part III, *Archiv für Sozialwissenschaft und Sozialpolitik*, vol. 25, pp. 10–51.

Caravale, G. (ed.) (1993) *Marx and Modern Economic Analysis* (Oxford: Basil Blackwell).

Ferguson, C. E. (1973) 'The Specialization Gap: Barton, Ricardo, and Hollander', *History of Political Economy*, vol. 5, pp. 1–13.

Hollander, S. (1979) *The Economics of David Ricardo* (Toronto: University of Toronto Press).

Jeck, A. and H. D. Kurz (1983) 'David Ricardo: Ansichten zur Maschinerie', in H. Hagemann and P. Kalmbach (eds), *Technischer Fortschritt und Beschäftigung* (Frankfurt am Main: Campus).

Kalmbach, P. and H. D. Kurz, (1986) 'Economic Dynamics and Innovation: Ricardo, Marx and Schumpeter on Technological Change and Unemployment', in H.-J. Wagener and J. W. Drukker (eds), *The Economic Law of Motion of Modern Society* (Cambridge: Cambridge University Press).

Kurz, H. D. and N. Salvadori (1995) *Theory of Production. A Long-Period Analysis* (Cambridge, Melbourne and New York: Cambridge University Press).

Marx, K. (1954a) *Theories of Surplus Value*, vol. 2 (Moscow: Progress Publishers).

Marx, K. (1954b) *Capital*, vol. I (Moscow: Progress Publishers).

Marx, K. (1966) *Grundrisse der Kritik der politischen Ökonomie* (Rohentwurf 1857–1858; Anhang 1850–1859), edited by the Moscow Institute of Marxism and Leninism (Berlin: Dietz Nachfolger).

Marx, K. (1971) *Theories of Surplus Value*, vol. 3 (Moscow: Progress Publishers).

Marx, K. (1977) *Capital*, vol. III (Moscow: Progress Publishers).

Ricardo, D. (1951 et seq.) *The Works and Correspondence of David Ricardo*, edited by Piero Sraffa with the collaboration of M. H. Dobb, 11 vols (Cambridge: Cambridge University Press).

Rosenberg, N. (1969) 'The Direction of Technological Change: Inducement Mechanisms and Focusing Devices', *Economic Development and Cultural Change*, vol. 18.

Wolfstetter, E. (1978) 'Das Gesetz des tendenziellen Falls der Profitrate in der Marxschen und in der klassischen Wirtschaftstheorie', *Jahrbuch für Sozialwissenschaft*, vol. 29, pp. 270–99.

10 A General Refutation of Okishio's Theorem and a Proof of the Falling Rate of Profit

Alan Freeman

INTRODUCTION

It is almost universally believed that Okishio's (1961) justly celebrated theorem disproves Marx's analysis of the tendency of the profit rate to fall, by showing that if real wages stay constant the rate of profit rises as a result of productivity-enhancing technical change. All attempted refutations accept Okishio's approach which like many others, notably the surplus approach school, is based a system of simultaneous linear equalities.

This chapter is a complete departure from the simultaneous method, which we believe was alien to Marx, theoretically deficient and utterly unrealistic. Applying the method of a growing body of writers convinced that simultaneous systems cannot represent the actual formation of values or prices,[1] it provides a fully general refutation rooted in a rigorous differential equation formalism. We show that the denominator of the rate of profit falls continuously unless capitalist consumption exceeds profit, as occurs in a slump. The resultant fall in the profit rate can be permanently offset only in such circumstances. Since this accurately reflects observed reality, we conclude that simultaneous systems – including neoclassical general equilibrium – cannot represent a capitalist economy, and that the premises of Okishio's calculation are false.

GENERAL EQUILIBRIUM MARXISM

The best-known progenitor of the simultaneous presentation of Marx's theory, from Bortkiewicz (1906, 1907), first appeared in Max

Weber and Werner Sombart's *Archiv für Sozialwissenschaft und Sozialpolitik*.

Bortkiewicz's explicit debt to Walras, the founder of modern mathematical general equilibrium theory, was the fruit of a lifelong correspondence with him (see Gattei, 1982), which he began in 1887 at the age of nineteen with the following words (Jaffé, 1965, Vol II p. 230): 'Your writings, sir, have awakened in me a lively interest in the application of mathematics to political economy, and has pointed out to me the road to travel in my researches into the methodology of economic science'. His famous article offers the following, revealing remark:

> Alfred Marshall said once of Ricardo: 'He does not state clearly, and in some cases he perhaps did not fully and clearly perceive how, in the problem of normal value, the various elements govern one another *mutually*, not *successively*, in a long chain of causation.' This description applies even more to Marx... who held firmly to the view that the elements concerned must be regarded as a kind of causal chain, in which each link is determined, in its composition and its magnitude, only by the preceding links... Modern economics is beginning to free itself gradually from the successivist prejudice, the chief merit being due to the mathematical school led by Leon Walras.[2]

The mathematics used to formalise Marx's theory are thus the explicit fruit of the doctrine now known as neoclassical general equilibrium theory. The lynchpin of the construction is the rejection of Marx's 'successivist prejudice' in favour of the Walrasian, simultaneist assumption that the prices and values of outputs at the end of a period must be equal to the prices and values of inputs at the beginning of the *same* period, a logically inconceivable assertion. By the same token it fully accounts for the transformation of flows into stocks and vice versa, an essential feasibility condition that is absent from all simultaneous treatments.

The emerging non-equilibrium alternative is based on two principal tenets:

1. Time is sequential, not simultaneous. Production and exchange are both represented by difference equations, and in the limit, differential equations.

2. The value transferred by consumed means of production to the value of outputs is given by the value of the money paid for them; variable capital is correspondingly given by the value of the money wage.

To arrive at a complete alternative a third aspect is dealt with in this chapter: the effect of capital stocks, or historically inherited value, and their effect on the determination of value. Neglect of this issue is the basis of the errors introduced by Okishio's formalism.

NOTATION

Mathematical notation is not neutral. Our principle is that the same symbol always stands for the same commodity in the same capital, while value is distinguished from use value, and stocks from flows, by varying the type or by additional symbols. This emphasises the unity of the commodity form. It also makes it easier to use the same letters as Marx, whose English translators tend to use C for nearly everything and V for everything else.

Every commodity has two aspects: use value and value. Value (and price) magnitudes will be represented with a £ sign in front unless the context is unambiguous.[3] The basic symbols are matrices C, W, X and B, and vectors V, L, λ and p:

- C_j^i = constant capital employed: quantity of commodity j in capital i (whose value is hence £C_j^i).
- V^i = variable capital (labour power) employed by capital i, in hours.
- £L^i = value-creating capacity of V^i, (value-product) in pounds.
- X_j^i = produced output of commodity j in capital i.
- W_j^i = quantity of commodity j in the purchases from wages of workers in capital i.
- B_j^i = quantity of commodity j in sector i.
- λ_j = value of a unit of commodity j measured in pounds.
- p_j = price of a unit of commodity j measured in pounds.

Columns represent commodities and rows represent capitals or sectors. This corresponds to Marx's usage rather than the Leontief tradition which shows sectors as columns.[4]

There may be more than one producer of the same commodity so C_j^i may not in general be square. We use a *reduced form* (Freeman,

1991) of C in which each column is a sector producing a distinct commodity.[5] X is therefore diagonal.

Workers' consumption is represented by a matrix (W) rather than a vector, so wages may differ from sector to sector, though of course they may be the same.

To distinguish rows from columns we use the convention that superscripts vary over columns and subscripts over rows. Thus:

- $£C^{farmers}$ is a row vector giving the farmers' constant capital, and so on.
- $£C_m$ is a column vector in which $£C_m^i$ is the value of money held in sector i.

The important matrix K gives the distribution of the total stocks of all commodities in the economy except labour power. A problem of signs arises. It is conventional, and anything else would be obscurantist, to represent the *consumption* of C, W and B as positive. But consumption actually diminishes a stock and, strictly, should be represented as negative.[6] The stock of a commodity is then *minus* the sum (or integral) of consumption flows. The stock of C is thus represented by $-C$, just as assets on a balance sheet appear as a debit, something owing to the owner. In writing down the relation between K and other stocks this cannot be avoided and we write

$$K = X - C - W - B$$

Row and column sums are represented by a subscript or superscript Σ thus:

- K^{Σ} is a row vector giving the amount of each commodity in the economy.
- $£K_{\Sigma}$ is a column vector giving the value of capital stock in each sector.

The diagonal matrix formed from K^{Σ} is called $\hat{K}$, so that $\hat{K}_j^i = 0$ when $i \neq j$ and $\hat{K}_i^j$ is the quantity of commodity i in existence. $\hat{C}$, $\hat{W}$ and so on are similarly defined. Note $\hat{X} = X$.

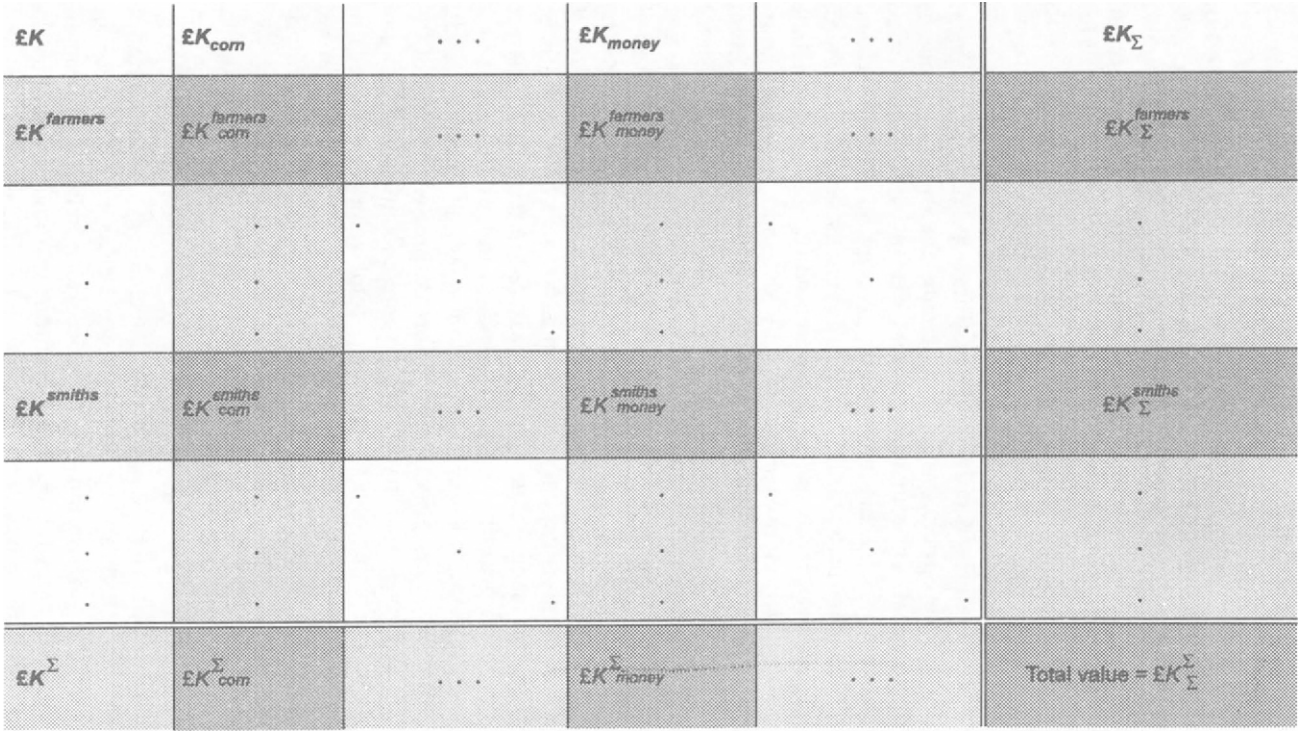

Figure 10.1 National conventions for columns, rows and sums

MARKET PRICES AND THE VALUE OF MONEY

All simultaneous presentations fall back on the Ricardian notion of price as the ratio at which goods are bartered for each other. This eliminates money and excises the real dynamics of the capitalist economy. It is possible only on the basis of the 'simplifying assumption' that rates of profit actually equalise, that is, that commodities sell for their prices of production instead of their market prices. This assumption is in fact a postulate. Without it, there is no simultaneous solution.

We differ in three decisive respects. First, we deal with sale at arbitrary market prices, without assuming the rate of profit is everywhere equal. Of course the special case in which profit rates equalise is covered by this fully general assumption. Second we deal with sale at *money* prices, as do Marx and capitalist economies. Third, more subtly, the market price of a commodity is the *value* of the money for which it exchanges. A fully dynamic treatment must recognise that a given quantity of money will represent different magnitudes of value at different times, for example as a result of price inflation. Changes in the value of money must be corrected for, and this is indeed one of the principal reasons an independent measure of the magnitude of value – labour hours – is necessary to decipher the underlying movement of the economy. No one seriously claims that, if price inflation raises capital stock from £1000 to £2000, a profit of £1000 has been made. Value must be measured in terms that abstract from changes in price that do not depend on the production of new goods (see for example Elson, Ramos, Rodriguez and Freeman, 1995).

Therefore all money prices are henceforth expressed in terms of the value that any given quantity of money represents in exchange at any given time. The value of £1 is then the total value of all goods in circulation, divided by their total money price. From now on we assume, as did Marx throughout volume III of *Capital*, a constant value of money.[7]

This calculation differs from that known as the 'New Approach', in which the value of money is determined in relation to the net product. In our view this requires it to be deduced from prior assumptions about production and technology, since without knowing the structure of production we cannot say what the net product is. Our derivation of the price–value relation (Freeman, 1995) proceeds from the exchange relations introduced by Marx in the first part of volume I of *Capital* and is independent of any

particular assumptions about production or reproduction. We argue that *all* goods serving as commodities (that is, goods to which the market attaches a price, whether or not they are sold) take part in circulation. The price–value relation therefore applies to the total commodity stock K.

Marx's first equality, the equality of total price and value, follows tautologically from this definition; it applies to the total stock of capital.

THE SEQUENTIAL APPROACH

If we assume (which Marx did not) that all goods are turned over exactly once, then $X = K$, the starting point of the Bortkiewicz approach. This can be used to illustrate some of the ideas of our approach that may be unfamiliar to newer readers and to show its relation to the simultaneous approach.

Our starting point is a *time-dependent* relation between values in one period and values in the next, given by the standard assumptions of value theory: the value of, outputs at time $t + 1$ is equal to the value of constant capital consumed in period $[t, t + 1]$ plus the value product of this period

$$X\lambda^{t+1} = C^t\lambda^t + \pounds L^t \tag{10.1}$$

or more simply

$$\pounds\lambda^{t+1} = \pounds C^t + \pounds L^t \tag{10.2}$$

This provides a difference equation for λ (as throughout this chapter we omit the time superscript where it can be unambiguously supplied, so that $\pounds L^i$ is simply written £L)

$$\lambda^{t+1} = X^{-1}C\lambda^t + X^{-1}\pounds L \tag{10.3}$$

Given the initial value λ^0 this has a positive determinate solution at all times provided inputs, hours worked and gross outputs are positive. It is difficult to conceive how this could be violated.

The simultaneous solution is a special case of this equation in which it is assumed that λ does not change:

$$\lambda = X^{-1}C\lambda + X^{-1}\pounds L \tag{10.4}$$

In terms of the normal procedures of dynamic analysis this is the *particular solution* of the general dynamic equation. It is illegitimate, and would be unacceptable in any other science, to regard a succession of particular solutions brought about by changes in the parameters C, X and £L as a description of the evolution of the state of that system 10.3, though this is the procedure that has been portrayed as Marxist for ninety years. It implies that λ has two distinct magnitudes at the same time; its equilibrium magnitude at the end of one period and its new equilibrium magnitude at the beginning of the next.

The Value Transfer Vector

Consider now the more general case $X \neq K$. The total market price $p^T\hat{k}$ and total value $\lambda^T\hat{K}$ of all goods in society are equal by definition. The price and value of any subset of these goods are not in general equal. The formation of p therefore transfers value between the holders of commodity stocks. This is independent of how much is actually traded. If a trader pays \$1000 000 000 for futures that fall to \$100 000 000 then she has instantly lost \$900 000 000, whether or not she sells them. We need to relate such value transfers to the price–value differences that induce them.

Consider the vector $\lambda^T\hat{K} = £K^{\Sigma}$, each of whose elements represents the value of the total stock of one particular commodity, and the vector $p^T\hat{K}$, each of whose elements represents the price of the total stock of one particular commodity. Their difference is a (time-varying) vector of value–price transfers, which we shall term £E:

$$£E = p^T\hat{K} - \lambda^T\hat{K}$$

Clearly the elements of £E sum to zero by definition. Corresponding to this vector £E is a unique vector of *unit* value transfers we shall term e.

$$e = \hat{K}^{-1}£E^T = p^{-\lambda}$$

This lets us calculate the value–price difference of any given collection of commodities. In particular it allows us to calculate the difference between the value and the price of the output of any given period:

$$X^t e^{t+1} = X_p^{t\,t+1} - X^t\lambda^{t+1} \tag{10.5}$$

5.2 The Second Equality

Equation 10.5 exhibits the value–price relation as a relation of *transition*; it allows us to separate any changes in value that have resulted from production, and have hence been embodied in $\pounds X^t$ during period $[t,\ t+1]$, from those that result from circulation at the end of this period and cause prices at $[t+1]$ to diverge from values at $t+1$. Were it not for the effects of supply, demand and the movement of capital, we would have

$$X^t\, e^{t+1} = 0$$

In this case the unit values expressed in $\pounds X^t$ would become the unit values of the inputs to the next period, $\pounds C^{t+1}$ and $\pounds V^{t+1}$. The Bortkiewicz tradition claims that Marx 'forgot to transform inputs', that is, asserts that the value transferred to the product by C^{t+1} is $\pounds C^t$, and that the value $\pounds V^{t+1}$ appropriated by workers is $\pounds V^t$.

A growing body of 'non-dualist' writers (Wolff, Callari and Roberts, Moseley, Ramos and Rodriguez) though working with simultaneous equations, that Marx's conception was a different one; that the value transferred to the product by C is equal to the price of the elements of C, namely Cp, and that he similarly perceived variable capital as Vp. He did not need to transform inputs in volume III since he had already done it in volume I.

Space does not permit repetition of the clear textual evidence that this was indeed Marx's view these authors and others have provided. It is, however, almost undeniable. The 'error' of which Marx has stood accused for ninety years does not exist.

Marx's idea is however easier to understand in the framework that is properly his own; namely that of a succession of periods of production and circulation. From this point of view, the issue is this: the value of the elements of C, when they serve as inputs, is determined not by production alone but by production *followed by* circulation. The time superscript completely clarifies this. The issue is the difference between $\pounds X^t$, values determined by the previous period of production alone, and $\pounds C^{t+1}$, a subset of these same goods whose values have been modified by circulation, transferring value both between the elements of C and between consumers and producers.

We can now illustrate Marx's second equality in the simple case where $X = K$. Define surplus value $\pounds S$ like Marx as the difference between $\pounds L$ (the value added by workers) and V_{pL} (the price of

consumed variable capital). The difference, on the other hand, between market price and cost price is capitalist profit, a row vector we call £Π. Hence (the subscript t being omitted where unambiguous)

$$\pounds S = \pounds L - \pounds V = \pounds L - Vp_I$$

$$\pounds\Pi^{t-1} - \pounds C - \pounds V = \pounds L - \pounds V + \pounds X_e^{t+1} = \pounds S + \pounds X_e^{t+1} \qquad (10.6)$$

Whatever the time average of £Π, each actual sale will deviate from it. Nevertheless, just as a general law regulating exchange (the first equality) applies to all market prices, a second general law regulates profits. Summing 10.6 across sectors (rows) gives total profits

$$\pounds\Pi^{\Sigma} = \pounds L^{\Sigma} - \pounds V^{\Sigma} + (X_e^{t+1})^{\Sigma}$$

But $(X_e^{t+1})^{\Sigma}$ is 0 being simply the sum of all price–value difference; therefore

$$\pounds\Pi^{\Sigma} = \pounds L^{\Sigma} - \pounds V^{\Sigma} = \pounds S^{\Sigma}$$

Marx's 'second equality'. Being established for the general case where profits are not equal, this is certainly true for the special case where they are, that is, where market prices equal prices of production.

CAPITAL

The assumption that all capital turns over equally in a given period is however both false and fatal. Every attempt to abandon this 'simplification' has come to grief, for two reasons (1), the confusion clarified above and (2) because of the parallel failure to integrate the relation between stocks and flows into the dynamics of value and price.

The fundamental question is: what happens when the value of a pre-existing stock of capital is modified as a result of the operation of the price system? We have just shown that newly produced goods leaving one period of production transfer to the next period of production a value that is different from the value with which they left the last period. The question then arises: what happens to the value of goods that were not produced in the immediately preceding period but were preserved in the form of stocks?

If a stock of some commodity – say computers – is tied up in production, then this both affects and is affected by their current price. As they become cheaper all capitals containing them depreciate. This depreciation, however, is a money sum that the capitalists have to find. If a capitalist buys a computer for £3000 and it is now worth £1000, then not even Berlusconi can simply write off the difference. The value of a capital is what the owner paid at the time of purchase; according to all simultaneous systems it is what other people pay for it now.

The capital gains and losses cannot simply be written off, and herein lies the principal fault of all simultaneous treatments, above all Okishio's. The error in these treatments is the conception that a new technology is instantly and costlessly adopted. Actually, as a new technology is introduced an *average* price emerges that transfers value from the owners of the old technology to the producers of the new. The cheapening of old capital is balanced by transfers of value to new producers. As long as there are 386 and 486 computers in the world, Pentium computers will sell at a higher price and possess a higher value than they would in the ideal simultaneous world in which the stock of old computers is costlessly wiped out overnight.

This is the basis for the systematic immiseration of three quarters of the world's humans. As a theory – which does not necessarily apply to the economists who use it – the notion of costless technical change is one of the most profoundly apologetic of modern economics: if it were true there would be no Third World and Eastern Europe would be rich.

Similar points have been recognised (see for example Alberro and Persky, 1981) but they have to be rigorously incorporated into the theory to provide a proper mathematical foundation for what Marx was really saying. This we now proceed to do.

The accounting concept of 'depreciation' contains two elements, as Marx discussed at some length an element of genuine wear and tear, and an element of 'moral' depreciation or loss in value purely due to improvements in technology.

There are thus transfers of value resulting from price variations not just between *current* outputs but also between *historically produced* outputs. It is these price–value transfers that must be systematically accounted for to formalise correctly Marx's account of both transformation and the rate of profit.

The Price–Value Relation with Stocks

Marx analysed reproduction, exactly as Bortkiewicz disparagingly remarks, as a succession of periods of production and circulation. This perfectly rigorous analytical distinction corresponds to the mathematical operation of partial differentiation. The total change in the value of any stock over any period of time is the sum of two distinct partial effects: the change resulting from production and consumption – that is the labour process – and the change resulting from the operation of the price mechanism and from trade – that is, circulation.

In any given period we use the symbol Δ_P to mean the change in the magnitude of a stock induced by production (in which from now on we include consumption), and Δ_C to mean the change induced by circulation. In the continuous case these become partial derivatives induced by either circulation or production/consumption. The total change Δ is just the sum of the two.

In passing from the discrete to the continuous case we shall represent

$$\lim_{\Delta t \to 0}\left(\frac{\Delta_C C}{\Delta t}\right) = \frac{\partial_C C}{\partial t}_{Circulation} \text{ by } C_C, \text{ and so on}$$

C_P, defined analogously, is what Marx called the turnover of constant capital, V_P the turnover of variable capital, X_P is output per unit time, and so on. Thus

$$C' = C_C + C_P$$
$$\pounds C' = \pounds C_C + \pounds C_P$$

and so on. One subtle point is that $\pounds L_p$, the *rate of value generation*, is the total new value added by labour Per unit time, or the monetary expression of hours worked per unit time. Note further that the true relation between prices p and values λ is now more easily expressible as a change in the *same* qualitative entity over time. In the transition from p^t to p^{t+1} there are two distinct mutations given by Δ_P and Δ_C.

$$p^{t+1} = p^t + \Delta_P p^t + \Delta_C p^t$$

Thus λ^t, shorn of the mystery with which generations have shrouded it, is another name for $p^t + \Delta_P p^t$, the partial derivative of price with respect to production, and the celebrated transformation of values

into prices is the partial derivative of price with respect to circulation, given by $p^{t+1} = \lambda^t + \Delta_C p^t$.[8]

Circulation cannot create or destroy use value. It can only redistribute it. Therefore $\Delta_C K^\Sigma$ is identically zero. Equally, however (and for this reason), it cannot create or destroy exchange value. Hence also $\Delta_C \pounds K_\Sigma^\Sigma = 0$ (the 'first equality') However circulation can transfer value between the owners of commodities, so that in general

$$\Delta_C(Kp - K\lambda) = \Delta\pounds E \neq 0$$

This means that profit is distinguished from surplus value not just by the difference between the price and value of current outputs, but by the value transferred from one capital to another through the price mechanism. If, for example, I hold stocks of oil worth £1m and those rise to £1,500,000, then £500,000 is transferred to me from other capitalists in the system even if I produce or consume nothing; this is just as much a profit, albeit a speculative one, as if I had just produced the oil yesterday.

This calls for a generalisation of the definition of profit, and a corresponding generalisation of the definition of surplus value. We begin by accounting rigorously for the values created and transferred in production with stocks of capital.

The Value Accounting Identity

Assume for simplicity that workers consume all wage goods in the current period. Consumed variable capital V is therefore always equal in price and hence value to the price of consumed wage goods W_P consumed during the same period.[9]

During production each stock decreases except X, because production creates new use values $\Delta_P X$. A portion of K^t survives intact to subsequent periods and preserves the value it has inherited. K^{t+1}, the total goods now in circulation, are equal to this portion plus X^t. It follows that this intact portion has magnitude

$$K^{t+1} - \Delta_P X^t$$

or

$$K^t + \Delta_P K^t - \Delta_P X^t \tag{10.7}$$

(Another way of deriving the same result is to say that this intact portion is equal to K^t less consumption of C, V, W and B.) This preserves the value it possessed when production began, and contributes this to the total supply of value in society as if it had just been produced. This component of new value is equal to

$$(\hat{K}^t + \Delta_P \hat{K}^t - \Delta_P X^t)\, p^t$$

Production creates new goods whose value comprises two components, namely the value transmitted by the consumed constant capital $\Delta_p C^t$ and the value added by labour power $\Delta \pounds L^t$. The total value in the economy following production is therefore the sum of preserved and new values,

$$(\hat{K}^t + \Delta_P \hat{K}^t - \Delta_P X^t)\, p^t + \Delta_P C^t p^t + \Delta_P \pounds L^t$$

On this basis, new unit values are formed. These are a social average, equal to the total value of each commodity divided by the total use value of the same commodity. Representing new unit values as $p + \Delta_P p$, the total value of all stocks in circulation is also given by

$$\hat{K}^{t+1}(p + \Delta_P p)$$

that is

$$(\hat{K} + \Delta_P K)(p + \Delta_P p)$$

where we drop the superscript t where unambiguous. Hence

$$(\hat{K} + \Delta_P K)\,(p + \Delta_P p) = (\hat{K} + \Delta_P \hat{K} - \Delta_P X)p + \Delta_P Cp + \Delta_P \pounds L$$

Expanding and simplifying yields

$$\hat{K}\Delta_P p + \Delta_P K \Delta_P p = -\Delta_P Xp + \Delta_P Cp + \Delta_P \pounds L$$

that is

$$\hat{K}\Delta_P p + \Delta_P Xp = \Delta_P Cp + \Delta P \pounds L + o(2) \qquad (10.8)$$

We now divide through by Δt and pass to the limit as $\Delta t \to 0$. The meaning of the term $\Delta_P \pounds L$ should be considered more carefully. It is the value added by living labour in the time period under consideration, that is, $\pounds_L \Delta t$. This gives the *value accounting identity*

$$\hat{K} p_P + X_P p = C_P p + \pounds L \tag{10.9}$$

or, in a slightly more familiar form,

$$(X_P - C_P)p = \pounds L - \hat{K}^t p_P \tag{10.10}$$

This should be compared with the value equation when all stocks are considered to turn over during the period of production, which can be written as

$$(X_P - C_P)p = \pounds L$$

The difference is the term $\hat{K} p_P$, the *moral depreciation term*, representing capital gains and losses. p_P starts for that part of the change in prices purely brought about by production.

Suppose now that in circulation goods sell, not at prices equal to values $\lambda (= p + \Delta_P p)$ but at new prices $p + \Delta p$ $(= p + \Delta_P p + \Delta_C p)$, where in general. $\Delta p \neq \Delta \lambda$. The term $\Delta_C p$ representing value transfers in circulation is just Δe and we can write

$$p + \Delta p = p + \Delta_P p + \Delta e$$

The same reasoning as above now yields the *price accounting identity*,

$$\hat{K} p' + X_P p = C_P p + \pounds L_P + \pounds E_C \tag{10.11}$$

Which is identical to 10.9 except for the new term $\pounds E_C$, value transfers induced by circulation.

Equations 10.9 and 10.11 are the basic dynamic relations of price and value. They can be rearranged to show how new value is created and redistributed in the economy, thus:

$$K p_P + (X - C)_P p = \pounds L_P \tag{10.12}$$

that is, *new value enters the economy at the rate* $\pounds L_P$, and

$$Kp' + (X - C)_P p = £L_P + £E_C \tag{10.13}$$

showing how this new value is redistributed through by transfer vector $£E_C$.

Surplus Value and Profit with Fixed Capital

The capitalists begin production with stocks K' W, that is, everything except wage goods, and variable capital V whose value is W_P. Their gross value is therefore

$$(K - W)p + Wp = Kp$$

At the end of production they have used up $\Delta_P C$ and $\Delta_P V$ and created new use values X_P.[10] They therefore own stocks equal to

$$K + \Delta_P X - \Delta_P C$$

and have also used up V_P of their variable capital. Their new worth is equal to the new price of their stocks

$$(K + \Delta_P X - \Delta_P C)(p + \Delta_P p) - \Delta_P V$$

and assuming that the value of variable capital is equal to the current price of wage goods, this is equal to

$$(K + \Delta_P X - \Delta_P C - \Delta_P W)(p + \Delta_P p)$$

Gross wealth including current consumption is therefore

$$(\Delta_P K + \Delta_P X - \Delta_P C - \Delta_P W)(p + \Delta_P p)$$

Subtracting current gross wealth from initial gross wealth gives net surplus value:

$$(K + \Delta_P X - \Delta_P C - \Delta_P W)(p + \Delta_P p) - Kp$$
$$K\Delta_P p + \Delta_P X p - (\Delta_P C + \Delta_P W)p + o(2)$$

But the value equation 10.8 established that

$$K\Delta_P p + \Delta_P X p = \Delta_P C p + \Delta_P £L + o(2)$$

Substituting for $p\Delta_P X$ and proceeding to the limit yields the rate at which surplus value is produced, or the *rate of surplus value generation*

$$£S_P = £L_P - £V + (K - \hat{K})p_P \tag{10.14}$$

This is the value-product of labour power $£L_P$, less variable capital $£V_P$, plus a *redistribution* term $(K - \hat{K})p_P$. This latter reflects the result of the competitive struggle between capitals through depreciation. All capitals whose value has risen have appropriated surplus value from all capitals whose value has fallen through depreciation. The rate of *profit generation* is given similarly by

$$£\Pi_P = £L_P - £V_P + (K - \hat{K})p_P + £E_C \tag{10.15}$$

that is, the rate of surplus value generation plus the transfer vector $£E_C$. Since $£E_C^{\Sigma}$ is zero and $K^{\Sigma} = \hat{K}^{\Sigma}$, we have

$$£\Pi^{\Sigma}{}_P = £S^{\Sigma}{}_P$$

Marx's second equality. Lastly the equations of price and profit yield a simple relation connecting price and profit on a sectoral basis

$$£\Pi_P = (X - C)_P p - £V_P + Kp' \tag{10.16}$$

The Stock Accounting Identity

Our final aim is to produce the fundamental equation of accumulation, governing the value of the total invested capital $£K$ over time. We must first account rigorously for the transformations of *use values* resulting from production and circulation. Since we cannot assume market clearing we must account for the differences between produced and purchased commodities, that is, the relation between stocks and flows. This we term the general time-dependent stock accounting identity; combining it with the time-dependent value and price accounting identities yields the equation of accumulation governing $£K'$.

Circulation, as we have discussed, alters the distribution of stocks but not their total quantity. There is no automatic way to predict the proportions of these exchanges. We know only the relation between them given by the definition:

$$K = X - C - W - B \tag{10.17}$$

The same applies to any changes of stock levels, so that

$$\Delta K = \Delta(X - C - W - B) \tag{10.18}$$

This is likewise true for any isolated source of change, so that

$$\Delta_C K = \Delta_C(X - C - W - B) \tag{10.19}$$

Now, K may change in circulation through a redistribution of commodities, but circulation can neither create nor destroy use values. It follows that the row sum of $\Delta_C K$ is zero.

Therefore summing 10.19 across rows – capitals – produces a fundamental statement, a sort of Kirchoff's Law of circulation, which any commodity economy must obey:

$$\Delta_C(X - C - W - B)^{\Sigma} = 0 \tag{10.20}$$

Consequently the quantity ΔK (changes in K over the whole of reproduction) can *only* be due to production (in which, recall, we include private consumption). Therefore (recalling that $\Delta = \Delta_P + \Delta_C$)

$$\Delta K^{\Sigma} = \Delta_P(X - C - W - B)^{\Sigma} \tag{10.21}$$

That is, the change in the total stock of each commodity over an entire cycle of production and circulation reduces to the change due to production alone. We term this the *fundamental stock accounting identity*. It is the most general statement we can make. If any magnitudes in it are specified in more detail – for example by a production function or a theory of consumer demand – then we have a particular model of the economy, which – whatever its special properties – must obey equation 10.21.

Capitalist Accumulation

The wealth of society falls into two main portions: the wage fund W owned by workers and everything else, owned by capitalists. This latter is capital; it consists of those commodities that, broadly speaking, enter into the equalisation of profit rates. In this we

include the wealth of collectors, speculators, hoarders and rentiers; in short every form of wealth that acts as a receptacle for surplus value and that, as a component in a portfolio of wealth, may be exchanged for other commodities in pursuit of a higher rate of growth of real value, that is, profit. Neglecting variable capital this is given by $K - W$.

However capital also seeks a return on variable capital along with all other advances of money. The value of the capital seeking a share of surplus value is therefore simply the scalar quantity $K^{\Sigma}p = £K^{\Sigma}$ The total rate of accumulation of society is the rate at which this magnitude grows. This is therefore

$$£K^{\Sigma} = (K^{\Sigma}p)' = Kp' + K'p$$

the sum of two quantities, one the result of the accumulation and capitalist consumption of use values and the other the result of price and value changes. The second term is given by the equation of value production, which can be simplified to:

$$K^{\Sigma}p' + X_p^{\Sigma}p = C^{\Sigma}{}_{P}p + £L^{\Sigma}{}_{P}$$

hence

$$£K^{\Sigma\prime} = £L^{\Sigma}{}_{P} + (K^{\Sigma} - X^{\Sigma} + C^{\Sigma})_{P}p$$

However the stock accounting identity tells us

$$K_P^{\Sigma} = (X^{\Sigma} - C^{\Sigma} - B^{\Sigma}W^{\Sigma})p$$

Thus the rate of growth of capital, summed over society, is therefore

$$\begin{aligned} £K^{\Sigma\prime} &= £_P^{\Sigma} - £B^{\Sigma}{}_{p} - £W^{\Sigma}{}_{p} \\ £K^{\Sigma\prime} &= £S^{\Sigma}{}_{P} - £B^{\Sigma}{}_{p} \end{aligned} \tag{10.22}$$

The only way this can be negative is if the bourgeoisie disinvest in value terms. This may be achieved either through direct diversion of use values to capitalist consumption through arms or other unproductive expenditure; or it may be, as takes place in a slump, because investment slackens off to simple replacement and so the stock of capital depreciates towards its new equilibrium value.

The General Law Governing the Rate of Profit

We are now in a position to state the general law governing the variation of the rate of profit. Since we have made no special assumptions concerning wage rates, supply and demand, capitalist behaviour or the structure of production, this law is absolutely general and must therefore apply in all special cases.

The general or average rate of profit is given by the ratio between $£S^{\Sigma}p$, the rate at which profit is generated, and $£K^{\Sigma}{}_{\Sigma}$, the volume in value terms of capital seeking a return on investment. For simplicity here we use S and K for these two terms. The rate at which the profit rate changes is then

$$r' = \frac{d}{dt}\frac{£S}{£K} = \frac{£K£S' - £S£K'}{£K^2} = \frac{£S - r£K'}{£K}$$

But we can substitute from the numerator for $£K'$ using equation 10.22 to give

$$r' = \frac{£S - r'(£S - £B)}{£K} = \left(\frac{(£L^{\Sigma}{}_p - £)V^{\Sigma}{}_p - r£I_P^{\Sigma}}{£K}\right)$$

where I_p^{Σ} is the rate of investment, that is, surplus value less capitalist consumption. We can now formulate precisely the conditions for this to be a positive magnitude (rising profit rate) or a negative magnitude (falling profit rate). First, if $£L_p^{\Sigma}$ and $£V_p^{\Sigma}$ are constant (constant rate of value creation and wage in value terms), then the rate of profit must fall unless the capitalists disinvest in value terms, that is, unless $£I_p^{\Sigma}$, the rate of investment, is negative. Thus (the law as such) investment produces a continuously falling profit rate.

Second, this can be offset (countervailing tendencies) by raising $£L_p^{\Sigma}$ – making the workers work harder or employing more of them – or by decreasing $£V_p^{\Sigma}$, the share of national product they consume in value terms. However there are *absolute limits to either*. L_p^{Σ} here is a social total. Differences between less or more skilled labour average out, and therefore it is in a fixed ratio to hours worked. And V cannot be decreased below zero unless the workers die.

We thus find – an astonishing and salutory result – that after a hundred years of nit-picking at Marx's original statement of the general law of the falling rate of profit, that this law is not merely valid, but scientifically and rigorously exact.

Notes

1. See the references in this article to Ernst, Langston, Carchedi, Freeman, Andrews, Naples, Kliman and McGlone, and Giussani and Walker's 1988 survey.
2. Bortkiewicz, 1906, pp. 23–4. I am indebted to Michele Naples for pointing out this passage.
3. This leads to a pedantic but necessary distinction: One pound's worth of value will be represented as £1 but a one-pound coin or note will be represented as 1£.
4. Schefold (1980) is an exception in using this convention.
5. This does not exclude joint production. It means that joint products have been allocated from the sector of origin to the main sector producing them, using the standard procedure employed by input–output statisticians to convert the 'make' matrix into the 'commodity' matrix.
6. I am indebted to Bruce Roberts for drawing my attention to this problem in a very patient reading of a first draft of a section of this chapter. It seems a rather strong illustration of the scant attention economics has paid to the stock–flow relation that this dilemma is not recognised.
7. This assumption can be relaxed: space does not permit this here. See Freeman, 1995.
8. To those who exclaim in shock or glee that this removes the connection between labour and value we reply: look at the equation of production. Labour is the substance of price as well as value. The shock, and the glee, result from the misconceived idea that price and value are qualitatively different things, instead of different stages of the same thing.
9. This can be corrected to allow for *secondary exploitation*, transfers of value to and from consumer durables, but we shall omit this correction here.
10. $\Delta_P B$, bourgeois consumption, is part of profits and should not be deducted before these are calculated.

References

Note: space does not permit the comprehensive bibliography given in Freeman and Carchedi, 1995; we confine ourselves to what is cited in the text and the direct precursors of the ideas it presents or criticises.

Alberro, Jose and Joseph Persky (1981) 'The Simple Analytics of Falling Profit Rates. Okishio's Theorem and Fixed Capital', *Review of Radical Political Economics*: vol. 7 (Spring).

Alberro, Jose and Joseph Persky (1981) 'The Dynamics of Fixed Capital Revaluation and Scrapping', *Review of Radical Political Economics*, 13, no. 2. pp. 32–7.

Bortkiewicz, Lvon (1952) 'Value and Price in the Marxian System' (part I), in *International Economic Papers*, vol. 2 5–60.

Bortkiewicz Lvon (1984) 'On the Correction of Marx's Fundamental Theoretical Construction in the Third Volume of *Capital*', in P. M., Sweezy, *Karl*

Marx and the Close of his System (Philadelphia: Orion Editions; originally London: Merlin and Augustus M. Kelley, 1949).
Brunhoff, Suzanne de (1976) *Marx on Money* (New York: Urizen Books).
Carchedi, Guglielmo (1984) 'The Logic of Prices as Values', *Economy and Society*, vol. 13, no. 4.
Carchedi, Guglielmo (1991) *Frontiers of Political Economy* (London, Verso).
Desai Meghnad (1989) 'The Transformation Problem'. *Journal of Economic Surveys*, vol. 2 no. 4. pp. 295–333.
Dmitriey, V. K. (1974) *Economic Essays on Value, Competition and Utility* (ed. D. M. Nuti) (Cambridge: Cambridge University Press).
Dumenil, Gerard (1983) 'Beyond the Transformation Riddle: A Labor Theory of Value', *Science and Society*, vol. 47, no. 4. (Winter), pp. 427–50.
Elson, Diane (1979a) 'The Value Theory of Labour', in Elson, 1979b.
Elson, Diane (ed.) (1979b) *Value: The Representation of Labour in Capitalism* (London: CSE Books).
Ernst. John R. (1982) 'Simultaneous Valuation Extirpated: A Contribution to the Critique of the Neo-Ricardian Concept of Value', *Review of Radical Political Economics*, vol. 14, no. 2, pp. 85–94.
Foley, Duncan (1982) 'The Value of Money, the Value of Labour Power and the Marxian Transformation Problem', *Review of Radical Political Economics*, vol. 14, no. 2.
Freeman, A. (1984) 'The Logic of the Transformation Problem', in Mandel and Freeman 1984.
Freeman, A. (1995) 'Marx without Equilibrium', *Capital and Class*, vol. 56 (Summer).
Freeman, A. and M. Carchedi (eds) (1995) *Marx and Non-Equilibrium Economics* (London: Edward Elgar).
Gattei, Giorgio (1982) 'Les Chaires "Ratées" de Ladislaus von Bortkiewiez', *Revue Européenne des Sciences Sociales*, vol. 20, no. 62.
Giussani, Paolo (1991) 'The Determination of Prices of Production', *International Journal of Political Economy*, vol. 21 (Winter), pp. 67–87.
Goodwin, R and Punzo, L. 1987 *The Dynamics of a Capitalist Economy* (Boulder, CO: Westview; Cambridge: Polity).
Harcourt, G. C. (1972) *Some Cambridge Controversies in the Theory of Capital* (Cambridge: Cambridge University Press).
Itoh, Makoto (1980) *Value and Crisis* (London: Pluto).
Jaffé, W. (ed.) (1965) *Correspondence of Léon Walras and related papers* (Amsterdam: North Holland).
Kliman, A. (1988) 'The Profit, Rate under Continuous Technological Change', *Review of Radical Political Economics*, vol. 20, nos 2–3.
Kliman, A. and McGlone, T. (1988) 'The Transformation non-Problem and the non-Transformation Problem', *Capital and Class*, vol. 35. (Summer), pp. 56–83.
Komorzynsky J. V. (1897) 'Der dritte Band von Carl Marx "Das Capital": eine Kritische Abhandlung über die Arbeitswertheorie und die Socialistische Lehre vom Capitalsertrage', *Zeitschrift für Volkswirtschaft, Socialpolitik und Verwaltung*, vol. 6, no. 2. No English translation is available.
Laise, D. G. Pala and P. A. Valentino (1977) 'Lo Svolgimento dei Processo di Formazione dei Prezzi', *Note Economiche* 2 (Siena).

Langston, Robert H. (1984) 'A New Approach to the Relation between Prices and Values', in Mandel and Freeman, 1984.
Lipietz, Alain (1982) 'The So-Called "Transformation Problem" Revisited', *Journal of Economic Theory*, vol. 26, no. 1 (January), pp. 59–88.
Luxemburg, Rosa (1951) *The Accumulation of Capital* (New York: Monthly Review Press).
Mandel. E. and A. Freeman (1984) *Ricardo, Marx and Sraffa*, the Langston Memorial Volume (London: Verso).
Marx, K. (1969) *Theories of Surplus Value*, parts I.II.III (London: Lawrence & Wishart).
Marx, K. (1970) *A Contribution to the Critique of Political Economy*, (New York: International Publishers, Moscow: Progress Publishers).
Marx, K. (1976, 1978, 1981) *Capital: A critique of political economy*, vol. I. II. III London: Penguin, New York: Vintage.
Mohun, Simon, (1993) *A Re(in)statement of the Labour Theory of Value*, unpublished manuscript.
Moseley, Fred (1993b) 'Marx's Logical Method and the "Transformation Problem"', in F. Moseley (ed.), *Marx's Method in Capital: a reexamination* (Atlantic Highlands, NJ: Humanities).
Naples, Michele I. (1988) 'Is a Uniform Profit Rate Possible? A Logical-Historical Analysis', *Science and Society*, vol. 52, no. 1 (Spring) pp. 83–93.
Naples Michele I. (1989) 'A Radical Economic Revision of the Transformation Problem', *Review of Radical Political Economics*, vol. 21, no. 1–2, pp. 137–58.
Okishio, Nobuo (1961) 'Technical Changes and the Rate of Profit', *Kobe University Economic Review*, vol. 7, pp. 86–99.
Okishio, Nobuo (1990a) 'Choice of Technique and the Rate of Profit', in Eatwell *et al.*, 1990a, vol. I. Pasinetti. T. (1977) *Lectures in the Theory of Production* (New York: Columbia).
Ramos, A. (1994) 'The Monetary Expression of Labour: Marx's two-sided measure of value', unpublished.
Ramos. Alejandro and Rodriguez, A. (1993) 'The Transformation of Values into Prices of Production, Luxury Articles and Commercial Capital', *Plus-valore*, no. 13, (Milano).
Rodriguez, A. (1994) 'Money, the Postulates of Invariance and the Transformation of Marx into Ricardo', forthcoming in Freeman and Carchedi, 1995.
Saad Filho, Alfredo (1993) 'Labour, Money and "Labour-Money": a Review of Marx's Critique of John Gray's Monetary Analysis', *History of Political Economy*, vol. 25, no. 1, (Spring), pp. 65–84.
Schefold (1980) 'Fixed Capital, Accumulation and Technical Progress', in Pasinetti (ed.), *Essays on the Theory of Joint Production* (London: McMillan).
Shaikh, Anwar (1981) 'The Poverty of Algebra', in Steedman, 1981.
Shaikh, Anwar (1982) 'Neoricardian Economics: A Wealth of Algebra, a Poverty of Theory', *Review of Radical Political Economics*, vol. 14, no. 2, pp. 67–83.

Shaikh, Anwar (1984) 'The Transformation from Marx to Sraffa', in Mandel and Freeman, 1984.
Shibata, K. (1933) 'The Meaning of the Theory of Value in Theoretical Economics', *Kyoto University Economic Review*, vol. 8, no. 2, pp. 49–68.
Steedman, Ian (1977) *Marx after Sraffa* (London: New Left Books).
Tugan Baranowsky, M. (1905) *Theoretische Grundlagen des Marxismus*, Leipzig Dunker & Humbolt.
Walker, Richard. 'The Dynamics of Value. Price and Profit', *Capital and Class*, vol. 35, pp. 146–81.
Walras, L. (1984) *Elements d'Économie politique pure*, trans. by Jaffé as *Elements of Pure Economics or the Theory of Social Wealth* (London: George Allen & Unwin, 1954, Philadelphia: Orion Editions, 1984).
Walras, L. (1965) *Correspondence of Léon Walras and related papers*, in Jaffé 1965.
Wolff, R. D., B. Roberts and A. Callari (1982) 'Marx's (not Ricardo's) "Transformation Problem": A Radical Reconceptualization'. *History of Political Economy*, vol. 14, no. 4., pp. 564–82.
Wolff, R. D., (1984) 'A Marxian Alternative to the Traditional "Transformation Problem"', *Review of Radical Political Economics*, vol. 16, no. 2–3 pp. 115–35.

11 Decentring the Marxian Debate over the Falling Rate of Profit: A New Approach[1]

Stephen Cullenberg

The law of the tendency for the rate of profit to fall (TRPF) remains to this day one of the most important and hotly debated issues in Marxian economics. Two fundamentally different theoretical approaches can be identified in the longstanding debate over the TRPF, the traditional debate and the debate over Okishio's theorem.[2] The purpose of this chapter is to suggest a new direction in this debate by considering the relationship between the rate of profit and the competitive behaviour of complex capitalist enterprises. This chapter examines the contradictory movement of the rate of profit when the capitalist enterprise is conceived as a complex site, as Marx originally developed in the latter part of volume III of *Capital*.

The traditional debate over the TRPF has been informed by a distinct type of Marxian theory that can be identified by the way one understands the relationship between a social totality and its parts. The *Hegelian totality* underlies the debate over the TRPF and imparts to this debate a particular way of making sense of the relationship between accumulation and the rate of profit, and in turn defines the terms and issues of debate.

In the traditional debate, capitalism has been understood as a totality whose inner essence is contradictory. The role of the capitalist enterprise, conceived as one of the constituent parts of the totality, is simply to accumulate. The accumulation process, however, is viewed as a contradictory one, and the TRPF as one manifestation of this contradiction. It is the surface appearance of capitalism's inner essence, accumulation.

In recent years the Okishio theorem and the debate surrounding it, which have both taken place in the terrain of *Cartesian totality*, has

displaced the traditional debate over the TRPF. In contrast to the holism of the Hegelian totality, the Cartesian totality begins from the ontological premise that its constituent parts exist prior to and independent of the totality. Indeed the totality is assumed to be nothing more than the patterns that emerge from the interaction of its preconstituted parts. Associated with this notion of Cartesian totality is a reductive form of causality that is often referred to as a mechanistic or linear causality. Mechanistic causality is based on the assumption that the world can be divided into a succession of distinct moments of cause and effect. A cause must always occur prior to an effect, while an effect can always be reduced to the action of a preexisting cause. The goal of analysis, then, is to discover the basic causes, or parts, from which the distinct patterns of the totality can be deduced.

Contrary to the reductionist approaches of the Hegelian and Cartesian totalities, it is possible to conceive of the social totality as a *decentred totality* wherein neither the part nor the whole are reduced to an effect of the other. Instead part and whole are understood mutually to constitute one another. Associated with this concept of a decentered totality is the concept of a multidialectical or overdetermined causality. This concept of causality can be understood by recognizing that each part, or process, is constituted by all the other processes of the totality. Therefore each process exists as the effect of the totality of its constituent processes. There can be no hierarchy of causes as in the Hegelian and Cartesian approaches as each process emerges, or comes into existence, as the simultaneous effect of all of its conditions of existence.

The decentred approach to totality has not been present in the debate over the TRPF or the Okishio theorem. The purpose of the rest of this chapter is to suggest how the debate over the TRPF might be affected by commencing with a decentred approach to totality.

DECENTRING THE MARXIAN DEBATE OVER THE FALLING RATE PROFIT

In order to begin to recast the Marxian debate over the TRPF, let the capitalist enterprise be conceived as a decentred site. This is fully consistent with the theoretical position developed by Marx in volume III of *Capital*. Consider an industrial capitalist enterprise (hereafter simply capitalist enterprise) as the site of what Resnick and Wolff (1987, pp. 166–70) call the capitalist fundamental and

subsumed class processes as well as the site of other political, cultural, natural and economic processes. The capitalist fundamental class process can be defined as the production and appropriation of surplus value, while the capitalist subsumed class process refers to the first distribution of the already appropriated surplus value. The fundamental and subsumed class processes can be represented by the following surplus value/subsumed class payment expenditure equation;

$$S = \sum_{i=1}^{n} SC_i$$

where S represents surplus value and SC_i represents the ith subsumed class payment of the n distributions of surplus value the capitalist enterprise makes. In order for the capitalist enterprise to reproduce itself, it must distribute its surplus value in such a way as to satisfy a number of various conditions of existence. For example the capitalist enterprise may have to make payments to managers in charge of accumulation, supervision, finances, advertising, political lobbying and so on. It may also have to make subsumed class payments to individuals outside its legal boundaries, such as rental payments to landlords, interest payments to bond holders, taxes to various governmental institutions and so on. Each payment is made in order to procure a specific condition of existence of the capitalist enterprise, and therefore the continued production of surplus value. The capitalist enterprise is literally the (overdetermined) site of all these effects, and in this sense the enterprise is a decentred totality.

The essence of the capitalist enterprise cannot be reduced to any specific subsumed class payment. In particular, accumulation is not the essence of the capitalist enterprise, to which all the other subsumed class payments are so many phenomenal appearances. Each subsumed class payment contributes a particular effect to the existence of the capitalist enterprise, and a change in any one will change the trajectory of the capitalist enterprise. The strategic decision-making process within the capitalist enterprise with respect to the exact configuration of subsumed class distributions is an overdetermined process affected by managers, productive workers, the board of directors and so on within the capitalist enterprise, and by others outside it, such as legislators, bank presidents, consumer activists and so on. As a result the particular subsumed class distributions of a

capitalist enterprise will constantly change over time as the influence and interests of these individuals change.

The fact that a capitalist enterprise's strategic decision making is overdetermined implies that movements in the rate of profit are similarly overdetermined. That is, the precise pattern of distribution of subsumed class payments of a capitalist enterprise at any moment in time will affect the movement in the rate of profit. At the same time, movements in the rate of profit will affect the way in which subsumed class payments are distributed by the capitalist enterprise. This overdetermined effect can be seen by reconsidering the surplus value/subsumed class distribution equation. Divide each side of this equation by $(C + V)$ to get the following expression for the rate of profit:

$$S/(C + V) = \sum_{i=1}^{N} SC_i/(C + V)$$

This equation can be simplified as:

$$e/(k + 1) = \sum_{i=1}^{N} SC_i/(C + V)$$

Here, $e = S/V$, is the rate of exploitation, and $k = C/V$ is the organic composition of capital. On the right-hand side of this equation are the various subsumed class payments that in part overdetermine both the rate of exploitation and the organic composition of capital. As the precise configuration of these subsumed class payments changes, so too will e and k, and hence the rate of profit. One example of the importance of subsumed class payments other than accumulation on the rate of profit would be the effect of decreased distributions to supervision managers in charge of maintaining the intensity of the productive labourers. The traditional debate over the TRPF has focused exclusively on the effect of only one of these subsumed class payments (accumulation) on the organic composition of capital and the rate of exploitation, and hence on the rate of profit, to the exclusion of the effect of all the other subsumed class payments. The decentred concept of totality, along with concept of class process as entry point, makes it possible to reconstruct the traditional and Okishio debates over the rate of profit, and in so doing open up new terrain and issues for debate.

THE CONTRADICTORY EFFECT OF ACCUMULATION ON THE RATE OF PROFIT

Given its importance in the literature over the TRPF, the two examples presented here will explore the contradictory effects of accumulation on the rate of profit. The first example will analyze the effect on the rate of profit of a redistribution of surplus value from supervision to accumulation in a static and partial setting, where unit values are held constant. The second example will incorporate the dynamic effect of the cheapening of constant and variable capital as a result of productivity gains due to the accumulation of capital.

Example I: Redistribution of Surplus Value in a Static Setting

Assume that an industrial capitalist enterprise decides to increase subsumed class payments to those managers in charge of accumulation. Perhaps the enterprise undertakes such a strategy because it hopes to raise its rate of profit through increased exploitation of productive labourers. The exact motive is unimportant for the present analysis.

The decision of the capitalist enterprise to accumulate will engender a series of potentially contradictory effects that may in fact undermine or alter the original intent of the increased accumulation, in this case an increase in the rate of profit. Indeed it is entirely possible that any attempt by the enterprise to raise the rate of profit through increased subsumed class payments to accumulation may set in motion forces that actually lower the rate of profit.

In order to see this contradictory process clearly, assume for simplicity that the capitalist enterprise makes only two subsumed class payments: a share of surplus value goes to managers to secure the economic process of accumulation and another share of surplus value goes to secure the political process of supervising the production process. Assume, also purely for simplicity, that unit exchange values are constant and that the real wage is constant and equal for all productive labourers.

Now, by undertaking a strategic decision to increase subsumed class payments to managers in charge of accumulation, the capitalist enterprise hopes that more surplus value will be produced, and/or realized, in future periods and as a result its rate of profit will increase. A change in the amount of surplus value produced may occur in two ways. On the one hand surplus value production may rise because

more productive labour is employed, thereby producing more total value and total surplus value (assuming no change in the rate of exploitation). On the other hand, if the intensity of labour is increased (due to increased supervision of productive labour), then relative surplus value will be produced as productive labourers can reproduce their living standard in a shorter part of the working day. Also, if accumulation is such that productive labourers can work more efficiently (more use values produced per hour worked), then the innovating enterprise will realize 'superprofits' and its 'realized rate of exploitation' will rise.[3]

Assume, further, that in order to increase subsumed class payments to accumulation, there must be at the same time a reduction in surplus value distributions to supervisory managers by an equivalent amount. Assume that the decreased distribution of surplus value results in supervisors being laid off. This, in turn, will decrease the rate of exploitation as productive labourers will now work less intensely (assuming a positive correlation between the amount of supervision and the intensity of labour), and therefore not produce as much surplus value as previously. Thus there is, even in this simple example, the possibility of contradictory effects on the enterprise's rate of profit as accumulation increases. These contradictory effects are the result of the mutual interaction, or overdetermination, of the specific conditions of existence of the capitalist enterprise. In this example only the subsumed class process of accumulation and the subsumed class process of supervision combine to overdetermine the enterprise's rate of profit. In a more elaborate example one would have to specify the potential interactions and reactions of all the theorized conditions of existence as they respond to the initial change in accumulation.

The contradictory effect of accumulation on the rate of profit in the above example can be expressed formally as follows. Let the already appropriated surplus value, S, be exhaustively distributed to accumulation managers, SC_a, and supervisors, SC_s. Thus the surplus value distribution equation can be written as:

$$S = SC_a + SC_s$$

Define the rate of profit for the capitalist enterprise as:

$$r = S/(C + V) = e/(k + 1)$$

where $e = S/V$ and $k = C/V$. The rate of exploitation, e, is a positive function of both SC_a (due to realization of superprofits) and SC_s (due to the assumption that supervision increases the intensity of productive labour) The rate of exploitation, then, can be expressed as:

$$e = e(SC_a,\ SC_s)$$

where $SC_a = \Delta C + \Delta V$ and $e_1 > 0$ and $e_2 > 0$

By definition, the accumulation of capital is equal to the increase in productive capital and productive labour. The organic composition of capital, k, changes depending on the labour or capital bias of the accumulation process. Thus the organic composition of capital can be written as a function of the subsumed class payment to accumulation.

$$k = k(SC_a)$$

As accumulation proceeds, $k' > 0$ (where $k' = dk/dSC_a$), depending on whether the organic composition of capital is rising (accumulation is biased towards capital), staying the same (accumulation is neutral) or falling (accumulation is biased towards labour).[4]

The rate of profit can now be expressed explicitly as a function of SC_a and SC_s as follows:

$$r = e(SC_a,\ SC_s)/(k[SC_a] + 1)$$

By differentiating this equation with respect to SC_a, the following result can be obtained.

$$\frac{\partial r}{\partial SC_a} = \frac{(e_1 + e_2\ (dSC_s/dSC_a))(k+1) - ek'}{(k+1)^2}$$

This equation can be simplified as follows:[5]

$$\partial r/\partial SC_a = \frac{(e_1 - e_2)(k+1) - ek'}{(k+1)^2}$$

As the denominator of this equation, $(k+1)^2$, is always positive, the sign of the derivative, $\partial r/\partial SC_a$, depends only on the sign of the numerator. Thus the movement of the rate of profit in response to

an increase in the subsumed class payment to accumulation depends on the relative size of the following three factors:

1. *The accumulation effect* (e_1): the increase in the rate of exploitation due to the increased efficiency of productive labourers and the subsequent realization of superprofits.
2. *The supervision effect* (e_2): the decrease in the rate of exploitation due to the decreased efficiency of productive labourers as supervisory labour is reduced.
3. *The change in the organic composition of capital* (k'): the organic composition of capital may rise, fall or stay the same depending on the capital, labour, or lack of, bias of the technical change.

The potential changes of the rate of profit can be analyzed in three different cases, depending on whether the organic composition of capital rises, falls or remains the same.

Case I: $k' > 0$

This is the usual assumption made in the literature, that is, the organic composition of capital rises as accumulation proceeds. Mathematically, the assumption that $k' > 0$ implies that the second term in the numerator is always negative. Therefore the rate of profit will rise, stay the same or fall, according to the following conditions:

1. $\partial r/\partial SC_a < 0$, if (a) $e_2 > e_1$ (that is, the supervision effect is greater than the accumulation effect, and therefore the numerator is negative) or (b) $e_1 > e_2$ (the accumulation effect is greater than the supervision effect), and $k'/(k+1) > (e_1 - e_2)/e$, that is, the rate of growth of the organic composition of capital is greater than the net rate of growth of the rate of exploitation. Thus the rate of profit will fall if (a) the decreased amount of surplus value production, due to the negative supervision effect, is greater than the increased surplus value production due to the positive accumulation effect, or (b) the accumulation effect is greater than the supervision effect, and also the rate of growth of net surplus value production is less than the rate of growth of the organic composition of capital.
2. $\partial r/\partial SC_a > 0$, if $e_1 > e_2$ and $(e_1 - e_2)/e > k'/(k+1)$. That is, the rate of profit will not decrease if the positive accumulation effect is greater than the negative supervision effect, and the net rate of

growth of the rate of exploitation is greater than or equal to the rate of growth of the organic composition of capital.

Case II: $k' < 0$

This is the case of a technical change that exhibits a capital-saving bias. Technical change of this sort implies that the productive labour input becomes more prevalent in the production process. In this case the rate of profit will change according to the following conditions:

1. $\partial r/\partial SC_a < 0$, if $e_2 > e_1$ and $(e_1 - e_2)/e > k'/(k+1)$. That is, the rate of profit will fall as the organic composition of capital increases, if the negative supervision effect is greater than the positive accumulation effect, and simultaneously the net increase in the rate of exploitation is greater than the rate of decrease (as $k' < 0$) in the organic composition capital.
2. $\partial r/\partial SC_a > 0$, if (a) $e_1 > e_2$ or (b) $e_2 > e_1$ and $k'/(k+1) > (e_1 - e_2)/e$. In this case the rate of profit will rise as accumulation proceeds if (a) the accumulation effect is at least as great as the supervision effect, or (b) the supervision effect is greater than the accumulation effect and the rate of decrease in the organic composition of capital is greater than the net rate of growth of the rate of exploitation.

Case III: $k' = 0$

This is the case of 'neutral' technical change. That is, the percentage increase in constant capital is exactly equal to the percentage increase in variable capital as accumulation proceeds. The rate of profit will change according to the following straightforward condition: $dr/dSC_a > 0$ as $e_1 > e_2$. In this case the movement of the rate of profit is only affected by the net change in the rate of exploitation depending on the relative movements of the accumulation and supervision effects.

Example II: Redistribution of Surplus Value in a Dynamic Setting

The previous example considered the contradictory effect on the rate of profit of an enterprise when there is a redistribution of surplus value from supervision to accumulation. It was also assumed that the per unit exchange values of constant and variable capital remained constant. Thus the above example, assumed both a partial setting (in

the sense of no interactive effects from other enterprises) and a static setting (in the sense of no adjustments of unit values over time). This allowed the highlighting of the contradictory effect of accumulation on the rate of profit. In a dynamic setting, however, the increase in productivity brought about by the increase in accumulation will tend to lower the unit values of capital and wage goods. This cheapening of constant and variable capital adds a different dimension to the overall contradictory effect on the rate of profit.

The cheapening of constant capital, and to a lesser extent the cheapening of variable capital, has been one of the most debated 'counteracting causes' of the TRPF. Sweezy (1970) and Robinson (1963), among others, have argued that any increase in the technical composition of capital will lead to a rise in productivity and a fall in the unit value of the capital goods and the wage goods, and thereby lower the total value of constant and variable capital. Thus there can be no assurance that the organic composition of capital will rise as a result of the accumulation of capital, even if the technical composition of capital were to rise. As a result there can be no law of the tendency for the rate of profit to fall, understood as a *necessary* result of capital accumulation.

The position of Sweezy, Robinson and others makes sense in a partial and static setting where one interprets Marx's law of the TRPF as a necessary prediction following from capital accumulation. However as Fine and Harris (1979), Fine (1990) and Saad-Filho (1993) argue, Marx made a distinction between his concept of the organic composition of capital and the value composition of capital. The organic composition of capital applies in a static and partial setting where the unit values of constant and variable capital are assumed to be constant as the technical composition of capital increases. The organic composition thus 'reflects' the changes in the technical composition of capital. In a dynamic, economy-wide setting, the productivity gains associated with a rising technical composition of capital will lower the unit values of both wage goods and capital goods and the resulting composition of capital, the value composition, will not directly reflect the increased technical composition of capital, and the value composition of capital can change in the opposite direction from the technical composition.

For simplicity, assume that there is a homogeneous capital and a homogeneous wage good. The composition of capital can be written as:

$$k = C/V = (m/n)T$$

where m is the unit value of the capital good, n is the unit value of the wage good and T is the technical composition of capital. It will be assumed here, as is commonly done in the literature, that as capital accumulation proceeds, the technical composition of capital, T, increases and the unit values, m and n, decrease, although not necessarily at the same rate. If this is the case, the overall effect on the composition of capital will depend on the relative sizes of these rates of change. The change in the organic composition of capital will depend on the value of the following equation.

$$\dot{k} = \dot{m} - \dot{n} + \dot{T}$$

where $\dot{k}$, $\dot{m}$, $\dot{n}$, and $\dot{T}$ are time rates of change.

Now consider an enterprise that redistributes its surplus value from distributions to supervision to distributions for accumulation, as in the above example. Assume that this increase in the accumulation of capital increases the technical composition of capital, raising the productivity of the innovating enterprise. Given the increase in productivity, this innovation will be copied by other enterprises, and once this innovation is adopted by all relevant enterprises, new unit values for the wage goods and the capital goods will emerge.[6] The new rate of profit that will emerge in this case depends in part on (1) the change in the technical composition of capital (the increase in the technical composition), (2) the decrease in surplus value produced due the reduction in supervision (the supervision effect), and (3) the cheapening of constant and variable capital (the cheapening effect).

The mathematics for determining the overall effect on the rate of profit are very complicated in this case and are not necessary for the point being made here: once the distribution of surplus value is considered, along with the cheapening of variable and constant capital, the overall effect on the rate of profit is contradictory. In the end it depends on the relative sizes of the different effects under consideration.

These examples have demonstrated the complex and contradictory effects that the decision to increase subsumed class payments to accumulation managers – while simultaneously decreasing them from supervision managers – *might* have on the rate of profit. One must

emphasize the word 'might', because conceiving of the capitalist enterprise as a decentred totality necessarily implies that there is no certainty accompanying any given initial change. The result of a particular capitalist enterprise's decision to accumulate will depend on the precise conjuncture of all its conditions of existence. Furthermore the very action of accumulation will set in motion other reactions that may reinforce or work against the initial desired goal of raising the rate of profit. These rather simple examples have only considered the analysis of the contradictory relationship of these two conditions of existence on the rate of profit. A more concrete analysis – that is, one that begins to incorporate more conditions of existence, both subsumed class payments and non-class conditions of existence – would add increasing complexity to the analysis. However, no matter how many conditions of existence are explicitly considered, it will never be possible to claim that the capitalist enterprise's essence has finally been discovered. An analysis of a decentred capitalist enterprise and its conditions of existence is never complete. It is always the case that its conditions of existence complexly overdetermine each other in a never-ending contradictory process of uneven development.

CONCLUSION

In the traditional debate over the TRPF, the rate of profit is an index of the pace of accumulation, and *ipso facto* an index of the overall 'health' of capitalism. For the Okishio debate, however, the rate of profit is an index of the success of a 'rational' firm. Each profit rate directly reflects the inner essence of the Hegelian and Cartesian approaches respectively. Conversely, in the context of a decentred totality the capitalist enterprise has no such inner essence to be reflected. As a consequence the rate of profit cannot act as an unambiguous index of the 'healthiness' or 'rationality' of the capitalist enterprise. Rather the rate of profit is one index of the class structure of the capitalist enterprise. However, movements in the rate of profit cannot be unambiguously interpreted with respect to the reproduction or transition of the class structure of the capitalist enterprise. In order for such an analysis to occur, the rate of profit must be seen in its full conjunctural specificity.[7] The goal of this chapter has been to begin to develop an alternative framework that will structure such conjunctural analyses.

Notes

1. Paper prepared originally for the international conference on Marxian Economics: A Centenary Appraisal, University of Bergamo, Italy, 15–17 December 1994. Revised June 1995. Thanks to an anonymous referee for insightful comments on the original draft.
2. For a detailed discussion, including extensive references to the literature, of the theoretical importance of the presence the Hegelian and Cartesian totalities in the long-standing Marxian debate over the TRPF, see Cullenberg, 1994, chapters 2 and 3.
3. Superprofits are those profits that accrue to the innovating capitalist enterprise due to the increase in productivity. These superprofits arise because the innovating enterprise can produce more use values in a given period of time and therefore realize surplus value from other capitalist enterprises. The realized rate of exploitation as used here refers to the ratio of surplus value and superprofit earned by the enterprise relative to the enterprise's variable capital. As long as the unit values of the wage goods and capital goods in the economy are constant, the total amount of surplus value produced and the rate of exploitation will remain the same. This example assumes that the unit values are fixed and therefore the innovation leads to superprofits.
4. Note that the unit values are assumed to stay the same here. Thus the relevant concept of the composition of capital is the organic composition of capital and not the value composition of capital.
5. It is straightforward to show that $dSC_s/dSC_a = -1$. Remember that in $S = SC_a + SC_s$ is the fixed amount of already appropriated surplus value and therefore is a constant. This equation can be rewritten as $SC_s = S - SC_a$. By differentiating with respect to SC_a, the result, $dSC_s/dSC_a = -1$, obtains.
6. This complex process of adjustment of unit values is similar to the metaphor used in the Okishio approach. The difference is that the Okishio theorem, and in the linear price of production models upon which it is based, this adjustment process is assumed to tend towards an equal rate of profit equilibrium, while no such equilibrium result is being assumed here.
7. The profits of an enterprise are always contingent, dependent on specific cultural (the ever-changing discourse on accounting rules), political (the rules of a forever changing tax code) and economic (the flows of changing subsumed class distributions) processes. To see the importance of this, note that profits can be defined as profit$= S - \Sigma Sc_i$. Profit takes on different meanings depending what is and is not included in the term ΣSc_i. For instance, the meaning of profit will vary greatly depending on whether dividend payments are understood as a 'cost' of doing business or as a part of surplus value. The decision to account for dividend payments, in one way or the other, depends of course on accounting rules, tax laws and the nature of corporate governance (that is, who controls the firm, the managers or the stockholders). The rate of profit then, is merely one index of the health of the capitalist enterprise.

Another would be profits/$C + V$ and there need be no necessary correspondence between the two: for instance the value rate of profit $S/C + V$, could rise, while the rate of profit, profit/$C + V$, falls (where profit is defined differently from S) and the enterprise goes bankrupt.

References

Cullenberg, Stephen (1994) *The Falling Rate of Profit: Recasting the Marxian Debate* (London: Pluto Press).

Fine, Ben (1990) 'On the Composition of Capital: A Comment of Groll and Orzech', *History of Political Economy*, vol. 22, no. 1 pp. 151–5.

Fine, Ben and Laurence Harris (1979) *Rereading Capital* (New York: Columbia University Press).

Resnick, Stephen and Richard Wolff (1987) *Knowledge and Class* (Chicago: Chicago University Press).

Robinson, Joan (1963) *An Essay on Marxian Economics* (London: Macmillan).

Saad-Filho, Alfredo (1993) 'A Note on Marx's Analysis of the Composition of Capital', *Capital and Class*, vol. 50, pp. 59–66.

Sweezy, Paul (1970) *The Theory of Capitalist Development* (New York: Monthly Review Press).

12 Destructive Creativity: Institutional Arrangements of Banking and the Logic of Capitalist Technical Change in the Perspective of Marx's 1894 Law of Profit

Geert Reuten[1]

INTRODUCTION

The theory on 'the law of the tendential fall in the rate of profit' (TFRP) is very much the centrepiece of volume III of Marx's *Capital*. It is presented in part 3 of that volume, prior to the theory on the differentiation of capital into several functional forms – the division of surplus value into profit, interest and ground rent (parts 4–6). This indicates that there is a long way to go from the methodologically abstract level of that law to its actual concrete application. This indication is confirmed by Marx's plans for the contents of the respective volumes of *Capital*, as laid down in several notes and letters.[2]

Quite a number of authors have interpreted the TFRP as a macroeconomic law and have applied it at that level empirically (for example Gillman, 1958; Weisskopf, 1979; Wolff, 1986; Moseley, 1991). Whilst such an interpretation and application is defensible, Marx's method also points at a different line of research.[3] The latter – which I shall follow in this chapter – conceives of the presentation in *Capital* as moving gradually from the abstract to the concrete, a presentation that is however incomplete (see also Bellofiore and Finelli in the companion

to this volume). Note that in the course of completion of the presentation, the *expression* of that law may be modified.

In this chapter I will take the theory in *Capital* as the starting point.[4] From there on my aims are very restricted: I will merely initiate the theory of the TFRP at a more concrete level of presentation, taking into account sectors or branches of production (cf part 2 of volume III) as well as finance capital (cf part 5 of volume III).

In so doing my object is to gain a further understanding of the development of capitalism, especially in its recent manifestations. Such an object is surely akin to the aims that Marx set himself. Certain 'stylized facts', in the back of the mind of the theoretician, play an important role in such an aim. In the present context, three stylized facts seem to have played a role at the time of writing of volume III: fairly regular cycles, increasing mechanization and falling rates of profit over time. The latter was not only an issue fitting the long run 'visions' of classical economists such as Smith, Ricardo and Mill (capitalism developing into a stationary state), it indeed was an empirical phenomenon requiring explanation. ('There are sufficient statistical facts, too, to confirm this conclusion [of a tendentially falling rate of profit] historically. The only question that can arise is as to the actual cause of this tendency' Jevons, 1871, pp. 245–6). These three stylized facts fit wonderfully well in Marx's theory of the TFRP.

However the current stylized facts for OECD-type economies are somewhat different: compared with the nineteenth century, cycles in the twentieth century have not been that regular; mechanization and the expulsion of labour was not *an issue* between 1945 and the 1970s, but reappeared high on the agenda afterwards; a falling rate of profit is not considered to be a general *phenomenon* requiring explanation; sectors/branches of production develop unevenly; enduring high rates of inflation in the second half of the century, especially in the 1970s, together with the 1979 policy turn followed by high rates of unemployment and an ever-more unequal distribution of income.[5]

In what follows I will indicate the lines along which the theory of the TRFP might be developed further so as to take account of both sets of stylized facts.

VALORIZATION, ACCUMULATION AND CREDIT MONEY

Before setting out the indicated theoretical development from the TFRP, I shall briefly set out its underlying 'abstract-labour theory

of the value-form'[6] as well as the institutional interconnection of capital accumulation and the credit system.

The inherent logic of capitalist production is valorization (the expansion of value), more specifically, production is geared towards a continual increase in profits. Whilst the exploitation of labour (as well as the exploitation of nature) is the basis of any physical surplus, the surplus (profit and so on) is calculated in terms of money – the one and only capitalist measure of achievement. All elements that matter economically take on a bifurcated form: they have a heterogeneous physical form, but at the same time they are constituted as having a homogeneous money form (value). In being both heterogeneous and homogeneous, they are contradictory. The capitalist system does not transcend this contradiction – it is dealt with merely by reductionism, that is, by reducing the opposition to one of its poles – the money form. At the same time the other pole continues to exert pressure. On the surface of capitalism, dehumanization is shown in that human labour takes on this bifurcated form, and the fetishism of money in that this is not usually conceived of as dehumanization (cf Marx, 1867, ch. 1, section 4). Consequently in this chapter all the input and output entities of production are primarily measured in terms of money. This applies prominently to labour and labour productivity. Not only is heterogeneous labour power, as an input, accounted for in terms of money (the wage), heterogeneous labour in actual capitalist production is also measured in terms of money, that is, it is ideally precommensurated in terms of the money value of its *output*.[7]

Valorization and profit increase is engendered by the accumulation of capital, and in particular the investment of capital in labour-productivity-increasing production techniques. One important condition for the existence of accumulation is the expansion in some way of money or/and the circulation of money. Were this not the case then continual price decrease due to productivity increase would have the effect of continual devaluation of capital. In a limited way this expansion may be accomplished by private credit relations between firms. These limits are overcome by finance capital and financial intermediaries. The particular characteristic of banks as financial intermediaries is that they issue credit money, which is accepted as a medium of circulation.[8]

Credit money is either issued by substitution, or it is issued against loans, that is, created *ex-nihilo*. Whereas the former is merely an act of money dealing that substitutes credit money for money that has validated previous production, *ex-nihilo*-created credit money is an *anticipation* of production and realization in the future. So the bank

that advances this credit money on the basis of a loan performs a *prevalidation* of production, which is socially validated when the anticipated production is realized (de Brunhoff, 1976, p. 46; see also Aglietta, 1976, pp. 332–5). Because prevalidation is not based on a compensatory withdrawal of money from circulation, its circuit is not closed (cf. de Brunhoff, 1973, p. 94; and de Vroey, 1984, p. 385). Therefore it can act as a lever to accumulation, that is, the expansion of valorization.

This can only be effected if the prevalidation of the production of a capital, anticipating expansion, is confirmed at some stage by the actual expansion of *other* capitals. Expansion indeed can only be validated by expansion. Other capitals must accumulate, say, the value equivalent to the credit money they received from the prevalidated capital in payment, for example, for means of production, or indirectly for consumer goods out of wages. Thus they must generate extra effective demand.

If the borrowing capital is not successful the bank suffers a loss in that it forgoes the principal as well as the interest agreed upon, which affects its solvency. There are then three possibilities. First, though the borrowing capital fails, other capitals nevertheless accumulate and expand, and the credit money that these other capitals received from the borrowing capital keeps on circulating in an *expansionary* manner. In this situation the bank's liquidity position is not affected. The second possibility is that the credit money keeps on circulating, but in an *inflationary* manner. Then the expansion of other capitals (and of the capital circuit as a whole) is 'fictitious'. The equivalent of the bank's loss (the principal) is then socialized in that it affects all holders of money (as well as creditors and debtors). Again, the bank's liquidity is not affected.

The third possibility is that other capitals do *not* expand in a compensatory way, but withdraw from circulation the credit money received (directly or indirectly) in payment from the borrowing capital. That money then must act as store of value (unless concurrently other capitals cancel their own credit with their own bank), which would mean that credit money has to be a permanent and not merely a temporary store of value.[9] This is accomplished in an 'integrated banking system' where banks operate under the umbrella of a central bank (as distinct from a fragmented banking system). Following a massive withdrawal of credit money from circulation, it is for the central bank to decide whether to attempt to prevent bank crises or not. It may do so by covering the bank's loss through the provision of a loan to the bank. The additional money so issued by the central bank

socially validates the prevalidation, but because it does not operate as a realization of production in the market, it is only a *pseudo-social validation* (de Brunhoff and Cartelier, 1974; de Brunhoff, 1976, pp. 46–7; Aglietta, 1976, p. 350). This then reinforces credit money as a fiduciary general equivalent on a par with central bank money. To the extent that the central bank guarantees that credit money is redeemable in central bank money (whence credit money develops into a full store of value), the banking system is then a fully integrated banking system. (Note that this guarantee may only apply to those banks that conform to the rules set by the central bank.) With this guarantee of redeemability, however, the central bank shifts the frictions inherent in prevalidation by banks to the social aggregate sphere. Consequently the conditions for the existence of money (that it is a measure of value, a medium of circulation *and* a store of value) risk being eroded.

THE LAW OF THE TENDENTIAL FALL IN THE RATE OF PROFIT

Part 3, volume III of *Capital* comprises chapters 13–15. In chapter 13 Marx emphasized that capitalist investment in new techniques tends to go along with a relative expulsion of labour. Therefore accumulation is expressed as a tendency for the composition of capital to rise, and for any given distribution of income as a concomitant tendency for the rate of profit to fall (TFRP). Chapter 14 discusses the factors counteracting this fall, and chapter 15 presents in a synthetic view 'the law's internal contradictions'.

In the introduction I briefly pointed out the methodical status of the law. Put succinctly, the chapter 13 theory states that for a given distribution of income between capital and labour (R/wl; where R is profit, w is the wage rate and l is labour employed), and given the tendency for a rising composition of capital (K/wl; where K is capital invested in fixed and circulating means of production), there will be a tendency for the rate of profit to fall. This can be seen from the rearranged definition of the rate of profit, $r = R/(K + wl) = (R/wl)/(K/wl + 1)$, neglecting turnover coefficients. This presentation glosses over several facets of the matter, one issue being that Marx derived the concept of profit (parts 1 and 2 of volume III) prior to the division of surplus value into its functional forms. Thus 'profit' in chapters 13–15 is in fact a composite category.

In the remainder of this chapter, I will not only treat profit as decomposed, I will also apply profit and the law of profit to *branches* of industrial production in connection with finance capital.

COMPETITION: THE DYNAMIC DISEQUILIBRIUM OF CAPITAL STRATIFICATION

An influential critique levied against the theory of the TFRP is that it lacks a microeconomic foundation: why should new techniques that decrease the rate of profit ever be introduced?[10] From the point of view of the methodical structure of *Capital* this critique is beside the point since the theory derives its interest from the macroeconomic level at which it is formulated:[11] 'we once again stand on firm ground, where, without entering into the competition of the many capitals, we can derive the general law directly from the general nature of capital as so far developed' (Marx, 1861–63, vol. 33, p. 104). Nonetheless the Okishian critique can be refuted *at a different level of abstraction*, that is, that of competition between capitals/firms. The Okishian type of argument not only places micro foundations at the macro level, it also relies on an implausible comparative static equilibrium account of technical change: firms (plants) within a sector of production are homogeneous, so new least-cost techniques are immediately adopted by *all* firms.

The reality of capitalist competition, however, is rather to be grasped by a dynamic disequilibrium account of industry. Capital tends to be embodied in stratified heterogeneous rather than homogeneous plants, because, whilst valorization is a continuous process, the investment of capital in means of production is a discrete, 'lumpy' process. Therefore plants are dated differently.[12] Because techniques and labour productivity change over time, dated stratification is characterized according to these factors. And as there is a tendency for uniform prices in a market, this dated stratification is also a stratification of different rates of profit.

When new techniques of production are available (with higher calculated plant rates of profit), the preservation of capital already accumulated may prevent immediate moves towards investment in new-technique plants. Even provided firms can command sufficient means of finance (from amortisation and/or additional credit), they will usually only adopt a new technique when the increase in the rate of profit that is expected as a result of its introduction compensates for the

early obsolescence of the fixed capital of the old technique. The scrapping of plants is only enforced when prices no longer cover prime costs.

Capital added to the stratification generally operates with up-to-date techniques of production – those with the highest technical composition of capital, maximum productivity of labour and minimal unit costs of production. This investment increases the sector's production capacity, *inducing price competition or/and production at overcapacity*. In either case the revenue and profit rate of the previous stratification is reduced.[13] The 'top capital' may in fact use the strategy of price competition so as to enforce the scrapping of plants at the bottom of the stratification, the optimal price being that which just prevents 'bottom plants' from reentering.

This stylized model of competition provides a sufficient base for the TFRP.[14] It is however not restricted to it, as it is not necessarily based on an increasing value composition of capital.

In sum, whilst the rate of profit of the newly invested capital tends to *increase compared with that rate of the capital just below in the stratification*, the average rate of profit of the branch as a whole tends to *decrease compared with the previous period*, even allowing for the expulsion of least-profitable plants. The extent of the rate of profit increase for the newly invested capital compared with the previous stratification depends on the productivity *difference* that can be achieved. The larger this difference the more overcapacity and/or price decrease that can be borne *and* the more it enforces the scrapping of capitals at the bottom of the stratification. As a result the achievement of productivity difference is the crucial course by which capital stratification proceeds.

Apart from this intrabranch effect of investment in new techniques, there is also an interbranch effect. Because any new plant can buy its fixed means of production more cheaply (that is, cheaper than was the case for all the plants lower in the stratification) it can decrease its price. The capitals lower in the stratification must follow suit and see their revenue and rate of profit falling.[15]

DEVALORIZATION AND DEVALUATION OF CAPITAL: ACCOUNTING PRACTICES

Capital presents, in my view, the conflict-ridden unfolding of the contradiction of the bifurcated form of commodities (see the section on 'Valorisation, Accumulation and Credit Money' above). In this perspective the theory of the TFRP is very much the apotheosis of all

of *Capital*. From the perspective of a non-dialectical reading of *Capital* a great deal of that theory can be understood in terms of conflicts too, especially that between labour and capital. Even those who would prefer to see capitalism as harmonious, can see at least some point in a theory of conflict because it is part of the everyday phenomena of capitalism. With the theory of the TFRP, however, this is different: it can be understood in terms of contradiction only. It is not surprising therefore that this theory has met so much resistance, or neglect. It seems indeed rather paradoxical: capitalists strive for valorization and profit rate increase; in the course of this, however, their deal is devalorization and profit decrease; and accumulation of capital, as we will see below, is likely to result in devaluation of capital. But this is irrational! Moreover it is both irrational and rational at the same time.

We saw in the previous section how the accumulation of capital (plant addition) may result in decreased revenue for capitals lower in the stratification. This reflects the *devalorization* of capital, which is due to the labour productivity for any one capital in some period lagging behind that in the previous period (in effect $R \downarrow$).[16] Thus valorization results in devalorization (note that this is independent of the rate of surplus value). The rate of profit on capital is merely the expression of (de)valorization (cf volume III, part 1: the transformation of s/v in r). We have also seen that this process results in the scrapping of plants: at the base of the 'normal' process of capitalist production is an ongoing destruction.

Profit rate decrease, however, is not the only expression of investment in new techniques and devalorization. The other expression is *devaluation* of capital. The 'ultimate' devaluation is of course when unamortized capitals are forced to be scrapped (lower in the stratification). Devaluation, however, may also apply to the capitals remaining in the stratification. If the revenue for any one capital falls (devalorization) entrepreneurs have the choice either to account for this by the profit rate ($r \downarrow$) or to devalue the capital ($K \downarrow$); in the latter case previous accumulation is partly nullified. Thus depending on the particular accounting practice (historical or current cost accounting), *devalorization* may be manifested either in $r \downarrow$ or in $K \downarrow$. As cash flow is not affected by either practice, the net effect is of course the same.[17]

INDUSTRIAL AND FINANCE CAPITAL: FRAGMENTED BANKING AND ECONOMIC CRISIS

This section applies foremost to capitalism operating under the institutional make-up of a *fragmented* banking system, as experienced by OECD countries prior to the Bretton Woods Treaty of 1944.

Economic Crisis and General Restructuring of Capital

The more rapid the technical change, the more it has the effect of wiping out the profit of unamortized capitals (as expressed in $r \downarrow$ or $K \downarrow$, eventually resulting in the scrapping of plants, see above). Should amortisation fall short of the financial needs of renewed investment, then capitals merely fail and are extinguished. This becomes acute when bank credit has been used to prevalidate production. The losses of bankrupt industrial capital are then transmitted to banks, and unless compensated for by the interest on other debts (or with the assistance of the central bank – see below), credit expansion is hampered on a social scale. Local breaks in the circuit of capital may then multiply into the disruption of the social circuit, generating economic crisis. This process gives rise to a *general* restructuring of capital (bankruptcies, mergers, takeovers, or 'internal' reorganizations) curing and overcuring overcapacity, as well as to wage decrease due to crisis-generated unemployment. In all cases submarginal plants are extinguished so that restructuring *reduces* the *range of the stratification* of capital.

Therefore restructuring tends to retard investment and technical change. This is so because stratification proceeds by the temporary creation of (extra) overcapacity such that the least efficient plants are expelled from the stratification, which is only feasible with a sufficiently large productivity difference between the top and the bottom plant. With the reduction in the range of the stratification due to restructuring, this difference is reduced. The addition of new plants would then result in all plants taking the full burden of overcapacity.

Cyclical Devalorization

Innovation in new techniques may again be profitable if it creates a sufficiently large cost difference, which requires that technological knowledge be built up: a 'hoarding' of inventions. Technical change then tends to come in waves (cf. Schumpeter 1937, 1943). During such a build-up, there will be a stagnation in accumulation of capital as

well as in price decrease, devalorization and scrapping of plants (at the same time the solvency of the remaining capital will increase). But once sufficient technical knowledge has been gathered, the stratification will be extended again, and so on, repeating the process. Thus whilst inventions occur throughout the cycle, their implementation (innovation) is determined by the range of stratification. With short ranges, competition between capitals remains only latent.

With a fragmented banking system, therefore, the TFRP (devalorization) is manifested by cycles/waves of restructuring that counteract the rise in the composition of capital.[18]

INDUSTRIAL AND FINANCE CAPITAL: INTEGRATED BANKING AND CONTINUAL INFLATION

An important characteristic of the institutional make-up of the banking system in the second half of the twentieth century is that banks, rather than operating in fragmentary way, have been more fully integrated under the umbrella of central banks.[19] This has important implications for the course of the accumulation process.

Continual Inflation and Restructuring

With the amortization of prevalidated capitals falling short (see above), prevalidation by banks has in fact proven to be inflationary rather than expansionary. Economic crisis and restructuring as described in the previous section, 'correct' and 'overcorrect', so to say, the pseudo accumulation after the event. Within a fragmented banking system, banks are in fact forced to let this correction happen – and in the process they themselves risk being extinguished. Within an integrated banking system this is different: economic crises can be bypassed.

Banks that have granted credits to devalorized capitals within a branch of production are confronted with the problem of whether to accept the loss, or to provide those capitals with *new credits* so as to recover (part of) it in the future. The extension of such renewed credit is predicated upon an integrated banking system (see the section on 'valorization, accumulation and credit money'). Renewed prevalidation engenders continued monetary expansion, which may turn either into a physical expansion or into the continuation of inflation.[20]

Credit renewal for firms in problems will however be conditional on a *local* restructuring of capital. Renewed prevalidation will nonetheless

give rise to a decrease in the range of the stratification of capitals, since more capital will tend to be concentrated within the advanced layer of the stratification. Banks can in fact facilitate capitals to move from the bottom part of the stratification, where they can no longer survive, to the top part, which is also the top technology – thus there occurs in fact a horizontal widening of the top of the stratification. Whilst this *process* of range reduction itself produces a local boom (a multiplication of the production of means of production for this branch), the subsequent *effect* of the range reduction once again produces a stagnation of investment, 'hoarding' of technology and better solvency positions. (cf. the subsection 'cyclical devalorization' above).

Inflation and the Conflict between Industrial and Finance Capital and Bank Creditors

Along with the process described above, another one develops. The general and continual price increase ensuing from protracted prevalidation has the effect of *revaluating capital*, which may compensate for devalorization.[21] (It should be emphasised that this revaluation is the expression of *price* increase only. Along with it the devalorization due to *technical* change goes on, and this may still be accounted for in a net devaluation of capital.) At the same time, in order for accumulation to continue, industrial capital must increase its indebtedness (because of the credit renewal required due to obsolescence as well as the ongoing price increase). This increasing indebtedness is the counterpart of the revaluation of capital. The decrease in the rate of profit implied by the TFRP is now (in part) *imposed on finance capital*, including banks, as its purchasing power is continuously reduced.[22] Thus the industrial capital gain is the equivalent of the finance capital loss, so that inflation reveals a potential conflict between them. Nevertheless the position of banks is different from non-bank finance capital. To the extent that banks maintain an adequate fit between short-term and long-term borrowing and lending (maturity matching), it is the banks' creditors that pay for the industrial capital revaluation.

Once inflation becomes self-perpetuating (cf. the second half of the 1960s and the 1970s for OECD countries) the conflict between industrial and finance capital is gradually played out in the following effects, which all result in an increasing share of interest in surplus value, thus in a decrease of profit. First, in order to be able to recontract credits at higher interest rates, banks increasingly substitute short-term for long-term lending. Second, when contracts expire, non-

bank finance capital tends to withdraw fixed interest assets (bonds) from industrial investment. Industrial capital then has to rely even more on short-term credit provided by banks.[23] Third, the decline of the share of non-bank finance capital in industrial investment increases the risk for banks. In the absence of sufficient security they will then require an extra risk premium on top of normal interest.

Thus the devalorization of capital associated with the TFRP tends to be counteracted by continued inflation – whence industrial capital is being revalued. With the substitution of short-term bank credit for long-term finance, devalorization is then reimposed on industrial capital.

In sum, the important similarity between the fragmented setting (see the previous main section) and the integrated financial setting is the dynamics of the change in the range of capital stratification, and the related acceleration and deceleration in the introduction of new techniques. The most important difference is that devalorization and obsolescence, instead of being revealed in crisis, are made manifest in the increasing indebtedness of capitals and relatedly in continued inflation. The losses of capitals are in fact socialized. The crisis course goes along with *general* restructuring (including the restructuring of credit) and stagnation. With the continued inflationary reproduction, restructuring is (repeatedly) branch-local. The ensuing decrease in employment of labour due to labour expelling technical change now shows as 'structural' rather than crisis-cyclical. A permanently unemployed layer of labour (rather than a *reserve* army) serves to exert a drain on wages.

SUMMARY AND CONCLUSIONS

Valorization, accumulation, devalorization – quite a Sisiphean process.

Any social law is predicated on an historical-institutional setting. Definite social systems vary over time in the evolving settings of their subsystems. Marx's 1894 'law of the tendency of the rate of profit to fall' is the apotheosis of his exposition of the internal logic of the capitalist system. It has been shown that a dynamic disequilibrium account of the stratification of capital in industry provides the ground for a concretisation of the law of profit. This is an 1894 rather than a 1994 achievement. The kernel of the law is the valorization–devalorization contradiction (ultimately deriving from the bifurcated form of capitalist entities). More concretely, an important expression of devalorization, alternative to the rate of profit fall, is the devaluation of capital. The two important manifestations of these are the destruction

of means of production and the unemployment of labour. One may call this, alternatively, the irrationality of rationality or the rationality of irrationality. The dynamics of devalorization in the course of development is determined by the degree of technical change, together with the related fluctuating range of the stratification of capital.

The actual exhibition, via economic crises or continued inflationary reproduction, is determined by the institutional make-up of the banking system. In both cases the above mentioned manifestations appear – abruptly in the first case and gradually in the second. On the individual plane, however, being laid off is always a misery. It must moreover be bitter to have been exploited for the purpose of a plant, destined for the scrapheap.

The concretisation of the law of the TFRP in this chapter has been restricted. Concerning the relationship between industrial and finance capital, no attention has been paid to recent financial innovations, although it seems that these might fruitfully be incorporated in the present framework. Further, the confines of this chapter did not allow for the incorporation of the factors affecting changes in the distribution of income and effective demand, as well as state intervention.

Notes

1. Faculty of Economics, University of Amsterdam, Roetersstraat 11, 1018 WB Amsterdam, Netherlands. Fax: X-31-20-525.4254. E-mail: Reuten @ FEE.UvA.NL. For their helpful comments, I am grateful to the discussants at the University of Bergamo conference on 'Karl Marx's third volume of *Capital*: 1894–1994', as well as to Mary Morgan, an anonymous referee and the editor of this volume, Riccardo Bellofiore.
2. See for example Wygodski, 1965; Rosdolsky, 1968; Zeleny, 1968; Mandel, 1976; Oakley, 1983.
3. The immediate macroeconomic application seems to be in line with the statement that 'the law in its generality is independent of that division' (of surplus value into profit, interest and so on) (Marx, 1894, p. 320; cf. Marx, 1861–63, vol. 33, p. 104). The literature on Marx's method in *Capital* is extensive. See the references in note 2 and for example the papers in Schmidt, 1969; Eberle, 1973; Moseley, 1993; Moseley and Campbell 1997; Arthur and Reuten 1997.
4. I take it for granted that a tendency is quite different from an empirical trend – especially for nineteenth-century economics there can hardly be any doubt about this. ('Counteracting influences must be at work, checking and canceling the effect [Wirkung] of the general law and giving it simply [*nur*] the character of a tendency, which is why we have

described the fall in the general rate of profit as a tendential fall' – Marx, 1894, p. 339). On the methodological status of Marx's TFRP in comparison with Mill's views on tendencies, see Reuten, 1997.

5. On the plane of the interconnection of capital accumulation, employment and financial groupings and institutions, not only the year 1979, marking the turn to moderate inflation, but also 1973 as the *formal* end of the gold standard era, is of importance – it may be said to mark the maturity of capitalism.
6. It is akin to a monetary labour theory of value (Bellofiore, 1989).
7. This is the kernel of a reading of Marx's value theory as an 'abstract-labour theory of the value-form' – expanded upon in Reuten, 1988a, 1993; Reuten and Williams, 1989, ch 1; Williams, 1992. For a critique see Likitkijsomboon, 1995. Reuten, 1995, is a reply to the latter and includes a summary statement of the theory.
8. Throughout this chapter a distinction is made between 'industrial capital' (enterprises engaged in production) and 'finance capital' (lenders of means of finance, including intermediaries such as banks). This is a theoretical differentiation. Thus, for example, enterprises engaged in production may at times act as lender of capital and as intermediary. Below, the term 'credit money' always refers to the 'money' (cheques, accounts and so on) issued by a financial intermediary such as a commercial bank. For the sake of brevity, all intermediaries issuing credit money and thus adopting a banking function are called 'banks', even if they are not a bank in a formal legal sense. A corollary of this is that no sensible borderline can be drawn between money and money capital (or finance capital). (See Reuten, 1988b, Reuten and Williams, 1989, pp. 88–9.)
9. This implies that it is considered a sound deposit, whence it is 'full money'. Full money is measure of value, medium of circulation and a fiduciary store of value. These three 'functions' are interconnected (see Reuten, 1988b). Any non-full money acting as a medium of circulation is predicated upon it being a temporary store of value.
10. The discussion of this problem was initiated by Okishio, 1961; Shaikh, 1978, reopened the discussion (for further references see Moseley, 1991, ch. 1, Reuten, 1991).
11. Over the past decades within neoclassical economics a similar misunderstanding of macroeconomics has developed. The supposed requirement for providing micro foundations to macroeconomics is just giving up macroeconomics. I am sorry that in my 1991 critique of the Okishian argument I did not take this into account.
12. The reference is to plants as a unit of management. A firm may comprise several plants, each dated differently. In addition to what is explained below, this may give rise to strategic market considerations to close down or open up plants.
13. For simplicity we may assume the overcapacity to be distributed proportionally over the stratification.
14. A more rigorous statement is in Reuten, 1991, and a fairly simple formalization in Reuten and Williams, 1989, pp. 135–8.
15. Marx subsumed 'the cheapening of the elements of constant capital' under the *counter*-tendencies (Marx, 1894, pp. 342–3). At a lower level

of abstraction, however, much depends on the course of the competitive process.

16. This is the value productivity. At the same time, in subsequent periods the relative physical productivity for any one capital decreases compared with the branch average.
17. This makes empirical research on the TFRP a tricky enterprise. For various reasons, and starting gradually from the 1920s onwards, managers prefer current to historical cost accounting – thus devalorization is accounted for in devaluation. At the same time the 'capital' (K) estimates of the national statistical bureaus, whilst taking into account price changes of capital goods as inputs, are based on fixed lifetimes of investments – so all the dynamics of devalorization are exempted from the figures. Reliably working up from the balance sheets of individual companies is not merely a monk's work – it requires monks to be master accountants.
18. The term cycle is used to indicate fluctuations in general, without any specification as to their duration or regularity. The link between restructuring of capital and the TFRP derives from Marx, 1894, ch. 15; it was reemphasized by Fine and Harris (1979, pp. 83–7) and Weeks (1981, pp. 208–13). The notion of technical change coming in waves derives from Schumpeter, 1937, 1943 – see also Bellofiore, 1993, pp. 56–64.
19. Within the confines of this chapter I cannot go into apparent inverse movements such as the emergence of the Eurodollar market.
20. Any 'extra money' (de Vroey, 1984, pp. 384–9) does not necessarily generate inflation; it is merely a monetary condition for inflation. Inflation requires in addition an upward movement of prices. The factors behind this are amplified upon in Reuten and Williams, 1989, pp. 147–51; see also Aglietta, 1976, pp. 313–15, 365–70.
    Throughout I use the term 'continual'/'continued' inflation so as to emphasize that upturns in the fragmented institutional setting were already (in part) inflationary.
21. The revaluation of capital, that is, the revaluation of the capital outlay in fixed means of production due to their price increase, is most transparent when the latter have been purchased by means of external finance.
22. This will not be immediately and simply reflected in the interest rate, so as to keep the so-called 'real interest rate' constant (see Reuten, 1988b; Reuten and Williams 1989, pp. 88–9). Empirically this is shown in Leeftink, 1995, ch. 5.
23. Note that the finance capital invested in any alternative (such as in existing shares, real estate or art – driving up their prices) is ultimately deposited *with banks*, or takes the form of near-banking call money. Much of finance capital has been floating in speculative spheres, contributing to the financial instability of the 1980s and 1990s.

References

Aglietta, Michel (1976) *Régulation et Crises du Capitalisme* (Calmann-Lévi), English trans. D. Fernbach, *A Theory of Capitalist Regulation; The US Experience* (London: NLB, 1979).

Arthur, Christopher and Geert Reuten (eds) (1997) *The Circulation of Capital: Essays on Volume II of Marx's 'Capital'* (London: Macmillan).
Bellofiore, Riccardo (1989) 'A monetary labor theory of value', *Review of Radical Political Economics*, vol. 21, nos 1–2 pp. 1–25.
Bellofiore, Riccardo (1993) 'Monetary macroeconomics before the *General Theory*: The circuit theory of money in Wicksell, Schumpeter and Keynes', *Social Concept*, vol. 6, no. 2 (1992), pp. 47–89.
Brunhoff, Susanne de (1973) *La Monnaie chez Marx* (Paris, Editions Sociales), English trans. M. J. Goldbloom, *Marx on Money* (New York: Urizen Books, 1976).
Brunhoff, Susanne de (1976) *État et Capital* (Presses Universitaires de Grenoble and Maspero), English trans. M. Sonenscher, *The State, Capital and Economic Policy* (London: Pluto Press, 1978).
Brunhoff, Susanne de and Jean Cartelier (1974) 'Une analyse marxiste de l'inflation', *Cronique Sociale de France*, no. 4.
Eberle, Friedrich (ed.) (1973) *Aspekte der Marschen Theorie I; Zur methodischen Bedeutung des 3. Bandes des > Kapital <* (Frankfurt a/M: Suhrkamp).
Fine, Ben and Laurence Harris (1979) *Rereading Capital* (London: Macmillan).
Gillman, Joseph (1958) *The Falling Rate of Profit* (New York: Carmen Associates).
Jevons, W. Stanley (1871, 1879) *The Theory of Political Economy* (Harmondsworth: Penguin 1970).
Leeftink, Bertholt (1995) 'The desirability of currency unification', PhD thesis, University of Amsterdam (Amsterdam: Thesis Publishers).
Likitkijsomboon, Pichit (1995) 'Marxian Theories of Value-Form', *Review of Radical Political Economics*, vol. 27, no. 2., pp. 73–105.
Mandel, Ernest (1976) 'Introduction', in Marx, 1867: Engl Penguin edn, 11–86.
Marx, K. (1861–63) *Collected Works* (New York: International Publishers, 1991).
Marx, K. (1867, 1890) *Das Kapital, Kritik der politischen Okonomie, Band I, Der Produktionsprozess der Kapitals*, English transl. Ben Fowkes, *Capital, A Critique of Political Economy, Volume I* (Harmondsworth: Penguin, 1976).
Marx, K. (1894) ed. F. Engels, *Das Kapital, Kritik der Politischen Okonomie, Band III, Der Gesamprozesz der kapitalistischen Produktion* (Berlin: Dietz Verlag, 1972), English trans. David Fernbach, *Capital, A Critique of Political Economy, Vol III* (Harmondsworth: Penguin, 1981).
Moseley, Fred (1991) *The Falling Rate of Profit in the Postwar United States Economy* (London: Macmillan).
Moseley, Fred (ed.) (1993) *Marx's Method in Capital: A Reexamination* (New Jersey: Humanities Press).
Oakley, Allen (1983) *The Making of Marx's Critical Theory: a bibliographical analysis* (London: Routledge).
Okishio, Nobio (1961) 'Technical changes and the rate of profit', *Kobe University Economic Review*, vol. 7, pp. 85–99.
Reuten, Geert (1988a) 'Value as Social Form', in Michael Williams (ed.), *Value, Social Form and the State* (London: Macmillan), pp. 42–61.

Reuten, Geert (1988b) 'The money expression of value and the credit system; a value-form theoretic outline', *Capital & Class*, no. 35, pp. 121–41.
Reuten, Geert (1991) 'Accumulation of capital and the foundation of the tendency of the rate of profit to fall', *Cambridge Journal of Economics*, vol. 15, no. 1, pp. 79–93.
Reuten, Geert (1993) 'The difficult labour of a theory of social value; metaphors and systematic dialectics at the beginning of Marx's *Capital*', in Moseley, 1993, pp. 89–113.
Reuten, Geert (1995) 'Conceptual collapses; a note on value-form theory', *Review of Radical Political Economics*, vol. 27, no. 3, pp. 104–10.
Reuten, Geert (1997) 'The notion of tendency in Marx's 1894 law of profit', in Fred Moseley and Martha Campbell (eds), *Investigations in Marx's Method*, New Jersey: Humanities Press, pp. 150–75
Reuten, Geert and Michael Williams (1989) *Value-Form and the State; the tendencies of accumulation and the determination of economic policy in capitalist society* (London/New York: Routledge).
Rosdolsky, Roman (1968) *Entstehungsgeschichte des Marxschen 'Kapital'* (Frankfurt a/M: Europäische Verlagsanstalt), English trans. Pete Burgess, *The making of Marx's 'Capital'* (London: Pluto Press, 1977).
Schmidt, Alfred (ed.) (1969) *Beiträge zur Marxistischen Erkenntnistheorie* (Frankfurt a/M: Suhrkamp).
Schumpeter, Joseph A. (1937, 1939) *Business Cycles* (New York: McGraw-Hill).
Schumpeter, Joseph A. (1943, 1954) *Capitalism, Socialism and Democracy* (London: Unwin University Books, 1966).
Shaikh, Anwar (1978) 'Political Economy and Capitalism: notes on Dobb's theory of crisis', *Cambridge Journal of Economics*, vol. 2, pp. 233–51.
Vroey, Michel de (1984) 'Inflation: a non-monetarist monetary interpretation, *Cambridge Journal of Economics*, vol. 8, pp. 244–61.
Weeks, John (1981) *Capital and Exploitation* (London: Edward Arnold).
Weisskopf, Thomas E. (1979) 'Marxian crisis theory and the rate of profit in the postwar U.S. economy', *Cambridge Journal of Economics*, vol. 3, pp. 341–78.
Williams, Michael (1992) 'Marxists on money, value and labour-power: a response to Cartelier', *Cambridge Journal of Economics*, vol. 16, pp. 439–45.
Wolff, Edward N. (1986) 'The productivity slow down and the fall in the rate of profit in the U.S. economy 1947–76', *Review of Radical Political Economics*, vol. 18 (Spring–Summer), pp. 87–109.
Wygodski, Witali (1965) *Die Geschichte einer grossen Entdeckung; Ueber die Entstehung des Werkes 'Das Kapital' von Karl Marx*, Berlin: Verlag Die Wirtschaft, 1967 (Russian original, Moscow: Mysl, 1965).
Zelený, Jindrich (1968) *Die Wissenschaftslogik bei Marx und das Kapital* (Berlin: Akademie Verlag), English trans. Terrell Carver, *The Logic of Marx*, (Oxford: Basil Blackwell, 1980).

13 Marx or Hicks? Structural Proportions and Crisis: The Transition from the First to the Third Volume of *Capital*

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INTRODUCTION

Two fundamental aspects of modern capitalist economies are not adequately treated in volume III of *Capital.* The first of these, the monopolistic stage of capitalism, is not discussed in any of the volumes. Instead there is an emphasis on competitive capitalism, governed by a tendency towards a uniform rate of profit, which, according to Marx, provides capitalism with its long-run dynamic. The second feature is the role of structural and sectoral adjustment in the dynamic growth process. Here the problem lies mainly with volumes I and III, as volume II embarks on an embryonic consideration of the issues in its treatment of the reproduction schemes.

The neglect of the monopolistic elements has been a continuing subject of controversy, and was already questioned by Engels in the preface to the English edition of volume I. There is an important school of Marxian scholarship, including Baran, Braverman, Hilferding, Kalecki, Lenin, Luxemburg, Steindl and Sweezy, which argues that under monopoly capitalism the laws of capitalist accumulation have been fundamentally changed. Elsewhere we have argued that the tendency towards a uniform rate of profit has been vitiated due to the changes in the structure of the economy, so that stagnationist tendencies have arisen (Halevi and Kriesler, 1991). This chapter will concentrate on the issue of the role of structural dispro-

portionalities in the work of Marx, and the subsequent developments by Lowe and Hicks.

The role of the sectoral structure of the economy emerges from the discussion of reproduction schemes in volume II of *Capital*, where the nature of the flows between the capital-goods producing sectors and the consumption-goods producing sectors is analysed. In order to avoid disproportionality crises, Marx showed that certain conditions must be fulfilled by these flows. However he also concluded that satisfaction of these conditions was extremely unlikely in a capitalist economy. That this prepared the space for the analysis by Löwe and Hicks of the structural traverse is the central proposition of this chapter. In the following section the importance of structural disproportionalities in early Marxist literature is noted, as well as the movement away from volume I of *Capital*. The third section compares the Löwe–Hicks analysis of the structural traverse with Marx's analysis.

THE CHANGE IN PERSPECTIVE IN MARXIAN THOUGHT

By the time of the publication of volume III of *Capital* the dominant theoretical component of Marxian and socialist thought, that is, German social democracy, was moving rapidly away from the analytical propositions put forward in volume I. This departure was further accentuated by Russian Marxism, which, with the contributions of Tugan Baranovski, Bulgakov, Lenin and Preobrazhensky, formed the most substantial body working on the theory of structural disproportionalities. In this context it is worth pointing out that the divergence from volume I is also evident in the notes written by Engels while editing Marx's main opus.[2]

For Engels, the issue at stake was Marx's general law of capital accumulation, expounded in chapter 25, volume I of *Capital*. This is the only part of *Capital* where Marx presented a theory of the global functioning of the capitalist economy based on the well-known cyclical interaction between accumulation and the 'reserve army of labour'. The importance of that chapter in providing Marx's vision of the totality of the capitalist process is evidenced by the fact that its content is virtually identical to that of *Wage, Price and Profit*. In both cases the process of capital accumulation is based on the belief that the competitive mechanism is constantly at work in a way that ensures a form of capital mobility entailing a persistent tendency towards a

uniform rate of profits. Engels began to question the historical validity of this aspect of Marx's analysis already in the preface to the English edition of volume I of *Capital*, where he observed that crises might now imply chronic unemployment and a state of persistent stagnation. In this context, it is important to recall that chronic unemployment is not possible in Marx's theory of the business cycle. Whenever the rate of profits begins to rise as a result of the negative impact of the crisis on factory jobs, and consequently on the wage rate, accumulation and investment rise again, leading to an upswing in employment levels. Indeed the only chronic form of unemployment conceivable within Marx's theory of the reserve army is that constituted by workers whose skills are no longer needed in the production process. Yet these obsolete people have no bearing upon the inverse relationship between the rate of profits and the wage rate upon which Marx built the entire edifice of his growth cycle. Thus the idea that the capitalist economy might become stuck in a situation of persistent stagnation is at odds with Marx's general law and foreshadows a different conception of accumulation, which Engels did not provide but hinted at in volume III of *Capital*.

Chapter 30 of volume III deals with the relationship between money and real capital. In particular, Marx developed there the view that at the onset of the crisis loan capital is short, because of the rise in the rate of interest due to the freezing out of credit, while real capital is plentiful because of the shutting down of factories resulting from a low rate of profits. The ensuing, but deterministic, divergence between the two rates is governed by the regularity of the cyclical movement in the rate of profits, as presented in chapter 25 of volume I. It is at this point that Engels, in a long footnote, took issue with Marx's conception of a regular cycle:

> As I have already noted elsewhere, the last general crisis represented a turning-point. The acute form of the periodic process with its former ten-year cycle seems to have given way to a more chronic and drawn-out alternation, affecting the various industrial countries at different times, between a relatively short and weak improvement in trade and a relatively long and indecisive depression (Engels, in Marx, 1981, vol. III, p. 620).

Engels then cited the creation of a world market, the rise of new industrial powers behind tariff walls and, finally, the retreat of

domestic competition in the face of cartellization, as the main factors counteracting the repetition of the old crisis.

In several respects Engels lagged behind the evolution of German Marxism as well as behind the analyses of the incipient Russian wing. For both strands the German experience was the reference point. The role of the metal and machining sectors in providing sustained impetus to accumulation, while no systemic regular cycle was occurring, made German social democratic thinkers lean towards a sectoral mode of thought. Once accumulation was identified as taking place through the growth of the capital goods sector, the question became to determine the point at which the process could no longer be maintained. As a consequence the very notion of crisis was no longer identified with the cyclical movements of production and of the rate of profits. This new attitude is well expressed by Karl Kautsky's position in 1902. According to Kautsky, 'the market for consumption goods, i.e. consumption demand, expands less rapidly than the accumulation of capital and the rise in the productivity of labour' (Kautsky, quoted in Sweezy, 1968, p. 179). This state of affairs is bound to generate a situation of chronic depression that, because of the persistent unemployment it entails, will eventually become intolerable for the mass of the population.

Kautsky does not seem to have discussed the mechanisms that are supposed to give rise to his scenario, yet they can be easily deduced with the help of modern contributions to oligopolistic pricing. Firstly, Kautsky's thesis implies that real wages will always increase at a pace slower than productivity, something that was denied, albeit confusedly by Eduard Bernstein. For this to occur the price setting process would have to be such that the rise in labour productivity leads to an increase in the mark-up. Secondly, even if real wages expand less than productivity a crisis need not happen as long as the gap is matched by an increase in investment (Sylos-Labini, 1969). This is indeed the macro-sectoral solution proposed by Tugan-Baranovski – of the Russian strand – who calculated in terms of labour values the proportional amount by which production will have to be shifted to the capital goods sector in the face of declining consumption demand. Note that the fall in consumption demand is, in this case, attributed to a rapid decline in the number of workers needed to operate the stock of machines. Although analytically incomplete, Kautsky's views, and *a fortiori* those of the Russian strand, constitute a radical departure from the analysis undertaken by Marx in volume I and in the relevant part on money and real capital in volume III.

MARX AND HICKS: FROM PRIMITIVE TO COMPLEX ACCUMULATION

At this point two possible routes are open to us. The first would be to accept Engels' view that the change lies in the historical form of accumulation. Yet this would imply the *a priori* acceptance of Marx's cycle for the early stages of industrialisation. Therefore, we have chosen the second route, where the source of the difference lies in the still primitive character of the theoretical formulation put forward in volume I and reproduced in the relevant part of volume III. This approach is justified by the fact that volume II does address, although in a rough manner, the questions that became germane to German and Russian Marxism. Once the general law of capital accumulation in volume I is shown to be based on a primitive model in a Hicksian sense, the appropriate link should run from volume II to volume III of *Capital*. Yet the connection appears to be highly problematical.

To paraphrase Hicks (1965, 1985), a model where capital accumulation proceeds through 'parsimony' is indeed primitive. The relation between 'parsimony' and accumulation is highlighted in the simplest of all constructions: a pure one-sector corn economy with constant coefficients of production. Corn output minus corn wages is accumulated, which means that it is invested. Why should the unconsumed corn be kept aside (in warehouses) except for uncertainty related to weather? Net investment means here that more corn is ploughed back than last year. If the number of people available for exploitation has increased well above the number required to carry out production, the corn wage that will be paid out by the end of the next year will fall. Hence by the next year the amount of corn available for investment will further expand by an amount equivalent to the difference between the old and the new corn wage multiplied by the total number of workers employed during the year. In this way the share, the rate of profit and the growth rate will have moved in the same upward direction. Exactly the opposite happens when accumulation meets a reduced number of available workers. The logical smoothness of the mechanism of the reserve army of labour works only when output is strictly homogeneous. The introduction of technical change in chapter 25 of volume I does not alter the issue. In fact it appears only as a device to obtain surplus population without having to rely on immigration flows from the non-capitalistic sectors of the economy. Marx's cyclical growth is, in essence, remarkably

similar to what Hicks has identified as the original model of Adam Smith. Now, it is true to say that in its intentions Marx's volume I was not meant to be limited to a one-commodity world, but whenever he analyzed the dynamics of accumulation he reverted to the corn model.

As soon as commodities are heterogeneous the logical simplicity of the general law breaks down. If tractors and corn are produced by means of tractors, and if the economy operates at full capacity, a fall in the corn wage will not, *ipso facto*, generate more overall investment. The fall in *real* wages will simply cause a less than full exploitation of capacity in the corn sector through an unwanted accumulation of corn inventories, thereby leaving idle some of the tractors operating in the corn sector. For real investment to rise, these tractors will have to be shifted to the tractor producing sector. Only at this point will it be possible to speak of a process whereby the notional shift in the distribution of income from wages to profits becomes an actual one leading to higher accumulation. But between the notional and the actual increase in the rate of profits there is a wide gap. The significance and importance of this gap can be gauged from the explicitly Marxian reproduction theory developed by Löwe (1987, 1976).

At this stage it is necessary to distinguish between problems associated with structural adjustment, or disproportionalities, and those associated with effective demand (realization problems). Although there are important connections between the issue of disproportionalities and the problem of realization and effective demand (Halevi, 1992), they are analytically distinct. The problem of the structural traverse is really about both the sectoral responses occurring when an economy is moved away from its steady state growth path, and the question of whether such a path, relying on all sectors growing in the same proportion, is a useful abstraction. This means that to analyze such problems properly three important considerations must be brought in: (1) the existence of a multisectoral model, (2) a distinction between at least one consumption sector and a capital goods sector, and (3) capital must be putty/clay. Without the first two we cannot significantly analyze intersectoral relations, while without the assumption of clay capital, problems with intersectoral flows can be ignored as the capital stock can immediately transform itself to the one appropriate to the new equilibrium.

Löwe's model is based on machine tools reproducing themselves as well as producing tractors that are used to plow and harvest corn.

Thus a decline in real wages, as envisaged by Marx in his growth cycle, will, in the first instance, render idle a certain number of tractors in the corn industry. Indeed the reduced demand for tractors turns out to be the structural condition needed to increase the rate of investment in the machine tools sector, thereby pulling up the aggregate rate of investment. However there is no *a priori* mechanism guaranteeing the transition to the new rate. In fact the whole process can be halted in its tracks and the notional (higher) rate of profits may never translate into a real one, even tendentially, unless the process is guided by institutional rather than deterministic forces. In Löwe's theory tractors are not shiftable. Thus the cost of their laying idle can be met by firing workers in the corn sector. The demand for corn will fall, leading to additional idle tractors. Whatever the desired rate of profits capitalists aspire to, their investment decisions will be governed by the state of real effectual demand. Hence corn producers will reduce their demand for tractors, leading to unused capacity in the machine tools sector. These machines are shiftable and can be used to expand their own production. ['Shiftable' is used in the literature on growth models to describe the degree of mobility of machinery (capital goods) between sectors. If machines are totally specific, that is if they are designed to operate only in a given sector, they are said to be non-shiftable.] Yet to obtain a rise in the self-expanding activities of the machine tools sector very stringent assumptions about expectations and about the information content conveyed by a fall in real wages are needed. These are as strong as those made in general equilibrium analysis (Löwe, 1976, chs 1–12).

It follows that, once complexity is introduced into the classical Marxian picture, the logical smoothness of the process described in chapter 25 of volume I must give way to a method that is capable of conceptualizing that complexity. This method is represented by what Hicks called the 'traverse'. The issue, therefore, is not whether Marx's trade cycle was good for a given historical period and inappropriate for the era of trusts and cartels, it is the inability to account for structural complexity, which calls into question the descriptive strength of Marx's general law. This is not the case if we look at Marx's contribution in volume II of *Capital*, which rightly attracted the bulk of the attention of German and Russian Marxists. Volume II does not stand in isolation since the idea of the structural traverse operates as a non-deterministic undercurrent in classical thought. Hence the next section will examine the role of the structural traverse in the work of Ricardo and Marx.

THE STRUCTURAL TRAVERSE IN CLASSICAL ECONOMICS AND MARX

Before the writings of Marx, structural problems associated with economies being out of equilibrium, in particular those associated with the structural traverse, were regarded as significant by Ricardo only in a late addition to his *Principles*, the chapter on machinery. Ricardo avoided most of the problems by effectively developing a one-commodity model with circulating capital. Although he allowed for manufacturing as well as the agricultural sector, his focus on the latter was due to his belief that all major economic relations were determined within the agricultural sector, so that problems of sectoral disproportionalities were not relevant. It has also been established that, despite his attempts to generalize, his analysis of value never left that of a one-commodity world. Nevertheless the analysis of value does allow for the economy not to be at its equilibrium level, as market prices can deviate from natural prices. However the forces of competition will tend to restore the latter. Importantly, because the forces that determine the equilibrium value (natural value) differ from those that push the economy back to that equilibrium, there is no question of path determinacy. To reiterate, natural prices are determined by the cost of production and are proportional to embodied labour. There is no role for demand. However it is the forces of competition through the workings of supply and demand that push the economy back to those natural levels in the event of deviation. The natural prices are unaffected by the adjustment path. The same is true for the natural subsistence wage.

An exception to the above discussion is Ricardo's analysis of the impact of machinery, which he introduced into the third edition of *Principles*. The anomaly *vis-à-vis* the general trend of thought adopted in *Principles* is that the introduction of fixed capital is incompatible with the labour theory of value and it represents the only part of the book where the economy is seen to generate unemployment. Although the analysis is still of a one-commodity type, the introduction of fixed capital may disturb the full employment equilibrium and cause structural unemployment. According to Ricardo, the creation of fixed capital will divert resources away from the production of wage goods (corn). This means that, although the economy is at full employment during the initial period of the construction of the machine, in the next period the reduced resources in the wage goods sector will cause a lower output, thereby shrinking the wages fund. This will in turn

reduce employment. The new machine will eventually enable a higher level of accumulation within the wage goods sector, which will lead to the creation of sufficient wage goods to absorb the unemployment. In other words, Ricardo modelled a structural traverse in which the creation of machines enables the economy to switch to a higher growth rate. However during the adjustment period there will be structural unemployment.

Importantly, Ricardo's analysis was more sophisticated than that of Marx in volume I, where the one-commodity assumption denied the possibility of structural problems. Marx did confront the issue of compensation in chapter 15 of volume I, but in a partial disequilibrium way. He observed that when workers are fired they cease to confront capitalists *qua* workers but face them as consumers. This, Marx said, will lead to a fall in the price of wage goods, *voila tout*! The important insight on the role of effective demand is lost in the partial approach taken by Marx. In contrast structural considerations arise in volume II, particularly in part 3, where the reproduction schemes address precisely this problem, albeit it in a different form. The model analyzes intersectoral flows between a capital-goods producing sector and a consumption-goods producing sector, with fixed (clay) capital. Marx then considered the conditions necessary for each sector to absorb its accumulation requirements, both from its own production and from that of the other sector, without any coordination being imposed except that derived from the market.

The basic point of these models is to examine the conditions under which a capitalist economy can grow (expanded reproduction) without being subjected to crises of overproduction in any department, that is, without structural problems (cf. Sardoni, 1982). In fact Marx showed that the conditions necessary for such unproblematic growth are extremely unlikely, and that, as a result, overproduction within departments is likely to generate structural problems. The problem stems from the dual role of workers – as consumers of the output of the wage goods sector and as a cost of production – so that wages and profits are inversely related (Sardoni, 1987). This antagonism at the heart of capitalism provides an important obstacle to balanced growth, as it necessitates growth in workers' powers of consumption, which is antagonistic to capitalist class interests. As a result the problem with intersectoral flows will spread to the whole economy, resulting, according to Marx, in a fall in investment, which causes an increase in unemployment:

> But as things actually are, the replacement of capitals invested in production depends to a large extent on the consumption capacity of the non-productive classes; while the consumption capacity of the workers is restricted partly by the laws governing wages and partly by the fact that they are employed only as long as they can be employed at a profit for the capitalist class. The ultimate reason for all real crises always remains the poverty and the restricted consumption of the masses, in the face of the drive of capitalist production to develop the productive forces as if only the absolute consumption capacity of society set a limit to them (Marx, 1981, vol. III, p. 615).

It is here, when the initial crisis caused by structural disproportionality spreads to become a general underconsumption problem, that the link between disproportionalities and effective demand comes into its own (Halevi, 1992).

In other words, the reproduction schemes do not show the actual conditions of capitalist economies, rather they are used to investigate the conditions under which such economies could grow without crises, as in the Harrod–Domar model. Having shown this, the next stage should be to analyze what happens outside the steady state. In a sense, Marx stopped his analysis exactly where Hicks and Löwe started theirs. Given the difficulty of growth without structural problems, the next step would be to analyze the structural traverse to see how the capitalist economy will respond to crises. Instead volume III abandons the sectoral approach of the reproduction schemes, and therefore does not put the structural problems raised by them into the centre of the analysis of crises. Indeed in chapter 30, where Marx discussed the relation between financial and productive capital, he relied on an analysis of the falling uniform rate of profit (taken from volume I) in a one-sector framework.

In fact, in a multisectoral framework the imposition of a uniform rate of profit has profound implications. As we have shown elsewhere (Halevi and Kriesler, 1991) a uniform rate of profit within a multisectoral framework is only consistent with balanced growth. However this imposes stringent restrictions on the model, as it implies, for example, conditions of uniform technological change and growth in productivity. In addition it ignores the possibility of changes in the composition of output, or in the mix of consumption and capital goods. Furthermore if, following Engels' suggestion in a footnote to that chapter (p. 620), we abandon the assumption of competition and

full capacity utilization, then there is no longer a necessary trade-off between profits and wages, as an increase in wages (for example) may lead to an increase in capacity due to the extra effective demand it has generated.

The abandonment of the assumption of competition also leads to a reconsideration of the tendency towards a uniform rate of profit. Once we allow for imperfect competition, then sectoral profit differences may remain due, *inter alia*, to barriers to entry. This means that, as a result, we are no longer limited to considerations of balanced growth. In fact imperfect competition, coupled with technological changes and uneven growth in productivity and per capita demand (Pasinetti, 1981), means that sectors are extremely unlikely to grow in the same proportions.

CONCLUSIONS

This chapter has examined a problem that was raised in volume II of *Capital* but neglected in volumes I and III, namely the role of the structural traverse in the process of capitalist growth. It was argued that the work of Lowe and Hicks in this area was a necessary supplement to Marx's insights, and allowed focus to be placed on the fundamental problem of capitalist dynamics. It should be noted that there is some further recognition of structural factors in volume III in the discussion of the transformation problem. However this discussion is fundamentally flawed for the reasons outlined above. Reliance on the tendency towards uniform rates of profits means that the essence of monopoly capitalism as well as intersectoral differences are ignored. This in turn means that the real significance of the sectoral dynamics of volume II are replaced by a model in which sectoral factors enter only in a static way.

Notes

1. Joseph Halevi is with UFR Sciences Economiques, Université Pierre Mendès France, Grenoble, and the Department of Economics, University of Sydney. Peter Kriesler is with the Department of Economics, University of New South Wales.
2. A referee has asked us to look at the recent literature on the subject. However we have worked with the best modern anthology of the *original papers* of the debate, published in Italy by Lucio Colletti and Claudio Napoleoni (1970). No original collection exists in English.

Unwittingly, the referee's comments highlight the perverse tendency in the Anglo-American world to bypass the original texts and rely on second-hand commentary.

References

Colletti, L. and C. Napoleoni (eds) (1970) *Il futuro del capitalismo. Crollo o sviluppo?* (Bari: Laterza).

Halevi, J. (1992) 'Marxism and Post-Keynesian Economics', *History of Economics Review*, no. 18.

Halevi, J. and P. Kriesler (1991) 'Kalecki, Classical Economics and the Surplus Approach', *Review of Political Economy*, vol. III.

Hicks, J. R. (1965) *Capital and Growth* (Oxford: Clarendon Press).

Hicks, J. R. (1985) *Methods of Dynamic Economics* (Oxford: Clarendon Press).

Löwe, A. (1976) *The Path of Economic Growth* (Cambridge: Cambridge University Press).

Löwe, A. (1987) 'Structural Analysis of Real Capital Formation', in A. Oakley (ed.), *Essays in Political Economics: Public Control in A Capitalist Economy: Adolph Lowe* (Sussex: Wheatsheaf Books).

Marx, K. (1981) *Capital: A Critique of Political Economy*, vols I–III (Harmondsworth: Penguin).

Pasinetti, L. (1981) *Structural Change and Economic Growth* (Cambridge: Cambridge University Press).

Ricardo, D. (1951) *On the Principles of Political Economy and Taxation* (Cambridge: Cambridge University Press).

Sardoni, C. (1982) 'Multi-sectoral Models of Balanced Growth and the Marxian Schemes of Expanded Reproduction', *Australian Economic Papers*, vol. XX.

Sardoni, C. (1987) *Marx and Keynes on Economic Recessions* (Sussex: Wheatsheaf).

Sweezy, P. (1968) *The Theory of Capitalist Development* (New York: Monthly Review Press).

Sylos-Labini, P. (1969) *Oligopoly and Technical Progress* (Cambridge, MA: Harvard University Press).

Part III
Empirical Approaches

14 The Dynamics of Historical Tendencies in Volume III of Capital: An Application to the US Economy since the Civil War[1]

Gérard Duménil and Dominique Lévy

INTRODUCTION

As is well known, Marx did not 'discover' the tendency of the rate of profit to fall, but found this famous law in the work of Smith and Ricardo. It is quite puzzling for us, as economists writing in the late twentieth century, why both Smith and Ricardo adhered to the existence of a declining historical trend of the profit rate. In particular it is hard to determine the empirical foundations of their conviction. For Marx, the existence of a tendency for the rate of profit to fall within capitalism was a prominent manifestation of the historical character of this mode of production. In the manuscript of volume III of *Capital*, Marx wrote the following:

> Thus economists like Ricardo, who take the capitalist mode of production for an absolute, feel here that this mode of production creates a barrier for itself.... The important thing in their horror at the falling rate of profit is the feeling that the capitalist mode of production comes up against a barrier to the development of productive forces which has nothing to do with the production of wealth as such; but this characteristic barrier in fact testifies to the restrictiveness and the solely historical and transitory character of the capitalist mode of production (Marx, 1894, ch. 15, p. 350).

Since this was written, the debate concerning the tendency for the rate of profit to fall has aroused much controversy, both on theoretical and empirical grounds, and this study does not purport to do justice to this literature. The purpose of this chapter is to summarize briefly what we consider the bare essentials of the explanatory power of the law of the tendency for the rate of profit to fall – a crucial element in the analysis of the history of capitalism and the understanding of the crisis of the late twentieth century.

Three broad issues are discussed in this chapter:

1. *The empirical relevance of the tendency and, more generally, of the whole set of tendential laws that accompany it in Marx's Capital* (considering the US economy since the Civil War). The historical profile of the profit rate in the United States over a period of more than a century, specifically 1869–1992, reveals a periodization in three stages corresponding approximately to the late nineteenth century, the first half of the twentieth century and the second half of the twentieth century. A downward trend of the profit rate is apparent in the first and third stages, but the profit rate rises during the first half of the twentieth century. During this latter period the downward tendency of the profit rate was superseded at the cost of a major metamorphosis of relations of production, *viz.* the transition to *managerial capitalism.*
2. *The mechanisms: the dynamics of the main variables describing technology and distribution.* The variables involved in these mechanisms are interconnected in a system of reciprocal relationships. Wages impact on the profit rate, and thus induce technical change in specific directions; technology also impacts on the profit rate. The value and variation of the profit rate in turn conditions the movement of wages. These relationships can be described in a dynamic model in which it is easy to generate the trajectories described by Marx.
3. *The consequences of the tendency, that is, the relationship between the occurrence of crises and the falling profit rate.* The actual decline of the profit rate is a crucial factor in the occurence of crises, as Marx expected. The two phases of decline mentioned above were followed by 'large crises' in both the late nineteenth and twentieth centuries. Two symptoms of such crises are especially noteworthy. First, crises coincide with violent fluctuations of the general level of activity (contractions of output). Second, the slower rate of growth of accumulation (the growth of

productive capacity) is manifested in the emergence of a 'structural' component of unemployment (steady unemployment, beyond that related to the business cycle).

The first section below briefly recalls Marx's analysis of historical tendencies in volume III. The second section is devoted to the empirical findings. In the third section we discuss the impact of the 'managerial revolution' by which the historical trajectory *à la* Marx was superseded during the first half of the twentieth century. In the fourth section we present a model of technical change of evolutionary inspiration, and demonstrate its ability to account for historical trajectories *à la* Marx. The final section analyzes the consequences of an actual decline in the profit rate in terms of crises and unemployment.

HISTORICAL TENDENCIES IN VOLUME III

The law of the falling rate of profit is too well known to require introduction here. It is, however, important to recall that this law is part of a broader system of tendencies analyzed in chapter 13 of volume III of *Capital*, consisting of (1) the rising productivity of labour (or the decline in the value of commodities), (2) the rising organic, technical and value compositions of capital, (3) the constant or rising rate of surplus value, (4) the falling profit rate, (5) the rising share of profit in the price of each commodity, (6) the increasing quantity of labour employed, (7) the rising total amount of wages, (8) the increasing quantity of total profit (or total surplus value), (9) the growing concentration of capital and (10) the acceleration of accumulation.

None of these observations concerning the very long-term trends in capitalist economies posed the same theoretical problems as the tendency for the rate of profit to fall. In particular it is difficult to imagine why enterprises might adopt new techniques that diminish their profit rate. This problem was well identified by Marx: 'No capitalist voluntarily applies a new method of production, no matter how much more productive it may be or how much it might raise the rate of surplus-value, if it reduces the rate of profit' (Marx, 1894, ch. 15, p. 373). Marx's 'solution' is as follows:

> But every new method of production of this kind makes commodities cheaper. At first, therefore, he [the capitalist] can sell them above their price of production, perhaps above their value. He pockets the difference between their costs of production and the

> market price of the other commodities, which are produced at higher cost.... But competition makes the new procedure universal and subjects it to the general law. A fall in the profit rate ensues – firstly perhaps in this sphere of production, and subsequently equalized with the others – a fall that is completely independent of the capitalist's will (ibid., pp. 373–4).

This 'microeconomic' behavioral attempt to supersede an apparent contradiction is indeed very appealing. As is well known, however, Okishio (1961) proved that this cannot be the case *under the assumption of a constant real wage.* Beginning with equalized profit rates, a new technique of production that increases the profit rate also increases the average profit rate when a new equilibrium is reached (through competition) and the former technique abandoned. This theorem, stated more than 30 years ago, fostered numerous replies, and the controversy is still not settled.[2] However these 'refutations' of Okishio do so at the expense of Marx's central ideas, such as the view that capitalists maximize the profit rate, as stated in the quotation above, and that profit rates equalize.

A central difficulty in the attempt to understand Marx's law is the result of the absence of an explicit tendential law concerning *real* wages in Marx's analysis. (A thesis concerning the rate of surplus values has implications concerning wages in terms of value, but not in physical terms.) Marx stated clearly that wages vary over the phases of the business cycle (in the short term), but in the discussion of the historical trend of labour income he set aside the issue of real wages, as well as any considerations concerning use values:

> We entirely leave aside here the fact that the same amount of value represents a progressively rising mass of use-values and satisfactions, with the progress of capitalist production and with the corresponding development of the productivity of social labor and multiplication of branches of production and hence products (ibid., p. 325).

In addition Marx vacillated between a *constant* and *rising* rate of surplus value. If a constant rate of surplus value is assumed in combination with rising labour productivity, the real wage must rise. In our opinion, including a rising real wage within what we call a trajectory *à la* Marx is consistent with Marx's analysis, provided that this new feature is compatible with 'the same or even a rising rate of surplus-value' (ibid., p. 322).[3]

DOES THE PROFIT RATE FALL?

There are a number of empirical and theoretical difficulties in assessing the factual relevance of Marx's analysis of historical tendencies. Available data are never perfectly appropriate to the task. The notion of 'tendencies' is itself difficult to grasp; historical tendencies may manifest themselves through important fluctuations, or even be superseded by countertendencies. However these difficulties do not dismiss empirical analysis as irrelevant. They only prove that measurements must be interpreted carefully.

We will not discuss here the origin of the recognition by Smith, Ricardo and Marx (and others) of the (empirical) fact that the profit rate was declining in the late eighteenth and early nineteenth centuries in England, but confront Marx's analysis with the historical trends observed in the United States since the Civil War. In this investigation we will ignore all difficulties related to the 'correspondence' between Marx's categories and empirical series – and a few other problems![4] We will denote the ratio profit/labour income, the 'rate of surplus value', and the ratio fixed capital/labour income, the 'organic composition of capital'.

As shown in Table 14.1, the organic composition of capital, γ, the profit rate, r, and the rate of surplus value, τ, remained approximately constant over the entire period 1869–1992. It is, however, important to distinguish between various phases in this evolution. Although the rate of surplus value remained approximately constant during the three subperiods 1869–1910, 1910–50 and 1950–92, the organic composition of capital and the profit rate displayed quite different trends: rising/declining/rising and declining/rising/declining. The first and third periods can be characterized as periods *à la* Marx, but not the intermediate period.

A similar periodization can be observed for other relevant variables (defined in real terms): labour productivity, *NNP/L*, the productivity of capital, *NNP/K* and the technical composition of capital, *K/L*. Labour productivity and the technical composition of capital grew throughout the period, but the growth within each period followed opposite patterns, slow/rapid/slow for labour productivity, and rapid/slow/rapid for the technical composition of capital. (Larger growth rates of the technical composition of capital, during the first and third periods, coincided with a rising organic composition of capital.) The movement of the productivity of capital was the same as that of the profit rate.

Table 14.1 Average growth rates (% per year)

	1869–1910	*1910–1950*	*1950–1992*	*1869–1992*
$\rho(NNP/L)$	1.22	2.33	1.48	*1.95*
$\rho(NNP/K)$	−1.22	1.39	−0.88	*0.04*
$\rho(K/L)$	2.07	0.40	2.24	*1.48*
ρw	1.46	2.33	1.48	*1.95*
$\rho(r)$	−1.66	1.40	−0.88	*0.05*
$\rho(\gamma)$	0.97	−1.39	0.88	*−0.05*
$\rho(\tau)$	−0.38	0.01	−0.01	*−0.01*

Note: We use the conventional description of production in which a certain amount of labour, L, is combined with capital, K, to obtain a product (net national product, NNP). Technology is described by three ratios (in real terms): (1) labour productivity, NNP/L, (2) the productivity of capital, NNP/K and (3) the capital–labour ratio, K/L. Technical change is measured by the growth rates of these three ratios. Considering, w, the relative price of labour in comparison with the product (called hourly labour cost, and approximately equal to the real wage), one can determine three additional ratios (of variables in current dollars): (1) the profit rate r (NNP minus total labour income, that is, profit, divided by the stock of fixed capital), (2) the organic composition of capital, γ (capital stock/labour income), and (3) the rate of surplus value, τ (profit/labour income).

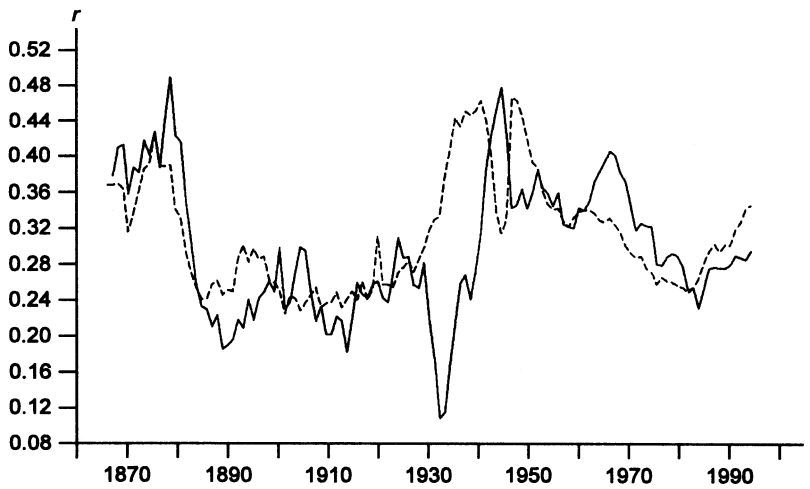


Figure 14.1 The historical profile of the profit rate: (continuous line) series and (dashed line) model of section 4

As suggested by the profile of the profit rate (continuous line) in Figure 14.1 and the growth rates in Table 14.1, a periodization in three stages emerges from an examination of these data: late nineteenth century/first half of the twentieth century/second half of the twentieth century. The profit rate declined during the first and third periods, and increased during the intermediary period. This does not mean, however, that Marx was only 66 per cent right! The problem is to identify the *countertendency(ies)* at work during the intermediate period. This is the purpose of the following section.

HISTORICAL TRAJECTORIES *À LA* MARX AND THE MANAGERIAL REVOLUTION

We interpret the above trends as follows (see Duménil and Lévy, 1996). The first and third periods can be characterized as two distinct 'paradigms' (encompassing under this label, technology, management, related institutions and their historical dynamics), corresponding to two distinct stages of capitalism:

1. The first paradigm is typical of mature capitalism, and was inherited from the English industrial revolution. In this paradigm, the main class contradiction is between the capitalist owner and the productive worker.
2. The second paradigm is that of *managerial capitalism*, as documented in particular by Chandler (1977, 1990). In this paradigm a new class of *managerial and clerical personnel* emerges, with it own internal contradiction, creating more complex class patterns and new configurations within the relations of production (see Duménil, 1975 and Duménil and Lévy, 1994a).

Each paradigm considered separately is subject to the tendency for the rate of profit to fall and, more generally, displays the features of a trajectory *à la* Marx. The intermediate period is interpreted as the progressive transition from the earlier to the more recent paradigm (see Figure 14.3a).

The managerial 'revolution' is characterized by the *more efficient use* of capital and labour. The new organization is gradually extended to all segments of the productive system, and its progressive diffusion is manifested in the larger growth rates of labour productivity and the exceptional rise of the productivity of capital (paralleled by a

simultaneous increase in the growth rate of real wages and a rising profit rate).[5] During the third period, when the diffusion of the new paradigm was almost completed, the resurgence of earlier trends echoes the fact that technical progress is largely subject to similar rules under the two paradigms. A profile similar to that observed during the first period is reasserted, a pattern *à la* Marx, since it combines the basic features described in volume III, in particular an aggresively rising capital–labour ratio (the composition of capital) and a declining profit rate.

Marx had a clear vision of these transformations at a very early stage of their emergence in England. In volume III he repeatedly referred to this metamorphosis of relations of production and the emergence of the new paradigm. There he analyzed the transfer of management from capitalist owners to salaried managers: 'Joint-stock companies in general (developed with the credit system) have the tendency to separate this function of managerial work more and more from the possession of capital, whether one's own or borrowed' (Marx, K 1894, ch. 23, p. 512). Moreover these new groups are clearly identified as a class: 'a numerous class of industrial and commercial managers' (ibid., p. 513). Marx probably underestimated the impact of this managerial phase of capitalism on technology and distribution, and its possible duration: 'This is the abolition of the capitalist mode of production within the capitalist mode of production itself, and hence a self-abolishing contradiction, which presents itself *prima facie* as a mere point of transition to a new form of production' (ibid., ch. 27, p. 569).

Overall the tendency for the rate of profit to fall accounts for a crucial historical tendency within US capitalism over the period considered. However this tendency was superseded during the first half of the twentieth century by the emergence of a new stage of capitalism, *managerial capitalism*, a deep metamorphosis of relations of production and class patterns. This evolution came as a reaction to the declining profit rate in the late nineteenth century, and was responsible for the illusion that the law was abolished for a few decades. When the new paradigm was diffused to the entire productive system, the old tendency reasserted itself in a straightforward manner, proving that tendential laws in this new stage had not been suppressed. This is where we find ourselves today.

Note that this interpretation of historical trends allows for a better understanding of the dominant analysis among Marxists at the transition between the nineteenth and twentieth centuries, for example Lenin's view of imperialism, as the *highest stage of capitalism*. It is

true that the prevailing historical trends could not be maintained for ever. There were actually two revolutions, the proletarian revolution in Russia and the managerial revolution within other advanced capitalist countries. One survived; the other did not!

THE DYNAMICS OF THE VERY LONG TERM

The various components of historical tendencies cannot be analyzed separately, but instead must be considered as a *system* of interdependent variables concerning *technology* (labour productivity, the productivity of capital and the capital-labour ratio) and *distribution* (labour cost and profit rate). As symbolically represented in Figure 14.2, three primary relationships are involved that we will consider successively: (1) calculation of the profit rate; (2) impact of the profit rate on the choice among techniques; and (3) feedback of the profit rate on the growth rate of wages.

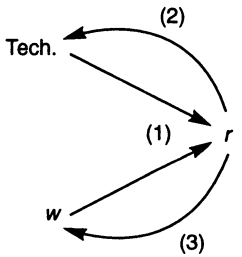


Figure 14.2 Relationships between technology, the labour cost, and the rate of profit

1. *The identity for the calculation of the profit rate.* With the notation in Table 14.1, one has:

$$r = \frac{NNP - Lw}{K} = \left(\frac{NNP}{L} - w\right)/(K/L)$$

that is the profit rate can be derived from the hourly labour cost, w, and the two ratios describing technology (NNP/L and K/L).

2. *The role conferred on the profit rate in the choice among techniques.* In several papers (Duménil and Lévy, 1994b, 1995a, 1996) we

developed stochastic dynamic models of evolutionary inspiration to account for technical change. In these models, the outcome of research and development is represented as a random process. Firms select new techniques according to their comparative profitability at existing prices.[6] This framework accounts for the effect of prices (in particular, wages) on technical change, because of the profitability criterion used in the selection of innovations.[7]

3. *A feedback effect of the profit rate on wages.* In addition to the direct negative effect of wages on the profit rate, we assume that there is a feedback of the value and variation of the profit rate on the growth rate of the real wage. (When the profit rate is low or declining, it is more difficult for wages to rise, and *vice versa.*)

The dynamic stochastic model has interesting properties. As suggested by either one of the two dotted straight lines in the three panels of Figure 14.3 one can generate trajectories that match the features of Marx's historical trajectories with (1) a declining profit rate, (2) an increasing labour productivity and (3) an increasing organic composition of capital.[8] There is no internal contradiction within these evolutions, which could be prolonged 'forever'. The problem is that the profit rate declines steadily – and at some point causes a number of economic difficulties (see the next section below).

As suggested in Figure 14.3, the intermediate period corresponds to a transition between two such trajectories. The ability of this model to account for observed historical patterns is illustrated in Figure 14.1 by the reconstruction of the profit rate (dotted line) .

This model clarifies several assumptions underlying Marx's analysis. Trajectories such as that in Figure 14.3 (dotted line) are obtained under the assumption that it is 'difficult' to obtain profitable

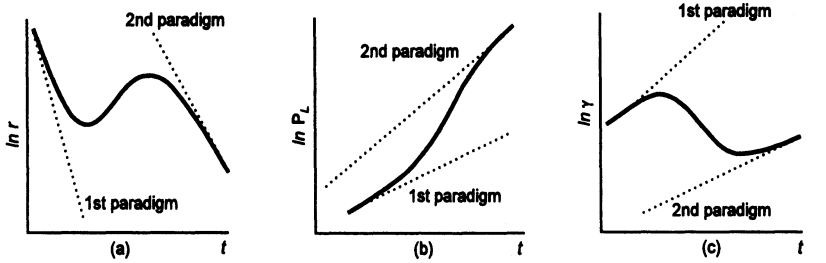


Figure 14.3 The transition between two trajectories *à la* Marx

innovations. This property relates, in our opinion, to Marx's crucial insight: *technical change is difficult and in particular it is not easy to find new techniques in which the progress of labour productivity is not paid for by a considerable increase in capital stock.* This property is central to understanding the falling rate of profit.

HISTORICAL TENDENCIES AND CRISES

Before addressing the issue of the relationship between the downward trend of the profit rate and crises, it is important to dismiss a basic ambiguity surrounding the term *crisis* itself. In the analysis of the business cycle, crises refer to *recessions*, which can be denoted as *'small' crises*. However, often the term crisis is also used to designate an accumulation of difficulties of which the occurrence of a recession is only one aspect. In addition to the repetition of overheating and recession, the symptoms of such situations can include inflation, persistent unemployment, large deficits and frantic attempts to transform institutions (for example, regulations). This use of the term crisis refers to disequilibria of a larger dimension or lengthier duration than a recession. They are typically called *large crises*. For example advanced capitalist economies are said to have undergone a 'crisis' in the 1970s, or even to have lived through a crisis since the 1970s.

The Falling Rate of Profit and Crises in Volume III of Capital

The connection between the falling rate of profit and crises is a central theme of Marx's analysis in volume III, and the object of chapter 15. Marx stated at the beginning of this chapter:

> On the other hand, however, in view of the fact that the rate at which the total capital is valorized, i.e. the rate of profit, is the spur to capitalist production (in the same way as the valorization of capital is its sole purpose), a fall in this rate slows down the formation of new, independent capitals and thus appears as a threat to the development of the capitalist production process; it promotes overproduction, speculation and crises, and leads to the existence of excess capital alongside a surplus population (Marx, 1894, ch. 15, p. 350).

Unfortunately, the exact mechanisms by which the falling rate of profit leads to a crisis are not precisely described by Marx in chapter

15 or anywhere else. While Marx discussed (with himself, often attacking Ricardo) the various 'internal contradictions' that are implicit in the system of tendencies that he previously described, this discussion remains rather vague. For example the following remark is typical: 'the development of labour productivity involves a law, in the form of the falling of the rate of profit, that at certain point confronts this development itself in a most hostile way and has constantly to be overcome by way of crises' (ibid. ch. 13, p. 367). In this type of analysis, was Marx considering business fluctuations or larger perturbations? The answer is clearly *both*.

The Profit Rate and Large Crises in the United States Since the Civil War

With the definition of large crises provided earlier, one can detect three such episodes during the period 1869–1992:

1. In the late nineteenth century, after a period of falling profitability, important fluctuations in the general level of activity were manifested. The 1870s and 1890s are known as periods of 'depression', sometimes called 'Great Depressions'.
2. Since the 1970s a new crisis situation has been created, similar in many respects to the above. This crisis has also followed a long period of declining capital productivity and profit rate. The rates of growth of labour productivity and wages have been dramatically reduced, and a new, strong, instability of the general level of activity has been manifested.
3. The Great Depression of the 1930s was a paradoxical manifestation of the tremendous restoration of the trends of the main variables concerning technology and distribution in the first half of the twentieth century, and of important institutional weaknesses illustrated by, for example, the organization of the banking system and the inadequate social control of stability. This crisis was specific and will not be discussed here (see Duménil and Lévy, 1995b).[9]

Two of these three crises were observed at the end of episodes *à la* Marx, with an actual decline of the rate of profit. In our opinion this observation clearly vindicates Marx's emphasis on the falling rate of profit.

The Profit Rate and Small Crises: the Example of the 1970s

The link between profitability and business fluctuations, *small crises*, can be easily illustrated by the example of the US economy in the 1970s (see Duménil and Lévy, 1993b, 1993a, ch. 12). As is well known, the 1970s coincided with a significant and sharp decline of the profit rate and exceptionally strong fluctuations in the general level of activity. In our opinion, this coincidence was not fortuitous. This can be shown by testing the impact of the profit rate on the parameters of the model, with the following conclusions:

1. The profit rate is a significant explanatory variable in the stability condition (far more significant than the rate of interest, for example).
2. This effect can be more precisely located, on the supply side, in the degree to which firms react to disequilibria between supply and demand by adjusting their levels of activity.

The actual decline of the profit rate induces modifications of firm behaviour that have a destabilizing effect on the macroeconomy. These transformations initiate phases of instability that require changes in the institutional framework responsible for the macroeconomic stability of the economic system – a correction that may come only after important delays. The relevant observation in the historical analysis of stability is, therefore, not the *absolute* level of the profit rate, but its recurrent decline.

The Profit Rate, Large and Small crises, and Unemployment

In this study little emphasis has been placed on the analysis of unemployment, in spite of its obvious importance. The analysis of unemployment is fraught with the same ambiguity as that of crisis. It is traditional to distinguish between *cyclical* and *structural* unemployment, two notions that echo those of small and large crises:[10]

1. *Cyclical unemployment*. The fluctuations of unemployment follow those of the general level of activity (see Duménil and Lévy, 1993a, section 11.8). This component of unemployment corresponds to Marx's reformation of the reserve army.
2. *Structural unemployment*. The expression refers to more 'stubborn' manifestations of employment. These may be related to *accumulation* or *technical* change.[11]

Consider, first, *accumulation*, under the assumption of a constant technology (a given capital/labour ratio); there is obviously no reason why capital accumulation must ensure the full utilization of labour power. If accumulation remains too slow for a considerable period of time, the capital stock, even used at normal or full capacity, is not adequate to employ all potential workers. This form of unemployment is typical of large crises, since deficient profit rates are reflected in deficient rates of growth of fixed capital. In addition, during large crises this type of structural unemployment is usually combined with cyclical unemployment, as a result of the multiplication of 'small' crises. Consider now the effects of technical change under the assumption of a given rate of accumulation. If the capital/labour ratio rises rapidly, accumulation only creates a limited amount of employment, and structural unemployment may prevail. (The appropriate variable in this analysis is the capital/labour ratio, not labour productivity.)

Notes

1. We thank Mark Glick for his aid in the translation of this text into English. Address all mail to: CEPREMAP, 142 rue du Chevaleret, 75013 Paris, France. Tel: 33 1 40 77 84 13, Fax: 33 1 44 24 38 57, E-mail: levy@cepremap.msh-paris.fr.
2. For example see Shaikh, 1978, or Skott, 1992.
3. We share this view with Duncan Foley (Foley, 1986).
4. In particular difficulties related to the distinctions between (1) values and prices, (2) productive and unproductive labour, and (3) fixed and circulating capital. There is no doubt that the productive system is heterogeneous and that several segments should be distinguished. There is also no denying the fact that sources are questionable. We do not believe, however, that these problems fundamentally question the profiles observed below, with the exception of the rate of surplus value, which would rise if the income of unproductive workers were excluded from labour income (see Moseley, 1992). In any event, these difficulties should not preclude any attempt at measurements.
5. This interpretation can be constrasted with that given in the 1960s by Baran and Sweezy (1966), who saw in the upward trend of the profit rate the effect of the transformation of competition. The increased size of firms is certainly related to the emergence of managerial capitalism, but this transformation of competition did not render the classical analysis of competition irrelevant, and did not invert the trend of the profit rate.
6. In this respect, our approach is akin to that of Richard Nelson and Sidney Winter (Nelson and Winter, 1975, 1982).

7. Substitution effects similar to those traditionally derived from a production function with factor substitution are obtained, but technology is path-dependent.
8. The labour cost (or real wage rate) rises and the rate of surplus value is constant.
9. In this study we interpret the Great Depression as a crisis that expressed the difficult emergence of managerial capitalism.
10. This analysis is based on the relationship $L = uK/\overline{K/L}$, in which u is the capacity utilization rate, and $\overline{K/L}$, the capital/labour ratio under normal utilization of productive capacities. (We abstract from the degree of rigidity of employment in the short term.)
11. The importance of the variations of the composition of output on employment should not be overstated, and will not be discussed here (see Pasinetti, 1981, 1993).

References

Baran, P. and P. Sweezy (1966) *The Monopoly Capital* (New York and London: Monthly Review Press).

Chandler, A. D. (1977) *The Visible Hand, The Managerial Revolution in American Business* (Cambridge, Mass. and London: Harvard University Press).

Chandler, A. D. (1990) *Scale and Scope, The Dynamics of Industrial Capitalism* (Cambridge, Mass. and London: Harvard University Press).

Delorme, R. and K. Dopfer (1994) *The Political Economy of Diversity: Evolutionary Perspectives on Economic Order and Disorder* (Aldershot: Edward Elgar).

Duménil, G. (1975) *La position de classe des cadres et employés; la fonction capitaliste parcellaire* (Grenoble: Presses Universitaire de Grenoble).

Duménil, G. and D. Lévy (1993a), *The Economics of the Profit Rate: Competition, Crises, and Historical Tendencies in Capitalism* (Aldershot: Edward Elgar).

Duménil, G. and D. Lévy (1993b) 'Why does Profitability Matter? Profitability and Stability in the U.S. Economy since the 1950s', *Review of Radical Political Economy*, vol. 25, no. 1, pp. 27–61.

Duménil, G. and D. Lévy (1994a), 'The Economic Functions of Managerial and Clerical Personnel, A Historical Perspective', in Garston, 1994, pp. 155–87.

Duménil, G. and D. Lévy, (1994b), 'Complexity and Stylization: An Evolutionary Model of Technical Change in the US Economy', in Delorme and Dopfer, 1994, pp. 229–51.

Duménil, G. and D. Lévy (1995a) 'A Stochastic Model of Technical Change, Application to the US Economy (1869–1989)', *Metroeconomica*, vol. 46, no. 3, pp. 213–45.

Duménil, G. and D. Lévy (1995b) 'The Great Depression: A Paradoxical Event' (Paris: CEPREMAP, No. 9510).

Duménil, G. and D. Lévy (1996) 'The Acceleration and Slowdown of Technical Progress in the US since the Civil War: The Transition Between Two Paradigms', *Revenue Internationale de Systemique*, vol. 10, pp. 303–21.

Foley, D. (1986) 'Understanding Capital, Marx's Economic Theory' (Cambridge, Mass., and London: Harvard University Press).
Garston, N. (ed.) (1994) *Bureaucracy: Three Paradigms* (London: Kluwer Academic Publishers).
Marx, K. (1894) *Capital*, Vol. III (New York: First Vintage Book Edition, 1981).
Moseley, F. (1992) *The Falling Rate of Profit in the Postwar United States Economy* (New York: St. Martin's Press).
Nelson, R. R. and S. G. Winter, (1975) 'Factor-price Changes and Factor Substitution in an Evolutionary Model', *Bell Journal of Economics*, vol. 6, no. 2, pp. 466–86.
Nelson, R. R. and S. G. Winter (1982) *An Evolutionary Theory of Economic Change* (Cambridge, Mass.: The Harvard University Press).
Okishio, N. (1961) 'Technical Change and the Rate of Profit', *Kobe University Economic Review*, vol. 7, pp. 86–99.
Pasinetti, L. (1981) *Structural Change and Economic Growth* (Cambridge: Cambridge University Press).
Pasinetti, L. (1993) *Structural Economic Dynamics: a Theory of the Economic Consequences of Human Learning* (Cambridge: Cambridge University Press).
Shaikh, A. (1978) 'Political Economy and Capitalism: Notes on Dobb's Theory of Crisis', *Cambridge Journal of Economics*, vol. 2, no. 2, pp. 233–51.
Skott, P. (1992) 'Imperfect Competition and the Theory of the Falling Rate of Profit', *Review of Radical Political Economics*, vol. 24, no. 1, pp. 101–13.

15 The Empirical Strength of the Labour Theory of Value

Anwar M. Shaikh

INTRODUCTION[1]

The purpose of this chapter is to explore the theoretical and empirical properties of what Ricardo and Smith called natural prices, and what Marx called prices of production. Classical and Marxian theories of competition argue two things about such prices. First, that the mobility of capital between sectors will ensure that they will act as centres of gravity of actual market prices, over some time period that may be specific to each sector (Marx, 1972, pp. 174–5; Shaikh, 1984, pp. 48–9). Second, that these regulating prices are themselves dominated by the underlying structure of production, as summarized in the quantities of total (direct and indirect) labour time involved in the production of the corresponding commodities. It is this double relation, in which prices of production act as the mediating link between market prices and labour values, that we will analyze here.

At a theoretical level, it has long been argued that the behaviour of individual prices in the face of a changing wage share (and hence changing profit rate) can be quite complex (Sraffa, 1963, p. 15; Schefold, 1976, p. 26; Pasinetti, 1977, pp. 84, 88–89; Parys, 1982, pp. 1208–9; Bienenfeld, 1988, pp. 247–8). Yet, as well shall see, at an empirical level their behaviour is quite regular. Moreover these empirical regularities can be strongly linked to the underlying structure of labour values through a linear 'transformation' that is strikingly reminiscent of Marx's own procedure.

In what follows we will first formalize a Marxian model of prices of production with a corresponding Marxian 'standard commodity' to serve as the clarifying numeraire. We will show that this price system is theoretically capable of 'Marx-reswitching' (that is, of reversals in the direction of deviations between prices and labour values). We will then develop a powerful natural approximation to the full price

system, and show that this approximation is the 'vertically integrated' version of Marx's own solution to the transformation problem. Lastly, using US input–output data developed by Ochoa (1984), we will compare actual market prices to labour values, prices of production and the linear approximation mentioned above. It will be shown that various well-known propositions in both Ricardo and Marx, concerning the underlying regulators of market prices, turn out to have strong empirical backing. In particular, measured in terms of their average absolute percentage deviations, prices of production are within 8.2 per cent of market prices, labour values are within 9.2 per cent of market prices and 4.4 per cent of prices of production, and the linear approximation is within 2 per cent of full prices of production and 8.7 per cent of market prices.[2] Lastly, we find that Marx-reswitching is quite rare (occurring only 1.7 per cent of the time), and moreover is confined to cases where the price–value deviations are small enough to be empirically unimportant. All these results point to the dominance of relative prices by the structure of production, and hence to the great importance of technical change in explaining movements of relative prices over time (Pasinetti, 1981, p. 140).

MARXIAN PRICES OF PRODUCTION AND A MARXIAN STANDARD SYSTEM

Lower-case variables are vectors and scalars, and upper-case ones are matrices. Dimensionally, all row vectors are $(1 \times n)$, column vectors $(n \times 1)$, and matrices $(n \times n)$.

- a_0 = row vector of labour coefficients (hours per dollar of output).
- A = input–output coefficients matrix (dollars per dollar of output).
- D = depreciation coefficients matrix (dollars per dollar of output).
- K = capital coefficients matrix (dollars per dollar of output).
- T = diagonal matrix of turnover times.
- U = diagonal matrix of industry capacity utilization rates.
- w = wage rate.
- r = rate of profit.
- p = vector of prices of production.
- v = vector of labour values.
- m = vector of market prices.

Both flows and stocks, per unit output flow, enter into the definition of unit prices of production. But whereas flow-flow coefficients such

as labour or material flows per unit of output may be taken to be relatively insensitive to changes in capacity utilization (which is the premise, for instance, of input–output analysis), the same cannot be said of stock-flow coefficients such as capital requirements per unit of output. In this case, any presumed stability of coefficients for a given technology must refer to the ratio of stocks to normal capacity output, or equivalently to the ratio of *utilized* stocks to actual output (Shaikh, 1987, pp. 118–19, 125–26; Duménil and Lévy, pp. 250–2). With this in mind, the total stock of capital advanced consists of the money value of utilized fixed capital per unit of output (pKU) and the utilized stocks of circulating capital per unit of output $(pA + wa_0)TU$, where the turnover times matrix T translates the flow of circulating capital into the corresponding stock (Ochoa, 1984, p. 79). Then Marxian prices of production will be defined by:

$$p = wa_0 + p(A + D) + r([pA + wa_0]T + pK)U \tag{15.1}$$

Let $A_1 = A + D$, $B = (I - A_1)^{-1}$, $H = (K + A)UB$, $a_1 = a_0.T.B$, and $v = a_0.B$. Then from equation 15.1 we can write $p = wv + rpH + r.w.a_1$. But since the row vector a_1 can be written as $a_1 = a_0TB = a_0B(B^{-1}TB) = v(B^{-1}TB) = vT_1$,
where $T_1 = (B^{-1}T.B) = (I - A_1).T(I - A_1)^{-1}$,

$$p = wv + rwvT_1 + rpH \tag{15.2}$$

which yields

$$p = wv(I + rT_1)(I - r \cdot H)^{-1} \tag{15.3}$$

We know that the wage rate and profit rate are inversely related, so that $p = p(r)$ (Sraffa, 1963, ch. 3). At one limit we have $w = 0, r = R =$ the maximum rate of profit, so from equation 15.2.

$$(1/R) \cdot p(R) = p(R) \cdot H \tag{15.4}$$

which implies that $1/R$ is the dominant eigenvalue of H.

At the other limit, $w = W$ the maximum wage, and $r = 0$. Then from equation 15.2, $p(0) = Wv$ – that is, prices are proportional to labour values when $r = 0$. The Marxian standard system will be defined by a column vector Xs, such that

$$(1/R) \cdot Xs = H \cdot Xs \tag{15.5}$$

so that Xs is the dominant eigenvector of H.

Letting X = the gross output vector in the actual system, we scale the output vector of the standard system in such a way that the standard sum of values = the actual sum of values.

$$v \cdot Xs = v \cdot X \tag{15.6}$$

We scale the price system such that (for all r) the standard sum of prices equals the standard (and actual) sum of values.

$$p(r) \cdot Xs = v \cdot Xs \tag{15.7}$$

This price normalization is equivalent to expressing all money values in the *standard labour value of money*, $v \cdot Xs/p \cdot Xs$. Alternatively, since at $r = 0$, equation 15.2 yields $p(0) = W \cdot v$, where W = the maximum money wage, the normalization $p(r) \cdot Xs = v \cdot Xs$ (for all r) implies $W = 1$ – that is, that the maximum money wage is the numeraire. To define the wage–profit curve implicit in the general price system, from equations 15.2, 15.5 and 15.7 we write

$$pXs = wv(I + r \cdot T_1)Xs + r \cdot p \cdot H \cdot Xs$$

By construction, $H \cdot Xs = (l/R)Xs$, and $pXs = vXs$. Define $ts = (v \cdot T_1 \cdot Xs)/(v \cdot Xs)$ = the average turnover time in the standard system. Then we get $l = w(1 + r \cdot ts) + (r/R)$, so the *Marxian standard wage–profit curve* is given by

$$w = (1 - [r/R])(1 + r \cdot ts) \tag{15.8}$$

Once the standard commodity is selected as the numeraire (equations 15.6–7), then what was previously the money wage, w, is now the wage defined in terms of the standard labour value of money, or equivalently as a fraction of the maximum money wage, W.

Note that the Marxian standard wage–profit curve is not linear. If we had constructed our price system as a Sraffian one with wages paid at the end, so that wages advanced, $w.a$ did not appear as part of total capital advanced in equation 15.1, then equations 15.2 and 15.8 would reduce to the Sraffian expressions shown below, and the wage relation would be linear.

$$p = wv + rpH \tag{15.2a}$$

$$w = 1 - (r/R) \tag{15.8a}$$

Even so the standard commodity, *Xs*, we have defined here is *not* generally the same as a Sraffian one. It can be shown that even when the wage–profit curve is linear, there are in fact *two* standard commodities that will do the trick (see Appendix 15.1).

MARX-RESWITCHING

In Marxian analysis the direction of individual price–value deviations is quite important, since it determines transfers of surplus value between sectors and regions, and between nations on a world scale (Shaikh and Tonak, 1994, pp. 34–7). Yet one of the properties of a general price of production system is that relative prices can switch direction as the rate of profit varies (Sraffa, 1963, pp. 37–8). I will refer to this phenomenon as 'Marx-reswitching'.

Consider the simple case of a pure circulating capital model, in which we abstract from fixed capital so that $K = 0$ and $D = 0$, and from turnover time so that $t_i = 1$ for all i and hence $T = 1$. Then the Marxian price system and wage curve in Equations 15.1, 15.3 and 15.8 reduce to

$$p = w(1 + r)v + rpH \tag{15.2b}$$

where now $H = A(I - A)^{-1}$

$$w(1 + r) = 1 - (r/R) \tag{15.8b}$$

Then for $a_0 = (0.193 \;\; 3.562 \;\; 0.616)$ and

$$A = \begin{bmatrix} 0.05 & 0.768 & 0.02 \\ 0 & 0 & 0.169 \\ 408 & 0 & 0.10 \end{bmatrix}$$

we get $R = 1.294$ and $v = (0.845 \; 4.211 \; 1.494)$. Figure 15.1 shows that the standard price–value ratio, $pv_3(r)$, initially rises above 1 and then falls below it, signalling a Marx-switch at roughly $r = 1.1$.

The preceding numerical example demonstrates that Marx-reswitching is possible. But it neither establishes the conditions under

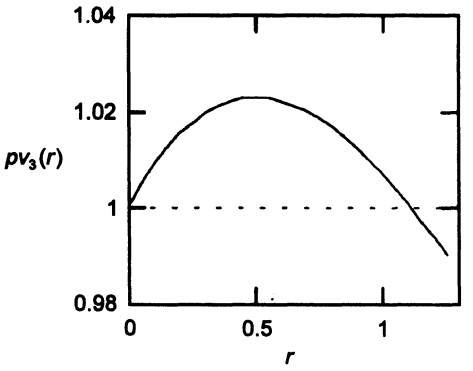


Figure 15.1 Standard price-value ratio, Sector 3

which it occurs, nor its likelihood. Although we cannot pursue the point here, further analysis suggests that when such instances occur, they do so only when an individual commodity's capital composition is 'close' to the standard one, so that its price of production is close enough to its labour value for 'Wicksell' effects (the effects of general price–value deviations on the money value of capital advanced) to have a significant influence. This is evidently the case in the preceding numerical example. More importantly, we shall see that it is also the case in every one of the (rare) empirically observed instances of reswitching (only six cases out of 355 over all years) in the US data. If true, it implies that Marx-reswitching is unimportant at an empirical level: first, because it is rare; and second, because even when it does occur, it does so only when the transfer of value involved is negligible because the price–value deviation is small.

APPROXIMATING PRICES OF PRODUCTION

A price system of the form in equations 15.2 and 15.8 (or indeed of the Sraffian equivalent in equations 15.2a and 15.8b) is in principle capable of very complex behaviour as far as individual prices are concerned. But there is an underlying core which is quite simple. To see this, we begin by expressing equation 15.2 in terms of a single price, p_i of the *ith* sector.

$$p_i = wv_i + r \cdot k_i(r) \tag{15.9}$$

where $k_1(r) = W(T_1^i + p(r) \cdot H^i$. T_1^i and H^i are the *ith* columns of the turnover matrix T_1 and the vertically integrated capital coefficients matrix H, respectively, so the term $K_i(r)$ represents the money value of the vertically integrated capital advanced per unit output of the *ith* sector.

We know from Sraffa (1963) that as $r \to R$, in *every industry i* the (money value of the) output–capital ratio, q_i approaches the *standard* output–capital ratio, $q_s = R$. This can be derived directly from equation 15.4. Note that this standard ratio R, which is the vertically integrated output–capital ratio of every industry at $r = R$, is also the *labour value of vertically integrated output–capital of the standard system.* To see this, multiply equation 15.5 on both sides by the labour value vector, v, to get $v \cdot Xs / v \cdot H \cdot Xs = R = q_s$

At the other limit, when $r = 0$ and the standard wage $w = 1$, we get $p = v$ (standard prices equal labour values) and the *ith* sector's output–capital ratio becomes $q_{oi} = v_i/(H^i + T_i^i)$, which is reciprocal of the labour value of the sector's vertically integrated technical composition of capital (that is, the ratio of the total labour time required for the production of commodity i to the total labour time materialized in the total capital inputs for this same commodity).[3]

We see therefore that for $0 < r < R$ the output–capital ratio $q_1(r)$ of every industry must lie between its *own labour value* output–capital ratio, q_{oi} and the *common standard labour value* output–capital ratio q_s. With this in mind, we turn to a simple approximation of the price system. The general system of equation 15.2 can be expressed as

$$p = wv + r \cdot wvT_1 + rpH = (wv[I + r \cdot T_1] + r \cdot vH) + r(p - v)H \tag{15.10}$$

In this expression, the first term on the right-hand side $(w[I + r \cdot T_1] + r \cdot vH)$ represents the component of prices of production that arises when constant capital (fixed capital and inventories) *is valued at its labour value*, while the remaining term represents the further effects of price–value deviations on the value of capital stocks. The first term is therefore the vertically integrated equivalent of Marx's transformation procedure, as presented in volume III of *Capital.* We may call it the Marx component of prices of production. The second term, on the other hand, may called the Wicksell–Sraffa component (Schefold, 1976, p. 23). On the assumption that this second term is small (which we will test shortly), we may approximate price of production via the Marx component alone:

$$p'(r) = wv + r(wT_1 + H) = (w[I + r \cdot T_1] + r \cdot H)v \qquad (15.11)$$

Equation 15.11 implies a corresponding approximation for the output–capital ratio. Here the approximate unit capital advanced is $k'_i(r) = wv(T_1)^i + vH^i$, so that the output–capital ratio is

$$q'_i(r) = p'_i/k'_i = (wv_i + r \cdot k'_i)/k'_i = (wv_1/[wT_1^i + H^i]) + r \qquad (15.12)$$

This latter approximation[4] yields the sectoral labour value ratio $q_{0i} = v_i/(H^i + T_i^i)$ when $r = 0$ and $w = 1$, and yields the standard labour value ratio (standard output–capital ratio) $q_s = R$ when $r = R$ and $w = 0$. In other words, the simple approximation to prices of production in equation 15.11 is equivalent to approximating each sector's output–capital ratio in terms of components that *depend only on labour values*, and in such a way that each sectoral output–capital ratio approximation is *exact* at the two endpoints $r = 0$ and $r = R$.[5]

The linear price approximation in equation 15.11 is a vertically integrated version of Marx's own transformation procedure. It is both analytically simple and, as we shall see, empirically powerful. However, before we proceed to the empirical analysis, it is worth noting that quadratic and higher approximations of the general price system of equation 15.2 can be easily developed. In effect, the the linear approximation $p'(r)$ was created by sustituting the value vector v for the price vector $p(r)$ on the right-hand side of equation 15.2, which amounts to ignoring the (Wicksell) effects of price–value deviations on the vertically integrated capital stock. A quadratic approximation can in turn be created by substituting $p'(r)$ for $p(r)$, which amounts to ignoring the effects of the errors in the linear approximation on the vertically integrated capital stock, and so on.[6] Although the quadratic approximation has little improvement to offer for US data, it will turn out to be useful in our discussion below of empirical applications of the pure circulating capital model Marzi and Varri, 1977.

EMPIRICAL RESULTS: MARKET PRICES, LABOUR VALUES AND PRICES OF PRODUCTION

The empirical calculations presented here are based on the data developed by Ochoa (1984), covering the input–output years 1947, 1958, 1963, 1967 and 1972. Work is underway to extend the results to the years 1977, 1982 and 1987 (the last available input–output year). Further details are in Appendix 15.2.

Since most data patterns are similar across all the input–output years, we will generally use the 1972 data to illustrate them. Any exceptional patterns will then be separately identified. It is useful to note at this juncture that because input–output tables are cast in terms of aggregated industries, there is no natural measure of 'output' for a given sector. One must pick a level such as (say) \$100 worth of output in each sector, which means that the market price for this output is \$100 for each sector. Such a procedure poses no real problems for the calculation of unit labour values or prices of production, but when comparing vectors it does require one to distinguish between 'closeness of fit' in the sense of the deviation (distance) between them from the correlation between them (Ochoa, 1984, pp. 121–33; Petrovic, 1987, pp. 207–8). General measures of the proportional deviation between two vectors, such as the mean square error (MSE), root mean square error (RMSE), mean absolute deviation (MAD) and mean absolute weighted deviation (MAWD) are all fine, and give essentially similar results for this data. But the correlation coefficient R, or the R^2 of a simple linear regression, are *not* meaningful in this case because (by construction) market prices show no variation, and hence will show no covariation with the other vectors. In what follows we will therefore select the mean absolute weighted (proportional) deviation (MAWD), each sector's weight being equal to its share in the labour or money value of total gross output. For two vectors with components x_i, y_i, and with weights z_i, mean absolute weighted deviation (MAWD) $= \Sigma(|y_i - x_i|Z_i)/\Sigma x_i z_i$

Market Prices, Labour Values and Prices of Production at the Observed Rate of Profit

For each input–output year, total labour times[7] $v = a_0(I - A_1)^{-1}$ are calculated directly. Using the actual (uniform) rate of profit in each input–output year (Ochoa, 1984; p. 214), we calculate standard prices of production (prices of production in terms of the standard commodity) from equations 15.2 and 15.8 Since we have only average annual rates of capacity utilization u for the economy as a whole (Shaikh, 1987), we do not use them when calculating individual prices of production. We do use them, however, when subsequently comparing the time trend of the observed actual and maximum profit rate r and R, respectively, to those of the normal-capacity rates $r_u = r/u$ and $R_u = R/u$.[8]

Standard prices of production are defined by the scaling $p(r) \cdot Xs = v \cdot X$ for all r (since this defines the standard commodity as the numeraire), so they are implicitly in the same units as labour values (which they equal at $r = 0$). They can therefore be directly compared to labour values. To make market prices comparable to both, we rescale market prices to units of labour time by multiplying the market price vector, m by the standard value of money $= m \cdot Xs/v \cdot Xs$. This makes all three vectors have the same sum of prices, and hence the same average level, which facilitates direct comparisons of their levels. It does not, of course, change relative market prices in any way.

In all years, both total labour times and prices of production are quite close to market prices. Table 15.1 summarizes the mean average percentage deviation (MAWD) between various pairs of vectors.

Table 15.1 establishes that both labour values and prices of production are quite close to market prices, with average percentage deviations of 9 per cent for the former and 8 per cent for the latter. It also establishes that labour values and prices of production are closer to each other than to market prices, with an average deviation of only 4.4 per cent between the two.

Table 15.1 Average percentage deviations (MAWD), (rescaled) market prices, labour values and prices of production at observed rates of profit

	1947	*1958*	*1963*	*1967*	*1972*	*Average*
Labour value vs market price	0.105	0.090	0.092	0.102	0.071	0.092
Price of production vs market price	0.114	0.075	0.076	0.084	0.063	0.082
Labour value vs price of production	0.056	0.038	0.038	0.048	0.038	0.044

Figure 15.2 illustrates the strong empirical connection between labour values and market prices for 1972, with the horizontal axis representing the total market value of standard sectoral outputs ($ms_i Xs_i$, where $ms_i =$ observed market prices m_i rescaled in the manner discussed above) and the vertical axis representing the corresponding total labour values. A 45° line is also shown for purposes of visual reference.

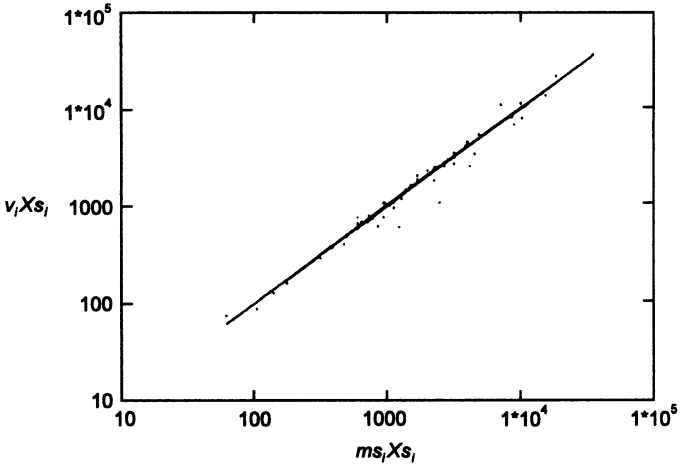


Figure 15.2 Total labour values vs total (rescaled) market prices, 1972 (log scales)

Figure 15.3 plots total sectoral prices of production p_iXs_i (sectoral standard outputs valued at prices of production) versus corresponding (rescaled) market prices ms_iXs_i.

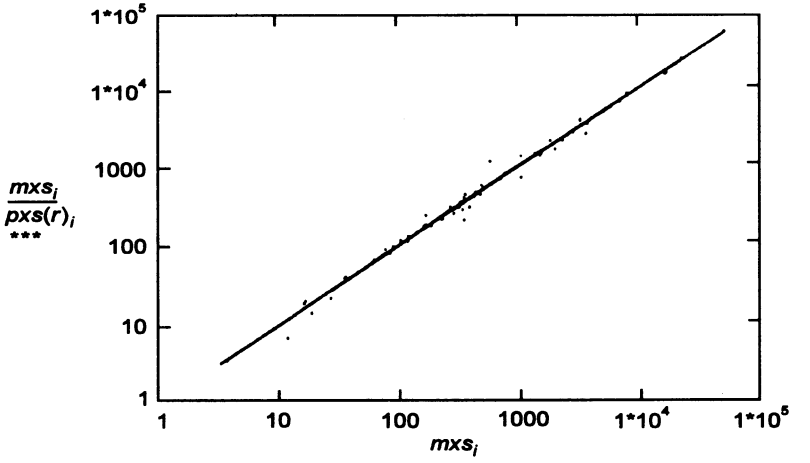


Figure 15.3 Total prices of production (at observed r=0.188) vs total (rescaled) market prices, 1972, (log scales)

Calculating Marxian Standard Prices of Production as Functions of the Rate of Profit

The next set of results pertain to the behaviour of standard prices of production as the rate of profit varies between $r = 0$ and $r = R$. Four things immediately stand out. First, in all years the relationship between the rate of profit and individual prices of production is *almost invariably linear*. Second, instances of Marx-reswitching are very rare (six cases out of 355 total prices in all the years). And third, the previously developed linear approximation to prices of production, which represents a vertically integrated version of Marx's own 'transformation procedure', performs exceedingly well: *the average deviation over all years between the approximation and full prices of production is on the order of 2 per cent*! And fourth, in relation to market prices, the linear approximation performs slightly better than full prices of production in one year and slightly worse in the others, with an average deviation of only 8.7 per cent (compared with 8.2 per cent for full prices of production in relation to market prices).

Figure 15.4 displays the movements of standard price of production–labour value ratios $PvT(r)_i$ as the ratio $x(r) = r/R$ varies between 0 and 1 (that is, as r varies between 0 and R) for 1972. The striking linearity of these patterns holds in all other years. In reading the various graphs, it is important to note that their vertical scales vary. Also of interest are the two instances of Marx-reswitching that occur in sectors 56 (aircrafts and parts) and sector 60 (miscellaneous manufacturing). Figure 15.5 and 15.6 present a close-up of this phenomenon. Over all years, there are only six cases of reswitching out of 355 prices series, and as hypothesized, in each case the switches in the direction of standard price–value deviations occur only when the price is itself very close to value throughout the range of the rate of profit.

Since labour values and market prices are given in any input–output year, the essentially linear structure of standard prices of production with respect to the rate of profit implies that the average deviation between prices of production and labour values (and market prices) increases more or less monotically with the rate of profit r. It is of interest, however, to note that the *range* of these deviations is quite small: *even at the maximum rate of profit, price–value deviations average only 12.8 per cent over all years.* Table 15.2 reports these upper limits in each year.

Table 15.2 Average deviations of standard prices of production from labour values, at $r = R$

	1947	*1958*	*1963*	*1967*	*1972*	*Overall average*
Average deviation at $r = R$	0.193	0.119	0.111	0.115	0.102	0.128

Testing the Linear Approximation to Full Prices of Production

We turn next to the relation between full standard prices of production and the linear approximation developed in equation 15.11. As noted earlier, this approximation, which represents a vertically integrated version of Marx's own transformation procedure, performs extremely well as a predictor of full prices of production (with an overall average deviation of only 2 per cent) and as a predictor of market prices (with an average deviation of 8.7 per cent). Figure 15.7 illustrates for 1972 a (typical) scatter between the two sets of prices, which are so close that the scatter looks like a straight line even though there is no reference line on this graph. Figure 15.8 plots the path of the corresponding average deviation as $x(r) = r/R$ varies. Note that the largest deviation is only 2.5 per cent, and that the endpoint at $r = R$ is only 1.5 per cent. This too is typical.

Table 15.3 Actual and normal-capacity rates of profit

	1947	*1958*	*1963*	*1967*	*1972*
Actual profit rate, r	0.247	0.179	0.212	0.233	0.188
Maximum profit rate, R	0.806	0.700	0.739	0.748	0.670
Capacity utilization, u	0.876	0.819	0.995	1.129	1.088
Adjusted actual profit rate, r_u	0.281	0.219	0.213	0.207	0.173
Adjusted maximum profit rate R_u	0.921	0.842	0.743	0.663	0.616

Finally, as noted earlier, Marx's analysis of the trends of actual and maximum rates of profit abstracts from the fluctuations produced by cyclical and conjunctural phenomena. As such, the relevant empirical measures are normal (capacity adjusted) rates, not observed ones. In this regard it is interesting to see what a difference it makes to the perceived trends of r and R when one adjusts for capacity utilization. Table 15.3 presents the observed rates of profit r (Ochoa, 1984, p. 214),

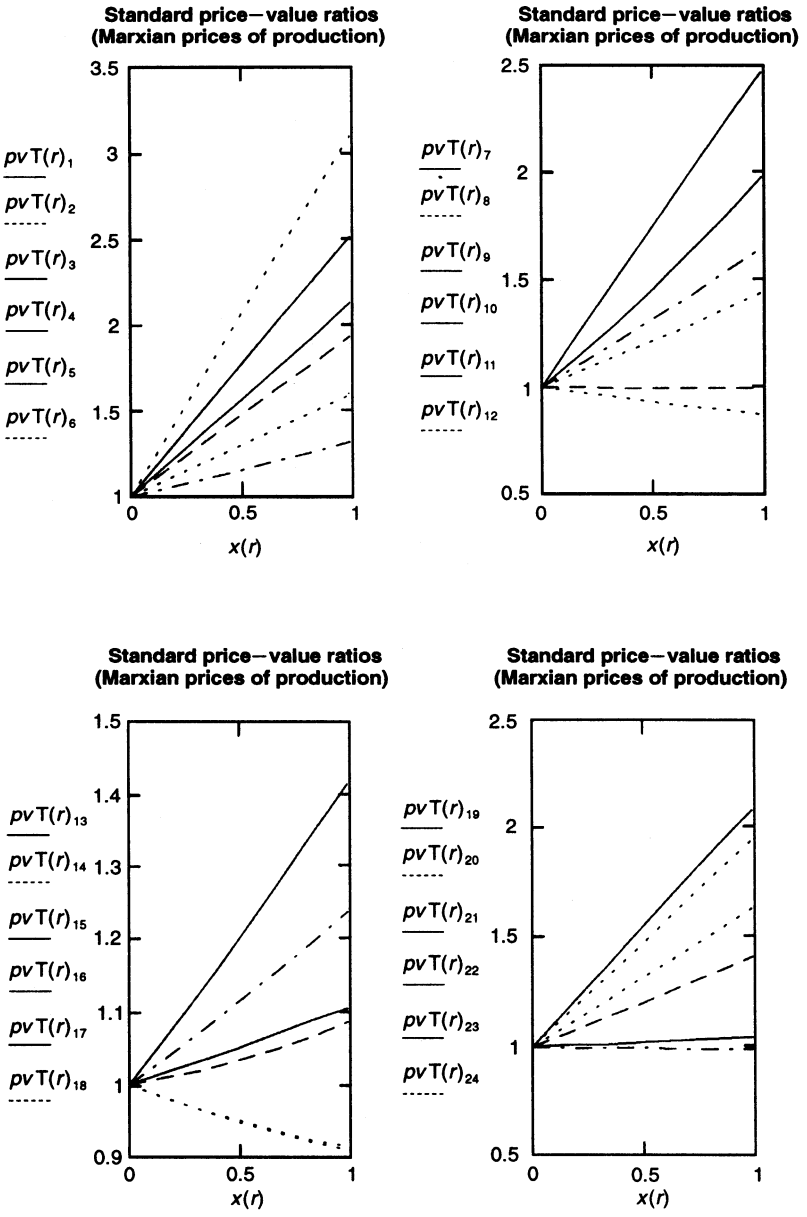


Figure 15.4 The behaviour of standard price–value ratios as $x(r) = r/R$ varies, 1972

Figure 15.4 continued

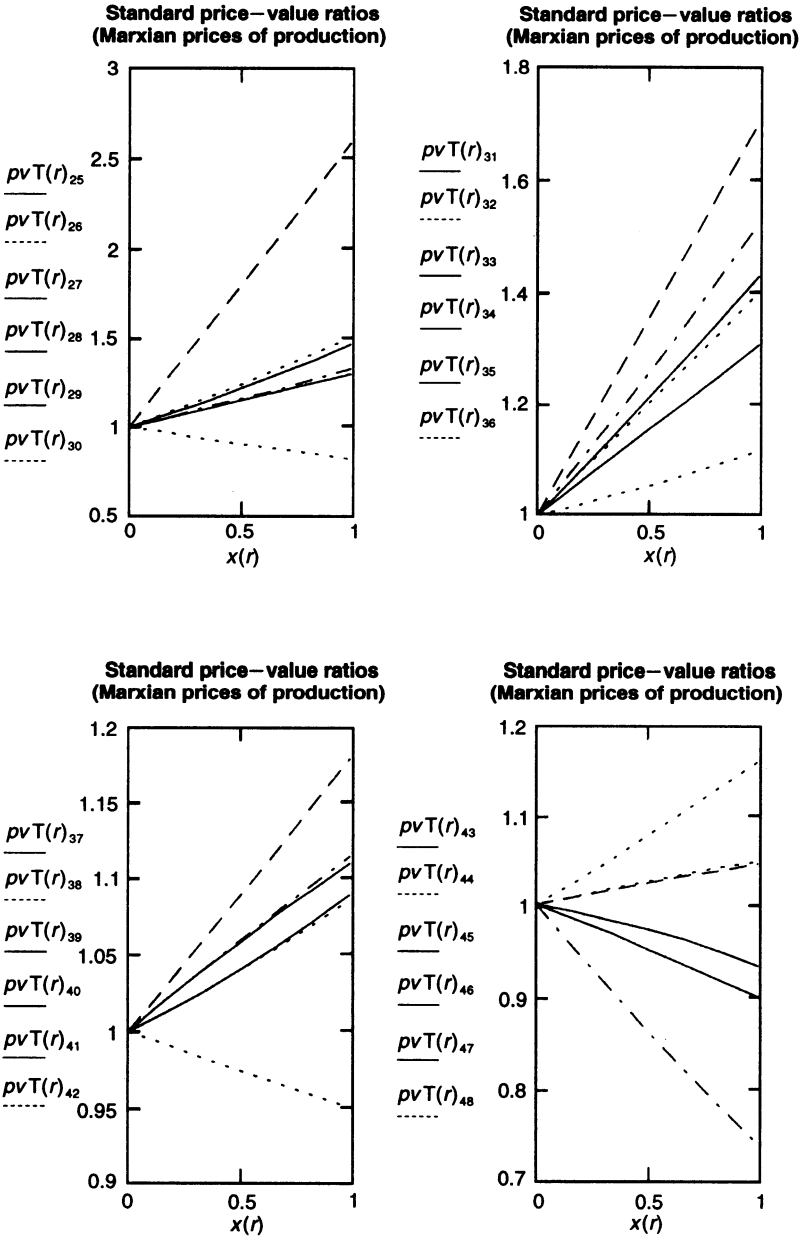
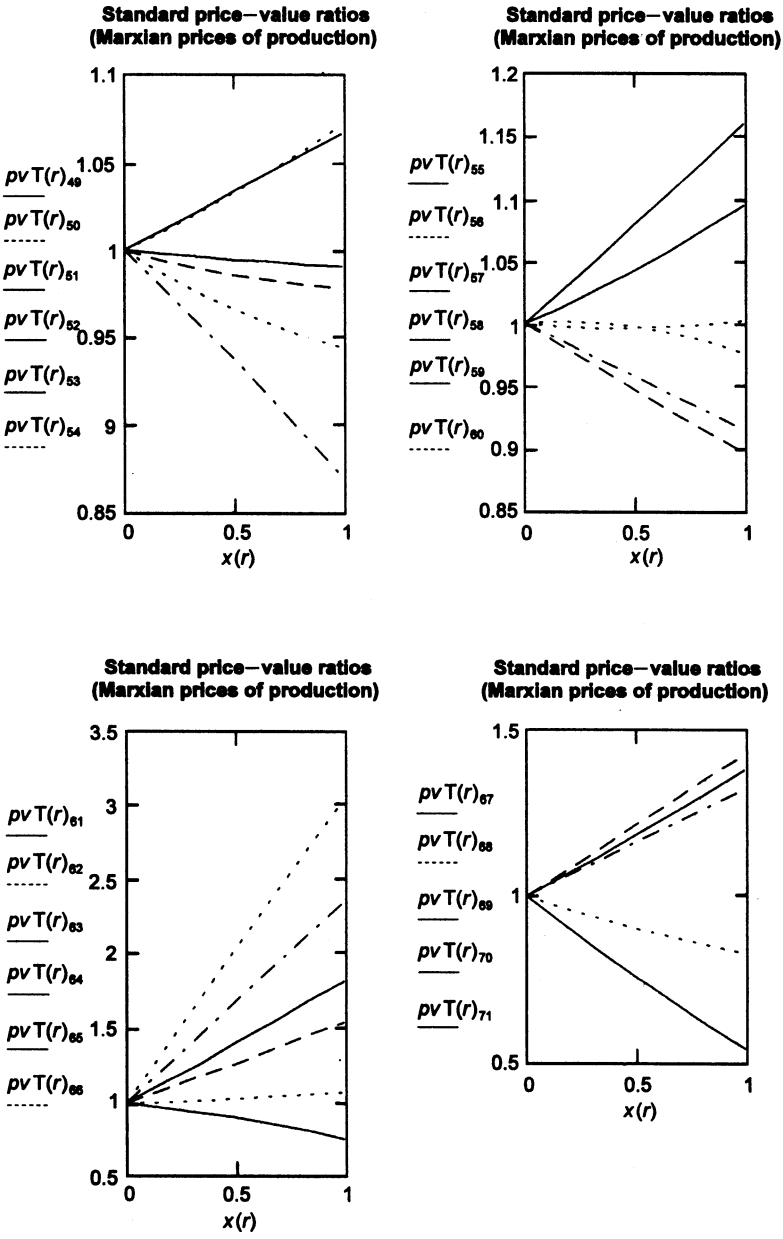


Figure 15.4 continued



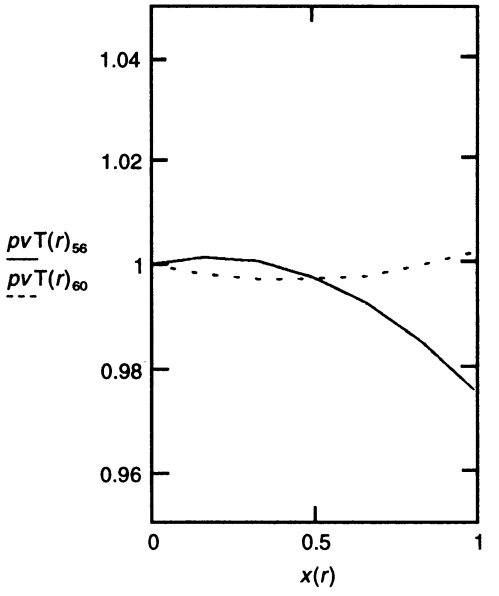


Figure 15.5 Price-value reswitching, Sectors 56 and 60, 1972

$pvT\ (r)_{56}$	$pvT\ (r)_{60}$
1	1
1.0013	0.998
1.0003	0.9969
0.9972	0.9967
0.992	0.9974
0.9847	0.999
0.9753	1.0016

Figure 15.6 Price–value reswitching, Sectors 56 and 60, 1972

our own calculations for the maximum rate of profit R and data on capacity utilization rates (Shaikh, 1987, Appendix B), which is then used to calculate normal capacity rates of profit, and $r_u = r/u$, as discussed previously. Note the adjusted rates exhibit a falling trend,

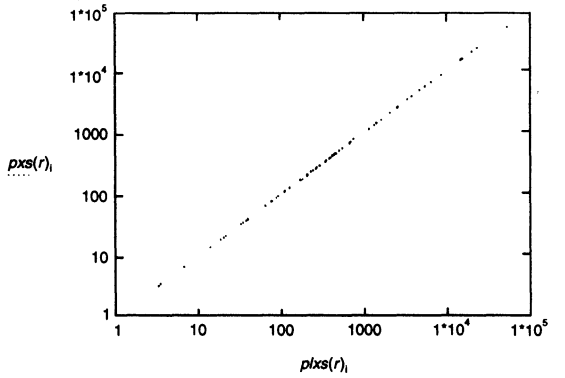


Figure 15.7 Price approximation vs full prices of production (at observed r=0.188), 1972 (log scale)

while the unadjusted ones have no clear pattern. This highlights the potential importance of such adjustments.

SUMMARY AND CONCLUSIONS

This chapter has explored the theoretical and empirical links between market prices, prices of production and labour values. Prices of production are important because in a competitive system they directly regulate market prices; and labour values are important because they serve both as the foundation of prices of production and as their

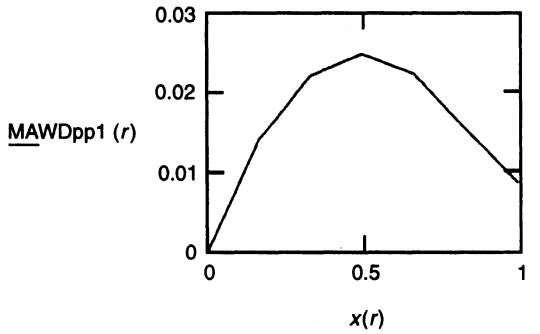


Figure 15.8 Average diviations, price approximation vs full prices of production, 1972

dominant components over time. This last aspect is particularly important, because over time technical change alters relative labour values and hence relative prices of production.

To address the above links, we first developed a model of prices of production that accounts for stocks, flows, turnover times and capacity utilization rates. These prices were in turn normalized by means of a Marxian standard commodity, which is generally different from the familiar Sraffian one. It is known that as the rate of profit r varies from zero to the maximum rate of profit R, prices of production can change in complex ways. We have shown that they are capable of reversing direction with respect to labour values, a phenomenon that we call Marx-reswitching. But on both theoretical and empirical grounds, this is not likely to be of any practical importance. On the other hand, a linear approximation to standard (that is, normalized) prices of production, one that can be viewed as a vertically integrated equivalent to Marx's own 'transformation' procedure, turns out to be of great significance. All of its structural parameters depend only on labour value magnitudes. And at an empirical level, it turns out to be an extremely good approximator of full prices of production (within 2 per cent), and hence an equally good explanator of market prices (within 8.7 per cent).

In our empirical analysis we compared market prices, labour values and standard prices of production calculated from US input–output tables for 1947, 1958, 1963 and 1972 using data initially developed by Ochoa (1984) and subsequently refined and extended by others (Appendix 15.2). Across input–output years we found that on average labour values deviate from market prices by only 9.2 per cent, and that prices of production (calculated at observed rates of profit) deviate from market prices by only 8.2 per cent (Table 15.1 and Figures 15.2–3).

Prices of production can of course be calculated at all possible rates of profit, r, from zero to the maximum rate of profit, R. The theoretical literature has tended to emphasize the potential complexity of individual price movements as r varies. Such literature is generally cast in terms of pure circulating capital models with an arbitrary numeraire. But our empirical results, based on a general fixed capital model of prices of production with the standard commodity as the numeraire, uniformly show that standard prices of prices of production are virtually linear as the rate of profit changes (Figure 15.4). Since standard prices of production equal labour values when $r = 0$, this implies that price-value deviations are themselves essen-

tially linear functions of the rate of profit. For this reason, the linear price approximation developed in this chapter performs extremely well over all ranges of r and over all input–output years, deviating on average from full prices of production by only 2 per cent (Figures 15.6–7) and from market prices by only 8.7 per cent (as opposed to 8.2 per cent for full prices of production relative to market prices).

What explains the linearity of prices of production over all rates of profit? It is certainly not because prices of production are close to labour values, as Figure 15.4 makes clear: in 1972 the coefficient of variation (standard deviation over the mean) of direct capital–labour ratios expressed in labour value terms is 0.080, and that of vertically integrated capital–output ratios is 0.04. Nor is it due to the particular size of the maximum rate of profit, R, since multiplying the matrix H (whose dominant eigenvalue is $1/R$) by different scalars has virtually no effect on the linearity of individual prices.

A large disparity between first and second eigenvalues is another possible source of linearity.[9] But here, although the ratio of the absolute values of the first to second eigenvalues varies across input–output years from 2.76 to 232.20, near linearity holds in all years. This at least raises the question of how 'big' such a ratio must be to produce near linearity.

There are some clues, however. The choice of a standard commodity as numeraire is evidently important, as Sraffa so elegantly demonstrates. Obviously, if individual prices of production expressed in terms of the Marxian standard commodity are linear in r, choosing any arbitrary commodity as numeraire is equivalent to creating ratios of linear functions of r, and these can display (simple) curvature. So choosing the appropriate numeraire 'straightens out' individual price curves to some extent. But this is only part of the story. If one abstracts from fixed capital (so the matrices $K = 0$, $D = 0$), and from turnover time (so $T = I$) then the resulting 'pure circulating capital' model *does* show substantial curvature in the movements of individual prices of production even when prices are expressed in terms of the (new) standard commodity. This suggests that the *structure* of stock/flow relations represented by K (rather than their size, since varying R makes virtually no difference) also plays an important role. Circulating capital models are quite popular in the theoretical literature, which may explain the theoretical presumption that prices of production are curvilinear with respect to the rate of profit. But of course the discrepancies between the full model and the circulating capital

model only point to the unreliability of this presumption. Moreover, even in this case any curvature of individual prices of production remains fairly simple (being convex or concave throughout), Marx-reswitching is just as rare, the linear price approximation captures about 80 per cent of the structure of prices of production, and the simple quadratic approximation discussed at the end of the section on 'Approximating Prices of Production' captures 92 per cent.

The puzzle of the linearity of standard prices of production with respect to the rate of profit is certainly not resolved. But its existence emphasizes the powerful inner connection between observed relative prices and the structure of production. Even without any mediation, labour values capture about 91 per cent of the structure of *observed* market prices. This alone makes it clear that it is technical change that drives the movements of relative prices over time, as Ricardo so cogently argued (Pasinetti, 1977, pp. 138–43). Moving to the vertically integrated version of Marx's approximation of prices of production allows us to retain this critical insight, while at the same time accounting for the price-of-production-induced transfers of value that he emphasized. On the whole these results seem to provide powerful support for the classical and Marxian emphasis on the structural determinants of relative prices in the modern world.

APPENDIX 15.1 MARXIAN AND SRAFFIAN STANDARD COMMODITIES

The Marxian standard commodity Xs can be different from a Sraffian one, even though both yield the same wage–profit curve. Consider the simple case of a Sraffian model with circulating capital that turns over in one period in each industry (so that $T = I$), infinitely lived fixed capital (so that $D = [0]$) and wages paid at the end of the period (so that wages do not appear as part of the capital advanced). Then

$$p = wa_0 + pA + rpK$$

At $w = 0$ we get $p(R) = p(R)A + RpK$. Sraffa's standard system is the quantity dual $Xs' = A \cdot Xs' + RK \cdot Xs$, so that the standard net product $Ys' = (I - A)Xs' = RK \cdot Xs$. This implies that $(1/R)Xs' = (I - A)^{-1}K \cdot Xs'$, so that Xs' is the right-hand dominant

eigenvector of the matrix $(I-A)^{-1}K$. Sraffa also normalizes prices by setting the sum of prices of the standard *net* output Ys' equal to the sum of labour values of this net output. This latter quantity is the amount of living labour in the standard system, which is in turn scaled to be the same as that in the actual system: $p \cdot Ys' = v \cdot Ys' = v \cdot Y$, where Y = net output in the actual system (Sraffa, 1963, p. 20).

For the very same price system, we derive the Marxian standard by noting that at $w = 0$ the price system can be written as $(1/R) \cdot p(R) = p(R) \cdot (K \cdot [I-A]^{-1}]$ and we define the Marxian standard commodity[10] by $(1/R) \cdot Xs = (K[I-A]^{-1}) \cdot Xs$, so that Xs is the dominant right-hand eigenvector of the matrix $K(I-A)^{-1}$. Recall that we normalize quantities by setting the sum of labour values of *total* output = the actual sum of values ($v \cdot Xs = v \cdot X$) and normalize prices by setting the standard sum of prices of total output = the standard sum of values of total output ($p \cdot Xs = v \cdot Xs$).

It is known that the matrices $K(I-A)^{-1}$ and $(I-A)^{-1}$ have the same eigenvalues. But they do not, in general, have the same eigenvectors (Schneider, 1964, p. 131). Therefore, in general the two standard commodities, Sraffian and Marxian, will be different. Only in the case of pure circulating capital ($K = A$), uniform turnover rates = 1, and wages paid at the end of the production cycle (as in this illustrative model), will the two matrices, and hence the two standard commodities, be the same.

In spite of their differences, the two different standard commodities will nonetheless both yield linear wage profit curves, albeit with the wage expressed in terms of a different numeraire.

To see this for the Sraffian standard, write the illustrative price equation as $p(I-A) = wa_0 + rpK$. The Sraffian standard commodity is defined by $Ys' = R \cdot K \cdot Xs'$, where $Ys' = (I-A) \cdot Xs'$, and the price normalization is $pYs' = vYs'$, where $v = a_0 \cdot (I-A)^{-1}$, so we can write $p(I-A)Xs' = pYs' = w(a_0 \cdot Xs) + r \cdot p \cdot K \cdot Xs' = w(v \cdot Ys') + (r/R) \cdot p \cdot Ys'$. Thus $w' = 1 - v/R$. Note that here the wage w' is the wage share in the Sraffian standard system net product per worker, because the price normalization implies that $pYs'/aoXs' = 1$.

For the Marxian standard, we express the same price system in the form $p = wv + r \cdot p \cdot K \cdot (I-A)^{-1}$. The Marxian standard commodity is defined by $(1/R) \cdot Xs = (K[I-A]^{-1})$, and with prices normalized by $pXs = vXs$, we get $pXs = wv \cdot Xs + (r/R)pXs$, so that $w = 1 - r/R$. In this case w represents a share of the maximum wage W, because when $r = 0$, $p(0) = W \cdot v$, so that the normalization $pXs = vXs$ (for all r) implies that $W = 1$ – that is, that W is the numeraire.

APPENDIX 15.2 DATA SOURCES AND METHODS OF CALCULATION

All input–output data is from Ochoa (1984) at the 71-order level: the labour coefficients vector a_0, and matrices of input–output coefficient A, capital stock coefficients K, depreciation coefficients D, and turnover times T. Sectoral output units are defined as \$100 worth of output, so all market prices equal \$100 by construction. The current data set spans the input–output years 1947, 1958, 1963, 1967 and 1972, but work is underway on a revised and more comprehensive data set spanning both earlier and later input–output tables, based on the work of Michel Julliard, Ara Khanjian, Paul Cooney, Greg Bongen and Ed Chilcote. Since sectoral capacity utilization rates are unavailable at present, we set $U = I$ in the calculations of labour values and prices of production, although we do use the aggregate capacity utilization rate (Shaikh, 1987, Appendix B) to adjust actual and maximum rates of profit (see Table 15.3).

Table 15A.1 Sector list

Industry no.	*Industry name*	*BEA I-O no.*	*Industry no.*	*Industry name*	*BEA I-O No.*
1	Agriculture	1	37	Screw machine products	41
2	Iron & ferroalloy ores mining	5	38	Other fab. metal prods.	42
3	Nonferrous metal ores mining	6	39	Engines & turbines	43
4	Coal mining	7	40	Farm machinery & equipment	44
5	Crude petrol. & natural gas	8	41	Construction mach. & equip.	45
6	Stone, clay mining quarrying	9	42	Materials handling equipment	46
7	Chem. & fertilizer mineral mining	10	43	Metalworking mach. & equip.	47.
8	New & repair construction	11	44	Spec. indust. machs. equip.	48
9	Ordance & accessories	13	45	Gen. indust. machs. & equip.	49
10	Food & kindred products	14	46	Machine shop products	50
11	Tobacco manufactures	15	47	Office & computing machines	51

Table 15A.1 Sector list (Contd)

Industry no.	*Industry name*	*BEA I-O no.*	*Industry no.*	*Industry name*	*BEA I-O No.*
12	Fabrics, yarn & thread mills	16	48	Service industry machines	52
13	Misc. textile goods & floor cov.	17	49	Electric trans. equip.	53
14	Apparel	18	50	Household appliances	54
15	Misc. fabricated textile prod.	19	51	Electric wiring & lighting	55
16	Lumber wood prod. exc. containers	20	52	Radio, TV & comm. equip.	56
17	Wooden containers	21	53	Elec. components & access.	57
18	Household furniture	22	54	Misc. electrical machinery	58
19	Other furniture & fixtures	23	55	Motor vehicles	59
20	Paper & allied products	24	56	Aircraft & parts	60
21	Paperboard containers & boxes	25	57	Other transportation equip.	61
22	Printing & publishing	26	58	Professional & scientific inst.	62
23	Chemicals & allied products	27	59	Photographic & optical gds.	63
24	Plastics & synthetic materials	28	60	Misc. manufacturing	64
25	Drugs, cleaning & toilet prep.	29	61	Transportation	65
26	Paints & allied products	30	62	Communications exc. brdcst	66
27	Petroleum refining	31	63	Radio & TV broadcasting	67
28	Rubber & misc. plastic products	32	64	Public utilities	68
29	Leather tanning	33	65	Wholesale & retail	69
30	Footwear & other leather products	34	66	Finance & insurance	70
31	Glass & glass products	35	67	Htels & repr. places exc. auto	72
32	Stone & clay products	36	68	Business serv.; R&D	73

Table 15A.1 Sector list (Contd)

Industry no.	*Industry name*	*BEA I-O no.*	*Industry no.*	*Industry name*	*BEA I-O No.*
33	Primary iron & steel mfg.	37	69	Auto repair & services	75
34	Primary nonferrous metals mfg.	38	70	Amusements	76
35	Metal containers	39	71	Med/educ serv. nonprof. org.	77
36	Heating & fabricated metal prod.	40			

Notes

1. I wish to thank Gerard Duménil, Dominique Lévy and Alan Freeman for helpful comments, Edward Ochoa for making available his input–output data, and Greg Bowgen and Ed Chilcote for their help with this data.
2. My results are similar to Ochoa's as far as interindustry comparisons of labour values, prices of production and market prices are concerned (Ochoa, 1984). But whereas he uses actual gross output as the numeraire, I use the standard commodity. Also, like Bienenfeld my focus is on the determinants and behaviour of individual price–value deviations (Bienenfeld, 1988).
3. The term $(v \cdot [K + AT]^i + a_0 T^i)/(a_0)_i$ is the ratio of the labour value of the direct capital advanced to the direct labour time required in production (see equation 15.1). If one calls this the *ith* 'materialized composition of capital', then the ratio of the labour value of total capital advanced to total labour required $= v \cdot (H + T_1^i/vi) = 1/q_i$ is the i^{th} vertically integrated materialized composition of capital.
4. The approximation is linear in w and r, but non-linear in r alone as long as turnover times differ across industries. Suppose all turnover times were alike, so that $T = t \cdot I$. Then $T_1 = B \cdot T \cdot B^{-1} = T = t \cdot I$, and the standard turnover time $ts = (v \cdot T_1 \cdot X_s)/(v \cdot X_s) = t$, and the wage rate $w = (1 - r/R)/(1 + r \cdot ts) = (1 - r/R)/(1 + r \cdot t)$. Substituting these into equation 15.11 yields $p'(r) = ([1 - r/R] + r \cdot H)v$, which is linear in r.
5. Needless to say, we could have instead approximated output–capital ratios directly, and then used this to derive an approximation to the price system. But then the analytical simplicity of the price approximation is generally lost. Since the simple price approximation is also empirically very powerful, there seems to be no gain in an alternate procedure.

6. Bienenfeld (1988) chose to extend my (previously developed) linear approximation by creating a quadratic approximation that is exact at both $r = 0$ and $r = R$. But the economic interpretation of the terms involved is obscure.
7. We do not distinguish between production and non-production labour in these particular estimates, but then it is not clear that such a distinction is appropriate when modelling individual prices, since the cost of activities such as wholesale retail trade will show up in the total costs of a commodity (Shaikh and Tonak, 1994, pp. 45–51).
8. The maximum profit rate R is the output–capital ratio of the standard system PX_s/PK_s, where both Xs and Ks are evaluated in any common price system (prices of production, market prices or labour values). To adjust for capacity utilization, we can either compare actual output flow Xs to utilized $K \cdot u$, or normal capacity output X_s/u to actual capital stock K. In either case the normal capacity maximum rate of profit $R_u = R/u$.
9. In recent private correspondence, Gerard Duménil and Donminique Lévy have shown that this could be a sufficient condition for near linearity. I had come to the same conclusion on the basis of my iterative procedure for linking Marx's 'transformed values' to full prices of production, since the speed of convergence depends on this ratio (Shaikh, 1977, mathematical appendix, unpublished).
10. The Marxian standard commodity can be shown to be related to the von Neumann ray (Shaikh, 1984, pp. 60–1).

References

Bienenfeld, M. (1988) 'Regularities in Price Changes as an Effect of Changes in Distribution', *Cambridge Journal of Economics*, vol. 12, no. 2, pp. 247–55.

Marzi, G. and Varri, P. (1977). *Variazioni de Produttiva Nell'Economia Italiana: 1959–1967* (Bologna: Societa Edifrice Il Mulino).

Marx, K. (1972) 'Wage, Labour and Capital', in R.C. Tucker (ed.), *The Marx–Engels Reader* (New York: Norton).

Ochoa, E. (1984) 'Labor Values and Prices of Production: An Interindustry Study of the U.S. Economy, 1947–1972', unpublished PhD dissertation, New School for Social Research, New York.

Parys, W. (1982) 'The Deviation of Prices from Labor Values', *American Economic Review*, vol. 72, no. 5, pp. 1208–12.

Pasinetti, L. L. (1977) *Lectures on the Theory of Production* (New York: Columbia University Press).

Pasinetti, L. L. (1981) *Structural Change and Economic Growth* (Cambridge: Cambridge University Press).

Petrovic, P. (1987) 'The Deviation of Production Prices from Labour Values: Some Methodology and Empirical Evidence', *Cambridge Journal of Economics*, vol. 11, no. 3, pp. 197–210.

Schefold, B. (1976) 'Relative Prices as a Function of the Rate of Profit: A Mathematical Note', *Zeitschrift fur Nationalokonomie*, vol. 36, pp. 21–48.

Schneider, H. (1964) *Recent Advances in Matrix Theory* (Madison: University of Wisconsin Press).

Shaikh, A. (1977) 'Marx's Theory of Value and the "Transformation Problem"', in J. Schwartz, *The Subtle Anatomy of Capitalism* (Santa Monica, CA: Goodyear).

Shaikh, A. (1984) 'The Transformation from Marx to Sraffa: Prelude to a Critique of the Neo-Ricardians', in E. Mandel and A. Freeman (eds), *Marx, Ricardo, Sraffa* (London: Verso).

Shaikh, A. (1987) 'The Falling Rate of Profit and the Economic Crisis in the U.S.', in R. Cherry *et al.* (eds), *The Emperiled Economy*, book I (New York: URPE).

Shaikh, A. and E. A. Tonak (1994) *Measuring the Wealth of Nations: The Political Economy of National Accounts* (New York: Cambridge University Press).

Sraffa, P. (1963) *Production of Commodities by Means of Commodities* (Cambridge: Cambridge University Press).

16 Unproductive Labour and the Rate of Profit in Australia, 1966/67–1991/92[1]

Simon Mohun

INTRODUCTION

In this chapter I consider how the categories of productive and unproductive labour in the labour theory of value can be used in empirical work. The labour theory of value is understood within the framework proposed independently by Foley (1982, 1983, 1986) and Duménil (1983–84, 1984), and surveyed in Mohun (1994). It is an aggregate theory, asserting that the labour time worked by productive labour is the source of all money value-added; that the value of money links the wage rate per hour and the value of labour power per hour of labour hired; and that aggregate profits are an exact representation of aggregate surplus value. These propositions remain valid whatever prices happen to be. Hence it is not assumed in this interpretation that embodied labour ratios determine price ratios, nor that the rate of profit is equalized. No assumption is made about the formation of individual prices, and hence there is no need of any specification of how one assumption of price formation (proportionality to labour time) is 'transformed' into another (proportionality to total capital advanced).

The first section of this chapter looks at how productive and unproductive labour might be measured in this perspective, using data drawn from the Australian economy. This data suggests that unproductive labour as a proportion of total employment is rising over time. The idea that unproductive labour consumes rather than produces value immediately implies that unproductive labour is in some sense a hindrance to accumulation, since, for any given amount of aggregate value added, the more the value consumed by unproductive labour, the less there is available for the employment of productive labour and for investment in the means of production with which that labour

works. This in turn suggests that a rising trend of unproductive labour might have a negative effect on the rate of profit. This has been considered for the US economy by Moseley (1991, 1992) for the postwar period, and by Duménil and Lévy (1993) in a longer-run study. The second section makes reference to this literature and focuses on the rate of profit and its proximate determinants in the Australian economy since the mid 1960s. A short conclusion follows.

EMPIRICAL TRENDS IN PRODUCTIVE AND UNPRODUCTIVE LABOUR

Productive and unproductive labour are understood in the following terms. Wage labour is:

- *productive* (PL) if and only if it transforms a quantity of productive capital into a greater quantity of commodity capital;
- *unproductive* (UPL) if and only if it does something other than transform productive capital into commodity capital. Within the circuit of capital it transforms commodity capital into money capital, or money capital into productive capital. But it can also exist outside the circuit of capital.

Labour that is not wage labour is *neither productive nor unproductive* (NPL).

Combining these definitions with the labour theory of value,

- the monetary measure of aggregate value added is the form of value produced by the aggregate labour time of productive labour;
- the total wage bill of productive labour is the monetary form of aggregate variable capital;
- the difference between the monetary measure of aggregate value added and the total wages of productive labour is the monetary form of aggregate surplus value.

That is, these aggregate monetary measures are *directly* forms of value, the relation between form and content in each case being mediated by the value of money. This suggests the possibility of an empirical analysis of certain Marxian aggregates in terms of monetary measures, despite the fact that readily available data is not collected and con-

structed according to Marxist principles. While standard considerations of unequal exchange preclude any interpretation of aggregate capital stock figures as directly monetary forms of the (fixed) stock of constant capital (that is, of its labour-time measure divided by the value of money), and while similar considerations apply to any *sectoral* analysis of monetary value added, an analysis in terms of *aggregate* value added and its components of wages (aggregate variable capital divided by the value of money) and profits (aggregate surplus value divided by the value of money) is possible on the basis of national accounts data.

The Australian National Accounts provide data on total wages paid in broad industry groups, further breaking this down into the totals paid by private enterprise, public enterprise and general government.[2] The general government sector is defined as all those bodies that produce goods and services outside the market mechanism; outputs are provided free (or at nominal charge) and inputs are financed from taxation. Hence wages paid by general government correspond closely to the theoretical category of wage payments to unproductive workers employed by the state.

Australian labour statistics also distinguish employers and the self-employed from employees. In 1978/79 the former accounted for 15.52 per cent of total employment and in 1988/89 for 14.75 per cent, roughly one third being employers and two thirds self-employed in each case. Employers are unproductive. The self-employed are analogous to petty commodity producers, and are treated here as value but not surplus-value producing if they exist in competition with wage labour which transforms productive capital into commodity capital, and as non-value producing otherwise. Value-producing self-employed workers are excluded from the total of workers who produce surplus value; and non-value-producing self-employed workers are incorporated in the unproductive totals.

Unproductive employees in private and public enterprises are the labour that enforces hierarchy and discipline in the labour process, and the labour that transfers title of ownership to commodities in financial and commercial activities. There are two ways in which this identification can be attempted. One way is to focus on occupations, using the Australian Standard Classification of Occupations (ASCO).[3] Three difficulties then arise. First, occupational data are not consistent with the employment data used in the Australian National Accounts. Second, superimposing the ASCO classification on to social relations that distinguish between private and public enterprise employees on the

one hand, and general government employees on the other, is problematic. And third, assigning the ASCO classification to the theoretical categories arising out of a circuit of capital framework involves a substantial degree of arbitrariness. Given that exactitude is impossible, I assume that within a firm the 'productive–unproductive' distinction can be approximated by a 'white collar–blue collar' distinction. On this basis, the ASCO allocation of labour is summarized in Table 16.1.

Table 16.1 Occupational designation of productive and unproductive labour (CCLO and ASCO)

Productive Labour (PL)		*Unproductive Labour (UPL)*	
CCLO (pre-1986)	*ASCO (1986 et seq)*	*CCLO (pre-1986)*	*ASCO (1986 et seq)*
Farmers, Fishermen Timber-getters, etc.	Tradespersons	Administrative, Executive and Managerial	Managers, Administrators
Miners, Quarrymen and Related Workers	Plant and Machine Operators and Drivers;		Professionals
Transport and Communication Tradesmen,	Labourers and Related Workers	Professional, Technical and Related	Para-Professionals
Production Process Workers and Labourers n.e.c.		Service, Sport and Recreation Workers	Clerks, Salespersons
		Clerical; Sales	Personal Service Workers

Alternatively, in place of an occupational focus an industrial focus could be used, using the Australian Standard Industrial Classification (ASIC). This has the advantage of convenience, being used in the Australian National Accounts. It is also superficially appealing in that labour employed by financial capital can be approximated by employment in the industry group 'finance, property and business services', and that employed by commercial capital by employment in the industry group 'wholesale and retail trade'. However the ASIC statistics relate only to the main activity of the firm, which can be misleading as to the appropriate designation of all of its employees. In particular the distinction between 'white collar' and 'blue collar' labour is impossible in this context. Using the ASIC, processes of discipline and control are not separable from the processes of administration and

coordination of the division of labour; and clerks are miners if working for a mining company, but electricians if working for an electricity company, and so on. Consequently, on an ASIC basis, all white-collar employees in public and private enterprises have to be considered as productive for labour processes transforming productive capital into commodity capital, and as unproductive otherwise. This 'allocation' of labour is summarized in Table 16.2.

Table 16.2 Industrial designation of productive and unproductive labour (ASIC)

	Private enterprise	*Public enterprise*	*Self-employed*	*General govt & Employers*
Agriculture, forestry, fishing, hunting	PL	–	PL (not S producing)	UPL
Mining	PL	PL	PL (not S producing)	UPL
Manufacturing	PL	PL	PL (not S producing)	UPL
Electricity, gas, water	PL	PL	PL (not S producing)	UPL
Construction	PL	PL	PL (not S producing)	UPL
Wholesale and retail trade	UPL	UPL	UPL	UPL
Transport and storage	PL	PL	PL (not S producing)	UPL
Communication	PL	PL	PL (not S producing)	UPL
Finance, property, business services	UPL	UPL	UPL	UPL
Public administration and defence	–	–	–	UPL
Community services	PL	–	PL (not S producing)	UPL
Recreation, personal and other services	PL	PL	PL (not S producing)	UPL

However it is certainly the case that the occupational classification overstates the quantity of unproductive labour, because it is not the case that all professional and clerical workers are unproductive. On the other hand, the industrial classification understates the quantity of unproductive labour employed by capital because of its presumption that all employees in productive sectors in Table 16.2 are productive workers. Casual reflection on the nature of the modern corporation and the number of white-collar employees devoted to the recording of financial flows suggests this is implausible. Given the approximations of the 'broad brush' macro approach, with its reliance on averages, there is little merit in attempting a finer designation through a more disag-

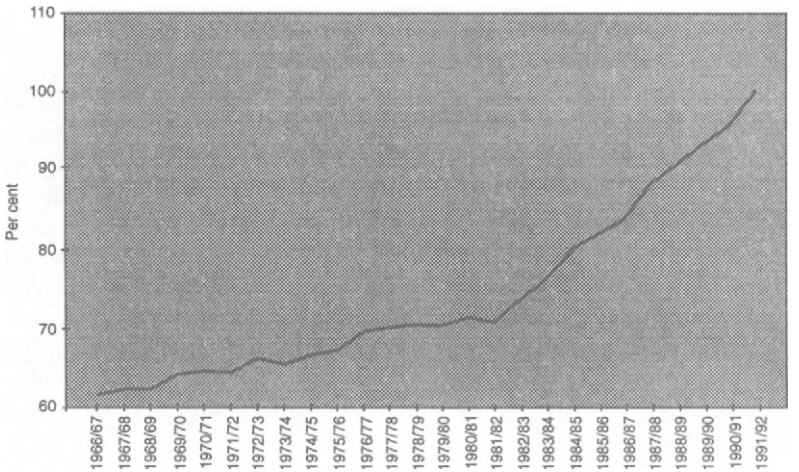


Figure 16.1 Wage ratio of unproductive labour employed by (public and private) capital to surplus-value-producing labour (per cent)

gregated approach. It is in any case necessary to mix the approaches in order for example to exclude general government workers from the total for unproductive labour. Hence in this chapter I take a simple average of the relevant figures across the two approaches.[4] The results are illustrated in Figure 16.1 for the ratio of wages paid by capital to unproductive labour to wages paid to surplus-value-producing labour.

The ratio in Figure 16.1 drifts upwards over time from the mid 1960s to the early 1980s, and increases sharply thereafter. Indeed payments to surplus-value-producing labour as a proportion of total wage payments by capital fell by 10.5 percentage points from 1966/67 to 1991/92, with 81 per cent of this fall occurring from 1981/82. In part this reflects the growing importance of the category 'finance, property and business services', in which wage payments as a proportion of all private and public enterprise wage payments rose from 8.6 per cent to 16.8 per cent from 1966/67 to 1991/92. With the removal of tariff barriers, the 1980s were an era of intensified international competition, in part requiring correspondingly greater sales effort; as part of the 'globalization of capital', it was also an era of major flows of financial capital, creating new instruments of fictitious capital in the process of asset speculation. As a small, increasingly open economy with a disproportionately small manufacturing sector, Australia was particularly vulnerable to these world-wide trends.

EFFECTS ON THE RATE OF PROFIT

Since unproductive labour consumes value rather than produces it, this suggests the possibility of relating a rising trend of unproductive labour to trends in the rate of profit. Consider the profits of a firm employing only unproductive labour – a commercial or a financial capital, for example. The 'classical' Marxian analysis interprets these profits as a transfer from the productive sector of the economy, a transfer effected via unequal exchange in the market. It then follows that the wages paid to unproductive workers by such a capital are a drain on total surplus value in money terms, and hence, if increasing in the aggregate, exert a downward effect on the rate of profit. For example Moseley (1991, 1992) has argued that the increasing trend of unproductive labour employed by capital is the main cause of the decline in the US rate of profit between 1947 and 1977. He distinguishes between circulation labour (some 80 per cent of total unproductive labour) and supervisory labour (20 per cent); in turn some 80 per cent of circulation labour is trade labour, and he suggests that the main cause of the increase in trade labour is not so much increased sales effort as slower productivity growth in trade labour compared with production labour.

In order to investigate further the relation of the categories of productive and unproductive labour to the rate of profit, some decomposition of the rate of profit is required. In National Accounts terms (pretax) profits could be considered as the difference between gross domestic product at factor cost less the consumption of fixed capital, or net domestic product (*NDP*) on the one hand,[5] and total wages (*W*) on the other. But the difference between net domestic product and total wages overestimates the profits accruing on a macroeconomic level to capital, because it includes the various imputations that are made in the calculation of domestic product. That is, conventional macroeconomic aggregates of total value added are hybrid measures, including monetary estimates of use values which are not traded. Monetary imputations of non-marketed services are neither part of wages paid to workers nor part of profits received by firms. Hence in determining a monetary figure of value added (*MVA*) to divide into wages and profits, they must be excluded. The major imputation made in national accounts is of rental payments made to themselves by owner-occupiers of housing, and this is the only one considered here.

Consider then a conventional pretax definition[6] of the rate of profit (r) as the ratio of profits to the net capital stock (K), and define profits

as net domestic product at factor cost (*NDP*) less imputations (*IMP*) less total wages (*W*):

$$r = ([NDP - IMP] - W)/K \tag{16.1}$$

Total wages comprise the wages paid to productive workers (W_P), the wages paid to unproductive workers employed by capital, including the unproductive self-employed (W_U), the 'wages' paid to the productive self-employed (W_S), and the wages paid to general government workers (W_G). Hence

$$r = ([NDP - IMP] - W_P - W_U - W_S - W_G)/K \tag{16.2}$$

By definition, general government workers do not produce a marketed output, and, like owner-occupiers' 'rent payments to themselves', cannot be allowed to contribute to any money representation of aggregate value added. These considerations imply that

$$MVA = (NDP - IMP) - W_G \tag{16.3}$$

Substituting equation 16.3 in equation 16.2,

$$r = (MVA - W_P - W_S - W_u)/K$$

But *MVA* is the sum of wages paid to value-producing workers and profits, where profits (Π) are the money form of surplus value. Hence

$$MVA = W_P + W_S + \Pi$$

so that

$$r = (\Pi - W_u)/K = W_P\left(\frac{\Pi}{W_P} - \frac{W_U}{W_P}\right)/K \tag{16.4}$$

The first ratio in the numerator is the rate of surplus value (e). Then, defining the productive capital stock (K_p) as that capital stock worked by productive labour, equation (16.4) can be rewritten as

$$r = \left(\frac{e - W_U}{W_P}\right)/\left(\frac{K_P}{W_P}\,\frac{K}{K_P}\right) \tag{16.5}$$

The numerator in equation 16.5 is what is left for capital in general after all labour has been paid, as a proportion of surplus-value-producing labour, and could be considered the 'residual rate of exploitation' ($\hat{e}$). The first term in the denominator (measured at constant prices) is one interpretation that can be given to Marx's 'organic composition of capital' (OCC).[7] Denoting proportional rates of growth by *rog*,

$$rog(r) = rog(\hat{e}) - rog\left(\frac{K_P}{W_P}\right) - rog\left(\frac{K}{K_P}\right) \tag{16.6}$$

One would expect these rates of growth to vary in different phases of the cycle. Cycles are identified by inspection of first differences in *MVA* at 1989/90 prices; this reveals a peak (P) in 1968/69, a trough (T) in 1974/75, a peak in 1978/79 and a trough in 1982/83. There is then a peak in 1983/84, a shallow trough in 1986/87 and a slightly higher peak in 1988/89 than in 1983/84. This is followed by a trough in 1990/91. Following the trough of 1982/83, I have taken the next peak as 1988–89, subsuming the fluctuation of the mid 1980s into an upswing. The dating of peaks and troughs is then the same as that indicated by the time path of the rate of surplus value (which shows neither a peak in 1983/84 nor a trough in 1986/87). Table 16.3 presents the evolution of the variables in equation 16.6 over the two complete cycles in the 1970s and 1980s.

Table 16.3 Average annual rates of growth over phases of the cycle (per cent)

(1)	(2) e	(3) W_u/W_p	(4) $\hat{e}$	(5) OCC	(6) K/K_P	(7) *est.r*	(8) r
1968/69(P)–1974/75(T)	−6.0	1.1	−12.2	−1.6	0.6	−11.3	−11.6
1974/75(T)–1978/79(P)	6.9	1.3	14.7	3.7	0.5	10.6	10.1
1978/79(P)–1982/83(T)	−6.2	1.1	−15.4	1.5	0.1	−17.0	−16.6
1982/83(T)–1988/89(P)	8.8	3.5	18.0	1.9	0.7	15.4	14.7
1988/89(P)–1990/91(T)	−0.7	2.7	−4.3	1.5	0.9	−6.7	−6.6

Note: Column 7, estimated r, is column 4 minus column 5 minus column 6; slight discrepancies are due to rounding. Column 7 differs from column 8 because higher-order differences are neglected.
Sources: See Appendix 16.1.

Inspection of Table 16.3 shows that the variables all broadly move procyclically. In each phase of the cycle, the average annual growth rate of the residual rate of exploitation is far and away the dominating influence on the average annual growth rate of the rate of profit. Furthermore, comparing columns 2 and 4, these movements in the residual rate of exploitation strongly amplify movements in the rate of surplus value. The reason for this can be seen by considering the first term of the right-hand side of equation 16.6; some manipulation shows that

$$rog(\hat{e}) = \frac{e}{\hat{e}} rog(e) - \left(\frac{e}{\hat{e}} - 1\right) rog\left(\frac{W_U}{W_P}\right) \tag{16.7}$$

The coefficient on the rate of growth of e in equation 16.7 varies between 1.6 and 3.1; since Table 16.3 shows that fluctuations in the growth rate of the rate of surplus value are much larger than those of the wage ratio of unproductive to productive labour, this is sufficient to account for the numerical relation between the magnitudes of the first three columns of Table 16.3.

Total growth over the whole cycle and over two cycles is shown in Table 16.4.

Table 16.4 Total growth over one and two cycles (per cent)

(1)	(2) e	(3) W_u/W_p	(4) $\hat{e}$	(5) OCC	(6) K/K_P	(7) est. r	(8) r
1968/69(P)–1978/79(P)	−11.7	12.3	−27.2	5.6	5.4	−38.2	−34.6
1978/79(P)–1988/89(P)	26.2	28.5	23.9	18.4	4.9	0.6	−0.2
1968/69(P)–1988/89(P)	11.4	44.4	−9.8	25.0	10.6	−45.4	−34.7

Sources and notes: as for Table 16.3.

Total growth over the 1970s cycle is similar in pattern to the intracyclical movements of Table 16.3. Matters are less clear-cut in the 1980s cycle, and over both cycles together the dominating influence on total growth in the rate of profit is total growth in the composition of capital, which on theoretical grounds is broadly what one would expect.

The proximate effects of the rise in unproductive labour can be approached counterfactually. Suppose the wage ratio of unproductive

to productive labour had increased in total over the 1970s cycle by the same amount as it increased over the 1980s cycle; this hypothetically larger rise than that which in fact occurred implies a fall in the calculated rate of profit of 48.6 per cent instead of the fall in the calculated rate of 38.2 per cent. Conversely, suppose the wage ratio of unproductive to productive labour had increased in total over the 1980s cycle by the same amount as it increased over its predecessor. Then instead of the estimated rate of profit rising by 0.6 per cent in total over the 1980s cycle, it rises by 16.7 per cent. In this sense the data supports the thesis that a rising ratio of unproductive to productive labour exerts a downward effect on the rate of profit.

However this is too simplistic. For if a firm employs more supervisory labour, or more white-collar labour to keep better track of its financial flows and sales, then there is a *prima facie* case that such employment could increase the flows of value accruing as profits, and hence despite that employment consuming rather than producing value, it could nevertheless have the effect of also increasing the rate of surplus value through its effect on productivity. Hence the issue is whether firms employing productive labour might experience efficiency gains either as a result of the services provided by other firms employing unproductive labour, or as a result of their own increase in employment to improve work discipline and to engage in financial and commercial activities more effectively. Within a firm, a relative growth of unproductive white-collar staff might be essential to cope with the increasing complexity of internationalized markets and national and international competition, or indeed to improve work discipline. And outside the firm, the growth of credit markets, underpinning the centralization of capital, might enable much larger transformations of money capital into productive capital, with potentially faster turnover.

Consider further, then, the first of the three terms on the right-hand side of equation 16.6. Some manipulation shows that

$$rog(e) = ([1 + e]/e)\ (\text{rog}\ [\text{PROD}] - \text{rog}[w]) \tag{16.8}$$

where *PROD* is the money value added produced per hour of surplus-value-producing labour. Hence combining equations 16.6–16.8,

$$rog(r) = ([1 + e]/\hat{e})(rog\ [PROD] - rog[w]) - ([W_U/W_P]/\hat{e})rog\left(\frac{W_U}{W_P}\right) - rog\left(\frac{K_P}{W_P}\right) - rog\left(\frac{K}{K_P}\right) \tag{16.9}$$

While as a matter of accounting, an increasing trend of unproductive to productive labour must have a negative effect on the growth of profitability, the variables on the right-hand side of equation 16.9 are not independent of each other. For example a rising organic composition of capital increases productivity, which, for given wages, increases the rate of surplus value. As is well known, and the source of much controversy, Marx himself tried to disentangle these two effects in a sequential analysis, by identifying a rising composition of capital as the cause of a falling rate of profit when the rate of surplus value is held constant, and then considering a rise in the rate of surplus value as a counteracting effect to a falling rate of profit.

Accordingly, the issue here is whether a rising trend in unproductive to productive labour might not have positive effects on productivity. This can be investigated by considering a simple regression of first differences in productivity on first differences in the wage ratio of unproductive to productive labour, although considerable caution is required in interpreting the results because of the small size of the data sample. These results are reported in Table 16.5.

Table 16.5 Regression results: productivity on the wage ratio of unproductive to productive labour (first differences)

Period	*Regressor*	*Coefficient*	*T-Ratio*	R^2
1967/68–1991/92	Constant	0.27778	1.14390	0.21277
	$W(u)/W(p)$	0.28607	2.49320	
1967/68–1978/79	Constant	0.58753	2.28930	0.05691
	W(*u*)/*W*(*p*)	0.17407	0.77684	
1979/80–1991/92	Constant	−0.37411	−0.81424	0.42161
	W(*u*)/*W*(*p*)	0.47820	2.83160	

All the various diagnostic tests reported in the Microfit package are satisfied (at the 5 per cent level) with the exception of serial correlation over the whole period. But there is no serial correlation over the two subperiods, and a Chow test for structural stability in the first subperiod suggests a break at the end of the 1970s. In the first subperiod there seems to be no relationship in first differences between productivity and the ratio of unproductive to productive labour (only the constant term in the regression is significant). But for the 1980s the relationship is significant, with the slope coefficient at nearly one half. That the R^2 figures are low merely indicates that other omitted

variables have effects on productivity, as one would expect. At least after 1978, the data supports the hypothesis for the Australian case that a rising trend of unproductive to productive labour might have some positive effects on productivity, and thereby on the rate of exploitation of productive labour.

The most dramatic example of this type of approach is in the work of Duménil and Lévy (1993) in a long-run analysis of the United States. While they do not explicitly use the categories of productive and unproductive labour, they contrast managerial and clerical workers with production workers, and argue that the emergence of the modern capitalist enterprise, with its vastly increased managerial and clerical staffs, was a response to the decline in the rate of profit in the late nineteenth century. While this was a contradictory phenomenon, the downward trend in the rate of profit was thereby arrested for almost half a century.

Thus on the one hand Moseley (1991, 1992) argues that the increasing trend of unproductive labour employed by capital had negative effects on the US rate of profit between 1947 and 1977, and on the other hand Duménil and Lévy (1993) argue for the opposite causation for an earlier period for the United States. The results using Australian data are mixed. There seems little positive effect on productivity in the 1970s cycle, in which case an accounting decomposition, based on the consumption of value by unproductive labour, is sufficient to determine the effects of a rising unproductive to productive labour ratio on the rate of profit. But there appears to be a positive effect on productivity in the 1980s cycle, in which case the consumption of value by unproductive labour is not on its own sufficient to determine an overall direction of causation. The different results for the 1970s and the 1980s also suggest that the causal effects of a rising trend of unproductive labour upon the rate of profit might depend upon the particular period considered.

SOME CONCLUSIONS

The distinction between productive and unproductive labour remains a controversial one, in part because it depends upon a precise specification of what is production and what is consumption. For whereas productive labour produces value, unproductive labour consumes it. In the neoclassical approach, the distinction is meaningless; the focus on individual consumption in a utility-maximizing context means that

anything that is capable of adding to utility is productive. In the Marxian approach, the focus is on the reproduction of value and the relations that produce it, and a sharp distinction is drawn between those activities that produce value and those that consume it in the course of that reproduction. Such reproduction requires the individual consumption of workers, and it requires the productive consumption of productive capital. It also requires both labour to supervise that productive consumption and the intervention of commodity capital and financial capital, all of which unproductively consume value.

This chapter has attempted to show that the Marxian distinction can be meaningfully used in theoretical and empirical work. The empirical analysis (albeit for a small data set) suggests that the unproductive consumption of commodity and financial capital, and indeed organizational labour employed by productive capital to enforce hierarchy and discipline, might under certain circumstances have positive effects on productivity and hence profitability. Further investigation is required, first to see whether data for other countries produces similar results, and second to characterize much more precisely the postulated change in the economy after the late 1970s compared with before. The Australian labour market in these years had some quite specific features with respect to state intervention and wage regulation not typically found in other capitalist countries, and further work is necessary to identify whether these specific features render the Australian case atypical.

Appendix 16.1

All data is taken from Australian Bureau of Statistics sources and is yearly (mid calendar year to mid calendar year); when the data is taken from DX, and has a different frequency, it is converted to a yearly basis. All monetary measures are at 1989/90 prices.

Employment numbers

1966/67–1973/74: from ABS 6204.0 for August of each year; defence personnel from DX (NIF.VNEQ.UN-NDF) for September quarter are added to the Standard Industrial Classification (SIC) category 'Public administration and defence' (PAD). 1974/75–1991/92: from ABS 5204.0, various issues.

Employers and Self-Employed

Each year is an average of August, November, February and May figures: 1978/79–1988/89: from ABS 6204.0; 1989/90–1991/92: from ABS 6203.0.

Data prior to 1978/79 was calculated on the basis of the presumption of stability between the number of employers in each SIC category and total employment in that category; similarly for the self-employed. So, for example, the ratio of employers to total employment in agriculture was calculated for each year from 1978/79 to 1991/92 and an average taken; the coefficient thereby obtained was applied to total agricultural employment for each year prior to 1978/79 to produce a number for employers in agriculture in each year.

Wages

'Wages' means 'wages, salaries and supplements'. Total wages for each SIC category, for general government and for the economy as a whole: 1966/67–1991/92: from ABS 5204.0, various issues.

The average wage is the total wage divided by total employment for each year, for the whole economy and for SIC sectors.

Each self-employed person in each SIC sector is assumed to earn the average wage earned in that sector. One might expect average earnings of the self-employed to be less than this average (the lower income being compensated for by the greater personal independence) or around the average (obtained through longer working hours than the average), but one would certainly expect the average earnings of employers to be greater. This is captured somewhat arbitrarily by imputing to employers in each SIC sector 1.5 times the average wage earned in that sector.

ASIC classification: wages paid by capital are total wages less general government wages. Wages paid to unproductive labour are:

1. all remuneration paid to employers, plus
2. all wages less general government wages, paid in wholesale and retail trade (WRT), plus
3. all wages less general government wages, paid in finance, property and business services (FPBS), plus
4. all wages less general government wages, paid in PAD. Wages paid to unproductive labour thereby include the unproductive self-employed.

Wages paid to productive labour are total wages less general government wages less wages paid to unproductive labour. These are wages paid to value-creating labour. Wages paid to surplus-value-creating labour are wages paid to value-creating labour, less the remuneration of the self-employed in all SIC categories other than WRT, FPBS, and PAD.

CCLA and ASOC data (August figures): from ABS 6204.0 and 6101.0, various issues.

MVA, LVA, VM, e, w, and VLP

Money Value Added (*MVA*) is GDP at factor cost less consumption of fixed capital less gross rent on owner-occupied dwellings less wages paid to general government workers.

GDP at factor cost and gross rent on owner occupied dwellings from ABS 5204.0; consumption of fixed capital: ANA Capital Stock 1991/92, from DX, File A5221;

Total surplus value in money terms is *MVA* less wages paid to value-creating labour.

The rate of exploitation (e) is total surplus value in money terms divided by the wages paid to surplus-value-creating labour.

The value of labour power (*VLP*) is determined from $VLP = 1/(1 + e)$.

The hourly wage rate (w) is the yearly wage per person (total wages divided by total employment), divided by 48 working weeks, divided by the number of hours worked each week. Average hours worked per week from DX (NIF.VNEQ.AN_NHW).

The value of money (*VM*) is determined from the ratio of *VLP* to w, followed by labour value added (*LVA*) from the ratio of *MVA* to *VM*.

To convert nominal wage variables to 1989/90 prices, the private final consumption expenditure deflator was used from ABS 5204.0.

Capital Stock

Productive capital is the net capital stock of non-dwelling construction and equipment in all private and public enterprises, excluding those in WRT, FPBS and PAD. The net capital stock for the whole economy includes these, but excludes general government capital. All calculated from the ANA Capital Stock 1991/92, from DX, File A5221.

Notes

1. Based on a paper presented at the conference on 'Karl Marx's Third Volume of *Capital* 1894–1994', University of Bergamo, Italy, 15–17 December, 1994. I am grateful for helpful comments on an earlier draft from conference participants, and on a subsequent draft from Susan Himmelweit. All errors are my own.
2. The industry groups are defined according to the 1983 Australian Standard Industrial Classification (ASIC). This replaced the 1978 version, which in turn replaced the 1969 version. At the ASIC division level of aggregation used in this chapter, the minor changes in coverage over time can be neglected.
3. The ASCO classification applies to data from 1986, replacing the previous Classification and Classified List of Occupations (CCLO). At least at major group level, the mapping from the earlier into the later classification is reasonably clear.
4. The proportions of productive and unproductive labour thereby derived are then scaled by applying them to the total employment figures of the Australian National Accounts.
5. Consumption of fixed capital has to be excluded from any monetary figure of net value added, and hence NDP rather than GDP figures are used.
6. Because this chapter uses a pretax definition, it is not concerned with the unproductive labour employed by the state and financed out of taxation. Trends in wage payments by general government as a proportion of *MVA* provide part of the basis for understanding the causes and consequences of class struggle surrounding state taxation and expenditure policies, for the quantity of unproductive labour employed by the state is determined in general by the management of class struggle, and in particular by class struggle over education, housing, health care, unemployment and other welfare expenditures impinging on the post-tax value of labour power, and the taxation necessary to finance them. This is not relevant in pretax definitions.
7. The elimination of circulating constant capital, inevitable in national accounts data because of the netting out of intermediate production, stretches the interpretation rather.

References

Australian Bureau of Statistics (1986) *The Labour Force, Australia. Historical Summary, 1966–1984* (6204.0) (Canberra: ABS).

Australian Bureau of Statistics (1986) *Labour Statistics, Australia 1985* (6101.0) (Canberra: ABS).

Australian Bureau of Statistics (1991) *Labour Statistics, Australia 1990* (6101.0) (Canberra: ABS).

Australian Bureau of Statistics (1992) *The Labour Force, Australia Historical Summary, 1978–1989* (6204.0) (Canbera:ABS).

Australian Bureau of Statistics (1992) Labour Statistics, Australia 1991 (6101.0) (Canberra:ABS).

Australian Bureau of Statistics (1993) *Labour Statistics, Australia 1992* (6101.0) (Canberra: ABS).

Australian Bureau of Statistics (1993) *Australian National Accounts: National Income, Expenditure and Product 1991–92* (5204.0) (Canberra: ABS).

Australian Bureau of Statistics (1993) *Australian National Accounts: Capital Stock 1991–92* (5221.0) (Canberra: ABS).

Australian Bureau of Statistics (1994) *Australian National Accounts: National Income, Expenditure and Product 1992–93* (5204.0) (Canberra: ABS).

Duménil, G. (1983–84) 'Beyond the Transformation Riddle: A Labor Theory of Value', *Science & Society*, vol. XLVII, no. 4, pp. 427–50.

Duménil, G. (1984) 'The So-Called "Transformation Problem" Revisited: A Brief Comment', *Journal of Economic Theory*, vol. 33, pp. 340–8.

Duménil, G. and D. Lévy (1993) *The Economics of the Profit Rate* (Aldershot: Edward Elgar).

Foley, D. K. (1982) 'The Value of Money, the Value of Labor Power, and the Marxian Transformation Problem', *Review of Radical Political Economics*, vol. 14, no. 2, pp. 37–47.

Foley, D. K. (1983) 'On Marx's Theory of Money', *Social Concept*, vol. 1, no. 1, pp. 5–19.

Foley, D. K. (1986) *Understanding Capital* (Cambridge, Mass: Harvard University Press).

Marx, K. (1976) *Capital*, vol. I (Harmondsworth: Penguin).

Marx, K. (1981) *Capital*, vol. III (Harmondsworth: Penguin).

Mohun, S. (1994) 'A Re(in)statement of the Labour Theory of Value', *Cambridge Journal of Economics*, vol. 18, pp. 391–412.

Moseley, F. (1991) *The Falling Rate of Profit in the Postwar United States Economy* (Basingstoke: Macmillan).

Moseley, F. (1992) 'Unproductive Labour and the Rate of Profit in the Postwar US Economy', in F. Moseley and E. N. Wolff (eds), *International Perspectives on Profitability and Accumulation* (Aldershot: Edward Elgar).

Shaikh, A. M. and E. A. Tonak (1994) *Measuring the Wealth of Nations* (Cambridge: Cambridge University Press).

The Transformation of Prices into Values

Comment on the Chapters by Simon Mohun and Anwar Shaikh by Alan Freeman

These two chapters are a testimony to the pioneering work of Anwar Shaikh and his coworkers, who have in my view established two key points.

First, beginning from published data one can recover underlying value magnitudes and hence empirically measure Marx's main categories. This directly contradicts a once-prevalent view that value magnitudes are an inaccessible 'essence' under the surface appearances of prices. Second, value magnitudes, though accessible, cannot be derived directly or trivially from the data. A systematic procedure is required to get at them. Two such are extant, and both owe a great deal to Shaikh.

One can start from aggregate price data – principally the national income accounts – and correct this for intersectoral and interclass transfers of value. Or one can start from input – output matrices and then, provided there is data either giving labour hours or some proxy for them, calculate values and other Marxian magnitudes, such as prices of production, on a disaggregated basis. In brief Mohun's chapter does the first and Shaikh's chapter the second.

Both raise distinct theoretical issues. In relation to Mohun's paper I shall ask: what *is* the right procedure for estimating values? In relation to Shaikh's I want to ask: how should we *test* the results?

The core of Mohun's procedure is a correction for the impact of unproductive labour. We should perhaps find an alternative for this archaic phrase, which implies that domestic labour, for example, is in some sense not useful. Unproductive labour is frequently immensely useful – for example the labour of state health workers. Under socialism all labour would be 'unproductive'. It is work that does not produce exchange value; that does not result in a commodity that can be appropriated for subsequent sale by a capitalist. Its importance is illustrated by its effect on the interpretation of the national accounts.

If national aggregate profits are corrected to allow for it, the resulting rate tells a completely different story.[1]

It includes the labour of servants, labour supplied by the state or household; and labour of circulation, for example that of bank workers, and it is the latter that I think Mohun – and all writers using this methodology – should consider more carefully.

All bank receipts come from profits earned elsewhere. They are a *faux frais*, a cost of circulation that does not produce value. This relates directly to some very practical modern disputes: a country with nothing but banks would create no new value – although of course it could make a handsome living from profits produced elsewhere. To recover the 'real' profits appropriated in a nation the 'factor income due to profits' must be corrected by adding on the moneys spent in circulation, including all the costs of the banking system. In national income terms, this expenditure should be treated as a component of final demand, like a tax on value production levied by the banking sector.

Mohan tends to assess labour as unproductive by looking at the nature of the work done. But it is also important to know *for whom* it is done. The workers who decked the European Bank for Reconstruction and Development in marble are just as unproductive as the clerks who now walk across it. Indeed national accountants are greatly confused by this; because interest receipts are not derived from commodity sale in the strict sense, they report bank profits as negative in many systems.[2] Others apply a correction for financial services in which interest payments become an interfirm transaction which disappears from the net accounts. This apologetic construction effectively treats payments to the banking sector as a necessary cost of production. In reality they are a transfer, a payment out of corporate profits.

With this in mind I shall turn to an apparent contradiction between Shaikh's chapters and that by Cockshott and Cottrell in this volume, which suggests that profit rates are not empirically equal. The importance of this is as follows. If, as Marx clearly believed, the motor of economic movement is the pursuit of surplus profit, and hence the *deviation* of market prices from production prices, can market prices actually be *equal* in general either to neoclassical or to Sraffian equal profit rate prices? The growing debate on this question has enormous practical and theoretical implications.

If empirical profit rates are dispersed, it is hard to see how prices of production can predict observed market prices. Yet Shaikh's results seem to show a near-perfect identity between observed market prices

and equal-profit-rate prices of production. He sees this as a manifestation of the structural features of a market economy, which I take to mean that medium-term average price aggregates depend – in essence – on the structure of production. I hope this simplified statement does not distort his intention.

There is little doubt in my mind that the correspondences he has established are neither trivial nor dismissable. My question is whether they prove what he thinks they prove, and whether his view may be better proved by different means.

My problem, in a word, is that his results are *too* good. Let us return to the banking sector. We know that the 'prices' of the banking sector reported in the input – output data are theoretically incorrect and do not represent 'prices of production' in Marx's sense. We know that bank profits are governed, not by structural features of production, but by movements in the sphere of circulation – interest rates, exchange rates, and so on. How can we therefore predict a phenomenon of circulation from the structure of production?

Further more the results contradict things we know about production itself. Everyday experience informs us that sectoral profit rates in key parts of the economy systematically exceed or fall below the average. Bill Gates, chief executive officer of a twenty-year-old company, is now the richest man in America. His wealth did not come from high wages; it consists of retained profits. Nor is this an isolated case; profits in computing are many times higher than elsewhere, as everyone who works the sector knows. Why doesn't this show up?

I want to reconsider the use of *aggregate* price and value data for comparing observed and predicted results. To simplify matters I will look at the relation between values and market prices, as do Ochoa (1985) and, in another article, Cockshott, Cottrell and Michaelson 1995. The argument applies *mutatis mutandis* to prices of production.

The difficulty of comparing *unit* prices, values and prices of production arises from the construction of input–output tables in which the unit of measurement is effectively the dollar (or pound, etc.). Thus if unit values were actually equal to unit market prices, they would all be £1 in this system of measurement. It is then impossible to ascertain how the variation of unit values affects unit prices, since there *is* no variation in unit values.

This leads Ochoa to the following conclusion:

> The question reduces itself to which is the appropriate population: unit prices or sectoral outputs. The only unambiguously defined

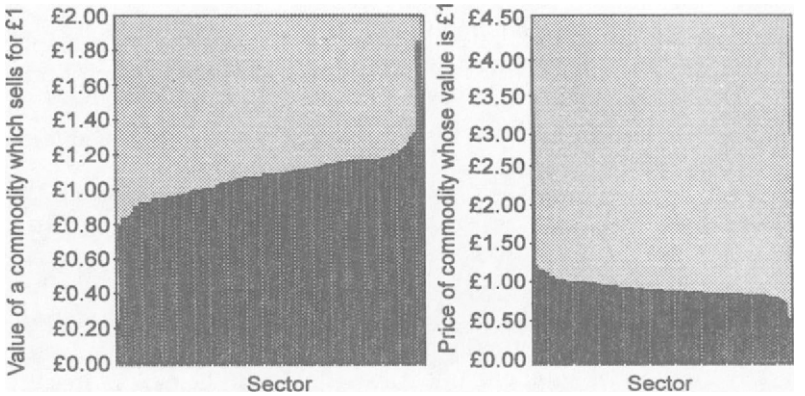


Figure 1 Dispersion of unit values about a unit market price of £1, and of unit market prices about a unit value of £1 (UK, 1984)

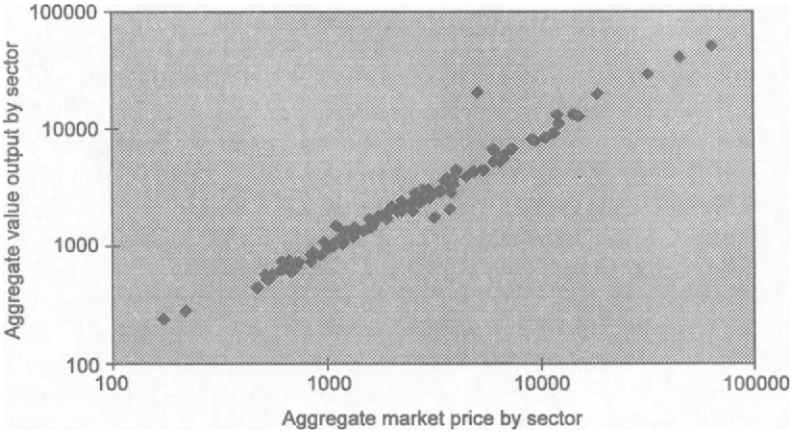


Figure 2 Aggregate values versus aggregate prices (UK, 1984)

elements with common characteristics are sectoral outputs, so their two properties (market price and computed price) can be legitimately compared (Ochoa, 1985, p. 130), although earlier he identifies the following potential problem:

In connection with cross-sectional series, the error of 'spurious correlation' is known to be a problem. Clearly, if we are trying to establish a relationship between a and b, and if we define $x = az$

> and $y = bz$ the correlation coefficient between x and y will overestimate the correlation between a and b... it is clear that we can increase or decrease the extent of common variation of P and M by judicious manipulation of the physical units. (ibid., 1985, p. 129).

But if we compare aggregates with aggregates, the danger is that the output of each sector serves as just such a variable, z, which concerns me – especially since I suspect that the values predicted by these types of equation are independent of the scale of output. A similar but perhaps lesser problem attends the use of a weighted mean deviation, if the magnitude of output is used as the weight. What does a weighted mean deviation tell us about an economy in which the bulk of market prices are close to values, but in small but very dynamic sectors (such as the information sector) this does not hold?

A possible approach is indicated by Figure 1, calculated for the UK economy using Ochoa's method. The first chart, sorted in order of unit value, shows how much labour, measured in £, is used to produce a commodity that sells for £1. The second gives the reciprocal of this, that, is the market price in £ of commodities whose unit value is £1.

Figure 2 shows the aggregate values and prices of the same sectors, displayed as a scatter diagram. The two figures tell a rather different story. The question is whether the impressive correlation shown in figure 2 owes more to the effect of variations in output than to the prediction of prices by values.

The basic problem is this: if values predicted prices accurately, there should be no variation in unit values at all. A commodity whose value is £1 should sell for £1 and Figure 1 should be flat. If, therefore, any unit value differs from £1, we should not accept the blanket conclusion that values by and large do not diverge from prices. As can be seen from Figure 1, there is a general spread of at least 20 per cent and outliers whose values are 300 per cent lower, and 50 per cent higher, than unit prices. We require a statistic that conveys this dispersion abstracting from variations in output. At the same time, there is clearly a problem in treating all sectors on an equal footing when some have a much greater weight in the economy than others.

Nevertheless Figure 1 *does* show a considerable correspondence between prices and values and, I would suggest, sheds real light on the structure of the economy. I think it would be a valuable extension of Shaikh's study to construct a similar representation of the relation between market prices and prices of production; and to consider possible alternative statistical indicators to test this relation.

Notes

1. See for example Moseley, 1990: Freeman, 1992: Shaikh and Tonak, 1994.
2. *United Kingdom National Accounts: Sources and Methods*, 1985, p. 88, sections 7.8–7.11.

References

Cockshott, P., A. Cottrell, and Michaelson, G. (1995) 'Testing Marx: some new results from UK data', *Capital and Class*, 55.

Freeman, A. (1992) 'National Accounts in Value Terms: The Social Wage and Profit Rate in Britain 1950–1986; in P. Dunne (ed.) *Quantitative Marxism* (Cambridge: Polity Press).

Moseley, Fred. (1990) 'The Decline of the Rate of Profit in the Postwar U.S. Economy: An Alternative Marxist Explanation', *Review of Radical Political Economics*, vol. 22, no. 2–3, p. 17–37.

Ochoa, E. M. (1985) 'Labour Values and Prices of Production: an Inter-industry Study of the U.S. Economy. 1947–1972', PhD Thesis, New School for Social Research.

Shaikh. A. and Ahmet E. Tonak. (1994) *Measuring the Wealth of Nations* (Cambridge: Cambridge University Press).

17 Burning Questions of an Old Book: Commodity Fetishism and Class Relations in Volume III of *Capital*

Massimo De Angelis

INTRODUCTION

One of the most fundamental operations of *Capital* was the dissecting of economic categories previously used by classical political economy and the discussion of these categories in terms of their class meaning (Cleaver, 1979). This is the explicit reference of Marx's 'critique of political economy', that 'in so far as it represents a class... [it represents] the proletariat' (Marx, 1867, p. 98).

In volume I of *Capital* Marx discussed the capitalist relation of work stripped of its fetishised character in its immediacy: 'The *process of capitalist production*, taken by itself, i.e. the immediate production process, in which connection all secondary influences external to this process were left out of account' (Marx, 1894, p. 117). In volume II he investigated the other phase of the life-cycle of capital, the process of circulation. A crucial conclusion was that the 'capitalist production process, taken as a whole, is a unity of the production and circulation process' (ibid.), as the 'circulation process... mediates the process of social reproduction'. Marx thus opened the way for later analyses of social capital (Tronti, 1966; Dalla Costa and James, 1972) as the exacerbation of the capitalist relation of work at the social level, including both waged production and unwaged reproduction labour. Finally, in volume III Marx's concern was 'to discover and present the concrete forms which grow out of the *process of capital's movement considered as a whole*'. This means 'to approach step by step the form in which [the configuration of capital] appears on the surface of society', that is, first 'in the action of different capitals on one another,

i.e. in competition', and second 'in the everyday consciousness of the agents of production themselves' (Marx, 1894, p. 117).

In this chapter I want to highlight a crucial element of Marx's discussion in volume III – namely, how economic categories are linked to those present in the 'every day consciousness of the agents of production themselves', and therefore how they embed a class meaning. To do so, I first discuss commodity fetishism as the representation, from the standpoint of capital, of the capitalist relation of work. I then show not only how this class meaning informs economic categories, but also how this fetishised representation of the class relation of work serves as a capitalist tool for the reproduction and perpetuation of the class relation itself. For these purposes I discuss the categories of cost price, profit and competition, which occupy a central role in volume III of *Capital*.

As this chapter is necessarily short, I cannot engage in a critical review of previous analyses of the links between economics, ideology and class relations. I must however make this qualification. My discussion represents an alternative to the traditional radical critique of bourgeois economics, which commonly exposes the value bias of economics, mostly on an ideological ground. Dobb (1973) and Mattick (1980) exemplify, respectively, a 'mild' and a 'tough' critique of economics on an ideological basis. The former recognizes the possible absence of common ground among different paradigms because of the different ideological starting points from which different theoretical conclusions necessarily follow. The latter goes further and rejects bourgeois economics for its non-scientific, plainly ideological and apologetic character (Mattick, 1980, p. vii). The discussion in this chapter opens the way to argue that, although economic categories are inherently value biased, we cannot ignore them as merely apologetic categories. Instead the 'scientific' character of bourgeois economics must be recognized not so much as an 'accurate' description and explanation of an objective social reality, but as an interpretation of the same reality from a particular class standpoint, that of capital. The notion of science itself is understood here as a political category. Viewed in this sense, bourgeois economics offers a box of tools with which to conceptualize capitalist reality and therefore *actively* to promote policies for its management *vis-à-vis* the working class.

The 'strategic' character of bourgeois economics was first pointed out by Tronti (1966) and Cleaver (1979, 1992). My contribution in this chapter is to show, by means of a discussion of Marx's notion of

commodity fetishism, how this strategic character is a consistent feature of his analysis and critique of political economy. This category provides us with a theoretical bridge between the class relation of work and the representation of this relation from a capitalist perspective. (For a more extensive discussion, see De Angelis, 1996.)

THE CRITIQUE OF CLASSICAL POLITICAL ECONOMY: THE SOCIAL MEANING OF THE 'SUBSTANCE OF VALUE' AND COMMODITY FETISHISM

According to Marx, classical political economy opens up the possibility of exposing the 'contradictions' of the capitalist mode of production. This ability, Marx believed, resides in the fact that the classical economists based their analysis on 'value', that is, '*a definite social mode of existence of human activity (labour)*' (Marx, 1963, p. 46, emphasis added). However the classical treatment of labour is insufficient for a full understanding of both the nature of capitalist social relations and their forms of appearance.

Adam Smith for example, tried to understand the 'inner connections' of the capitalist system and at the same time to come to terms with the 'external phenomena of life' as they 'seem and appear' (Marx, 1968, p. 165). However, 'both these methods of approach', both these lines of enquiry, 'not only merrily run alongside one another, but also intermingle and constantly contradict one another' (ibid.) David Ricardo, on the other hand, forced economic analysis to face the 'starting point for the psychology of the bourgeois system – for the understanding of its internal organic coherence and life process' through 'the determination of value by *labour-time*' (ibid., p. 166). However 'the determination of value by labour time' is necessary but not sufficient for a proper understanding of social relations within capitalism. Thus Ricardo's analysis fails to discuss two interrelated questions: one about the analysis of the 'essential character of capitalism', the other about the analysis of its 'forms of appearance'.

Ricardo's shortcoming in not addressing the 'essential character of capitalism' must be referred back to the determination of relative values by the quantity of labour. 'Right from the start [Ricardo] is only concerned with the *magnitude of value*, i.e., the fact that the magnitudes of the value of commodities are proportionate to the quantities of labour which are required for their production.' What '*Ricardo does not examine*' is 'the form – the peculiar characteristic of

labour that creates exchange-value or manifests itself in exchange-values – the *nature* of this labour' (ibid., p. 164). If labour is 'a definite social mode of existence of human activity', and therefore is constituted only through relations between people, Marx's interest in the particular *form* of labour must be referred back to his interest in the particular form taken on by social relations in capitalism. It is precisely at this juncture that Ricardo showed his weakness.

By failing to show the 'form of labour', that is, substance of value, Ricardo was also unable to account for the 'form of appearance' of social relations. For example he was not able to 'grasp the connection of this labour with money or that it must assume the form of money.... Hence his erroneous theory of money' (ibid.) If Smith was pursuing both the analysis of the inner connections of the capitalist system and the forms of appearance, analyses often in conflict with each other, Ricardo pursued only the former, but inadequately. Because he stopped short of revealing the character of this labour substance of value, that is, the capitalist character of this social relation, Ricardo could not have a theory of how social relations appear. In chapter 1, volume I of *Capital*, the form of money is precisely the first step in this direction.

It seems therefore that fully to understand what is at stake in Marx's criticism, it is necessary to turn to Marx's own category of the kind of labour that does produce value, and the relation between this and the form of appearance. A suggestion about the character of the labour substance of value may be found in Marx's criticism of Ricardo himself. '*Ricardo*'s mistake is that he is concerned only with the magnitude of value.... But the labour embodied [in the commodities] must be represented as *social* labour, as alienated individual labour' (ibid., p. 131). In volume I of *Capital* the character of this 'alienated individual labour'-creating value is defined in terms of abstract labour. In De Angelis (1995b) I discussed how Marx's definition of abstract labour embeds a conception of the capitalist relation as a class relation of work, where work is imposed, alienated and boundless in character. The key formulation that allowed this analysis is Marx's definition of abstract labour as 'human power expended without regard of the form of its expenditure' (Marx 1867, p. 128). I thus argued that this definition of the substance of value, that is, work abstracted from its specific concrete determinations, implies treating work as a non-sensuous thing, a thing among things. This representation of labour under capitalism – labour creating value – is not only a theoretical representation abstract from reality, but the mirror

image in thought of a real activity. However, from the point of view of the labourers no human activity is 'sensuous-less'. Abstract labour therefore must identify a *social relation*, a *relation of work*, in which the two sides related to each other occupy two objectively opposite and contradictory positions.

Thus, because the subject matter is a *relation*, a relation of work, the question of commodity fetishism, which is the question of how things appear, becomes a question of the *meaning* acquired by that relation of work. A meaning, however, that can only be defined in terms of the *relative* positions of the participants in that relation of work. Because the participants occupy objectively different positions, there is reason to believe that the meanings attributed to the relation itself must be also be different.

Table 17.1 presents a schematic division of the two sides of the capitalist work relation, as discussed in *Capital*.

Table 17.1 The link between the class relation of work and its representation

	Capital	*Working Class*
Lived experience of the work relation (conscious experience)	Capitalists 'treat people as things' (Marx, 1867, pp. 988–9).	Reification vs labour as sensuous activity
Cognitive apprehension of the work relation: representation of the class relation	Labour as external object, as input among inputs. Labour as non-sensuous activity.	'In itself' vs 'for itself'

The first row of Table 17.1 shows how the different sides in the work relation experience that relation, a relation summarized in a nutshell by the category of abstract labour. Both experiences are *real* and neither of them can be said to be 'truer' than the other.

In several places in volume I of *Capital*, Marx addressed the issue of this twofold character of the lived experience of the work relation. In one place he defined capital as 'a specific social relationship in which the owners of the conditions of production treat living-labour power as things' (Marx ibid., pp. 988–9). This is what I define in the top-left corner of the table, paraphrasing Marx, as the capitalist lived experience of the work relation *vis-à-vis* the workers. In this definition I use the word 'capitalist' in the same fashion Marx does, that is, as a bearer of a social function. From the perspective of this function,

living subjects act as labour power, as inputs of production, things. This can also be expressed by depersonalizing the function, and defining with Marx the 'rule of the capitalist over the worker' as 'the rule of the independent *conditions of labour* over the worker' (ibid.)

The top-right corner in the table describes the work relation in terms of the lived experience of the workers. Again, I limit myself here to pointing out those features of this lived experience that pertain to the domain of the capitalist relation of work itself. From the workers,' perspective, a labour activity that is 'abstracted from the form of its expenditure' means essentially dehumanized activity, in which all its sensuous elements are subordinated to the expenditure of value-creating human energy. In the process of being treated as a thing by the independent force of dead labour, living subjects are reified, transformed into things. Of course this is only part of the story, as during the process of this transformation the workers are still sensuous beings. This contraposition between the process of reification and labour as sensuous activity is the basic material kernel of the class struggle.[1]

There is also a direct relation between these thing-like relations at the point of production and the way these relations 'appear'. Moreover, appearance itself is *real* to the extent that it reflects a real experience of this relation, of a way to *apprehend* the world as it emerges from the way it is experienced. In the second row of the table I illustrate the way the work relation appears to different subjects. For capital, the work relation appears only as an external object, having the commodity form. The commodity form, which is real, is precisely the objective form assumed by the work relation. This objectivity assumes a twofold character: the objective price of labour power and the objective work performed by that labour power. Objectivity corresponds here to external reality: non-sensuous, thing-like, measurable objectivity. The characteristic of non-sensuous, thing-like objectivity is what informs capitalists' representation of the relation of work: it is the way that relation appears and *is for them.*

The commodity form is also real for the working class, but it takes a completely different character. First, the working class experiences the commodity form as 'otherness', as the external force of competing labour powers, as threatening differences within a wage hierarchy. Second, the use of their own commodity labour power is not experienced as an external labour process of objectification (creating things), but as the process of *being* transformed into things, reification. Again, one must be careful not to overemphasize this process of reification as some critical theorists have done. The *real-life* process of

reification is not exhausted by the notion of reification. It is not limited to that notion. In reality it has a chance of going further, because the subjects being reified are alive and can transcend reification itself.[2]

Thus, necessarily, the conflict arises between two world-views, understood here not in a merely ideological sense, but as two ways of apprehending the work relation by the working class itself. On the one hand there is the view consistent with the reproduction of working-class division (imposed by material, cultural and ideological forms of external power), which is working class as variable capital. On the other hand there is the view consistent with working-class attempts to transcend the conditions of division and reification (from individual 'shirking' to mass insurrection). The study of popular culture as a site of struggle (Fisk, 1989) could offer important insights in this direction. For the purpose of this chapter it is enough to point out that this dichotomy, which is a persistent feature of the capitalist mode of production, has been traditionally discussed in terms of class 'in itself' and class 'for itself' (Marx, 1852).

COMMODITY FETISHISM AND ECONOMIC CATEGORIES

From the foregoing analysis, it follows that the question of commodity fetishism is central to any critique of economics because it represents the theoretical bridge between Marx's conception of the capitalist relation of work and the *representation* of this class relation from the perspective of capital, that is, from the perspective of the maintenance, perpetuation and diffusion of the capitalist relation of work (bottom-left corner of the table). Marx is very aware of the link between this position of capital and the economic categories used to represent the class relation. To illustrate the thing-like form of categories as reflecting the capitalist standpoint in the work relation, I want briefly to discuss Marx's categories of cost price, profit and competition. All three categories have a central role in volume III of *Capital*, and each has a twofold meaning corresponding to the two classes within the work relation.

Capitalist Representation of the Class Relation of Work: Cost Price and Profit

The category of cost price, with which Marx opened volume III, originates in the 'transformed' formula $(c + v + s)$ encountered in

volume I. It is $k + s$, that is, commodity value = cost price + surplus value. For Marx, the cost price expresses 'the specific character of capitalist production. The capitalist cost of the commodity is measured by the expenditure of *capital* whereas the actual cost of the commodity is measured by the expenditure of *labour*' (Marx, 1894, p. 118).

When investigated from the perspective of the different participants in the capitalist work relation, the apparently value-neutral category of 'cost' leads to the further, deeper question: cost for whom? What at first appears to be a simple accounting proposition stripped of any value bias, becomes the object of a political deconstruction of the capitalist categories. Marx counterposed two notions of cost. The first, based on the expenditure of labour, is cost in terms of the sensuous real-life energies expended in the labour process under despotic capitalist conditions, namely the actual cost of production is people's lived experience of that production, which is the subject matter of volume I. The other is based on a detached evaluation of a non-sensuous, objective and external reality, which is the capitalist cost as recorded by the company's bookkeeper. People and machines are not differentiated from this perspective. They are both inputs, and their actual mix is a function of both technical needs and cost. People are seen and treated as things, as 'human' capital. As things, they can be 'allocated' along with other inputs in the labour process. Thus capital apprehends the world uniquely as objective, as pure *external* reality. The thing-like appearance of social relations in capitalism is not merely a mystified representation of a different reality. Capitalists' representation of the work relation reflects capitalists' lived experience of that relation itself.

In this sense, relations between people are indeed a relation between things (Marx, 1867, p. 166). Indeed from this perspective, people, together with machines, raw materials and so on, represent different elements of a mass, different elements of cost price, k. It is only in connection with this mass, regarded as a 'thing', that the other economic category of *profit* can be represented.

> Because no distinction between constant and variable capital can be recognized in the apparent formation of the cost price, the origin of the change in value that occurs in the course of the production process is shifted from variable capital to capital as a whole. Because the price of labour-power appears at one pole in the transformed form of wages, surplus-value appears at the other pole in the transformed form of profit (Marx, 1894, p. 127).

Profit is, therefore, the same thing as surplus value 'save in a mystified form' (ibid.) The act of economic *representation* of the class relation of work from capital's perspective is completed when the *rate of profit* – that is the ratio between profit and total capital – is calculated. But this is only the ratio between two 'things', and in the 'thinghood' of this ratio there is no trace of alienated lived activity.

This mystified representation of labour under capitalism may definitively serve as an apology for the capitalist system, as a euphemism for the corrupted reality of capitalist work. But this is not all. Profit is the mystified representation of the work relation because it is the representation of that relation from the capitalists' standpoint. Thus, this mystified view, which hides the human source of profit, offers individual capitalists a pretty good insight into what the conditions of exploitation are at the social level. In spite of their 'restricted view', the individual capitalists, or the 'sum total of capitalists in a particular sphere of production', are right to believe that their 'profit does not derive just from the labour employed by [them] or employed in [their] own branch' (ibid., p. 270). And this belief is what informs their daily practice, their decisions to invest or withdraw capital from a sector, an industry and so on. In other words, this mystified form of profit is the pivot around which capitalist competition is organized. Capitalist competition, in turn, is an instrument for the organization at the social level of the capitalist relation of work.

Capitalist Use of 'Mystified Categories': the Class Meaning of Competition within and among Sectors

For Marx 'this much is clear: a scientific analysis of competition is possible only if we can grasp the inner nature of capital' (Marx, 1867, p. 433). This methodological remark in chapter 12 of volume I gains more relevance when connected to the discussion in volume III of capital's movement 'as a whole'. In this light, the analysis of competition allows it to be shown how the 'inner nature of capital', that is, the antagonist class relation of work, reproduces itself through the everyday phenomenal form of capitalist production. This has already been noted. Cleaver (1990, p. 20) has argued that competition 'is merely the form through which the class struggle between capital and labour is organized', and that the term 'competition' is also a euphemism for the forced rivalry among different sections of labour, upon which capital's competition must rely.

The foregoing analysis of commodity fetishism allows us to go a step further and point out *how* competition acquires a dual meaning corresponding to different class perspectives, and therefore *how* the 'mystified' form of profit, underlying capitalists' motives to compete, allows capital to organize the class struggle at the social level.

This can be seen in the way competition was analyzed by Marx in two different contexts: *within* a given sphere of production and *among* different spheres of production. Both these analyses of competition informed Marx's discussion of the formation of a general rate of profit. In Chapter 9 (Marx 1894, p. 257), and in more detail in Chapter 10, Marx discussed how the movement of capital and labour power among different spheres of production brings about a change in the relationship between demand and supply (ibid., p. 297), and therefore underlies the formation of an average rate of profit. This is not, of course, a new result, as classical economists also saw the role of capital's migration among different sectors. What is new in Marx, however, is the acknowledgement of the apparent contradiction of the two forms of competition. For example in *Theories of Surplus Value* Marx noted how Ricardo needed, for his theory of rent,

> two propositions which express not only *different* but *contradictory* effects of competition. According to the first,... competition creates the *market*-value... [and] therefore enforces different *rates of profit*, i.e. deviations from the general rate of profit. According to the second,... competition brings about a *general rate of profit* (Marx, 1968, pp. 206–7).

In the same passage Marx noted only 'incidentally' that this second action of competition is 'between capital of *different* spheres... while the other competition... occurs between capitals of the *same* sphere' (ibid., p. 207). 'What is most remarkable' in Ricardo, concluded Marx, is 'that he does not sense this twofold determination' (ibid.) Marx ascribed this to Ricardo's faulty theory of value, where, from the beginning of chapter 1 *Principles*, 'On Value', Ricardo 'identified cost-price and value' (ibid., p. 208).[3]

What is the meaning of 'this twofold determination' of competition? The process of competition *within* a sphere of production leads to the formation of a market value, which is the *socially necessary* labour time required to produce commodities. Although Marx dealt at some length with this aspect of competition in volume I, especially in chapter 12, where the analysis of competition gives insight into his

analysis of relative surplus value, he dedicated several pages in chapter 10 of volume III to the subject. It is important to note that while this chapter is on 'The equalization of the general rate of profit into average profit through competition', he still dedicated the bulk of his discussion to the effects of competition on the formation of market values.

Market value is a weighted average of individual values, where the weights are provided by the quantity of commodity produced by individual capitals in a particular sphere. The creation of this '*single* social value' is brought about by competition among the producers of a given commodity (Marx, 1894, p. 273). Competition of course brings about changes in the proportion between demand and supply. In turn the divergences of demand and supply not only affect distributional variables through deviations of market prices from market values, but also act as an impulse through which market values change:

> the relationship between demand and supply... explains on the one hand simply the divergences of market price from market value, while on the other hand *it explains the tendency for these divergencies to be removed*, i.e. for the effect of demand and supply relationship to be cancelled (ibid., p. 292, emphasis added).

Marx illustrated this point with some examples. In these, it is clear how one fundamental way in which 'demand and supply can cancel the effect that their disproportion produces' is through the change in market values themselves. For example, if demand falls below supply and therefore market price falls below market value, there arises one of two possible situations: one in which market value falls as an effect of invention, the other in which there is a reduction in supply and a withdrawal of capital. However, this can also reasonably be seen as implying a reduction in market value – that is socially necessary labour time – following the reduction in supply by the capitalists whose commodities are produced under worse conditions and therefore embody a higher individual value (ibid., pp. 295–6).

Thus competition *within* a sphere of production enforces socially necessary labour time, and then a new standard of socially necessary labour time enforces competition. In this never-ending movement, demand and supply cancel each other out and thus they 'always coincide if a greater or lesser period of time is taken as a whole, [that is] they coincide only as the average of the movement that has taken

place and through the constant movement of their contradiction' (ibid., p. 291). Thus the bottom line of Marx's analysis of competition within a sphere of production is this: the inner law of capitalist production, 'the law of the determination of value by labour-time' acts as a 'coercive law of competition' and therefore forces the individual 'competitors to adopt a new method' (Marx, 1867, p. 436). But the labour time that is socially necessary (ibid., p. 129) is not a simple technical definition. Rather it embodies a class content. It presupposes a certain degree of capital intensiveness, a certain level of intensity of work, and a certain labour organization, that is, a structure of power within a certain class composition. Capitalist competition therefore enables the redefinition of the conditions of the class struggle at the social level through the continuous definitions of new standards of socially necessary labour time.

We must now turn to the question of competition *among* spheres of production, which is the process that generates the average rate of profit. It should be clear that price of production representing an average profit, 'is the form in which capital becomes conscious of itself as a social power, in which every capitalist participates in proportion to his share in the total social capital' (Marx, 1894, p. 297). Thus differences in profit among different sectors act as signals to which individual capitalists cannot remain indifferent. With systematic profit rates below average, capital will withdraw, and *vice versa*; systematic profit rates above the average will be followed by capital injections in that sphere of production. This is the essence of competition among spheres of production.

It is clear that the immediate effects of these migratory flows cause a perturbation in the relationship between demand and supply in the spheres affected by the movement of capital. It is also evident how this may lead at first to a simple redistribution of total value by a change in market prices. However, from the previous discussion it is clear that this is not the end of the story. Once the newly injected capital is introduced into the sphere of production, *from that moment on* the new entrant will have to compete *within* that sphere with other individual capitalists. Thus the conditions of production that the new entrants will try to implement will be those that allow them to compete better. In other words, any injection of capital into a given sphere of production is the starting shot for the modification of socially necessary labour time in that very sphere of production.

Thus, paraphrasing Marx, the antagonistic relation of work, this 'immanent law of capitalist production', manifests itself in profit

deviations and fuels capitalist competition. It is in this mystified form that these antagonistic social relations 'enter into the consciousness of the individual capitalist as the motives which drive him forward' (Marx, 1867, p. 433). This mystified form of profit allows capitalists to regulate the flow of capital in different sectors, thus attempting to modify the labour time that is socially necessary for the production of commodities and thus to modify the conditions of labour subordination to capital. The category of competition is thus nothing other than another category of the class struggle, possessing a twofold meaning. The first corresponds to capitalists' representation of the class relation of work and therefore informs their practice. At the level of capital and the phenomenal forms guiding its actions, competition presents itself as a race for higher profit, a process that only tendentially leads to the formation of a general rate of profit. The other relates to the lived experience of the working class and presents itself as the external compulsory social force through which the discipline of capitalist work is constantly renewed in form: this is constantly restructured in order to subordinate people to a faster rhythm of work and life, and to enforce competition among workers. As such, therefore, it informs whatever working-class practice exists to resist and move beyond this social force. The category of competition, when considered as the unity of these two moments, is therefore a category of the class struggle.

CONCLUSION

In this chapter I have discussed the class meaning of economic categories and shown how a capitalist fetishised representation of the class relation assumes a strategic character *vis-à-vis* the working class. The question that this chapter opens up is how working-class struggle forces capitalist strategies, and therefore the economic conceptualization of these strategies, to change. Once commodity fetishism is understood in terms of capital's own thing-like representation of a real process of reification (transformation of people into things), and once we understand this process of reification as always accompanied by historically specific forms and levels of working-class resistance, then the development of the categories used to represent this real process of reification must reflect the ruptures imposed upon the capitalist mode of production by social conflict and the need for a bourgeois reformulation of the theoretical framework informing its

'box of tools'. It is therefore necessary to supplement the general methodological points of a critique of economics provided in this chapter by extensive historical research on the development of economic thought.[4]

Notes

1. 'The collective worker is counterposed not only to the machine, as constant capital, but also to labour power itself, as variable capital. It must end up having as its enemy the whole of capital: therefore also itself as part of capital' (Tronti, 1966, pp. 55–6).
2. I have paraphrased here a passage from Albert Camus, (1942, p. 32).
3. Cost price in this formulation corresponds to price of production.
4. For an analysis in this direction regarding the rise and fall of Keynesianism, see De Angelis 1995a.

References

Camus, Albert (1942) *The Myth of Sisyphus* (Harmondsworth: Penguin, 1975).

Cleaver, Harry (1979) *Reading Capital Politically* (Austin: University of Texas Press).

Cleaver, Harry (1992) 'The Inversion of Class Perspective in Marxian Theory: From Valorisation to Self-Valorisation', in Werner Bonefeld, Richard Gunn and Kosmas Psychopedis (eds), *Open Marxism. Theory and Practice*, Vol. II (London: Pluto Press).

Dalla Costa, Mariarosa and Selma James (1972) *The Power of Women and the Subversion of the Community* (Bristol: Falling Wall Press).

De Angelis, Massimo (1995a) 'Social Antagonism and Economics: a Reformulation of the Radical Critique of Keynesianism', PhD. dissertation, University of Utah, Salt Lake City.

De Angelis, Massimo (1995b) 'Beyond the Technological and Social Paradigm: a political reading of abstract labour as the substance of value', *Capital and Class*, vol. 57 (Autumn), pp. 107–34.

De Angelis, Massumo (1996) 'Social Relations, Commodity-Fetishism and Marx's Critique of Political Economy', Review of Radical Political Economics, Vol. 28, No. 4, pp. 1–29.

Dobb, Maurice (1973) *Theories of Value and Distribution Since Adam Smith. Ideology and Economic Theory* (Cambridge: Cambridge University Press).

Dunayevskaya, Raya (1973) *Philosophy and Revolution. From Hegel to Sartre and From Marx to Mao* (Atlantic Highlands: Humanities Press).

Fisk, John (1989) *Understanding Popular Culture* (Boston, Mass.: Unwin Hyman).

Marx, Karl (1852) 'The Eighteenth Brumaire of Louis Napoleon', in Saul K. Padover (ed.), *Karl Marx on Revolution*, (London: McGraw-Hill) pp. 243–328.
Marx, Karl (1867) *Capital*, vol. I (New York: Penguin, 1976).
Marx, Karl (1894) *Capital*, vol. III (New York: Penguin, 1981).
Marx, Karl (1963) *Theories of Surplus Value*, vol. 1 (Moscow: Progress Publishers).
Marx, Karl (1968) *Theories of Surplus Value*, vol. 2 (Moscow: Progress Publishers).
Marx, Karl (1971) *Theories of Surplus Value*, vol. 3 (Moscow: Progress Publishers).
Mattick, Paul (1980) *Economics, Politics and the Age of Inflation* (London: Merlin Press).
Tronti, Mario (1966) *Operai e capitale* (Torino: Einaudi).

18 Profitability and the Persistence of Capitalism

Meghnad Desai

The demise of the USSR and the transition of Leninist polities from socialism/state capitalism to capitalism have obviously led to a crisis in Marxian theory. If thought of as a theory of a socialist state, it has become irrelevant. But Marx was not theorising about socialism but about capitalism. The obverse side of the demise of the Soviet Union is the continued survival, and indeed efflorescence, of capitalism. Far from being *late* (troisième age) or being ripe for demise after its highest/latest phase of imperialism coming to an end, capitalism in the centenary year of volume III of *Capital* is not only alive, but also well and kicking (Mandel, 1978; Lenin, 1916). Are the methods and tools of *Capital* and of Marxism in general helpful in explaining this phenomenon?

Profitability is the motor of capitalism: as soon as the system as a whole stops generating profits on a scale and a rate at which capitalists continue to accumulate, the system will cease to be (see Desai, 1993). It is of little interest at the moment whether this decline will come spontaneously or be hastened by class action. There was a time when such disputes appeared to have immediate relevance; now sadly that is no longer the case. But we can therefore concentrate on the theoretical issue of the determination of profitability.

It is well known that in Marx's work there is a seeming contradiction. In part 7, volume I of *Capital* the classical model of accumulation and crisis is put forward. While this abstracts from money and from price/value deviations, it argues for a crisis-ridden capitalism where the focus of the struggle centres around the rate of exploitation and the rate of profit. Attempts to restore the rate of profit by increasing the organic composition are eventually not successful. While no time frame is put on the course of the (long) cycle in profitability, the argument is clearly in the direction of the collapse of the system. In chapter 21, Volume II of *Capital* the 'scheme of extended reproduction' is put forward, and this shows the possibility, albeit in a value-rather than money-theoretical model, of sustained balanced

growth in a two-sector/department model. In this model the (value) rate of profit is unequal across the two departments, but the growth rate of output converges to equality as between the two sectors within one year. Indeed for suitable parametric values, it could converge instantaneously. (I have discussed this extensively in Desai, 1979.)

In volume III of *Capital* there is a chapter on the 'Falling Rate of Profit'. By this stage in the book the price value transformation has been tackled, and despite much subsequent debate it is not a hindrance to the discussion of the falling rate of profit. There were attempts to test the falling rate of profit even before the publication of volume III of *Capital* (see Engels' preface and his reference to Steibeling; see also Desai, 1991.) Profitability has been investigated ever since by Marxists and non-Marxists (see the articles by Glyn and Moreton in Dunne, 1991; Duménil and Lévy, 1993.)

It is now well established (Roemer, 1981, ch. 4) that Marx's reasons for the falling rate of profit are not tenable. But 'It should be emphasised that changes in the subsistence vector b resulting from technological "progress", class struggle, and the growth of the reserve army have not been taken into account. When this, and the various deviations from the ideal model posited here are considered, the story becomes less definitive' (Roemer, 1981, p. 108). It is not only the growth of real wages and so on that is important, but that the monetary/financial side is ignored in all such discussions of Marx. We know that capitalism has survived. Bad as the data on profitability are, we can guess that profitability must have been adequate. What forces can then explain profitability in a way that takes on Marx's argument but goes beyond it?

The existing theorisation of profitability in Marxian economics is entirely in real terms, largely macroeconomic – national or sectoral, and closed economy oriented. It concentrates on the class struggle in one form or another and aspires to work out a price theoretic version of the value rate of profit that Marx concentrated on in volume I, part 7; volume II, chapter 21; and volume III, part 3. The treatment of M–C–M' in volume II, part 1, is ignored in all the discussions. The argument turns around the *share* of *non-labour* income in total GNP/revenue and then makes a stab at approximating the rate of return on capital by some measure of fixed capital (Armstrong, Glyn and Harrison, 1984). The most recent and exhaustive of such treatments is that by Duménil and Lévy (1993). They show, at the end of a carefully written book, that there is some discernible downward trend in the profit rate in the United States, but by and

large the system has an ability to metamorphose when faced with a serious crisis.

The Duménil–Lévy data are for the period 1869–1989, but they are for a single economy that is treated as a closed economy as well. One question that may arise relates to the importance of international trade in capital and commodities, (which has been a constant feature of capitalism since its inception), or indeed the globalisation that has been recently occurring (though it may only be revival of a nineteenth-century tendency), in restoring the profitability and hence the prospects of capitalism. In the closed economy formulation, profitability is a struggle between the rate of technical progress and the growth of real wages. (Goodwin, 1967, made an earlier, succinct formulation of this problem, though with a constant rather than a declining rate of profit; Duménil and Lévy, 1993, summarise their basic model in this way – see chapter 15 of their book.) But is internationalisation a way out as a separate strategy, or is it part of the same model only played out over a wider scale?

The controversy about finance capital and imperialism is well known; but in that literature the role of the periphery was to restore profitability in the single metropolitan country. The competition between the metropolitan countries was theorised in terms of the politics of war and imperial rivalry, but not in economic terms. Thus how are we to judge between the Hobson–Lenin theory of rivalrous metropolitan capitalist countries and Kautsky's theory of colluding metropolitan capitals in a peaceful superimperialism? It was thought that the history of the 1914–18 war had vindicated Lenin and disproved Kautsky. But now in the late twentieth century, does postmural Marxism embrace Kautsky?

The point is that we need to look again at Marx's theory of profit and see if it can accommodate any of the recent developments. Do we say that the revival of capitalism and its continued vigorous existence is merely a phase as before and as predictable within Marxism, or has Marxism itself become the endogenous victim of the metamorphosis of capitalism?

WHOSE PROFITABILITY: LEVELS OF AGGREGATION

A remarkable result of the growth of macroeconomic theory and of national income data is that the theory and measurement of the rate of profit is done at the level of the entire economy treated, by def-

inition, as closed or at best at the level of sectors. It is of course no mean task to do even this properly as the Duménil–Lévy book amply demonstrates. But eventually profits accrue to individual firms, or *capitals* as Marx labelled them. Note for example that the celebrated table in chapter 9 of volume III relates not to profitability in a simple or expanded scheme of reproduction (as almost all subsequent discussion from Bortkiewicz onwards have done), but five individual capitals listed seriatim, not necessarily tied together in an input–output nexus. Much of part 1 of volume III also treats profitability of individual capitals with unequal rates of surplus value, different organic composition of capitals and so on. Inasmuch as he knowingly eschewed both the circuits of capital schema and the reproduction schema in analysing the equalisation rates of profit problem, was Marx trying to solve a different problem than all of us have been foisting on him? (*That* problem can be and has been solved more often and in a greater variety of ways than any similar problem in economics, for example, the existence of equilibrium in Walras.)

This is said not in a spirit of fideism but because the continued dynamics of capitalism and the new (or renewed) forms it is taking compel us to look away from individual countries to individual, especially large, global capitals. It is the competition and collusion among the global and transnational corporations that is shaping capitalism. Sixty years after the *General Theory* the scope of Keynesianism in one country looks restricted. Governments are finding that their autonomy over the economy is limited. They no longer deal solely with the national bourgeoisie but with a faceless global financial market and global corporations with no loyalty to any particular flag.

It is therefore time to pose again the question of profitability. Large global corporations belong neither to single countries nor to particular sectors. Their internal trade generates a large proportion of the international trade of the world. They borrow capital from around the world and the recent financial innovations have made monetary statistics at the level of a single country increasingly meaningless. The growth of credit instruments is so noticeable that we can no longer continue to conduct the analysis of accumulation in 'real' terms. The shift of gravity of global capitalism towards the Far East and South-East Asia has also illustrated that the search for surplus value is now global, but also that the periphery, far from being a source of raw materials and a dumping ground for surplus

commodities as in the old model of imperialism, is now an active part of the capitalist world.

Thus the discussion of profitability must have at least the following elements (more will no doubt be added):

1. Profitability must be theorised at the level of the individual capital/firm/corporation rather than the economy as whole, at least to begin with.
2. There must be present from the beginning a monetary/financial dimension, both because of the importance of the money circuit of capital in Marx (M–C–M') but also because it is the reality.
3. The aggregation of individual capitals may be appropriate at the national level, but it may also require a multicountry or global perspective.
4. The dynamics of the rate of profit can no longer be studied at the level of a single country: while the rate of profit may decline in one country, the efforts to restore it may take the form as much of class struggle via economic and political forces within the country as the migration of capital abroad in search of higher profits. (While this has been known in a way since the Communist Manifesto, the data availability and the national macroeconomic theorising make us forget this simple fact.)
5. The global corporation is, in this sense, at once the agent and the result of the metamorphosis of capitalism after the oil shock to restore profitability.
6. Innovations in information technology, transport, and electronics have rendered possible the international division of labour, but they have also changed the very nature of the commodity in capitalism and thereby the nature of the accumulation and exploitation processes.

Let me immediately add that most of these strictures also apply to neoclassical economics, which lacks a theory of profitability, fails to integrate money into general equilibrium and has no way of tackling the regional drift of capitalism away from the core to the periphery. What little theory exists of individual firm profitability is due to obscure and neglected economists such as Keirstead and Shackle (see my entry on 'Profit Theory' in the *New Palgrave* – Desai, 1987).

Let me take up these questions, not so much in the order put above but in the order of their importance in my view.

ABSTRACT COMMODITIES AND CONCRETE LABOUR

Marx's formulation of the link between surplus value and profit is based on one important idea: the notion of abstract labour. Different heterogeneous commodities produced by material means of production and concrete labour can be made commensurate by the fact that they are all products of abstract labour. So while their use values are incommensurable, their exchange values can be related to their being vessels of abstract labour. This reduction of exchange value of labour power to abstract labour time (which is possible for any other commodity of course) made it directly comparable to the use value of labour power when employed in the production process by the capitalist. This use value is measured by the length of the working day/week with allowance for intensity and so on. In addition it is assumed that various heterogeneous types of labour can be reduced to abstract labour.

I wish to argue that recent innovations have done two things. Many of the newer commodities have a very small material content and a large abstract content of ideas, information, artistry and so on. Consider a video or a fax. In each case the material content in terms of exchange value is a small component of the total value. What gives the video of, say Cinderella, its exchange value is not the material but that it is the product of artists, musicians, cameramen, designers and so on. All these types of labour are concrete and difficult to reduce to average unskilled abstract labour. Labour time is a very inadequate measure of their value. It is the skill acquired over a long period and deployed in conjunction with others, or relevant complementary skills, that gives each person's labour power exchange value when deployed in production.

The materiality of the good is even more in question in messages sent by fax or via computer screens – transactions that may generate profits in the process. A complex international division of labour, global sourcing and so on become possible because of the availability of information networks where the cost of sending the message is negligible and the labour time spent (even allowing for the time spent installing the infrastructure) is very short indeed.

How do we bring to bear on this problem the classic Marxian analysis? This is not the same problem as that of automation, as discussed in the 1960s by Martin Nicolaus and others (Nicolaus, 1968). Labour time is reduced in abstract terms but the labour power

involved is highly trained, highly paid and represents years of accumulated knowledge, experience and so on.

Now if it were in principle possible to reduce these various concrete labours to abstract labour (say by the crude method of weighting an hour of concrete labour by its relative earning compared to unskilled labour, akin to Keynes' wage unit) then we would find that the organic composition of capital has collapsed, at least in the new commodities. At the same time, in terms of crude measures of labour time or number of hours worked, there will be a similar shrinkage. Everywhere in developed capitalist countries employment in manufacturing is static or going down. Productivity per person, or per hour, is rising very rapidly and the wage differential between skilled and unskilled labour is widening as well (Desai, 1994).

Thus in terms of simple labour time, less living labour is being used; yet weighted by their concrete skills, more labour time is being used. This is true for the new information-intensive commodities and services. At the same time the production of 'mature' commodities in terms of their product cycle has shifted away from the metropolis to the periphery. This is the traditional case of looking for higher profits by looking for cheaper but skilled labour. The emergence of the countries of East and South-East Asia as major exporters of manufactures is very much the result of this process. This process devalorises unskilled labour in the metropolis while valorising labour in the periphery. So simultaneously we have permanent, structural long-term unemployment in the OECD countries and widespread rural–urban migration in the rapidly growing peripheral countries of Asia. Here the organic composition of capital at the national level is rising and the rate of surplus value may be rising as well.

If this argument is plausible, what it implies is that the renewal of profitability that happened during the 1980s was a two-sided process – innovations that minimised crude labour time but used high-value concrete labour time to produce information-intensive abstract commodities in the core countries, and shifted the production of older commodities to areas where labour power was cheaper than that in the core for the same level of skill. The long cycle that started in 1973–74 with the oil shock (itself a symptom of the falling rate of profit in the metropolis) reshaped capitalism regionally and in terms of the commodity structure by this double process.

CREDIT AND CAPITAL

The dual process described did not happen without a parallel revolution in the financial markets. Even before the oil shock the difficulties of the US economy in realising a high profit rate (symptoms of which were inflationary pressures, balance of payment problems, and a weakening of the dollar, which required efforts to de-link gold and the dollar) had led to the creation of the off-shore Eurodollar market. With this, for the first time in a century a significant sector of the credit market was outside the control of any nation state. The oil shock continued this process by generating a large quantity of petrodollars, whose recycling became the responsibility of private banks. In this process the lending of these petrodollars extended the sway of commercial banks to Eastern Europe and the peripheral countries for the first time since the 1914 war. Despite the delusions of monetarism, there emerged a largely autonomous global financial sector that lay outside the control of all national authorities.

It was this sector that demanded and obtained the deregulation of foreign exchange markets and made possible the relocation of capital from one country of the core to another (Japan to Europe and to the United States) and from the core to the periphery. The mobility of direct foreign investment as well as of portfolio capital has been remarkable. It has made possible the relocation of capital in search of higher profits, the rapid production and marketing of innovations and, last but not least, the undermining of the autonomy of nation states in the economic sphere.

Thus the money and the physical circuit have intertwined at a transnational level. The translation into the commodity circuit – calculation of constant and variable capital and the rate of surplus value – has been rendered problematical by this process. Within each national economy a lot of production is still local and can be analysed as before in a national context. But the dominant tendency, small though it may be, is for the global division of labour increasingly to define and shape profitability. Surplus value from one region is fed into and becomes profit in another, the very process being made possible by the existence of innovative financial products and information-intensive services.

This also means that when Mr Moneybags arrives on the scene and advances M amount of money capital, he could be doing so in any currency other than that of the country where he is investing; the money in turn could be used to import equipment from a third

currency area, or many areas. When we convert the 'the money wage' of workers into variable capital, the same set of foreign exchanges come into play: imported consumer goods, holidays abroad, remittances back to the home base of the migrant worker; all involve the foreign exchange markets. When the end of the commodity circuit of capital is reached, output C has to be sold and converted back into M' via Q. But the conversion of C into M' may also involve exports and exchange manipulation. Finally, since the capital was foreign, the profit, m, will definitely be converted. (The notation and variables refer to Marx's 'three circuits of capital', described in part 1, volume II of *Capital*. See Desai, 1979, for a full exposition.)

Thus the money markets, far from being superficial and parasitical, become an important part of the surplus-value creation and realisation process. In one sense this has always been the case and the neglect of the monetary dimension of Marx's work has been due to the classical as well as the neoclassical doctrine of the veil of money. But the importation of capital equipment, the international fragmentation and division of labour exemplified by just-in-time production, the international trade flows in energy supplies, the practice of transfer pricing and international subcontracting; all point to a much more complex articulation of the interplay of exchange and production, as well as of the money circuit of capital with the other circuits.

COMPETITION AND MONOPOLY

One of the directions in which Marx's theory was revised soon after the publication of volume III of *Capital* was the thesis of monopoly capitalism. It was argued that while the nineteenth century was an era of competitive capitalism, the end of the century heralded a new era of cartels and combines. Hilferding and then Lenin most influentially argued the thesis of imperialism as emanating from a combination of large enterprises forced to combine into cartels linked up with financial capital, which augured the era of monopoly capital (Hilferding, 1910/1981; Lenin, 1916). The theory of how surplus value was realised, if in any different way than that outlined in *Capital*, was never made clear. In Lenin's famous pamphlet, largeness by itself seems to be a sufficient sign of monopoly status. Whatever the truth of that assertion, subsequent writers in the Marxist tradition accepted this thesis. The articulation of the neoclassical Pigouvian doctrine of

perfect and imperfect competition by Joan Robinson and Edward Chamberlin encouraged the line of thinking that, competition is a matter of size and the number of competing firms. Postwar thinking in Marxism by Paul Baran and Paul Sweezy did nothing to challenge this (Baran and Sweezy, 1966). It seemed to many that the US automobile industry epitomised this monopoly capital status. It had the market power, according to Galbraith, to shape demand as it wished. This monopoly capital had the power, according to Baran, to retard development in the periphery (Baran, 1957).

The events in the first 25 years after the Second World War gave a lot of support to this world view. Even today, some would argue that the corporatist capitalisms of Germany and Japan integrate oligopolistic industrial structure intimately with the state, which becomes an accessory to rapid accumulation. But during the 1970s, as the developed world was plunged into the crisis of profitability, the periphery began to replace the core as the place to revive profitability. Already during the 1960s, the power of the US automobile industry had been challenged by the German Volkswagen, the British Mini and the French Renault. During the 1970s it became difficult to pretend that the United States had monopoly power in cars, steel, aviation and so on (Auerbach *et al.*, 1988). This restructuring of capitalism raises questions about the very notion of competition and monopoly. Marx's theory combines class monopoly of the ownership of the means of production with competition among capitals. Size does not really matter, although in Marx's day the British had the larger firms and the monopoly power of the early starters. But openness to trade ensures competition, no matter how large or how many the firms. This process of contest combines with the desire for mergers and takeovers across the globe. No single capital, no single country, is immune from such contestability. The current trade battle between the United States and Japan is an attempt on the part of the former to expose the latter to greater contestability. The incessant process of innovation and openness of markets has reshaped, and is continuously reshaping, the global economy. It would be difficult to hold on to the theoretically diffuse notion of monopoly capital now.

THE CLASS STRUGGLE OVER PROFITABILITY

Thus the spatial displacement of the theatre of profitability – and hence of the class struggle from within the single economy of the

metropolis, or even within the metropolitan countries – to a larger canvas and, through the intervention of autonomous financial markets, to a more complex integration of the money circuit with the other circuits, has challenged many of the old certainties. The class struggle is no longer confined to one country; in the erosion of competitiveness of the core states there is a strange alliance between labour and capital against the periphery, while in the periphery many Marxists are still fighting the old battle against foreign capital and free trade. Trade unions are weakened and fragmented; the decline of Fordism and the emergence of information-intensive products have seen the relative shift of power between manual-workers' unions and white-collar unions. The latter have a different agenda and different view of their relation *vis-à-vis* capital than did the manual-workers' unions. The great political parties of the left in the core countries have thereby been debilitated.

At the same time, unionisation is weak to non-existent in the so-called 'high-performing Asian economies (HPAE), as well as in China. Globalisation is demanding the dismantling of trade unions in the few cases in the periphery (for example India) where they have flourished, albeit for a small slice of the workforce. A similar deconstruction of trade union strength took place throughout the 1980s in Latin America and Africa.

Of course there are contradictory forces in operation. Just-in-time production and the international fragmentation of production, in which the domestic content of a product is often less than 50 per cent, imply that a stoppage in one place, even for a day, means lay-offs elsewhere because the parts required for production are not being delivered. Thus international solidarity may grow objectively in the future and not merely as a slogan, as was the case in the last decades of the nineteenth century (only to be shattered by the 1914–18 war). But such a growth takes time, even in the rapidly changing circumstances of today. The growth of multinational entities such the EU and NAFTA may help speed the process, but only slightly.

CONCLUSION

This chapter has discussed, at a general level only the ingredients required for a new theory of profitability. I do think that the framework in the three volumes of *Capital* – the theory of cycles in part 7 of volume I, the theory of circuits of capital in part 1 of

volume II, and the schemes of reproduction in part 3 of volume III, plus the material on the determinants of profitability in parts 1–3 – provides a robust starting point. At the same time, the internationalisation of capitalism, the emergence of the global corporation as a new form, the changing importance of mental as opposed to manual labour, the revolutionary transformation in the financial markets – all these need to be incorporated in the framework.

To paraphrase Marx's famous eleventh thesis on Feuerbach: The world has changed. However, philosophers are now needed to (re)interpret the world.

References

Armstrong, P., A. Glyn and J. Harrison (1984) *Capitalism since World War II* (London: Fontana).

Auerbach, P., M. Desai and A. A. Shamsavari (1988) 'The Dialectics of Plan and the Market: On the Transition from Actually Existing Capitalism', *New Left Review*, no. 170 (September–October).

Baran, P. (1957) *Political Economy of Growth* (New York: Monthly Review Press).

Baran, P. and P. M. Sweezy (1966) *Monopoly Capital* (London: Penguin).

Desai, M. (1979) *Marxian Economics* (Oxford: Blackwell).

Desai, M. (1987) 'Profit Theory', in J. Eatwell *et al.* (eds), *The New Palgrave Dictionary of Economics* (London: Macmillan).

Desai, M. (1991) 'Methodological Problems in Quantitative Marxism', in Dunne, 1991.

Desai, M. (1993) 'Capitalism', in *The Oxford Dictionary of Political Thought* (Oxford: Oxford University Press).

Duménil, G. and D. Lévy (1993) *The Economics of the Profit Rate* (Aldershot: Edward Elgar).

Dunne, P. (1991) *Quantitative Marxism* (Oxford: Blackwell).

Glyn, A. (1991) 'International Trends in Profitability', in Dunne, 1991.

Goodwin, R. M. (1967) 'A Growth Cycle', in C. Feinstein (ed.), *Socialism, Capitalism and Economic Growth* (Cambridge: Cambridge University Press).

Hilferding, R. (1910/1981) *Finance Capital* (London: Routledge & Kegan Paul).

Lenin, V. I. (1916/1960–80) *Imperialism, the Highest Stage of Capitalism*, in Vol. XXII of Collected Works (London: Lawrence & Wishart)

Mandel, E. (1978) *Late Capitalism* (London: Verso).

Marx, K. (1867/1894) *Capital*, Vols I–III (Hamburg: Meissner)

Moreton, D. (1991) 'Marxian Crisis Theory and the Rate of Profit in the UK Economy, 1957–1985', in Dunne, 1991.

Moseley, F. (1992) *The Falling Rate of Profit in the Post War US Economy* (New York: St Martin's Press).

Nicolaus, M. (1968) 'The Unknown Marx', *New Left Review*, vol. 48 (March–April).
Roemer, J. (1981) *Analytical Foundations of Marxian Economic Theory* (Cambridge: Cambridge University Press).

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