Towards a New Understanding of Sraffa

Insights from Archival Research

Edited by
Riccardo Bellofiore
and Scott Carter

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Contents

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Jonathan Smith has been Archivist at Trinity College Cambridge since 1991. He is interested in the study of manuscripts created in the production of academic texts. Recent works include "Circuitous processes, jigsaw puzzles and indisputable results: making best use of the manuscripts of Sraffa's *Production of Commodities by Means of Commodities*" in the *Cambridge Journal of Economics* (2012) and "Wittgenstein's Blue Book: reading between the lines" in *The Textual Genesis of Wittgenstein's Philosophical Investigations* (edited by Nuno Venturinha, 2013).

List of Abbreviations

PCMC   *Production of Commodities by Means of Commodities: Prelude to a Critique of Economic Theory*

SP   Sraffa Papers housed at the Wren Library, Trinity College, University of Cambridge

SC   Sraffa Collection of books from his Private Library, Trinity College, University of Cambridge

1
Introduction

Riccardo Bellofiore and Scott Carter

The Sraffa Archive at the Wren Library, Trinity College, Cambridge, has been open for consultation by interested scholars since 1993, one decade after the economist's death. A project of publishing in 3 volumes a substantial selection of his papers is on-going, coordinated by Heinz Kurz with the contributions of many serious Sraffa scholars. It is certain to be a landmark and no doubt an essential tool to deepen our knowledge of Piero Sraffa, and finally reopen the debate on his works, foremost of all his masterpiece *Production of Commodities by Means of Commodities: Prelude to a Critique of Economic Theory (PCMC)*. But in the last twenty years the visitors consulting the mass of mostly hand-written notes of the Sraffa Papers (*SP*)[1] and his vast personal library known simply as the Sraffa Collection (*SC*) have been numerous, and many debates have been and remain conducted about the legacy of the Italian economist.

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[1] Sraffa references what we now call the Sraffa Papers as a 'mass of old notes' in the Preface to *PCMC* when speaking of the 'disproportionate length of time over which so short a work has been in preparation':

> Whilst the central propositions had taken shape in the late 1920's, particular points, such as the Standard commodity, joint products and fixed capital, were worked out in the 'thirties and early 'forties. In the period since 1955, while these pages were being put together out of a mass of old notes, little was added, apart from filling the gaps which had become apparent in the process (Sraffa 1960, p. vi).

The arrangement of the *SP* accords to the Trinity Catalogue made under the direction of Wren Library Archivist Jonathan Smith. Throughout this volume any underlined emphases within citations from the archive are Sraffa's own.

Among those regularly visiting the Cambridge archive were also many of us contributing to this volume, including the two authors of this Introduction. We, as others, were first curious as to what could be found in the archive, then somehow surprised by the documents we read: not only by the sheer amount of papers extant in contrast to the relatively few publications in his life, but also and especially by their content. The Sraffa Papers (*SP*) reveal a complex intellectual journey that has remained, it seems, mostly hidden to his friends, colleagues, and followers. We met an 'other' Sraffa, one different from the one usually transmitted by the literature certainly before his death but also left unchallenged for at least 15 year after his death; an 'other' Sraffa not in contrast with what he published, to be sure, but rather a Sraffa that could shine a different light on his printed articles and books. The opportunity to read the papers of this 'other' Sraffa was not one to be missed.

This was the original impulse behind the idea of organising a conference on the topic 'The Other Sraffa: Surprises in Archive?' at the University of Bergamo in December 2010, the immediate occasion being to honour the 50 years from *PCMC*. Most of the papers presented at that conference are here collected, after a thorough revision and rewriting. With very few exceptions, the conference had been organised by asking people who worked on the unpublished writings to provide new readings of Sraffa's *oeuvre*, and offering them a forum for debate with comments and rejoinders, thanks to the participation of other renowned Sraffa experts. The main subjects around which this volume, as well as the conference, were articulated are among the most controversial ones, very often inter-related: (i) the (dis)connection between Sraffa and Marx (what about the role of the labour theory of value, of exploitation, of the law of the falling rate of profits, after Sraffa?); (ii) the importance of the Standard commodity, and its analogy or not with money; (iii) the meaning of the determination of prices with a uniform rate of profits in *PCMC*, and the related issue of the tenability or not of the notion of centres of gravitation; (iv) the essentiality of money in various moments of Sraffa's thought as revealed through archival evidence; (v) the significance of the notion of the surplus in the 1960 book.

This volume opens with a chapter by Jonathan Smith, archivist at the Wren Library. Every scholar going to the Cambridge archive to study Sraffa has a debt to Jonathan Smith which we know well is impossible to be repaid. Whatever the approach to Sraffa's intellectual output, Smith argues, the opening of his papers has provided unexpected vistas of Sraffa's landscape. It has allowed us access to completely new material, such as his faculty lectures, and helped us to understand the routes he took to works with which we have become familiar, such as the preparatory work for *PCMC*,

archived according to the Trinity Catalogue as D3/12. Indeed, it might be argued that one purpose of archival material is at times to surprise and shake us out of the familiar ideas that we have, and take us into more uncomfortable territory. But surprise is not evident in isolation from our knowledge of Sraffa's work, rather it is a reaction to the identities we each impose on Sraffa based first on our understanding of his printed work – which is a carefully controlled subset of his potential intellectual output. However these identities, these 'other Sraffas', are not static, but are further contextualised as we grow more familiar with the Archive and as theories are contested in academic debate. According to Smith, while perhaps we should not be surprised that the archive has revealed some unexpected aspects of Sraffa's thought, the vigorous debate occasioned by the nexus of our differing identities for Sraffa and the content of his archive has produced vital insights into his life and works.

Part I of this book consists of Chapters 2 and 3 and a comment on both, located at the end of Chapter 4. Chapter 3 is the contribution by Dario Preti, an independent, non-academic researcher, interested in Sraffa and Marx. He is likely the first researcher who noticed, in the 1990s and without any visit to the archive, that the normalisation in §10 and §12 of Sraffa's book can be interpreted as an implicit endorsement of the labour theory of value (not so far from the postulated New Interpretation of Marx). The aim of Chapter 3 is a rejection of the criticism of redundancy mounted against the labour theory of value by some of Sraffa's followers; Preti refers to it as the 'critique of irrelevance'. To this end he first offers a solution to the transformation problem. He observes that that solution still appears insufficient to overturn the charge of irrelevance. Thus, in subsequent sections of the chapter he looks for the reason accounting for this result. The step that is needed to effectively defeat criticism is found in identifying the relationship between the living labour expended during the working day and the methods of productions (the 'givens' of the productive configuration in Sraffa). Preti levies an indictment against the neoricardian charge of irrelevance but also indicates how Marxian theorists too failed in appreciating the opportunity the technical critique against the labour theory of value had in further developing the latter. The chapter concludes by questioning the possibility of reaching a non-antagonistic relationship between Marx and Sraffa and developing the analytical points of contact between those approaches.

Chapter 4 is by Scott Carter, mostly focused on the notion of the Standard commodity. Carter follows how this theoretical construct is developed in Sraffa's journey up to *PCMC*, with a special attention to the 1955–7 period of writing, especially the Majorca Draft of March 1955.

The Standard commodity has been subject to wide scrutiny in terms of its mathematical properties and its economic implications. It is to the latter that Carter gives most of his attention. In his opinion the discovery of the Standard commodity occupied a key role in the development of Sraffa's outlook, and may be seen as a bridge towards the category of exploitation, interpreted in accord with the New Interpretation. What Sraffa demonstrates is that the value of this uniform physicalist Standard ratio coincides with the value of the aggregate labour to means of production ratio as well as the maximum rate of profits. Archival evidence shows that the impulse behind this construction was to support his Hypothesis (or 'Hypo') regarding the fundamental constancy in the ratio of net product (social revenue) to means of production, while recognising its non-generality. Surprised by his own discovery, Sraffa recognised behind the Standard commodity the necessity of a degree of abstraction which is no less than that required by 'paper-money'. Together with the proportional view about the wage and the closure of the price system through the rate of profits, Sraffa opened the door to the monetary sector.

The chapters by Preti and Carter are discussed by Pier Luigi Porta in a comment at the end of Chapter 4. Porta sees Preti's effort as a promising starting point in the never-ending game of challenging the Marxian notion of value. For Porta, Carter is trying to make the Sraffian system more Marxian than it is, but he substantially agrees that Sraffa had a Marxian approach in rescuing classicism. Where there is a strong dissent is rather on the idea that Sraffa somehow continued, in his own way, Marx's discourse on exploitation.

Part II of the volume opens with Chapter 5 by Ajit Sinha. The author starts by reminding us that in the Preface to *PCMC* Sraffa advances some specific remarks that are essential to understanding his book. Sraffa warns against reading his propositions in terms of an equilibrium of demand and supply, and claims that no assumption about returns to scale has been implied. Sraffa also affirms that he is taking up again the standpoint of classical political economy, from Adam Smith to Ricardo, and putting forward only a prelude to a critique of modern economic theory. If the propositions of the book are proved to be correct then they might provide a foundation for launching a critique of modern economic theory. Unfortunately, according to Sinha, none of these clear-cut statements of Sraffa have been given careful attention either by his followers or by his critics in interpreting *PCMC*. In his chapter Sinha discusses the above points in detail to develop a new perspective on Sraffa's book. Sinha maintains that Garegnani's idea of centres of gravitation given by effectual demand tacitly assumes

constant returns. What Sraffa instead takes as given is the empirical knowledge of the actual input–output data 'after the harvest'. The uniformity of the rate of profits is not in Sraffa the consequence of some kind of competitive gravitation mechanism among capitalists but rather a logical consequence of the manner in which Sraffa structures his system

The second chapter in Part II (Chapter 6) is by Stefano Perri and launches from Sraffa's 1943 rebuttal of Bortkiewicz's criticism of Marx's theory of the falling rate of profits. Perri sees in Marx's law two aspects. The first refers to technological progress as an historical, not mechanical, tendency towards the increase of constant capital per unit of labour as the main source of a growing productivity of labour. The second aspect is an analytical one: when this historical tendency prevails, the organic composition of capital grows, the maximum rate of profit decreases and eventually the actual rate of profit falls. Sraffa saw the law as built upon an abstraction from 'real' technological progress, and judged Marx's analytical framework to be consistent. However, when writing his notes, Sraffa believed also that even in the 'actual' economic system the relation between aggregate income and aggregated capital does not vary when the distribution of income changes (the 'Hypo'). Perri thinks that the Standard commodity can be used to support Sraffa's view on Marx's law even when the assumption of a constant relationship in the 'actual' economy between income and capital is dropped. The Standard relation should be interpreted as a value (not only physical) relation between the rate of profits and variable capital per unit of labour.

Andrea Salanti comments on Chapters 5 and 6 which appears at the end of Chapter 5. He starts from the observation that Perri is right in arguing that the analytical device of the Standard relation between wages and the profit rate may be employed to show that mechanisation, as a particular form of technical change, entails a fall in the maximum rate of profits. Salanti is less convinced by the extension of this conclusion to a fall also in the actual rate of profits. The point is the same as the one raised long ago by Joan Robinson, that a comparative statics comparison cannot yield definitive conclusions about the actual path of technical progress in capitalist economies. The criticism Salanti raises towards Sinha is methodological in nature: models have to accomplish some representational functions. Even though Salanti is, like Sinha, sceptical of the interpretation of prices of production as centres of gravitation, that approach at least openly deals with the issue of how to bridge the gap between the model and the 'world out there''– namely, which use might be made of Sraffa's prices.

Part III is comprised of two chapters by Ghislain Deleplace and Jean Cartelier, respectively, and a comment on both by Guglielmo Chiodi which appears at the end of Chapter 8.

Chapter 7 by Deleplace focuses on a usually neglected aspect of Sraffa's prices: their real versus their monetary character. Modern Walrasian equilibrium prices are real prices, since their determination depends upon forces which can be understood regardless of any assumption about money. Although the theory is supposed to be dealing with a monetary economy, money is then considered as neutral with respect to the determination of relative prices: whatever the way money is or is not 'integrated', the equilibrium price system remains unaffected. Then the question arises as to whether it is the same with the Sraffa system, that is whether money should also be considered as neutral with respect to the determination of relative prices. Drawing on the Sraffa Papers, the chapter consider various ways in which money could be viewed as playing a role in the determination of prices, and takes into account the unpublished notes written by Sraffa for his 1932 article against Hayek as well as those included in Sraffa's copy of *The General Theory*. Deleplace reaches four conclusions. First, looked at in the rear-view mirror of the 1930s, Sraffa prices are money prices, so that we have to raise the question: how does money affect them? Second, contrary to a frequent assertion, §44 of *Production of Commodities* on the role of 'the money rates of interest' is not the appropriate answer to that question: money may only affect prices through distribution if it acts at a deeper level in the economic system (what this author calls Sraffa's two-tier approach to money). Third, this deeper level is the role of money as a means of exchange and as a standard of deferred payments, not as a store of value. Fourth, and as a consequence, money in Sraffa is at the same time to be considered 'essential' but also outside the 'natural' system of production.

Chapter 8 by Cartelier is also focused on the balance between real and monetary analysis in Sraffa, although from a different angle. The question this author wants to discuss is what kind of objectivity we are dealing with when Sraffa considers two different economies, one without and the other with a surplus. The heart of the matter is whether it makes sense to take the technique as being physically given (i.e. observable by the 'man from the moon'). Cartelier claims that the relevant objectivity is not physical but social. What is called a 'technique' crucially depends on the social conditions of production. Two main propositions are put forward: (i) in Sraffa's framework, if natural prices are adopted by the market, it is impossible to objectively observe a surplus if all producers are independent; (ii) a surplus may be objectively observed only if

individuals are not homogeneous from the point of view of production (the typical example is wage-earners working for entrepreneurs). Better than 'techniques' 'or 'physical commodities', monetary relations objectively reveal the crucial difference between a simple market economy (akin to Marx's simple commodity production) and a market economy with surplus. A brief illustration is provided pointing to Kalecki and Keynes rather than Ricardo.

Guglielmo Chiodi's comment on Deleplace disputes the idea of a two-tier approach to money. The determination of the rate of profits through the money rate of interest shows the essentiality of 'money' in the economy, and emphasises the key role of the financial sector in regulating the power relationships within society. Regarding Cartelier, the gist of Chiodi's observations is probably the following: that what is 'objective' in Sraffa is not simply the physical 'given quantities of commodities' used and produced. Those 'given quantities of commodities' must be interpreted from a social viewpoint, where political elements and power relations are most important, and the historical profile of the community is summarised. Relevant for the criticisms mounted by Chiodi, in both cases, is the consideration that the oblivion of the notion of the subsistence element of the wage is unwarranted: subsistence is an essential part of the classical and Marxian heritage, and must be taken as a genuine social notion.

In the concluding Chapter 9, Riccardo Bellofiore returns to the *vexata quaestio* of the relationship between Sraffa and Marx. A difficulty is that too often the followers of Sraffa do not seem to know enough of the new developments in the Marxian territory in the last 30 years, and that most of the Marxists do not understand the surplus approach and/ or deny in a too-cavalier manner the presence of problematic points in the labour theory of value. The chapter begins with a personal survey of some moments of the debate of the 1970s (especially the Italian one, which is for many reasons particularly significant). It then traces a conjectural history of the path to *PCMC* since the late 1920s, stressing the discontinuity of the various phases in the writing of the book. The role of Marx in the construction of Sraffa's 1960 book turns out to be more profound than could previously have been guessed before the opening of the Sraffa Archive, and Sraffa's reference to Marx's value theory persists even after the publication of the book. It is possible to detect some points of contact, and some divergences, of Sraffa with the macro-monetary approaches to Marx, and especially with the New Interpretation. Bellofiore sees the link in the idendity proposed by Sraffa between the value of the net product and the direct labour producing

it, so that distributional shares may be read in terms of exploitation; the ground for this reading goes back to the 1940 notes on *Use of the notion of surplus value*, where the origin of the surplus is accounted for through a counterfactual comparison based on the prolongation of living labour. The 'snapshot' of the methods of production after the harvest must be recognised as a still frame in a movie, and we need to ground the process of the constituting Sraffa's spectral objectivity in Marxian exploitation.

2
Surprise in the Archive: Reactions to Sraffa's Papers

Jonathan Smith

Introduction

The Papers of Piero Sraffa (*SP*), held in the Wren Library at Trinity College Cambridge, were not made available for consultation until late in 1993, ten years after the economist's death. Once they were opened, the papers saw a steady stream of readers eager to study his literary remains. One such was Riccardo Bellofiore, who thought he recognised in them something that he found surprising; something that did not chime with the orthodox view of Sraffa's thought. In a paper exploring his ideas on Marx's influence on Sraffa's theoretical output, Bellofiore describes one aspect of his reaction to encountering the Sraffa Papers in the following fashion. 'In my view', he says 'the Wren Library provides unexpected vistas of Sraffa's landscape which partly changed my view of interpreting Sraffa's theoretical contribution' (Bellofiore, 2008, p. 69). He then goes on to explain that these 'unexpected vistas' consist of a view of the relationship between the ideas of Marx and Sraffa that did not concur with the thought of Sraffa as it was generally understood.

The extent of Marx's theoretical influence on Sraffa has been a cause of much debate, both before and after the papers became accessible, but the opening of the papers certainly fuelled debate on all aspects of Sraffa's life and work. That there should be material in the Sraffa archive which leads to differing interpretations of the development of his intellectual output is to be expected. Giancarlo de Vivo points this out effectively. In a comment on his work in reconstructing the path Sraffa followed in producing *Production of Commodities by Means of Commodities* (*PCMC*), a

comment which reflects as much on history and historians of all kinds as it does the Sraffa Papers, he states:

> It goes without saying that a work like the present one can never aim at being definitive. Even irrespective of possible errors of interpretation, one cannot rule out that others may provide a partially or entirely different reconstruction of that path. The writing of a paper like this must necessarily be like the piecing together of a jigsaw puzzle, with the added difficulty that many of the pieces must be left out. It is therefore by no means impossible that using different pieces, a partly or entirely different picture may be put together. (de Vivo, 2003, p. 2)

Significant archives often fill us with a sense of wonder where they go beyond what we expect to find in them. Writers such as Heinz Kurz and Neri Salvadori (2005, p. 70) and Luigi Pasinetti (2007, p. 174) have intimated as much in discussing their encounters with the Sraffa archive. But beyond wonder, when they reveal information that runs counter to our expectations, archives may also surprise. I do not intend here soley use of the ordinary definition of the term 'surprise'. Of course archives should also confirm and elucidate things that we already know and add evidential credence to matters that may have been suspected though yet unproven. However the present chapter makes the case for an explicit, and particular, notion of surprise arising from interaction with an archive revealing aspects of both the archive and its creator that were either completely unknown or had been discounted in the face of prevailing evidence. Furthermore, my use of 'surprise' relies on the presupposition of what might be called objective surprise. That is to say surprise in this study targets external properties in the archive, not only the scholar's subjective response at being surprised, though the two are certainly connected.

It is not my intention to give a list of surprising findings arising out of the Sraffa Papers. I hope that this chapter will show that there is good reason to expect that different people will be surprised in different ways by different things, depending on their nature and experience. Moreover, given the unique nature of each archive, some archives prove more fertile in their capacity to surprise than others. I wish to suggest that the Sraffa Papers are a particularly good example of an archive with the *potential* to surprise. I would also like to suggest reasons why we might be surprised by material that emerges from the archive and why our reaction to that sense of surprise is beneficial to our understanding of that material. In

addition I shall touch on the subject of why this makes the archive so important in understanding Sraffa's printed work because, whatever we are surprised by, surprising information does not exist in a vacuum. Novel though it may be, material that surprises us should either be completely rejected or somehow integrated into our knowledge of the individual that created the archive. In the process it will either change our vision completely about aspects of the history, biography or thought of their creator, or allow us a more nuanced understanding of them.

First, however, I ought to describe briefly the archive itself. Sraffa's Papers (*SP*) contain records of various different aspects of his life: the personal – his official documentation, family and familiar correspondence and diaries; the more professional papers – academic notes, drafts for lectures and preparatory materials for his publications; and material that perhaps falls between the two – such as his bibliographical papers. Examples of important sections of his professional papers include the lengthy notes of the important lectures on the Advanced Theory of Value (archived as D2/4) given to student of the Economics Tripos in the late 1920s and early 1930s and the substantial preparatory work, from conception to print, of his longer works, the Ricardo edition and *PCMC* (archived as D3/11 and D3/12, respectively). The relationships between documents within the archive can be complex and are perhaps not yet completely understood, yet they add contextual elements to our understanding of the manuscript and typewritten pages as authors such as Kurz and Salvadori have shown. Evidence from within the archive suggests that Sraffa was reasonably meticulous in preserving their order and making explanatory annotations where he moved material from one folder to another and in indicating those occasions where he thought he had followed a false route in his reasoning. On approaching the archive for the first time, its complex and detailed nature is immediately evident, giving the promise of interesting results and revelations of new perspectives on the influences and development of Sraffa's thought; of things that had previously only been hinted at or vaguely understood or things that were completely novel; and of things that would excite interest among those scholars studying Sraffa's work. Such materials should certainly elicit wonder, but do they produce in us reactions of surprise?

Unexpected events and counter-expected events

Before considering the element of surprise in the archive it is relevant to look very briefly at the concept depicted by the term 'surprise'. Here I may be accused of over-simplification in the light of recent

work by Matthias Gross (2010) and others, but I wish to concentrate on a particular type of surprise, that based on counter-expectation. In his paper *The Expectational Dynamics of the Individual*, George Shackle (1943, p. 117) makes the distinction between 'unexpected events', that is events that have never been formulated in the subject's imagination, and 'counter-expected events', events that have been considered but rejected on the basis of the prevailing evidence. Shackle's input is, I think, important, not least because he spent much of his academic life trying to persuade others of the importance of understanding the relevance of surprising occurrences within apparently stable systems. Although he also describes various subsets of counter-expected events, his simple bipartite definition not only covers all types of surprising event; it also introduces us to the notion of counter-expectation and defines the surprise caused by occurrences that are not wholly new to us. Turning to the Sraffa archive, there is potential for surprise to arise out of unexpected events – such an event might be the discovery of a completely unknown work. However, it seems to me that it is surprise arising from counter-expectation rather than from unexpected events that comes closest to characterising the type of surprise that is likely to arise when consulting the archive.

If any surprise findings in the archive are likely to be as a result of counter-expectation, it should also be stressed that different types of counter-expected findings may well emerge. The most obvious type is that which arises when information in the archive runs against fundamental aspects of Sraffa's thought, for example the type of findings that Bellofiore was surprised to encounter. We might call this 'greater surprise'. However, there is clearly a type of surprise that the reader might experience which is based on material in the archive that does not run counter to Sraffa's fundamental principles, but which corrects minor misunderstandings, and makes more explicit ideas and sources of which Sraffa only gives hints and material which for stylistic or other reasons may have been edited out of his publications. Perhaps this could be deemed a species of 'lesser surprise'. Thus there are different orders of surprise. We may usefully compare this distinction with the not-unconnected topic of scientific revolutions as defined by Kuhn. These too can be large or small and have repercussions which may be wide-ranging or distinctly focused, yet which are all necessarily revolutionary, though may only seem so to those whom they affect (Kuhn, 1996, pp. 49, 92–3). They may also arise from surprising research findings which, as Kuhn points out, was the case relating to the discovery of X-rays which 'violated deeply entrenched expectations' (1996, p. 59).

The printed works

To Gross, surprise and ignorance walk hand in hand, since ignorance is required to produce a surprising event (Gross, 2010, p. 1). Nevertheless, in the case of counter-expectation, it is evident that a modicum of knowledge is surely also required as an antecedent premise for being surprised. If we find evidence of a train of thought or a source or influence that we had discounted, or of which we were unaware among the archive of an academic such as Sraffa, we may be surprised. However we are surprised as a reaction to prior evidence based not on perfect knowledge of their thought, but on knowledge which we are likely to have constructed on the basis of their printed output, and of our interaction not only with it, but also with, and in the context of, the work of others active in the same area. This is a vital aspect of counter-expectation in the context of academic texts and in relation to the Sraffa Papers in particular. Crucial to the potential for surprise in the archives of academics is the fact that we are almost certainly first aware of their printed oeuvre, and only later take cognisance of the archival material created in developing those works. From the point of view of understanding the development of the ideas therein this is surely the wrong way to approach it, but is, of course, in all practicality unavoidable. For while we preserve the papers of academics essentially for the insight into the development of the ideas that they yield, in the case of most academics we do already have representations of their thought in the shape of their publications. It is therefore the published works that form the source for prevailing evidence, counter to which opposing evidence from the archive will create a sense of surprise.

   The potential for the counter-expected, when relating the printed work to drafts and other material produced in the process of its development, arises in part from the nature of the published work. In general, the arguments of an academic publication are developed in a linear and controlled way. In extreme cases some writers are unable to adequately represent their thought in print. The philosopher and friend of Sraffa, Ludwig Wittgenstein, for example, struggled to find a means by which he could provide a linear exposition of his ideas by 'welding together' his remarks only to realise that this was beyond him and consequently never published another major work after the *Tractatus*. Perhaps this was because he realised that an academic publication is a static rather than a dynamic text. It is, as the 'genetic-critic' Pierre-Marc de Biasi reminds us of all published texts, 'closed in its perfected form and in a state of equilibrium that seems to be the immediate expression of

its own internal necessity' (de Biasi, 2005, p. 37). While in the arena of academic discourse such publications are debated and effectively reinterpreted, as texts they remain set in stone as an encapsulation of an academic's attempt to express their view on a subject at a particular time. Views which, to give an extreme example, may have been held for 30 years may come to be rejected shortly after publication, often as a result of criticism. We can here perhaps pause to sympathise with Frege, on the point of publishing the second volume of his multi-volume work on the foundation of arithmetic, only to learn from Russell that there was a flaw in the logic expounded in his first volume.

If academic publications are in this way static, they are also controlled. Publication is the most efficient way for an academic author to control those areas of their thought which are disseminated to the wider academic community, though of course they will certainly have less control once the publication reaches the arena of academic debate. Sometimes it is a consequence of controlling those aspects of their thought that the wider world sees that academics may choose to prevent certain data reaching the public domain. For an example of an academic who thought he was losing the control that he had over his ideas, we turn again to Wittgenstein and his furious reaction when he saw the flawed and repeated dissemination of his ideas by various members his circle. Yet, hand in hand with the control that publication offers to authors, the approachability of published academic works and their role at the very heart of academic life has made them for centuries our prime means of negotiating with the ideas of particular individuals. Thus they have become the most widespread means of understanding as much we can another's thought. The great mistake would be to assume that they represented both the totality as well as the consistency and accuracy of that individual's thought.

So how do these general aspects of the printed academic work relate to the particular instance of the Sraffa corpus? In his case, the number of theoretical publications was rather small, in essence the 1926 article, the 1930 *Economic Journal* symposium, the attack on Hayek, the introduction to Ricardo, and, of course, *PCMC*. Even viewed as a volume of collected works it would be slim; and as a corpus it is considerably smaller than the output of his Trinity colleagues, Dennis Robertson and Maurice Dobb, or of his friend John Maynard Keynes, which seems vast in comparison. Even Wittgenstein, who as we have observed struggled to produce a finished text left us a printed corpus hardly smaller than Sraffa's theoretical work. If the material is narrowly defined in quantitative terms, there are also certain qualitative aspects that contribute

to the sense of the counter-expected when we later approach Sraffa's archive. *PCMC*, for example, his best-known theoretical work, is one that is clearly tightly controlled in terms of the ideas that Sraffa wished to put forward.

This sense of control is heightened by the fact that Sraffa rarely discussed aspects of his work with fellow economists with the exception of the loyal Maurice Dobb. *PCMC* has a particularly terse style – arguably aiming at an objectivist view of only selected aspects of an economic system (though of course much has since been developed from the system he created). The reason for this given by some is that he wished to hide the Marxian element of his thought during a period when East/West relations were not particularly happy. This may be true, but we should also note Sraffa's appreciation of the terse style of the classical economists as revealed in a note quoted by Pasinetti (2007, p. 196) and the possible influence that this might have had on his own style. Whatever its cause, such is the style and nature of the book that when it was published, it was misunderstood by a goodly portion of the economic community – in the words of Enrico Bellino (2008, p. 34) it 'wrong-footed most of the economists who ran into it', whether from its standpoint (essentially rooted in classical economics), its style, or its slightly unusual use of mathematics. The limited output and controlled style might lead us to expect that the archival material was of a similar nature.

Meeting the archive

So we have set out the nature of Sraffa's printed works – sparse, tautly written and controlled. To judge the potential for counter-expectation we must now compare it with the archive. Unlike books and articles in periodicals, well-preserved archives do not show the result of a process of thought on a particular subject, but record that thought process itself. Indeed, the causal relationships between thought and document make them very much a part of the process they record. In addition archives are relatively free-form, with individual archival entities interacting with others in interesting ways, thus allowing us illuminating insights into both thought and process through their inter-relationship. Archives also usually embody evidence that enables us to introduce a better defined temporal aspect into our understanding of the development in an individual's ideas, since, though they might have their genesis in a brilliant moment, most theories are developed to more mature conclusion over time. In the case of the Sraffa Papers this is

quite evident given the length of time that Sraffa took to develop *PCMC* from the first ideas to publication. Here we are aided considerably by the tendency of Sraffa to date his notes. As with other academic archives the Sraffa Papers document trains of thought that do not appear in the subsequent publication, discarded because a subjective shift of priority rendered them irrelevant to the central argument of the work, or found wanting as a result of an objective refinement. For example in a number of cases Sraffa annotated files created during work on *PCMC* with the words 'rubbish' or 'discarded' and he dropped a number of lectures from the series on the Advanced Theory of Value. Finally academic archives often reveal evidence of specific aspects of collaboration with another individual as in the case of Sraffa, Frank Ramsey, Abram Besicovitch, and Alister Watson.

It seems clear then that there is potential for archives of academics in general, and the Sraffa Papers in particular, to yield evidence of an individual's thought that is very much at odds with the view based on their published oeuvre, and so for an archive to surprise. Indeed, I would argue that it is part of the nature of a significant archive to surprise precisely in this way. Certainly if it was merely made up of familiar material such as manuscript and typescript representations of the published work of an academic it would fail to add a great deal to our knowledge of its creator. In addition it would also not make a particularly good case for permanent preservation. Here I think it is safe to conclude that the Sraffa archive does not disappoint in that it includes all these potentially surprising aspects.

Imposed identities

If part of the reason for being surprised by what we might find in the archive is the way in which the nature and content of the published material differs from its archival precursor, it is not the whole story. A key factor in counter-expectation is the way in which we approach the work of others and this explains why some people are surprised by material that they find in the archive, while others are not. Here I think to a certain extent we need to be tuned to the discovery of the counter-expected. As was suggested earlier, the potential for counter-expectation results from our interaction with the printed work and the debates that arise out of it. It is this that we encounter before we read the preparatory material in the archive, and it is this factor that accounts for the fact that some who approach the archive are surprised by what they find in it, whilst others, reacting to the same evidence,

are not. When developing a knowledge of the work of any academic, we construct an identity for the thought of that academic which is only partially complete and partially accurate, yet it is one which we subsequently impose on them in our relationship with their work. This identity – we might call it a discourse-mediated imposed intellectual identity – is formulated by the relationship between the published work and our academic experiences, opinions and prejudices so that each identity of such a type is different, to a greater or lesser degree, for each individual who formulates one.

As a result of these different influences on the way that we engage with the work of others, we see many different identities imposed on an academic author that are neither a completely true nor completely false representations of their thought. If we represent this diagram-matically, such imposed identities form intersecting sets. However none intersect completely, either with other imposed identities, or with the actual intellectual identity of that academic. Some of them interact more extensively than others. Where they intersect with other identities as well as the true one represents a consensus of understanding. In other areas they might intersect with each other yet not with the original, creating a consensus of misunderstanding. Ultimately each of the imposed identities is the result of complex negotiation. However, if these identities are all unique, only in the most stubbornly dogmatic mind can they be static, as our under-standing is moulded by new evidence and inter-reaction with other scholars in academic debate. As the family resemblances between the identities that we create become apparent, they reveal the schools of thought within the community of scholars that studies a particular academic's life and work.

When we ally this view of the way we interact with another's thought with the concept of counter-expectation, we see how important it is to our case. What is clear is not only that Sraffa scholars impose identi-ties on Sraffa's thought that differ subtly from each other, but also that schools of thought are brought together by common aspects of these identities. It also follows that scholars from each school can be surprised by the existence of certain material in the archive, though not neces-sarily by the same material. We have seen how thin on the ground and tersely composed some of Sraffa's published works are, with the epitome of the terse style being that of *PCMC*. What is undeniable is that the various imposed identities play a large part in leading academics to form differing interpretations of that work. Was the book a negative or a posi-tive contribution to economic thought? Was it merely a critique of an

existing system or the basis of a new one? What, if any, was the debt to Marx and if there was a debt, to what end? Or, at the extreme, is Sraffa's work worth studying or is it merely a footnote to the history of economic thought? Once we start constructing real answers to these questions we become tuned to surprise based on counter-expectation as we consult the archive.

Anticipation and expectations

If counter-expectation is one of the greatest sources for finding surprising information in an archive, we ought to consider how expectation is managed in the case of an archive that was closed to scholars for quite some time. This is of course pertinent to Sraffa's Papers. We have to examine the role played by anticipation and the development of expectations, both realistic and unrealistic, of what the archive might contain. For while Krishna Bharadwaj and Pierangelo Garegnani had made strides in cataloguing the material during the period in which the archive was closed as a prelude to the intended publication of a selection of it, in general its contents were only vaguely known to the wider economic community.[1] In contrast to this situation, there was a strong desire by members of that community to gain access to the material the archive contained.

Given Sraffa's reputation, both as a first-rate theoretician and as a meticulous scholar, and given the difficult nature of his last great work, it is not surprising that in some cases speculation filled the void left by the absence of factual evidence. The combination of restricted access and desire to know what is in an archive can result in an unrealistic expectation of what it contains, with the result that once opened users are disappointed. Most obviously for the case in point is the absence of anything substantial relating to the writing of the introduction to the Ricardo edition which is important on theoretical as well as historical grounds as it provides us with a new interpretation of classical economic theory. Disappointment follows in the wake of surprise, a form of counter-expectation built not on the firm ground of academic research but on anticipation heightened by time, which then leads to unrealistic expectations.

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[1] See Smith (2012, p. 1296) for a brief synopsis of earlier efforts to catalogue the Sraffa Papers.

Concluding remarks

My thesis is a simple one. It is that our understanding of Sraffa's thought that we take from his printed work and from debate on that work might be challenged when we consult his papers. If the gulf in understanding brought to light by this is sufficiently large it may result in revelations that we find surprising. But if the Sraffa Papers throw up surprising material that runs counter to our expectations what are we to make of this? What, if anything, is the consequence, and what should we learn from the fact? Surprise, after all, should make us aware of our own ignorance and encourage us to make good our deficiencies. Gross reminds us this is 'often something to which scientists aspire since it means a window to new and unexpected knowledge' (Gross, 2010, p. 1). And though the research paradigm may be different, it is also a window to unexpected knowledge in other disciplines. In 1934 C. S. Peirce tried to explain the role that could be played by surprise resulting from counter-expectation in bringing about new conclusions. In his later theory of abduction (as opposed to deduction and induction) which he saw as a pragmatic way of reasoning where likelihood of a premise being true replaced certainty, he suggests that it takes the following logical form:

> The surprising fact, C, is observed;
> But if A were true, C would be a matter of course,Hence there is a reason to suppose A is true. (Pierce, 1934, p. 118)

If we can use surprise findings positively in the way that Peirce suggests, I believe that it follows that if the archive does indeed produce novel material that surprises us, we ought to embrace it and make use of this new material, though our reaction to it needs to be proportionate. Material that emerges from the archive is material of high evidential value that cannot, or certainly should not, merely be dismissed without debate. Rather, it needs emphasising, drawing attention to and pointing out. Even so, our surprises require a narrative to hold them together and bind them to less surprising material, which will help to contextualise and interpret them. They may take us in new directions, ones that we had not expected from our existing knowledge of Sraffa's work. Equally, this situation may help correct misconceptions by facilitating the explanation of aspects of Sraffa's thought more explicitly or by making evident the routes he took to particular conclusions.

Related to this, the surprising findings which comprise our topic remind us that the printed sources do not reveal all. Rather they record such aspects of Sraffa's thought as he wanted to reveal at the time of publication. In contrast they illuminate the importance of the archive. We may be able to understand Sraffa's publications better by following the route their author took in composing them, by noting the influences on him, with all that implies, and being prepared to be surprised by the fact that what emerges from the archive does not match our preconceptions. We must also acknowledge that new and surprising material also helps fuel the debates over aspects of Sraffa's work; and without it discussion may wear thin as familiar ground is trodden and re-trodden. I stated earlier the idea that we all develop identities which we impose on Sraffa which differ, subtly or less so, with those identities which others impose on him. Given the importance of the archival material as a source of quality evidence, the debate that surrounds any new material may help to bring us towards greater consensus on aspects of Sraffa's thought pulling together the different identities we impose on it, bringing us closer to Sraffa's actual and very complex identity. This is, I think, the point: that we must embrace any surprising findings in the archive and use them to gain a more rounded understanding of a remarkable intellectual.

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3
On the Neoricardian Criticism of Irrelevance

Dario Preti

Introduction

The publication in the early 1960s of Piero Sraffa's *Production of Commodities by Means of Commodities* (*PCMC*) (Sraffa 1960) triggered a storm of criticism directed at the core of Marxian theory, threatening to undermine it. Why did Sraffa's book have the power to induce so potent a theoretical cataclysm? The answer is easy. A few years earlier, Seton's (1957) important work 'The "Transformation Problem"' had been published, in which prices of production and the profit rate were derived from a matrix of data expressed in value terms: that is, in quantities of labour, just as Marx's theory seemed to require. Then Sraffa, using similar mathematics, calculated prices and the profit rate starting from the physical quantities of means of production, labour-power and produced commodities.[1] Here values carry out no function and Marx's theory of value disappears. Since Sraffa's prices appear to be exactly the same as Marx's prices of production, some economists quickly reached the distressing conclusion that prices of production and the profit rate could be derived without reference to Marx's theory. Marx's theory would in this case be irrelevant, a statement that strikes at the heart the theory of the origin of surplus value (or profit) from the expenditure of human labour stated by Marx in *Capital*. This discovery has given way to a critical reflection that undermines Marxist theory in its internal consistency and therefore its validity.

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[1] The calculation of prices starting from physical data had in fact already appeared in Seton (1957); however at the time this critical result did not draw much attention.

The purpose of this chapter is to show the substantive inconsistency of the main argument fielded by critics, henceforth called 'neoricardian', of the Marxian theory of value, namely the issue of irrelevance of the latter theory, and therefore of the expenditure of labour, in determining the rate of profit.[2] Substantially, the chapter continues the effort of those theories which have thus far attempted, albeit inadequately, to challenge the destructive conclusions of the neoricardian criticism.[3] I hope that this could promote the progress of a reflection eventually free from false conclusions and prejudgments on a matter as central as the link between human labour supplied in commodity production and the valorisation of capital

Value and price

Let us begin with a rather neglected but essential point about the relationship between relative and absolute value. The *fact* of exchange, namely the fact that the quantity x_i of commodity i is exchanged against the quantity x_n of commodity n, establishes that the exchange value of commodity i is the quantity of commodity n received during the exchange. This is expressed by the relation:

$$x_i v_{in} = x_n .$$

in which v_{in} is the unit exchange value of commodity i in terms of commodity n. This value is a *relative* value because it is expressed by the quantity of another commodity, the commodity received in exchange. When the received commodity is money, the relative value is called *price*. Denoting the price of commodity i by p_i, the previous equation becomes:

$$x_i p_i = x_n .$$

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[2] The more relevant papers considered here are: Samuelson (1970), Lippi (1979), and Steedman (1977). Vicarelli (1981) enlarged the scope of the critical position and Vianello (1986) expressed negative judgments on labour-value many times, although here we only draw upon a paper edited for the Marxian centenary. Of particular interest is the critique of Claudio Napoleoni. Since a detailed commentary on Napoleoni's work is impossible here, the reader is referred to Bellofiore (1991).

[3] Specifically the 'New Interpretation' (NI) approach proposed by Duménil (1980), Duménil (1983), and Foley (1982), the later approaches associated with Wolff, Roberts and Callari (1982), Moseley (1993), and the 'Temporal Single System Interpretation' (TSSI) of, for example, Freeman and Carchedi (1996).

From which it follows that:

$$p_i = \frac{x_n}{x_i} . \qquad (3.1)$$

Now, the situation in which x_i quantity of a commodity exchanges against x_n quantity of another commodity allows us to advance the hypothesis that, in the passage of commodities from hand to hand, equal *values* are exchanged. With this is posited the notion of commodities having *intrinsic value*, or *absolute value* (which we will henceforth call simply *value*).[4] Since, as we will see, the values subtended to capitalistic exchange of commodities are the transformed values z_i, we can already use this notation. Then, denoting the unit *values* of the commodities i and n by z_i and z_n respectively, according to the hypothesis just advanced we can write:

$$x_i z_i = x_n z_n .$$

The *value* of x_i quantity of commodity i is equal to the *value* of x_n quantity of commodity n.

From this relation we derive:

$$\frac{z_i}{z_n} = \frac{x_n}{x_i} .$$

Recalling Equation (3.1) we therefore obtain:

$$p_i = \frac{z_i}{z_n} . \qquad (3.2)$$

So the *price* of a commodity is also a ratio between *values*: or to be precise, the ratio between the unit *values* of the commodity and money. The formula shows that price is an expression of the commodity exchange value that assumes the value of money as unit of measurement. This

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[4] Marx states this thesis at the beginning of *Capital* where he writes: 'Let us now take two commodities, for example corn and iron. Whatever their exchange relation may be, it can always be represented by an equation in which a given quantity of corn is equated to some quantity of iron, for instance 1 quarter of corn = x cwt of iron. What does this equation signify? It signifies that *a common element of identical magnitude exists in two different things*, in 1 quarter of corn and similarly in x cwt of iron.' Continuing Marx finds that this common thing of equal magnitude is *value*: 'the common factor in the exchange relation, or in the exchange-value of commodity, is therefore its *value*' (Marx, 1976, pp. 127–8; emphasis added).

is the relationship between *value* and *price* that must be taken into account in the so-called 'transformation problem', the burden and delight of theoretical Marxism to which we now turn. Indeed the enigma of this problem rests to a large extent on the perpetual confusion within economic thought between the categories of *value* and *price*.

Statement of the problem

According to Marx a commodity 'has value only because abstract human *labour* is *objectified* or *materialised* in it' (Marx, 1976, p. 129). Therefore the *value* of a commodity is for him the quantity of socially necessary labour in general, or the abstract human labour, spent to produce it. Following Ricardo, this labour includes both living labour, which is immediately supplied by the worker, and past labour spent to produce means of production. Thus the *value* of a commodity is constituted by the sum of quantities of living labour and past labour 'congealed' in means of production and transferred to the product. Let us denote as λ_i the unit value of the commodity i, k_{ij} the physical quantity of means of production i used within industry j (so $k_{ij} \times \lambda_i$ represents the labour objectified in such means of production), l_j the quantity of living labour expended in industry j, and q_j the quantity of commodity j produced and sold; then the system of equations that calculate the *values* of commodities according to Marx's theory is:[5]

$$k_{11}\lambda_1 + k_{21}\lambda_2 + \ldots + k_{n1}\lambda_n + l_1 = q_1\lambda_1$$
$$k_{12}\lambda_1 + k_{22}\lambda_2 + \ldots + k_{n2}\lambda_n + l_2 = q_2\lambda_2$$
$$\ldots \qquad\qquad\qquad\qquad\qquad\qquad (3.3)$$
$$k_{1n}\lambda_1 + k_{2n}\lambda_2 + \ldots + k_{nn}\lambda_n + l_n = q_n\lambda_n$$

Given 'physical data' (quantities of means of production k_{ij}, labour-power l_j and commodities q_j, defined as the physical structure of

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[5] The simplifying assumptions introduced are: (i) no changes occur within the economy, it is in a stationary state; (ii) the productive system is made up of *n* industries producing *n* commodities during a given time period (each industry produces only one commodity and there are no joint products); (iii) means of production are entirely used up in each period and no commodity is used as means of production in the period within which it is produced; (iv) one commodity (we assume it is the commodity *n*) acts as money and is used as measure of values of other commodities, namely it is the numéraire of system; and (v) all commodities produced in a period are sold.

production methods), Equation (3.3) represents a system with n equations that univocally determine the n values λ_i. We will henceforth name them *original values*. From these equations one easily obtains that the physical dimension of *values* λ_i is the same as living labour l_j – therefore time – whose magnitudes are expressed by the same unit of measure used for labour (hour or another time unit). Then values λ_i are quantities of abstract labour expended and objectified in unit quantities of commodities *i* during the production process. By determining the values, the Equation (3.3) determines the value production that takes place in the overall system. Thus we can think of them as the expression in mathematical terms of the process of creating value – the *valorisation process* – which, according to Marx, takes place in every industry together with the labour process. It is in this way that we will henceforth think of these equations: they are not the values in a hypothetical society of simple commodity production which precedes capitalism but rather show the production of value by the labour *that takes place in capitalism*.

Yet in capitalist society, commodities are not generally sold at prices corresponding to their original values λ_i. The main reason is the tendency toward the equalisation of profit rates due to the competition among firms and between industries as well as differences in the organic composition of their capitals. This fact does not imply the abandonment of Marx's theory of the determination of value magnitude by labour time; rather, it raises the theoretical question of how to draw from the valorisation process the new different values of commodities current in capitalism. This means what we usually call the 'transformation problem' is therefore essentially the calculation of how, in competitive capitalism, the value produced by the expenditure of human labour is redistributed among commodities so that an average rate of profit is established in all industries. Marx thought this calculation could be performed in monetary magnitudes, assuming the value of money was constant.[6] If the assumption is admitted, the ratio between the value and price of a commodity is fixed (exactly as it appears in Equation (3.2), as the value of money) and becomes irrelevant in calculation using prices or values. Yet in the redistribution of values made in capitalism all values change; and so the value of the commodity acting as money in our system must also change. Consequently the use of prices or values is no longer irrelevant: indeed

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[6] '(A) further series of factors have also to be taken into account in our analysis ... . Firstly, the *value of money*. This we can take as constant throughout' (Marx, 1981, p. 142).

one must use values. This causes no difficulty and even appears perfectly consistent with Marx's notion of value in which prices are theorised as *the necessary mode of expression*, or the outward form of appearance, of an inner essence: that is, value.[7] This vision implies at least two things: first that the redistribution process takes place at the inner level of essence, the level of values; second that the analysis must immerse itself in these deep waters to throw light on the *subterranean and unobservable processes* whereby form of appearance (prices of production) are determined by the labour supplied and objectified in commodities. It follows that the calculations must be carried out initially by values, and only successively, at the end, reach their outward form of appearance, i.e. prices. We will proceed exactly in this way.

Theoretical research in its long historical evolution from Marx to Bortkiewicz and Seton has arrived at the following equation system to calculate the rate of profit and *transformed values* (the term henceforth used to refer to *absolute values* corresponding to Marx's *prices* of production) determined by competitive capitalism:

$$(k_{11} z_1 + k_{21} z_2 + ... + k_{n1} z_n + l_1 z_w) (1+r) = q_1 z_1$$
$$(k_{12} z_1 + k_{22} z_2 + ... + k_{n2} z_n + l_2 z_w) (1+r) = q_2 z_2 \qquad (3.4)$$
$$...$$
$$(k_{1n} z_1 + k_{2n} z_2 + ... + k_{nn} z_n + l_n z_w) (1+r) = q_n z_n$$

where z_i is the transformed value of the commodity i, z_w the unit value of labour-power and r the uniform rate of profit. But is this calculation possible? To attempt an answer the first step is to count equations and unknowns. Before beginning the count, it is necessary however to clarify how we are thinking of dealing with the value of labour-power. The money wage p_w is determined by the bargaining between workers and capitalists on the labour market, or rather of power relations among

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[7] Marx writes: 'exchange-value cannot be anything other than the *mode of expression*, the "form of appearance", of a content distinguishable from it' (Marx 1976, p. 127; original italics, deleted from the English edition, have been restored). Further, this distinguishable content is *value* as crystals of human labour in the abstract: 'All these things (the products of labour) now tell us that human labour-power has been expended to produce them, human labour is accumulated in them. As crystals of this social substance, which is common to them all, they are values, commodity values. ... The progress of the investigation will lead us back to exchange-value as the necessary mode of expression, or form of appearance, of value. For the present, however, we must consider the nature of value independently of its form of appearance' (p. 128).

social classes that are established on that market at any particular epoch. In the context of our problem we can therefore assume it as given. From Equation (3.2) we draw that the value of labour-power is:

$$z_w = z_n p_w \, . \tag{3.5}$$

We add this to Equation (3.4) where we see that the value of labour-power z_w is directly proportional to the money wage p_w. It thus becomes possible to introduce the simplification that, in place of wage p_w, the value of labour-power z_w is directly given, eliminating the Equation (3.5) just introduced.[8] If after this specification we turn to the count of equations and unknowns, we find that there are n Equation (3.4) while the unknowns are $n + 1$ (n values z_i and the profit rate r). The calculation of transformed values cannot be performed due to the lack of an equation. We must find it and add it.[9]

The Function of value theory

Of what does this equation consist? In the Marxist literature the question has given rise to the problem of understanding the meaning and role of the missing equation. In Equation (3.4) terms z_i figure as elements that are unknown and not yet well defined in their physical dimension. We cannot affirm that they are *values* or *prices*. In the context of our problem the meaning and role of the additional equation becomes the mathematical expression of the theory of value that defines the physical dimension of values and makes possible their calculation. The point is not, as is often thought (e.g. Seton, 1957), to simply add an equation that establishes an equality between some magnitude before and after the transformation, but *to set out the theory that defines how much is the value production of the labour in the system*, value production which remains unchanged during value redistribution. Within this the poorly understood problem of the role and meaning of the missing equation is hidden; precisely, the need to express in mathematical form the theory of value we choose to adopt. Since

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[8] Alternatively, one can assume that the real wage is historically determined and adds to Equation (3.4) the equation to calculate the value of labour-power:

$w_1 z_1 + w_2 z_2 + \ldots + w_n z_n = L z_w$

where $w_1, w_2, \ldots, w_n$ is the basket of wage-goods and L the total living labour.

[9] As we will see below, by system Equation (3.4) we can calculate the ratio between values z_i / z_n – a ratio that, as it appears from Equation (3.2), represents the *prices* of commodities – but not the transformed *values* z_i.

Marx's value theory assumes that labour is objectified in a commodity as value – so that, in a sense, labour produces value – one or more equations are required to establish that the total amount of *value production* within the whole productive system, therefore the total value of the commodities produced, equals the total labour expended and objectified in commodities. This is the missing equation, and also the mysterious meaning of the problem that rises with it: mathematical (or physical) logic requires us to put the theory of value into mathematical language. This logic is cogent and unequivocal: *if the equation is missing, or if there is a formula which establishes a magnitude of value independent of supplied labour, there is no labour theory of value and no solution to the transformation problem.*

Calculating the total value of production according to Marx's theory presents no particular difficulty. It can easily be carried out by Equation (3.3), the system of equations that expresses, as we said, the valorisation process. Marx's theory affirms that total value is equal to total past labour plus total living labour, so it is enough to sum all terms on the left-hand side of Equation (3.3) to arrive at it. Since total past labour is:

$$C_\lambda = K_1\lambda_1 + K_2\lambda_2 + ...+ K_n\lambda_n$$

where:

$$[K_i = (k_{i1} + k_{i2} + ... + k_{in}), \text{ and}$$

$$L = l_1 + l_2 + ... + l_n = \text{total living labour.}$$

Consequently the total value production will be:

$$\Lambda = C_\lambda + L \ (= q_1\lambda_1 + q_2\lambda_2 + ... + q_n\lambda_n) \tag{3.6}$$

The value of gross social product in capitalist society must equal the above total production of value, and therefore must be:

$$q_1z_1 + q_2z_2 + ... + q_nz_n = C_\lambda + L \ (= \Lambda)$$

that is:[10]

$$q_1z_1 + q_2z_2 + ... + q_nz_n = q_1\lambda_1 + q_2\lambda_2 + ... + q_n\lambda_n \tag{3.7}$$

We have found the missing equation that leads to the solution of our problem; or better yet, since in Equation (3.7) the original values λ_i

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[10] The equality of transformed and original total value is an obvious consequence of our formulation. In the shift from original values λ_i to transformed values z_i the value of money changes; it follows that the equality of total product in terms of *values*, expressed in the equation, does not entail the equality in terms of *prices*.

are present which require Equation (3.3) in order to be calculated, the
equations to be added are actually Equations (3.7) and (3.3). Thus the
complete system is made up of Equations (3.3), (3.4) and (3.7). The n
Equation (3.3) determines n original values, i.e. labour objectified in
commodities; the $n + 1$ Equations (3.4) and (3.7) determine n trans-
formed values and the rate of profit based on the production of value
established by Equation (3.3), that is based on Marx's theory of value.
These latter equations further establish the physical dimension of the
transformed values z_i, which clearly is the same as the original values
λ_i, that is time; also the unit of measure is the same: hour or another
time unit. The meaning of the whole procedure can be summarised in
this way: we have set a *valorisation process*, expressed by Equation (3.3),
that determines the total production of value shown by Equation (3.6)
and used in Equation (3.7), and a *redistribution process* of such a total
value according to the criterion of a uniform rate of profit, shown by
Equation (3.4).

Calculation of prices of production and emergence of the neoricardian problem

The sole remaining task is to map out the path leading from the trans-
formed *values* just calculated to their form of appearance: *prices of
production*. This appears unproblematic. Since, as we have assumed, the
commodity n acts as money, a straightforward application of Equation
(3.2) allows us to obtain the prices corresponding to these values. Thus
our calculation is finalised. Another interesting opportunity, however,
arises from this mathematical technique: if we divide all Equations (3.4)
by the transformed value of money z_n, then referring to Equation (3.2)
we obtain (where p_w is the money wage):

$$(k_{11} \, p_1 + k_{21} \, p_2 + \ldots + k_{n1} \, p_n + l_1 p_w) \, (1+r) = q_1 \, p_1$$

$$(k_{12} \, p_1 + k_{22} \, p_2 + \ldots + k_{n2} \, p_n + l_2 p_w) \, (1+r) = q_2 \, p_2 \qquad (3.8)$$

$$\ldots$$

$$(k_{1n} \, p_1 + k_{2n} \, p_2 + \ldots + k_{nn} \, p_n + l_n p_w) \, (1+r) = q_n \, p_n$$

As $p_n = z_n/z_n = 1$, the price of money no longer is unknown. This is
the system of equations obtainable from Sraffa. It is clearly interesting
because it is a system with n equations in n unknowns (the $n - 1$ prices
and the rate of profit) that allows, given 'physical data' and the money
wage, an immediate calculation of prices and the profit rate, without

the necessity of using the labour theory of value.[11] This discovery has been the outwardly solid foundation of the neoricardian criticism of irrelevance because it eliminated the necessity of labour-value theory in the calculation of the profit rate and prices, a theory which Marx and Marxists consider to be essential. Yet we have reached here a different result: instead of there being only Sraffa's way, we have at our disposal *two equally practicable ways* to arrive at the same result (the calculation of profit rate and prices): the 'Sraffian' way, represented by Equation (3.8), and the labour-value way, represented by the system of Equations (3.3), (3.4), (3.7) and finally Equation (3.2). This is one step ahead of the neoricardian critics who contend prices and the profit rate are determined independently of labour-value and the labour theory is dismissed as irrelevant. This step in my opinion is sufficient to cast doubt on the criticism because it is a signal that the labour-value theory is relevant in determining profit, yet is still insufficient to get rid totally of the load of criticism. In other words we remain always in a situation of embarrassing uncertainty and ambiguity with the question posed that continues to haunt us: is the labour-value theory relevant for determining profit or not? On the one hand in fact, because in one of the two ways the labour-value theory is involved in the calculation, it would seem relevant; on the other hand however, given that it is not influential in the Sraffian way, it continues to appear irrelevant. We are like Alice in Wonderland to whom things appear in one way yet also in another, and where theories are relevant but at the same time are not.

We need to examine this issue more closely. The tangle in which we find ourselves arises from the fact that Marx had identified in the working time spent during the working day the determining factor of surplus value (and thus also of the profit rate), and the labour-value theory is able to show this relationship of determination. The first book of *Capital* is largely devoted to this enterprise which we summarise as follows: the daily expenditure of labour produces value that is deposited in the goods produced, and surplus value is derived from the production of value exceeded beyond the time required to produce the means of support for the worker. Marx explained his theory by assuming the simplest hypothesis that the price of commodities corresponds to the original values, that is to the labour expended to produce them.

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[11] If the money wage is unknown, we can suppose, similarly to note 8, that the basket of wage-goods, or real wage, is given, and add to Equation (3.8) the equation:

$$w_1 p_1 + w_2 p_2 + \ldots + w_n = L p_w.$$

But, as we know, with capitalism commodities are not sold at original values but rather at prices of production. What remained to be done to improve the theory and to make it more concurrent with reality was to continue the Marxian analysis of showing how even production prices stem from the objectification of labour. It was necessary to solve the famous transformation problem that Marx bequeathed to his successors and followers, who in fact tried several times to reach a more satisfactory result than that outlined by Marx himself.

While Marxism was struggling with this problem, the twentieth-century economic theory elaborated the new theoretical construction of *production methods* in which, as soon became clear in the work of Sraffa, things generally appear in quite a different way. Indeed – Sraffa points this out immediately in the first few pages of *PCMC* – when methods of production are given the total surplus produced by the system is determined and, knowing the real wages paid to workers, the overall surplus product remaining for the capitalists is also determined. But profit is surplus product in money terms; and therefore as the methods of production allow the calculation of prices along with the surplus product, the profit and the rate of profit are then determined. These latter also depend directly on the methods of production. And since the methods represent a technique described by the matrix of technical coefficients, the profit and the rate of profit also become technical phenomena. A very productive technique generates a large surplus product and therefore high profits while a primitive technique produces little surplus product and low profits. Hence the notion of the 'production method' becomes the major analytical tool in understanding the value form. So the relationship of determination between expended labour and profit – which had been the great discovery of the Marxian theory of value – therefore *disappears*. With this the production of value by labour – the labour theory of value – no longer plays any function, loses the central role it had through Marx, and in fact loses any role at all. Soon thereafter arises the thought in many minds of the irrelevance of the labour theory in relation to the determination of profit and the rate of profit. This is the thesis reached, after Sraffa, by neoricardian criticism. Supported by seemingly unquestionable evidence, the thesis spread with overwhelming force.

Faced with such a theoretical construction, even finding a solution to the age-old transformation problem no longer seems sufficient to reverse the situation which is unfavourable to the value-labour theory. In fact, even if we have identified a second way of calculating prices and the rate of profit based on the labour theory of value, that way also uses the tool of production methods in which profit seems not to have

a relationship with the labour expended definable in terms of Marxian theory. We therefore remain in a state of uncertainty that prevents reversal of the critical argument. Expressed in its simplest terms, the delicate and problematic point – which seems to confirm neoricardian criticism – can be formulated as follows: given the overall wages paid to workers, while in Marx's original theory, the increase of expended living labour determines the increase of the surplus value produced and therefore of the rate of profit, with the analytical tool of production methods, this is no longer the case. If we perform the calculations, we find that also with the second way based on the labour-value theory, the increase of living labour leaves the rate of profit unchanged. Thus the seemingly more advanced tool of production methods is construed as disavowing the Marx's theory leading to the conclusion that profit does not originate from the expenditure of labour but from the technique itself (indeed it is easy to verify that the rate of profit increases by reducing the technical coefficients, namely by improving the production technique). This different result is due to the fact that in Marx, the increase of supplied living labour, because it is derived from the lengthening of the working day, gives an increase of the value produced by the quantitative increase of commodities produced, from which follows the increase of surplus product, surplus value and rate of profit. Alternatively with the notion of production methods, the prices and the rate of profit depend exclusively – as is well known and easy to prove – on the matrix of technical coefficients, which is fixed and invariable, so increases or decreases in the labour required, notwithstanding they entail variations in the quantities produced, have no influence on the rate of profit. Thus the amount of labour loses the role of 'producer of value' – and thus of surplus value – which it has in Marx, and the theory of labour-value becomes irrelevant. For a critical assessment of this result from the use of technical coefficients, two observations are useful.

First, the instrument of technical coefficients merely states that the quantities of means of production used are all proportional to one another: a double amount of labour requires a double quantity of machinery, tools, raw materials, etc., and results in twice the amount of goods produced. But if this seems fairly plausible if we consider double the amount of labour to be double the number of employees working for the same work time; it is much less plausible – in fact it is not at all plausible – if we consider the double amount of labour to be the same number of employees working for twice as long. It is plausible to assume that an industry, when it employs 50 workers for 8 hours a day uses half the machinery and tools and produces half compared to when 100 workers are used but still for 8

hours. In this case, the simple relationship of proportionality between the amount of labour and means of production established by the technical coefficients is acceptable. This is no longer the case when it is the daily working time that varies instead of the number of workers. It is quite clear that 50 workers require the same machinery and tools – namely the same fixed capital – whether they work 4 hours or 8 hours or 12 hours a day, but working 8 hours will produce twice as much as in 4 hours, and working 12 hours three times as much. This leads us to conclude that the instrument of technical coefficients as they are usually conceived is inadequate and inappropriate to address fully the question of the relationship between expended living labour and profit. Its failure is clear when the change in the amount of labour is due to changes in the daily working time instead of the number of workers employed.

To overcome this defect, it is necessary to distinguish the two components that make up the amount of living labour added, namely the number of workers and the daily working time, and to investigate the different consequences that stem from changing one or the other. Secondly, even with such an inadequate instrument, it is however possible to find that the *mass* of profit varies in direct proportion to the living labour added, increasing if the labour provided increases, and decreasing if the labour provided decreases. Even with their inadequate tool, neoricardian critics could thus identify the existence of a relationship between the quantity of labour employed and the mass of profit obtained by firms. But I don't think they have. This makes us realise that together with the blindness provoked by the primitive tool used, there is also an ideological blindness. Critics did not want to see and therefore have not seen.

Criticism of neoricardian argument of irrelevance

At this point, we are now able to perceive the step necessary to successfully challenge the critical thesis: there is a need to better focus on the relationship between the structure of production methods and the living labour expended, which in Sraffa and in neoricardian criticism remains somewhat in the shadows. The criticism assumes that the production methods are either given directly or in a scalar form through technical coefficients; but although that can be sufficient for certain inquiries, it is no longer sufficient for exploring the origin of profit. When the relationship between profit and labour comes into play, it is necessary to abandon these limited and faulty assumptions and to consider the structure of the methods formed and its relationship with the expenditure of labour.[12] The result we arrive at is a structure of production methods

as a function of daily work time, one that is a relatively complex material determination of the daily working time and exists in that form as a result of a given length of the working day. Variations of the working day involves some kind of change of the structure.

With production methods determined in this way, we are able to perform the calculation of the original and transformed values, production prices and the rate of profit for different lengths of the working day, or for different actual quantities of living labour expended. The calculation shows that in a system where workers receive a fixed wage, profit and rate of profit are increasing functions of the length of the working day. By changing the working day, production methods vary, and with this profit and thus the rate of profit: an increase in daily working time increases profit and profit rate increase and vice versa for a reduction in daily working time[13] just as Marx had found. This effect of working time on profit takes place through the change of production methods determined, as described above. Therefore, when production methods are given directly – as is generally the case and as we have done in this chapter – or are given in scalar form refering to a given matrix of technical coefficients, the relationship between daily working time and level of profit is difficult to perceive, or rather cannot be seen at all. To see this relationship, it is necessary to recognise the fact that production methods depend on the working time from which they derived. But it is precisely this fact that neoricardian criticism ultimately ignores. Dealing with inadequate tools, it hides from itself the fact that by varying the daily working time, production methods also vary in a certain way and accordingly the profit and the rate of profit vary. From this ignorance comes the idea that the expenditure of labour, and therefore the labour theory of value, is irrelevant in determining the rate of profit. The reasoning now developed can be summed up by the following schema of relationships.

Figure 3.1 represents the structure of a modern version of the labour theory of value: the living labour supplied during the working day determines the production methods from which profit – or, in Marx's language,

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[12] The file *production methods* on the website *http://digilander.libero.it/ivesives/valuelab* provides a concise but comprehensive picture of the construction of such a structure.

[13] The file *giorlav* which can be downloaded from the website *http://digilander.libero.it/ivesives/valuelab* shows the relationship between the length of the working day and level of the rate of profit.

surplus value – and the profit rate are derived. From this schema it becomes clear that the labour theory of value cannot be irrelevant: profit, rate of profit and production prices depend in fact, ultimately, on the length of the working day, that is on the actual expenditure of living human labour. Specifically, profit and the profit rate are increasing functions of daily working time.[14] The following figure is a synthetic illustration of this.

Figure 3.2 shows that below a certain minimum daily working time there is no profit and above this minimum begins surplus labour time and hence profit arises. Profit and the rate of profit increase with the increase of such time. The technology used (therefore, for example in our case, the technical coefficients) works by moving the curve left or right and thus raising or lowering the rate of profit for a given daily period of working time.
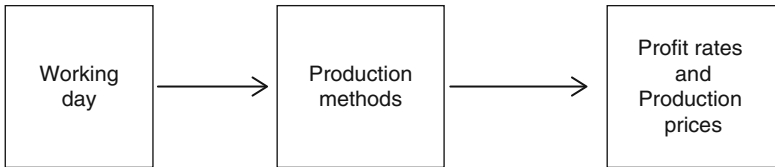

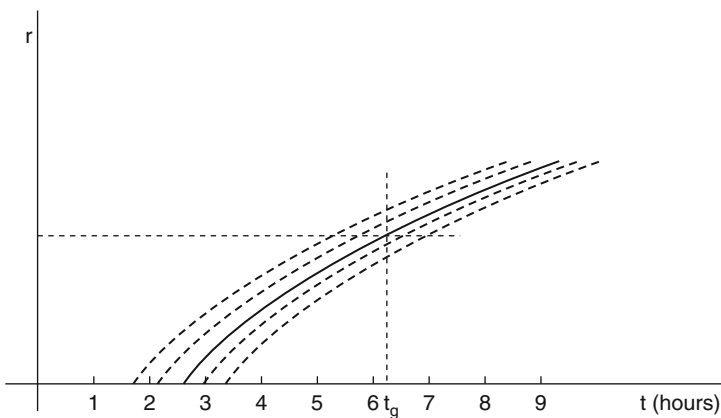*Figure 3.1*   Structure of the labour theory of value

Figure 3.2   Profit rate as an increasing function of daily working time

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[14] Centrality of living labour and importance of working time lengthening had been frequently underlined by Riccardo Bellofiore (see Bellofiore, 2007, particularly section 7).

When the methods are given directly or in scalar form no one sees all this; one only sees that there is in them a physical surplus from which, subtracting the means of support paid to workers, one obtains the surplus product and therefore also the profit and rate of profit. No one sees the role played by the length of the working day. In this way one reaches the conclusion that profit depends only on the technique used in various industries (while instead, as we have just seen, the technique is influential in the sense that it raises or lowers the curve of the function that links the rate of profit to the daily working time). Neoricardian criticism was built around this blindness. Its fault comes from, besides its own internal theoretical weaknesses, the fact also that, in the complicated affair of the transformation problem, Marxist theorists thought to a certain extent that prices and the rate of profit were determined according to the labour theory of value once we have production methods in which the quantities are magnitudes of value corresponding to expended labour. However, as discussed in more detail in next section, they were wrong. Thanks to the work of Sraffa, neoricardian criticism realised that this was not the case – in fact, according to Sraffa, the rate of profit is determined with the production methods expressed in physical terms – and used this Sraffian discovery to eliminate the labour-value theory and the related idea of a relationship between the length of working day and the extent of capital valorisation. But it was, as we now understand, an unfair resolution.

Reasons for the strength of neoricardian criticism

What still remains to be understood at this point are the reasons for the outward strength and undoubted success of an argument that now appears so mediocre. It derives from the history of the transformation problem, from the way in which the thinking around this problem has developed. We shall attempt to understand it by examining the solution established after Seton. The solution accepted by many Marxists before the neoricardian criticism is represented by the following system of equations:[15]

$$\left[(k_{11}\,\lambda_1)\,\beta_1 + (k_{21}\,\lambda_2)\,\beta_2 + \dots + (k_{n1}\,\lambda_n)\,\beta_n + 1_1\,z_w\right](1+r) = (q_1\,\lambda_1)\,\beta_1$$

$$\left[(k_{12}\,\lambda_1)\,\beta_1 + (k_{22}\,\lambda_2)\,\beta_2 + \dots + (k_{n2}\,\lambda_n)\,\beta_n + 1_2\,z_w\right](1+r) = (q_2\,\lambda_2)\,\beta_2 \quad (3.9)$$

$$\dots$$

$$\left[(k_{1n}\,\lambda_1)\,\beta_1 + (k_{2n}\,\lambda_2)\,\beta_2 + \dots + (k_{nn}\,\lambda_n)\,\beta_n + 1_n\,z_w\right](1+r) = (q_n\,\lambda_n)\,\beta_v$$

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[15] This system is an elaboration of Seton's system. Setting $z_i = \beta_i\lambda_i$ we obtain Equation (3.4).

In these equations values λ_i are given, or calculated, by means of Equation (3.3), and every element enclosed within round brackets, considered in its entirety, is a magnitude of value representing labour objectified in the commodity. According to traditional Marxist theory, extending from Bortkiewicz through Sweezy, the presence of such elements establishes that the calculation of unknowns (the β_i coefficients, which in Seton are 'prices') is made on the basis of the 'labour theory of value'. On this interpretation, we cannot recognise the actual meaning of the missing equation required, which is, as we said above, 'to put the theory of value into mathematical language'. Within the traditional view, this theory is already operational in the magnitudes representing labour. Reiterating its presence is therefore unnecessary. So the additional equation simply becomes a 'normalisation equation' with the limited function of establishing a price level that realises some invariance condition during the transformation. The choice of invariance options (surplus value, new-value, gross product, or some other value) does not invoke the role of labour in the theory of value, but is typically based on the criterion of simplicity. Sweezy (1970) argued that the 'simpler and, therefore, more attractive' option 'from a mathematical point of view' is to maintain unchanged the Bortkiewiczian 'unit value' or, in Sweezy's terminology, the 'unit of gold' (i.e. the value of money). Hence the additional equation generally adopted is:[16]

$$\beta_n = 1 \tag{3.10}$$

Using this equation we can calculate β_i 'prices' starting from *original values* so that the 'transformation problem' seems to be happily solved. On the contrary the solution is only the triumph of appearance and Marx's theory of value is actually suppressed, as will soon be clear, via Sraffa, even to neoricardians. The point is this: in our procedure transformed values and the rate of profit are computed *on the basis* of the labour-value theory by the mathematical method of

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[16] As $z_n = \beta_n \lambda_n$ it follows that: $z_n = \lambda_n$. The value of money remains invariable in the transformation. Equation (3.10) comes from Bortkiewicz (1949), and Sweezy (1970). Seton (1957) says it as the first practical choice among the possible alternatives. Notice that in Equation (3.9) β_i elements can be interpreted as the unitary *transformed values* of physical quantities expressed in labour-time. The function of Equation (3.10) is to change these β_i into prices, namely in a form which does not require any theory of value. In fact adding Equation (3.10) is equivalent to dividing Equation (3.9) by β_n. And as seen from above, the ratio between *values* β_i /β_n identifies the *price* of commodities.

setting – through a system of equations – the total redistributed value equal to the total production of value determined by the valorisation process. If we do not work this way, the theory of value disappears, with the consequence that it is no longer possible to calculate these *values*. This is exactly the outcome when Equation (3.10) is assumed as the additional equation. The fact that *values* are present in Equation (3.9) among the data cannot change this conclusion. This is because values (the elements enclosed by round brackets) have no function in the determination of the *production of value* within the system but merely represent quantities of means of production and commodities in a not very common unit of measurement (hours of labour or some other time unit), and therefore do not carry out the determining function required by Marx's theory of value. So his theory actually disappears as it is reduced to the appearance of commodity magnitudes expressed in labour time.

With respect to this outward solution the criticism seizes an opportunity since it has only to make explicit the actual suppression, already accomplished, of Marxian value theory. In the traditional solution developed by Seton the expression of value in labour terms has the limited role of measuring physical quantities of commodities. Yet, nothing prevents the use of customary units of measure – kilogram, metre, litre, etc. The determination of *prices* is still possible, but the external link to labour is eliminated.[17] The labour-value theory then appears *irrelevant* because prices of production can be determined without it. Thus very little is done to eliminate from the traditional solution what is already present only in appearance, that is the link between 'prices' β_i and the value production by labour, Marx's value theory. Since the Marxist tradition, following Bortkiewicz, Seton and Co., has already tacitly suppressed that theory, retaining only its outward appearance, the neoricardian criticism discovers the irrelevance of the appearance, that is, the absence of any role for the theory in the determination of prices and the profit rate. As a result, Marx's theory of value disappears. Because of its own theoretical limitations, traditional Marxism first reduces the role of labour in the

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[17] One may simply shift the brackets in Equation (3.9). Take any term $(k_{ij}\lambda_1)$ β_i and rewrite it $k_{ij}(\lambda_i\beta_i)$. The meaning of the term changes: now k_{ij} is a quantity expressed in a convenient unit of measure (kilograms, meters, etc.) while $\lambda_i\beta_i$ $(=z_i)$ is the transformed value for the 'physical unit of a commodity'. The weak reference to labour embodied represented by the expression $(k_{ij}\lambda_i)$ disappears. With this manoeuver, Equation (3.9) becomes Equation (3.4) which, divided by z_n, become the 'Sraffian' Equations (3.8) where any reference to Marx's theory is lost.

theory of value to an appearance, then critics, by drawing on the logical implications, eliminate the appearance. So they conclude affirming the irrelevance of Marx's value theory and the self-destruction of the transformation problem.[18]

Final remarks

Within the conclusion of this study, certain observations, which can be drawn from the analysis undertaken here, may perhaps be useful. The first observation is that the use of the new tool of production methods does not delete, as criticism has thought, the Marxian theory that profit is determined by the daily working time; rather it confirms that theory and therefore strengthens it. What remains is a suitable arrangement of value and price categories within the new, more complex, theoretical structure.

The second observation concerns the simplifying hypotheses listed at the beginning in Note 5. The side of the theory in greatest need of these hypotheses is the 'Sraffian' side of the algebraic calculation of values and prices: suffice to remember the critical findings of Steedman and the same Sraffa on the difficulties that arise in the calculation of values and prices when considering joint products. Instead the construction of the structure of production methods in relation to the daily working time is able to leave these hypotheses behind and arrive at a more complex theory, and therefore one closer to the real world. By adopting a theory in which prices are not an algebraic determination, it is therefore possible to formulate a general theory of the relationship between working time and rate of profit where all the simplifying hypotheses introduced are eliminated, except for the last (the one that assumes that all commodities produced are sold). In this way it becomes possible to overcome the critique of Steedman based on joint products. Regarding the latter

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[18] This blindness is inherent in the neoricardian criticism. The paradigmatic example is Samuelson's 'eraser theory' (Samuelson, 1970, p. 425). Analogous conceptions can also be found (Lippi, 1979, pp. 103–4; Steedman, 1977, p. 14; Vicarelli, 1981, p. 95; Napoleoni, 1975, pp. 172–3). The latter concludes with the assertion: 'that quantities of labour are irrelevant in the determination of prices and the rate of profit, into the analytical structure assumed by the transformation problem…so that the transformation problem developed in accordance with Marx's analysis self-destructs, because the existing system does not transform values into prices but determines prices independently of values' (Napoleoni, 1976, pp. 95–6). Steedman (1977, pp. 14–5), echoes this conclusion.

hypothesis, it should be noted that it only requires a change of terminology, that is: what we have hitherto called 'rate of profit' should be more appropriately called 'valorisation capacity' of the capital because that is what we are in fact calculating, assuming that all the commodities produced are sold. The current rate of profit achieved by firms in actual practice will then depend on the share of commodities that can be produced which are actually sold.

Finally, the work of Sraffa's *Production of Commodities by Means of Commodities* was created, which the author intended, to serve as a basis for criticism of the marginal theory of value and distribution. As a result of neoricardian criticism, the original meaning of Sraffa's work has been turned into a decisive contribution to the critique of the Marxian labour-value theory. As such, Sraffa ended up becoming a rival of Marx. The rejection of the neoricardian criticism of irrelevance permits the overcoming of this antagonistic relationship between Marx and Sraffa, and the work of the latter may return to being what was originally and most authentically intended by its author: a contribution to the beginning of criticism of the neoclassical mainstream. Marx and Sraffa can be reconciled; jointly they can help to reactivate criticism of the neoclassical economic theory dominant today and to recover the capacity to build a better theory of the social system. This appears to be in tune with the age that is now opening. Periods of crisis are also periods of great theoretical upheavals and we are entering a time of deep crisis for the capitalist society, a period requiring fresh ideas on the social actions of humanity and our relationship with nature.

Conclusion

Once the content of the theory of the origin of profit from the expenditure of labour that Marx stated with his labour-value theory has been clarified, the main argument proposed by neoricardian criticism cannot withstand a careful interrogation of its propositions. How then can one explain the huge success achieved by the criticism? It is as if an excessively accentuated destructive will has been exercised on a theory which was worthy of careful study and consideration rather than a drastic demolition. In place of objective scientific work, neoricardian critics seem to have asserted an ideologically superior 'spirit of the time' and executed an obscure final judgement. Considered in this sense, the neoricardian criticism that too hastily wished to dispense with labour-value expresses the leading ideology of its own age: similar to something

that goes where the historical wind blows and necessarily imposes itself. It's very wide practical success, which appeared to be an unquestionable sign of superior theoretical strength, can now be seen instead as the manifestation of its own nature. So we could say that it is more significant as an historical event rather than as an advance of critical and scientific thought.

Here is its weak side that our analysis has tried to show. With this however the meaning of such an intellectual event is not entirely exhausted. Even with the deficiencies we have pointed out, criticism has highlighted a real problem relating to the version of the labour theory of value that had been historically established. The need to reject an attack that appeared so fatal has given energy to the thinking on the labour-value theory and the problems it contains. So in the end, paradoxically, the most meaningful result of the criticism seems to be the intellectual spur to new thinking that re-asserts the importance of the labour theory of value and the origin of profit. In this sense we can talk about the ambiguous flimsiness of the neoricardian criticism: we are in presence of a faulty but stimulating thesis that obliges us to resume reflections on Marx's theoretical construction, leads us to solving its problems and so helps to direct more powerful inquiry toward the fields in which Marx's theory is an essential basis. That is to say we can now assert a link between the expenditure of labour and capital valorisation and regard both as helpful tools to research the economic law of motion of capitalistic society.

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4
Sraffa and the Standard Commodity

Scott Carter

Introduction

This chapter concerns the concept of the Standard commodity in terms of an exploration of the development of this construct from the Sraffa Papers (*SP*). Since its arrival into the realm of economic theory in 1960 with the publication of *Production of Commodities by Means of Commodities (PCMC)*, the Standard commodity has been subject to wide scrutiny in terms of both its mathematical properties and its economic implications and ramifications, although in this author's mind much more has been written on the former at the expense of the latter. It is often much easier to conceive of the properties of a mathematical relation in lieu of those of the economic relation the math is intended to express and convey; it is to the latter task that the present chapter is directed. This is developed in light of recent evidence uncovered in the Sraffa Papers open for study at the Wren Library, Trinity College, University of Cambridge, UK.

Coincident ratios

The Standard commodity is not simply a *numéraire*, or perhaps we can say that it *is* a *numéraire*, but one with special properties; namely properties of invariance in the face of changes in the distribution of

the net product between wages and profits; that is the class struggle. The Standard commodity represents an important unity (synthesis) between the value-theoretic concept of price with the use-value (physical) structure of an economic system. The value-theoretic side of the story involves systems of price-determination (commensuration) for a wide range of economic systems (e.g. circulating capital models; fixed capital models; reduction models; etc.). The use-value side of the story involves the physical structure of production of the various systems.[1]

What Sraffa is able to show, quite simply, is that when we conceive of the Standard *system* – of which the Standard commodity is *only* a derivative concept – there is an important resonance and point of contact between the value structure of production, the physical structure of production, and, as we argue below, the distribution of the net product when the rate of profit is at its maximum value. This point of contact takes the form of the relationship between the *p*-system of relative prices – including both 'value' (labour-value) and 'price' (prices of production) – and the *q*-system of quantity multipliers. Important in these points of contact are the 'coincident' ratios (Sraffa's term, §22, p. 17) that are associated with each system.

In the value structure of production where the wage share (ω) is unity and the rate of profit (r) zero this important ratio is what Sraffa calls

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[1] Since the writing of this chapter my views have changed on the role of commensuration in the process of determination of value, some of it along the lines of Porta's Comment below. Following my own interpretation of Sraffa's method of exposition, the value-form (conceived as a synthesis of exchange-value and value) to me now seems fundamentally related to the conditions of restoration of an economic system in terms of subsequent production rounds being able to procure adequate inputs in order to continue the production process, and that those adequate inputs are necessarily valuated ('rendered commensurate' I would have said earlier) at a set of exchange-values that ensure this restoration. The question of the conceptual separation of the theory of exchange-value from a theory of value in general, and the *labour* theory of value in particular, comes when living labour is explicitly considered and a net output is explicitly produced. Although the two are certainly inter-connected, this is a separate question from that of the theory of exchange-value evidenced by the fact that Sraffa's subsistence producton model contains neither net product nor living labour yet well defined and determined exchange-values no less arise (are 'directly-sprung'). Although I do not altogether agree with his manner of exposition but do so with many of his conclusions, Preti's chapter in this volume explores this value – exchange-value connection and interface. See also my 'Response to Porta' below. Please note that this deepening of an understanding of the value-form does not alter the main focus of the present chapter, one purpose of which is to demonstrate the unity of the Standard ratio across different configurations of an economic system.

'proportions of labour to means of production', or we refer to as the *labour to means of production ratio (LMP)*. For a *k*-dimensional single product industries system the LMP ratio is given as:

$$LMP_{\Sigma}^0 = \frac{w^0 L_{\Sigma}}{\sum_{i=1}^{k} \sum_{j=1}^{k} p_i^0 A_{ij}}$$

$$= \frac{\text{value added by system-wide living labour}}{\text{value of system-wide means of production requirements}} \quad (4.1)$$

Where[2]:

$w^0 =$ 'complete' wage rate, or wage rate when $\omega = 1$ and $r = 0$ ($^{\text{numéraire}}/_{\text{hr}}$)

$p_i^0 =$ direct price of ith basic commodity ($^{\text{numéraire}}/_{\text{unit } i}$)

$L_{\Sigma}^0 =$ aggregate or global living labour added (unit of labour = 'hour')

$A_{ij} = i^{\text{th}}$ means of production requirement for j^{th} industry (unit commodity i)

The LMP ratio by definition is a scalar equal to the direct (labour) value of the aggregate living labour divided by the indirect (labour) value of the aggregate means of production. Clearly this is Sraffa's proxy for the capital-labour ratio and/or the organic composition of capital. In truth, as defined here the LMP ratio is really what in Marxian parlance is called the value-composition of capital in that it is a pure wage-distribution ratio; that is to say it is valuated at (labour) values associated with distribution when profits are zero and living labour is remunerated 'completely' the entire net product. When the LMP ratios of the respective industries are conceived relative to that of the social LMP ratio, labour-intensive or surplus industries versus capital-intensive or deficit industries) are distinguished and indentified (see Carter 2014).

When distribution changes prices are no longer proportional to labour values. What Sraffa shows is that a set of prices arises at the opposite 'pure exploitation' end of distribution, when the wage share is zero and the

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[2] Following Sraffa's exposition the economic system is given in physical quantities of means of production and direct labour requirements, as opposed to the more conventional exposition of inter-industry and direct labour coefficients. Also the present formalisation makes explicit via the superscript the distributive regime the specific price system belongs according to the value of the rate of profit of that regime, where p^0 represents the $(1 \times k)$ set of prices when the rate of profit is zero $(0 = r)$, p^* when the rate of profit is between extremes $(0 < r < R)$, and p^R when the rate of profit is at its maximum value $(r = R)$.

profit rate is at its maximum, that have some *very interesting properties*. Specifically, the maximum rate of profit of the maximal profit rate price-system comes to coincide with the aggregate social LMP ratio of the value system acsertained at the opposite pure-wage extreme. What is important to distinguish are the respective numerators in the two different value-ratios: (i) the pure-wage distributive LMP ratio is conceived in terms of the value of the objectification of living labour and its productivity; and (ii) the pure-profit *qua* exploitation distributive maximum rate of profit is conceived in terms of the price of net product times its quantity. The equality of the two ratios is given in congruency relation Equation (4.2):

$$LMP = \frac{w^0 L_\Sigma}{\sum\limits_{i=1}^{k}\sum\limits_{j=1}^{k} p_i^0 A_{ij}} \approx \frac{\sum\limits_{i=1}^{k} p_i^R Y_j}{\sum\limits_{i=1}^{k}\sum\limits_{j=1}^{k} p_i^R A_{ij}} = r^{\max} = R \tag{4.2}$$

Where:

p_i^R = maximum rate of profit price of ith basic commodities ($^{\text{numéraire}}/_{\text{unit } i}$)

Y_j = net product of jth industry (unit$_j$)

According to this typology, the left-hand side (LHS) of congruency relation Equation (4.2) represents a 'complete' or pure wage-distribution ratio. Following the language of classical political economy, at this extreme of distribution the command of labour is 'complete' and that of capital zero; Pasinetti (1977, p. 122) calls this the 'complete wage rate'.[3] The right-hand side (RHS) of Equation (4.2) looks at the system from the opposite extreme. Here the prices of both net product and means of production are conceived as pure-capital distribution prices associated with a wage share of zero and the rate of profit at its maximum value. This represents a 'complete' pure-profit-distribution ratio, which from the perspective of labour is a pure-exploitation ratio; again following the classical terminology, at this opposite extreme of distribution the command of capital is complete and that of labour zero. The first level of 'coincidence' in this important ratio occurs here.

It is only after conceptually distinguishing the LMP ratio (pure wage-distribution) from the maximum rate of profit ratio (pure exploitation *qua* profit-distribution) that we can begin to look at the use-value side

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[3] 'An 'ideal' system of prices…determines…relative prices and a wage rate which absorbs the entire net product per worker in the economic system. This [is] regarded as the 'maximum' wage rate…since it corresponds to a profit rate of zero. We may call it the 'ideal' wage rate…or, form a different point of view, the 'complete' wage rate…' (Pasinetti, 1977, p. 122).

of the coincidence in the ratio. Here we can conceive of the physicalist commodity-own rates of reproduction,[4] which we denote by the separate symbol ζ ('zeta'). In single product industries, a commodity own-rate is defined as the quantity of the (homogenous) commodity that appears as net product in the economic system divided by the total quantity of the same (homogenous) commodity that serves as means of production for the entire economic system, that is:

$$\zeta_i = \frac{Y_i}{\sum_k A_{ik}} = \frac{unit_i}{unit_i} = scalar$$

There will be as many commodity own-rates as there are commodities/ single product industries, although in an actual economic system some of these own-rates may be zero (when the industry is completely 'sterile' in the Physiocratic sense of the term[5] and there is no net product) and others may be infinite (when the commodity is a pure non-basic and does not enter into the means of production of any commodity, including itself).[6]

What Sraffa shows is that for any actual economic system its own unique and 'embedded' Standard system can be constructed such that the own-rates are uniform for the commodities of all basic industries, even for those sterile in the actual system having no net product and hence an actual own-rate of zero. Sraffa does this via his q-system of quantity

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[4] See Pasinetti (1977), section 10.7, pp. 109–10, for a definition and use of the physical own-rate concept.

[5] The reference is to Francois Quesnay's *Tableau Economique* which conceived society in three different sectors of production and consumption: the 'fertile' Farming sector which was productive of the *produit net* or net product of the system (which coming from agricultural was deemed the 'gift of nature'; Marx in *Theories of Surplus Value* speaks of the feudal remnants in Physicocratic thinking which despite this had a much more advanced theory of capital than Smith or Ricardo); the 'sterile' Manufacturing sector which was productive in the sense that use-value output was produced just no 'new' value was seen to be added; and lastly the Landlord class who consumed without producing and served as the conduit through which the net product was distributed zig-zag like (with the corresponding counter-flows of money) throughout the economic system.

[6] The most extreme case of a pure non-basic is the case of pure unassisted labour, i.e. when pure labour alone produces an output. Ricardo and Malthus debated on this idea with the notion of silver picked up in a day at the seashore; Sraffa identifies this as the fourth measure of value adopted by Malthus. In an interesting lesser known lecture given in May of 1825 but not published until 1829 entitled 'On the Measure of the Conditions necessary to the Supply of Commodities' (see Pullen, 1989), Malthus refers to 'unassisted labour' as the product of 'appropriative industry' and conceives of 'wild strawberries or fruit' (Malthus, 1829, p. 171). This was the essence of Ricardo and Malthus's 'shrimp' – i.e. 'the result of immediate labour only' (Sraffa and Dobb, 1951–74, *Works XI*, pp. 108).

multipliers which serve to 'chip...away the unwanted parts' of an actual economic system, or in the case of the zero actual own-rate 'adding-to' the 'wanted parts' of that system as well. All of this serves to render uniformity in the Standardised commodity ratios of the underlying system and it is this uniform rate that Sraffa calls the *Standard ratio*:

$$\zeta^{STND} = \zeta_i = \ldots = \zeta_k = \text{Standard ratio}$$

It is important to emphasise that the Standard ratio is a property of the given physical system of production. It is now well known (Kurz and Salvadori, 2005, section 4.3, pp. 116–9) that formally speaking the Standard commodity is the eigenvector of the means of production coefficients matrix associated with its maximum eigenvalue (λ_{max}), and the Standard ratio is an inverse function of the said maximum eigenvalue λ which owing to the economic application of well-known theorems by Perron and Frobenius accords to the formula:

$$\zeta^{STND} = \frac{1}{\lambda_{max}} - 1$$

Hence the Standard ratio is as much 'given' as the physical quantities themselves, and can in that sense be construed as also 'springing from the conditions of production'.

Finally, and what Sraffa found remarkable, the value of the Standard ratio was exactly equal to the aggregate LMP ratio *qua* maximum rate of profit. What Sraffa discovers regarding the properties of his Standard system is therefore twofold:

1. that on the value/price-side of the congruency relation a fundamental ratio is shown to be equal when expressed at opposite ends of the distribution spectrum. The pure wage-distribution LMP ratio comes to coincide with the pure-profit distribution maximum rate of profit (R).
2. that when the physicalist use-value structure of the actual system is 'chipped away' of its 'unwanted parts' an embedded Standard system emerges such that the commodity ratios are uniform throughout, and further that the value of this ratio itself 'coincides' with the LMP *qua R*.

We thus see the following remarkable equality between three distinct realms of economic inquiry: (i) the value-structure of production according to the LMP ratio conceived when distributive shares are $\omega = 1 : r = 0$; (ii) the distributive relations engendered in the maximum rate of profit conceived at prices when the distributive shares are $\omega = 0 : r = R$; and (iii) the physical structure of production when conceived

$$\text{LMP} = \left(r_{max} = R\right) = \zeta^{\text{STND}}$$

| Value structure of production (distribution when $\omega = 1$ and $r = 0$) | Maximal profit structure of production (distribution when $\omega = 0 : r = R$) | Physical structure of production |

Figure 4.1 The 'coincident ratio' across three realms of economic inquiry

in an economic system's unique Standard proportions as expressed through the Standard ratio, as shown in Figure 4.1.

The parallel structure of the price and quantity systems can be seen explicitly when the maximum rate of profit p-system and the q-system are viewed in tandem.

Price system (heterogeneous industries)[7]

$$\left(p_a^R A_a + p_b^R B_a + \ldots p_k^R K_a\right)(1+R) = p_a^R A$$
$$\left(p_a^R A_b + p_b^R B_b + \ldots p_k^R K_b\right)(1+R) = p_a^R B$$
$$\vdots$$
$$\left(p_a^R A_k + p_b^R B_k + \ldots p_k^R K_n\right)(1+R) = p_k^R K$$

Quantity system (homogenous commodities)

$$\left(q_a^\xi A_a + q_b^\xi A_b + \ldots q_k^\xi A_k\right)(1+\zeta) = q_a^\xi A$$
$$\left(q_a^\xi B_a + q_b^\xi B_b + \ldots q_k^\xi B_k\right)(1+\zeta) = q_b^\xi B$$
$$\vdots$$
$$\left(q_a^\xi K_a + q_b^\xi K_b + \ldots q_k^\xi K_k\right)(1+\zeta) = q_k^\xi K$$

$$R = \zeta \qquad (4.3)$$

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[7] In order for the following discussion to resonate with the original archival evidence cited below, the notation adopted from this point forward is primarily Sraffa's in the sense that A_a, A_b, … denotes the quantity of good 'a' used as means of production in industries a, b, …; B_a, B_b, the quantity of good 'b' used as means of production in industries a, b, etc.; and A, B, … the gross output of industries A, B, etc. Note that the $(k \times k)$ inter-industry means of production input matrix conceived as a whole (whose elements are represented A_{ij}) should not to be confused with the gross output of industry A.

Equation (4.3) is a *k*-commodity economic system expressed in its Standard proportions. The (top) system of price equations is conceived at the level of the industry, where the heterogeneous inputs of each are valued according to the set of prices consistent with the maximum rate of profit times the maximal profit factor $(1+R)$. By contrast the (bottom) system of quantity equations is conceived at the level of the commodity, where each element is multiplied by the appropriate *q*-multiplier times the Standard ratio factor $(1+\zeta)$. In the Standard system the price relation and the use-value relation literally interconnect such that there is a one-to-one correspondence between the two systems. The Standard commodity, strictly speaking, is actually a *derivative* of this more fundamental Standard system, and is defined as the commodity composition of the net product of the Standard system:

$$
\begin{aligned}
Y_a^{\xi} &= Aq_a^{\xi} - \left(A_a q_a^{\xi} + A_b q_b^{\xi} + \ldots + A_k q_k^{\xi}\right) = unit_a \\
Y_b^{\xi} &= Bq_b^{\xi} - \left(B_a q_a^{\xi} + B_b q_b^{\xi} + \ldots + B_k q_k^{\xi}\right) = unit_b \\
&\vdots \\
Y_k^{\xi} &= Kq_k^{\xi} - \left(K_a q_a^{\xi} + K_b q_b^{\xi} + \ldots + K_k q_k^{\xi}\right) = unit_k
\end{aligned}
\tag{4.4}
$$

It will be this composite commodity that represents a unit of Standard net product that Sraffa will adopt as his measure of value for wages and prices.

The relationship between Sraffa's Hypothesis and prices when distribution changes

Sraffa's Hypothesis or 'Hypo' concerning a fundamental constancy in a (macro) economic system has been the subject of recent scholarship that has come from close study of the Sraffa Papers.[8] The basic idea behind the Hypothesis is that the price of the social capital remains invariant with distribution when compared against the price of the gross and/or net output.[9] From the period in 1942 through to 1946 Sraffa

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[8] Gilibert (2003), de Vivo (2003) Bellofiore (2001, 2008, 2012), Carter (2011, 2013), Gehrke and Kurz (2006), Kurz (2006), Kurz and Salvadori (2001, 2008, 2010).

[9] See especially Bellofiore's Chapter 9 below, beginning page 210, and Bellofiore (2012, pp. 1391–2). In Carter (2013) we show how the origin of the 'Hypo' may have come out of Sraffa's reading of Cassel (1935) and the literature on the reduction to quantities of dated labour that appeared in German and in English around that time.

spent tremendous energy on developing, critiquing, and inquiring on the correctness of his Hypothesis.[10] During this period Sraffa was concerned whether or not his Hypothesis was valid for price systems across different regimes of distribution. Consider the interesting document called 'The Value Theory of Labour' (D3/12/46/24–28). The document itself is written in ink in December 1946[11] with the title and annotations in pencil dated 6–7 June and 17 July 1955. Here we find the proposition that no-profit 'complete-wage' prices, that is to say, prices ascertained when the wage share is unity and the rate of profit zero, can be arrived at via two methods: (i) what Sraffa calls the 'direct method' which involves the reduction to quantities of dated labour, and (ii) the 'indirect method' which involves setting the rate of profit equal to zero in the original system of equations:

> Discussions on the relations between labour + value are apt to concentrate on the influence of the former upon the latter. There is some interest however in looking into the opposite (wrong) other end of the telescope, namely starting from the value to discover the quantity of labour. The quantity of labour contained in a product can be *formed ascertained directly*, when the 'reduction' of the commodity + of the materials used in its production to their 'ultimate' labour content can be carried out in a 'finite number of moves' it at one remove can be done by finding the limit of the sum of an infinite series, when the reduction has always a residue of commodities *(a very different affair: when wages tend to zero)*. In these cases it can be verified that the result of the direct method of ascertaining quantity of labour always agrees with the *indirect method*, that of solving the equations for values, i.e. after making r = 0: for it is clear that (on the usual assumption of uniform labour, or some equivalent assumption) that value of a commodity must be equal to the value (+ therefore proportional to the quantity) of labour which directly or indirectly 'enters' it – since all the proceeds go to labour. The indirect method however comes into its own in cases in which direct ascertainment becomes impossible is not possible, at least in

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[10] Close study of the Papers at that time finds Sraffa first accepting then rejecting, again rejecting then accepting, over and over, the conceptual and theoretical correctness of his 'Hypo'. See Bellofiore's Chapter 9 below, p. 210.

[11] We know that this document was originally written in ink in December 1946 even though no date appears in ink because Sraffa wrote on the file folder of D3/12/44: 'Notes' 'Value Theory of Labour' Dec. 46, + Feb. 55.

a way acceptable to common-sense and indeed inconceivable, as in the case of joint products. (D3/12/46/24–25; italicised emphasis added)

Notice here that Sraffa actually identifies three different sets of prices, the first two of which represent alternative methods to arrive at the 'value theory of labour' values, and the third 'a very different affair':

1. Value Theory of Labour – Direct method: reduction to dated quantities of labour.
2. Value Theory of Labour – Indirect method: solve system when $r = 0$ and $\omega = 1$.
3. 'Very different affair'-prices: solve system when $r = R$ and $\omega = 0$.

This is a very sophisticated approach to the price phenomenon where legitimate economic and scientific merit results from the conceptualisation of the price form at the opposite poles of income distribution.

At the upper end of the income distribution when the rate of profit is zero, the wage share is unity and therefore the wage rate 'complete', there will 'spring directly' a set of commodity prices and the wage rate that allow Sraffa to conceive the Hypothesis of constancy. Sraffa shows that these prices can be 'sprung' through two alternative but equivalent methods, the 'direct method' through the reduction to quantities of dated labour, or the 'indirect method' through solving the system of equations when the wage share is unity and the rate of profit is zero. Sraffa shows in notes from the 1940s that the reduction methodology is perfectly determined at the unitary wage rate. Here the labour theory of value holds in that the prices are equivalent to direct and indirect labour embodied in the production of the commodity.

The 'very different affair'-values correspond to the set of prices at the zero wage rate and the maximum rate of profit. It is here that the theory of exploitation enters as this distributive regime is one associated with pure exploitation of labour. We find very clearly as early as the 1940s the conceptualisation of the dual extremes of the distribution problematic, as both give rise to an economically relevant structure of prices. Important for Sraffa is that even if these prices are used, that is prices ascertained when the wage share is zero and profits are at their maximum, the fundamental Hypothesis of constancy becomes no less evident.

The development of the Standard system in the 1940s and 1950s

Discovery of the Standard commodity in the 1940s

We argued above the role of Marx's concept of exploitation and the importance that it had for Sraffa's own enquires. Here (pure) exploitation as a conceptual category fundamentally informs the manner in which Sraffa developed the concept of the Standard system, the Standard ratio, and ultimately the Standard commodity via the *q*-system of quantity multipliers. Here Sraffa begins to develop his unique and peculiar methodology of conceiving the price form across different regimes of income distribution, and in an important sense 'mixes the history' by applying prices determined when the wage share is unity ($\omega = 1$) and the rate of profit is zero (I = 0) to scenarios when the wage share and the profit rate are allowed to vary, a procedure that, albeit imperfect, was nonetheless possible due to the procedure of physicalist invariance assumed in his 'Hypothesis'.

Sraffa's search for the Standard commodity at this early stage was an attempt to transform any actual economic system, what at this early juncture he calls a 'non-repetitive system', into a Standard system, what he calls here a 'repetitive system'. The transformation of the non-repetitive 'actual' system into the repetitive 'Standardised' system was from the outset an attempt to prove the Hypothesis of constancy. It is precisely in the 27 page set of notes entitled 'Hypothesis' (dated 27 January–1 February 1944 and archived as D3/12/36/61–84) that Sraffa first identifies the Standard system, seen explicit in reflections written in January 1955 on the inside cover of the folder to which this set of notes belongs:

> 31…1.55
>
> The Standard commodity is first identified in the packet of small sheets of College notepaper dated 27.1.44 + headed 'Hypothesis' (D3/12/36/91).

The methodology involved in the search for the Standard commodity is succinctly stated four pages into this 27-page set of notes:

> Systems to which Hypo does not apply, but (linear) relation (between r, w, and max r) does, are non-repetitive systems (i.e. not all commods. on the left are found on the right in as large quantities). These systems

can all be reduced to a repetitive one by multiplying the individual equations by an appropriate factor; and in the repetitive form the Hypothesis <u>will</u> apply (constant ratio of commods. on two sides). (D3/12/36/44)

Thus in late January 1944 Sraffa identifies the methodology to be employed in transforming a non-repetitive into a repetitive system and thus ensuring the efficacy of his Hypothesis, and it is in this context that he discovers the Standard commodity. From this point through 1946 Sraffa would frame his inquiries within the context of the Standard system including early extensions to fixed capital.

The Majorca Draft of 1955

Fast forward to January 1955. The tenth volume of Ricardo's *Works* had been delivered to Cambridge University Press, and Sraffa having relinquished his duties for the Royal Economic Society (saving the index which was not completed until 1974)[12] began his third and last period of constructive activity by holing himself up on the Spanish island of Majorca.[13] The fruit of Sraffa's stay on Majorca is a fascinating 31-page handwritten manuscript penned over a three-week period in March 1955 entitled the Majorca Draft, catalogued as D3/12/52, which constitutes an advanced working draft of Part I of Sraffa's book (single product industries). In this manuscript Sraffa restates and reformulates much of the material that he had been working on the 1940s and it is here that the full blossoming of the Standard commodity really commences and we find the *q*-system in its final stages of development.

In the pages of the Majorca Draft the flushing out of the economic significance of the Hypothesis and the Standard commodity begins in full force, complete with the notion of the 'coincident ratios'. Sraffa posits the relationship between the aggregates of commodities and

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[12] See Schefold (1998) for a very interesting account of the writing of the Ricardo Index and the relationship conceptually to the Index in *PCMC*.

[13] We read from Pollitt (1988):

> On 3 January 1955 Dobb reported that 'Piero is just back from interesting voyagings on the other side of the world; Ricardo Vol. X (should) be out about Feb; and he's now off for a stay in Majorca – hoping to do some work (non-Ricardo) of his own, tho' not *too* hopeful that he actually will'…The work that Sraffa hoped to do in Majorca, of course, was begin that process of thought and assembly of past thoughts that eventually emerged as *Production of Commodities by Means of Commodities*. That he would have felt able to do this before the publication of his edition of Ricardo seems unthinkable. (Pollitt, 1988, p. 64)

labour on the input-side (LHS) against the aggregate of final gross products on the output-side (RHS), arguing that:

> The price ratio of these two aggregates, although composed of many commodities that vary in all directions, is pretty likely to be stable. And if we regard it as completely stable, the picture is considerably simplified. This assumption (namely that the price relation of the N.I. {National Income} to the aggregate of means of production is invariable with respect to variations of wages and profits) implies that just as the wage can vary between 1 and 0, so the rate of profit can vary between 0 and the maximum which is the ratio of the N.I. to the aggregate means of production. This maximum Rate of Profit can be regarded as the magnitude that characterises an economic system.
>
> In such a world, where everything moves in every direction; where wages can increase more than profits fall; where the value and indeed the composition of the nat. rev. can change merely because it is divided in different ways; where the prices of commodities rise or fall, and we cannot express in simple words (or any words) the conditions under which they rise or fall; where…one sympathises with Ricardo in his search for an 'invariable measure of value'. In a universe where everything moves we need a rock to which to cling to, a horizon to reassure us when we see a brick falling that it is not us who are going up, nor that we are falling when we see a balloon rising. (D3/12/52/16)

We find here a clear statement of Sraffa's interest; namely the search for a measure of value that allows for the Hypothesis of constancy in the ratio between aggregate net product and aggregate means of production to be maintained given changes in income distribution. Sraffa then embarks on constructing the Standard system via the *q*-multipliers and in doing so is able to demonstrate the equality of this constructed quantity system with the price-system expressed when the rate of profit is at its maximum:

> We seek a set of coefficients $q_a, q_b, …, q_n$ such that, if we multiply by each of them the corresponding equation, the quantity produced of any commodity a will bear the same ratio ζ to the quantity of a among the means of production of all industries as the quantity produced of any other commodity g bears to the quantity among the means of production of all industries. In other words, the quantity of

each on the right hand side of the equations will be in proportion to the aggregate quantity of it on the left hand side.

Stated algebraically, this condition is:

$$(q_a A_a + q_b A_b + \ldots + q_n A_n)(1+\zeta) = q_a A$$
$$\vdots \qquad\qquad\qquad (2)^{14} \ldots$$
$$(q_a N_a + q_b N_b + \ldots + q_n N_n)(1+\zeta) = q_n N$$

This ratio $(1 + \zeta)$ is the same ratio $(1 + R)$ as we found as the ratio between the prices of means of production and the product when the whole nat. revenue went to profits. In effect, if we multiply these Equations (2) by their respective prices for r = R, and add all the equations, we get

$$(q_a A_a P_a + \ldots + q_n A_n P_a + \ldots q_a N_a P_n + \ldots q_n N_n P_n)(1+\zeta) = q_a A P_a + \ldots q_n N P_n. \quad (3)$$

And if we multiply the Equation (2) by their coefficient q, and add them, we get

$$(q_a A_a p_a + \ldots + q_n A_n p_a + \ldots + q_a N_a p_n + \ldots q_n N_n p_n)(1+R)$$
$$= q_a A p_a + \ldots q_n N p_n \qquad (4)$$

All the terms in Equations (3) and (4) being identical, it follows that, unless their sum is = 0,

$$\zeta = R$$

We shall call $\overline{q_a}, \overline{q_b}, \ldots, \overline{q_n}$ the values we have found for the coefficients $q_a, \ldots, q_n$; and R the value of ζ (D3/12/52/19–20).

Sraffa here denotes the quantity ratio and the value ratio by two different variables (a convention we adopt), although in his book he chose to denote both ratios by the single variable R.[15] In fact Sraffa chooses in his book to denote all three ratios, what above we have termed the LMP ratio, the maximum rate of profit (R), and the physicalist Standard ratio (ζ), by the single letter R.

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[14] Sraffa's notes omit equation (1) and begin with equation (2).

[15] Eatwell (1975) was among the first to introduce different symbols to distinguish the physcialist Standard ratio (where he uses 'Q') from the maximum rate of profit (where he uses 'R').

Archival evidence after the Majorca Draft

Upon Sraffa's arrival back in Cambridge from Majorca in late Spring 1955 he would engage in a two-year fevered-pitch effort at finally getting his book into shape. The archival evidence of this period shows a significant tightening and honing of the argument Sraffa laid down on the island of Majorca. Space prevents a thorough account of this period, and in the reminder of this section only the most important elements will be highlighted.

Perhaps the most telling evidence of the equality in the three 'coincident ratios' comes from a document that Sraffa wrote in January of 1956, where we read:

> 1.1.56
>
> I must, early, show the identity of these things:
>
> (a) 'the proportion' of labour to means (or of net product to means, at values) that gives 'balance';
>
> (b) 'the same proportion in which all products must increase in the St. Comm';
>
> (c) The maximum rate of profits.
>
> The link between the two is that unbalance can only result from (or be connected with) a change in the net income of the industry, which can only happen by more or less of the product being required to pay for the replacement of means of production: this is the inevitable accomplishment of unbalance.
>
> But then <u>no</u> unbalance of this type can arise when product and means consist of the same composite commodity, for since there can be no change in the relative price, there can be no transfer to, or from, net product to payment of means. (D3/12/61/48)

Similarly in June of 1956 we read that:

> Consider a system of production in which the industries are taken in the Standard proportions while the commodities are labeled with the prices that correspond to zero wages. From the proportions we get a ratio that cannot be affected by prices: and at the same time from the price we get a ratio that cannot be affected by proportions. It is evident that the ratio between the <u>quantities</u> of the two aggregates and the ratio between their <u>values</u> cannot be different without contradiction. We must therefore conclude that the quantity ratio of net product

to means of production in the Standard system is equal to what may be called (since it corresponds to zero wages) the Maximum rate of profits of the system. (D3/12/64/18)

Up to this point we find Sraffa maintaining the same basic line of inquiry as regards the Standard system in the 1940s; namely that the Standard commodity can be constructed via the *q*-system of quantity multipliers and that it can serve as an invariable measure of value as regards changes in income distribution. But beginning in 1956 Sraffa commences a line of inquiry that the Standard commodity is in fact an 'auxiliary construction' and that the 'scaffolding' of the *q*-system of quantity multipliers can be discarded. These sentiments appear in a document entitled 'Scaffolding' (1956), archived as D3/12/68. The archival material beginning with these notes represents this very interesting phase in the development of Sraffa's book. They shed some light on the methodological symmetry between an abstract standard the physical composition of which is unknown and 'paper money'. They also provide commentary on the adoption of the profit rate rather than that of the wage as closing the system; this latter from the cryptic parting shot in §44 on the 'money rates of interest'.

   In 'Scaffolding' we find an interesting document written 13 September 1956 entitled 'Scaffolding removed':

The Standard system is purely auxiliary construction which once it has served its purpose can be discarded although we retain … the results … secured by its means.

In effect it is clear that just as the fact of measuring wages in terms of the Standard product by itself implies a relation of proportionality between the wage reduction and the rate of profit – so, if … we make it a condition of the system that it should conform to that relation this ipso facto involves the wages (and therefore also the prices) being expressed in Standard product.

In other words, as a result we can dispense altogether with the additional equation which makes the Standard net product equal to unity and indeed with any explicit definition of the unit, – and replace it with the equation:

$$r = R' \, (1 - w)$$

which has the same result that wages + prices will all be expressed in terms of the Standard net product, since with no other standard of wages can this equation be true (Alternatively ≠

It is notable that we are thus enabled to use the Standard commodity as the measure of wages and prices <u>even though we do not know</u> its composition (<u>what it consists of</u>). For the value of R' (which of course is a known number) can have been determined (found out) discovered by solving the production equations for $w = 0$, without any need of bringing in at all the Standard system or the q-equations. (D3/12/68/3)

Sraffa acknowledges that it is 'puzzling' to be able to avoid the actual construction of the Standard system via the q-system and hence of being able to construct an invariable measure of value the physical composition of which is unknown, but three days later on 16 September 1956 Sraffa observes that:

The use in our calculation of a standard of which we do not know what it consists of should not present much difficulty. The degree of abstraction required is nothing as compared with that involved in the current use of an inconvertible paper-money of which even less is known. (D3/12/76/6)

In a draft of this sentiment dated 28 June 1956, Sraffa echoes these sentiments. Here he refers to the 'removal of the scaffolding' as a 'dodge':

This dodge by which (having found the value of R which is, say R') we replace r with $\underline{R}'(1 – \underline{w})$ takes the place of (has the same effect as) is equivalent to having a special equation which defines the unit of wages and prices as being equal to the Standard net national income since the relation $\underline{R}'(1 – \underline{w}) = \underline{r}$ when R' is a known number is <u>only</u> true if the standard product is adopted as unit of wages and therefore that substitution <u>implies</u> the adoption of that unit. This saves the trouble necessity of finding the values of the q's to determine that unit. And since the value of R can be found by solving the p-equations after making $\underline{w} = 0$, it turns out that we can do altogether without the q-system. It has served as scaffolding and can now be dispensed with.

Thus, once we know the value R' of R we can determine all prices at any level of w in terms of the Standard commodity, <u>even though we do not have no idea know what this commodity consists of</u>. This may seem strange; but if will be found that it is no stranger than using paper money as medium of prices – (even less is known)…that

the idea is less abstract than that of paper-money (intangible, airy, evanescent). (D3/12/68/17)

Sraffa clearly here seems to equate the fact that the 'scaffolding' of the *q*-system of quantity multipliers can be discarded and replaced with the idea of 'paper-money'. But this is not to equate the Standard commodity with money. Rather it is to say that the idea of a standard of wages and prices the commodity composition of which we do not know is (i) equivalent to the Standard commodity should we go to the trouble to actually find it; and, (ii) is no less abstract conceptually as paper money, 'of which even less is known'.

The idea of an abstract standard serving as the measure of both prices and more importantly *wages* is what leads Sraffa to question the efficacy of closing the system from the wage-side of the coin, the latter being the practice of the classical economists and certain interpretations of Marx. In the opening document of the 'Scaffolding' file, which following Sraffa's habit of putting the most recent documents first in his folders and given the fact that no date appears here we conjecture is drafted *after* 16 September 1956, we find this spelled out:

> It may be added that in regarding the wage as the independent variable, we have followed the practice of the classical economists of…. On the other hand it may be added that the practice of regarding the wage as the ind. var. which we have followed ~~is reasonable~~ seems acceptable so long as the wage is ~~measured~~ composed of in necessaries of subsistence consumption goods, whether natural or customary, but it cannot easily be maintained for a wage measured abstract Standard commodity; nor is it appropriate when the central problem variable is that of the distribution of a surplus. However there is no objection to regarding the rate of p. as the ind. var.

> On the other hand it becomes rather somewhat awkward now that w is measured in abstract Standard commodity to continue to regard it as the 'given' quantity or as the independent variable; a practice that was based on the wage being composed of necessaries of subsistence, whether natural or customary.

> No such difficulty arises with the rate of profit as the independent variable. We shall accordingly tend to regard the rate of profit as the given quantity as in relation to it no such difficulty arises.

> On the other hand, with the wage measured in the abstract Standard commodity it becomes awkward and unrealistic to continue to regard

it as the independent variable, a practice which originates from a wage which consists of the necessaries of subsistence; it will therefore be convenient to replace it in that position with the rate of profits. (D3/12/68/1–2)

We find in this archival evidence that Sraffa's approach to the question of the openness of the distribution parameter relates to (i) the idea of wages being expressed in terms of an abstract standard, which Sraffa remarks is not much unlike being expressed in terms of 'paper-money'; (ii) which allows for the rejection of the 'classical' conception that the wage represents a 'given' subsistence bundle[16]; and (iii) thus leaving open the possibility that in fact it is the profit rate that serves as the mechanism of closure. These notions are further corroborated by the document immediately following:

> We have up to this point regarded the wage as being the ind. variable which is 'given' while the rate of profits and the prices or commodities have to adjust themselves to it. This agrees with the practice of the classical economists and it is from the classical economists whose general point of view that the problem has been approached. However, their practice was essentially based on a general assumption of a wage given by natural and customary conditions which would only vary slowly.
>
> The point of view however of variation depending on the pull and push for the distribution of the surplus is more suited to regarding the rate of profit as being the independent variable and as being itself a reflection of the rate of interest which is determined by the operation of the St. E. {stock exchange} or regulated by banking policy.
>
> However with the wage being measured in the Standard commodity it can hardly be supposed that it can be 'given' in that form. With the wage measured in Standard commodity instead of in necessaries for subsistence that position is not easily tenable. And with the problem of distribution of the surplus the rate of profit as independent variable more consonant (germane) the latter being in turn determined by the rate of interest as determined by the Bank.
>
> If however as is more consonant with the sharing of surplus, we regard r as determined by money note, and this by Bank or St. E. the

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[16] In Carter (2011) several original passages from the Marjoca Draft are reproduced where Sraffa makes his argument for the unequivocal adoption the wage share over the wage bundle.

problem is much simplified; for, if the value of r is given the system becomes linear one. (D3/12/68/2)

Sraffa becomes quite explicit that, if prices and wages are indeed measured in an abstract standard which is on analytical par with 'paper-money', it makes much more sense to conceive of the distribution parameter as being closed from outside the production system, namely the monetary sector conjectured as possibly *both* the 'Stock Exchange' *as well as* 'banking policy'. Sraffa does seem aware that such a radical departure from classical doctrines is indeed a controversial idea, and in the famous §44 is far more obscure than in the archival notes discovered above, referring there only to the 'money rates of interest', *not* the institutional mechanisms of banking policy nor the stock exchange.

Conclusion

The discovery of the Standard commodity occupied a central role in the development of Sraffa's constructive contributions. Archival evidence shows that the central thesis behind this construction was the desire to demonstrate the correctness of his Hypothesis regarding the fundamental constancy in the ratio of net product (social revenue) to means of production. By making this breakthrough in the 1940s Sraffa seems to have been intellectually free in the sense of putting down temporarily his constructive work, finishing up (finally) his Ricardo edition, and writing his famous interpretation regarding the corn-theory of profits.[17]

We also find that immediately after finally getting the first ten volumes of his Ricardo into print in 1954 Sraffa begins in earnest in early 1955 to, as Sraffa tells us in his Preface, 'pull together out of a mass of old notes' the ideas that he was developing over the previous 25 years. Here emerges the constructed physicalist Standard system and Standard net product via the *q*-equation, the scaffolding of which could be discarded yet the results retained. It is found possible to have an invariable measure of value the composition of which was unknown merely by replacing

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[17] Indeed Sraffa tells us as much, in an important parenthetical remark made in Appendix D References to the Literature:

It should perhaps be stated that it was only when the Standard system and the distinction between basics and non-basics *had emerged* in the course of the present investigation that the … interpretation of Ricardo's (corn) theory (of profits) suggested itself as a natural consequence. (Sraffa, 1960, p. 93)

the Standard net product as unit with the simple relation $\underline{r} = \underline{R}'(1 - \underline{w})$. Although initially surprised at this discovery, Sraffa recognises that the degree of abstraction necessary to allow conception of such a possibility is no less than that required by 'paper-money'. This led him to go against classical conceptions and argue that (i) the commodity wage was no longer appropriate, and (ii) with wages conceived as a share, the rate of profits may in fact be the more theoretically sound means of closing the distribution parameter, at least with respect to questions concerning the effect of income distribution on the price form.

All this led Sraffa to open the theoretical door of the monetary sector and in his notes he even mentions by name the specific institutional mechanisms of the stock exchange and banking policy. What remains a mystery is why Sraffa opens this monetary door but refuses himself to enter the room. As a contribution to the solving of this mystery, or at least to conjecturing plausible reasons, consider an interesting scribble made on a 3 × 5 piece of paper dated 22 January 1957, *after* the archival material already cited in this chapter was penned, where he writes 'Just enough to hand it over before going down' (D3/12/58/2). Sraffa seems to have known all he was doing is opening the door and seemed content with that and provided instead in the Preface of *PCMC* a charge for the 'younger and better equipped' to carry it all forward. And, as far as we have come, we still have a long way to go.

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Comment: On the Neoricardian criticism of irrelevance by Dario Preti and Sraffa and the Standard commodity by Scott Carter

Pier Luigi Porta

Forty years ago my old friend Alfredo Medio wrote a paper in which he declared at the outset: 'The main subject of this paper is the Marxian theory of *value*.' Among many other thoughts, he added: 'Some people will maintain that the points in the present article are rather old fashioned and well known. To this I reply that, since the *dernier cris* on both sides of the barricade are, after all, Ricardo and Walras, I might just as well claim some room for Marx, also' (p. 314). Dario Preti continues today to read along the same track. Is it worth it? I emphatically think so.

'The purpose of this chapter' – he writes – 'is to show the substantive inconsistency of the main argument fielded by critics, that I shall henceforth call "neoricardian", of the Marxian theory of value, namely the issue of irrelevance of that theory, and therefore of the expenditure of labour, in determining the rate of profit. Substantially the chapter continues the effort of those theories which have thus far attempted, albeit inadequately, to challenge the destructive conclusions of the neoricardian criticism. I hope that this could promote the progress of a reflection eventually free from false conclusions and prejudgments on a central matter as the link between human labour supplied in commodities production and capital valorisation' (this volume, p. 26). Preti's chapter is similar in structure to Medio's: introduction, formal model, conclusions. The arguments are indeed different and, while Medio insists on the compositions of wages and on exploitation, Preti is keen on the structure of production.

In substance this is a piece in a never-ending game which hopefully is still likely to bear nice fruits to the player. That was especially the case, in those past times, as a young scholar was intent on entering the stage. Medio, who was little more than an outsider at the time, in fact soon got a doctoral degree in Cambridge and a Chair in Italy. It is preposterous (as it is done sometimes) to blame Marx for failing to earn his own living, while

forgetting of the whole host of scholars who happen to have earned much more than a decent standard of life at Marx's expense. It is good, moreover, that the present chapter by Preti so clearly appears to be part of a long run challenge, as (indeed!) quite a number of Marx's supporters have sadly turned into professional anti-Marxists through the years. This chapter by Preti seems promising and it is to be hoped that the author may remain a faithful Marxian or Marxist scholar throughout his life and really provide the adequate weapon to achieve what (as he rightly points out) has been so far missing. Neoricardians would then be cornered for good.

Scott Carter's chapter focusses on a more limited issue, which has to do with the role and significance of Sraffa's Standard commodity. His chapter makes use of unpublished writings by Sraffa, belonging to archival materials dating mainly from the first half of the 1940s and some from the latter half of the 1950s. Basically those materials are part of a much larger set of documents that are classified under 'Preparations for the Production of Commodities book of 1960' (archived as D3/12) in the Sraffa Papers at Trinity College, Cambridge.

Let us, first of all, recall what it is well known, namely that Piero Sraffa, in approaching the conclusion of his discussion on the uniqueness of the Standard system in *Production of Commodities*, describes (§43) the 'Standard system' as a 'purely auxiliary construction'. And he adds: 'It should therefore be possible to present the essential elements of the mechanism under consideration without having recourse to it.'[1] Carter seems to disagree. 'The Standard commodity is not simply a *numéraire*' – he writes (this volume, pp. 47–8): 'Perhaps we can say that it *is* a *numéraire*, but one with special properties; namely properties of invariance in the face of changes in the distribution of the net product; that is the class struggle. The Standard commodity represents *an important unity* (synthesis) *between the value-theoretic concept of price with the use-value* (physical) *structure of an economic system*. The value-theoretic side of the story involves systems of price-determination (commensuration) for a wide range of economic systems (e.g. circulating capital models; fixed capital models; reduction models; etc.). The use-value side of the story involves the physical structure of production of the various systems' (italics added).

Scott Carter thus devotes considerable amounts of energy to introducing a specific identifiable link between the Sraffian system and the labour theory of value, i.e. the 'value-theoretic' side of Marx's analysis. His objective evidently lies in making the Sraffian system more 'Marxian': presumably (by perhaps discovering a 'strong' way to connect Sraffian analysis with Marxian value), his real final aim is to

resurrect exploitation within a Sraffa–Marxian frame in a (hopefully!) more convincing way with respect to what has been done, for example, by Garegnani and others. As a matter of fact, a number of Sraffian authors limit themselves to paying irritating lip service to the notion of exploitation (Garegnani, 1981), while others, perhaps more coherently, simply choose to ignore the subject (Steedman, 1977), which however is not in itself terribly attractive for someone wishing to survive in the Marxian camp.

'What Sraffa is able to show, quite simply' – Carter notes (p. 48) – 'is that when we conceive of the Standard *system* – of which the Standard commodity is *only* a derivative concept! – there is an important *resonance* and *point of contact* [emphasis added here] between the value structure of production, the physical structure of production, and, as we argue below, the distribution of the net product when the rate of profit is at its maximum value. This point of contact takes the form of the relationship between the *p*-system of relative prices and the *q*-system of quantity multipliers. Important in these points of contact are the 'coincident' ratios (Sraffa's term) that are associated with each system'. In the book Sraffa mentions (§22) the 'corresponding' ratios, which can be chosen in order to replace 'the "hybrid" proportion of the *quantity* of labour to the *value* of the means of production' (emphases added), in line also Sraffa's chosen title of Chapter 3 ('Proportions of labour to means of production').

It is now important to understand what exactly this '*resonance* and *point of contact*' is as well as the meaning of it in Carter's language. Let me say immediately that I totally agree with the idea that Sraffa's Standard commodity is a Marxian tool. Nevertheless, I hasten to add, it is unlikely that it has much to do with the labour theory of value. I think this is the important point to be understood concerning Sraffa's system. Let us begin by recalling that the Standard commodity has generally been associated with *Ricardo's* analysis of *value*. As a result of that it has sometimes been interpreted as little more than a curiosity of pure intellectual interest in the search for a perfect measure of absolute value. Yet, in Sraffa's eyes its significance was certainly more considerable and some of the observations by Sraffa himself, as reported above here, should

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[1] Sraffa states in the Preface to the book that '[w]hilst the central propositions had taken shape in the late 1920s, *particular points*, such as the Standard commodity, joint products and fixed capital, were worked out in the late "thirties and early forties"' (p. vi, emphasis added). That is now brought out by the archival evidence.

be now completed for a proper understanding of the problem, to see where *exactly* it is that we have to find the significance of that piece of analysis.

Sraffa stated that his whole interpretation of the formative stages of the *Ricardian* system came to take shape as an outcome of his earlier studies on the Standard system. 'It should perhaps be stated' – Sraffa wrote (1960, Appendix D, §1, p. 93) – 'that it was only when the Standard system and the distinction between basics and non-basics had emerged in the course of the present investigation that the above interpretation of Ricardo's theory suggested itself as a natural conse-quence'. The 'above interpretation', of course, is the corn-ratio theory of profits, conjecturally (a 'rational foundation', 'never explicitly stated by Sraffa and Dobb, 1951–74, p. xxxi) attributed by Sraffa to Ricardo.

The significance of the Standard system, and within it of the Standard Commodity, lies precisely in the fact that it provided the final stage of a *Marxian* journey from the corn-ratio theory of profits (explicit in Marx's *Theorien über den Mehrwert*) through the labour theory of value, a journey which Sraffa transforms into the core of the classical approach to economic analysis, by showing that Ricardo can be read along the same line. That *Marxian* reading of Ricardo achieved its highest point in Sraffa's masterpiece – his introduction to Ricardo's *Principles* – in the light of which his subsequent *Production of Commodities* must be read. Sraffa's terse and tight apology in the introduction appears designed to provide the missing link to *Marx's* journey from Physiocratic quantity (corn) surplus, through labour value (as a pure measuring device), to the price system. The Physiocratic model, where the rate of surplus is deter-mined as a ratio of physical quantities of the *same* commodity, remains Marx's ideal formulation, which his subsequent macroeconomic expres-sions (either in terms of labour values or in terms of the product of the average sphere of production) are meant to replicate in more general forms.

It is easily demonstrable that Marx himself had ideas on how to replace 'corn' with a composite commodity as he goes to the more general state-ments of the problem. Marx was not entirely successful and it is Sraffa's brilliant achievement to have designed the Standard system as the proper device to grant the kind of invariances and of proportions after which Marx strived so ardently. It is therefore hardly surprising that – as he approached the discovery of the Standard system especially during the war years – Sraffa went back to *Marx*. As Kurz and Salvadori (2010, also

quoted by Carter) emphasise, Sraffa had a renewed season of passionate study of Marx.[2]

My conclusions can be summarised in three points:

1. I entirely agree with Scott Carter's concluding section in the chapter especially the first half of it, ending with the quote from Sraffa's Appendix D.
2. The whole business of Sraffa's Hypothesis (§3) adds nothing new, but should in my view be considerably better stressed as an important confirmation of Sraffa's Marxian approach to Classicism in Economics.
3. The only point on which I perceive a difference with Carter concerns his own emphasis on exploitation. For instance, the opening statements of section 'Discovery of the Standard commodity in the 1940s' reveal that the argument 'above' (he writes, i.e. in the previous pages of the chapter) has been about 'the role of Marx's concept of exploitation and the importance that it had for Sraffa's own enquiries'. This comes as a complete surprise to me, for I fail to see the bridge over such a wide territory. To that Scott Carter adds that 'exploitation as a conceptual category fundamentally informs the manner in which Sraffa developed the concept of the Standard system, the Standard ratio, and ultimately the Standard commodity via the *q*-system of quantity multipliers'. What exploitation has to do in the context of the Standard system, I confess that I am at a loss to understand.

Finally let me say that a proper understanding of Sraffa's Marxian Classicism requires a connection with the Italian tradition of Marxism, in which the labour theory of value was criticised and dispensed with at an early stage. It would be out of place here to dwell on the issue. I shall only refer the reader (see Bibliography) to my 2012 paper. Let me finally mention that one of the best collections on Marx was provided by Caravale (1991). The paper by Napoleoni in that collection especially seems suitable in casting the important problems discussed by Carter in the proper perspective.

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[2] When I contributed my interpretation of Sraffa's view on classical economics, I was unaware of that significant set of papers, which are now accessible and discussed by Scott Carter and by others. I feel grateful to them for, in my forthcoming book on the classical school in Economics, I shall make full use of the evidence they discuss, which appears to be perfectly in line with the kind of interpretation of Sraffa's Classicism as reconstructed through several of my own works.

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A Response to Pier Luigi Porta

Scott Carter

I would like to thank Pier Luigi Porta for his insightful comments on my chapter. It has been almost 20 months since that chapter was first written and my thinking on these matters has evolved, much of it along the lines of the legitimate criticism offered by Professor Porta. So in that capacity I would like to further thank him for contributing to the development of my thinking.

In the first instance I completely agree with Professor Porta that one of the objectives of that chapter 'evidently lies in making the Sraffian system more "Marxian"' (Porta, 2014; 6 paragraphs down beginning 'Scott Carter thus…'). In agreement with Professor Porta's critique, my earlier approach does verge on reading into Sraffa what may in fact be my own reading of Marx, where ultimately 'value' is conceived of as a commensurate homogenous 'substance' (the tendency to read into Sraffa what may be my own reading of Marx is identified also in critiques made by Riccardo Bellofiore[1], Heinz Kurz[2], and Robert Solow[3] on some of my previous unpublished writings). This is the backstory behind the idea of the LMP 'value ratio' as developed in the chapter. There this ratio is conceived as a fraction of congealed quantities of 'value' the prices of which reflect 'pure wage distribution' whose units cancel out just like Physiocratic corn. This I guess is behind Porta's observation that the 'Physiocratic model…remains Marx's ideal formulation' (this volume, p. 73).

Value, as I now understand it, does not represent a physical 'congealment' of some fundamental abstract absolute quantity, be it labour,

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[1] Bellofiore below speaks of the approach in my earlier unpublished writings as identifying Sraffa as the 'true Marxist'; see below chapter 9.

[2] In private discussions and public comments on my presentation at the Cambridge University Press Conference on the 50th Aniversary of *Production of Commodities* held at Queens College, Cambridge in June 2010.

[3] In February 2007 Robert Solow Commented upon a paper of mine on a panel session on Sraffa at the Eastern Economics Association Annual Conference in New York City. My original paper, his Comment, and my Response appear in Carter (2014a,b) and Solow (2014).

Standard commodity, or otherwise. Rather value, or more specifically the value-form, in commodity-producing societies represents a synthesis of the relation of exchange-value to that of the production of *newly* created-value. The former exchange-value concept represents a physical relation of exchange between these different commodities (including wage labour) such that the system can (i) in subsistence production restore itself and (ii) in surplus production restore itself as well as equitably distribute the surplus according to the general rate of profits on the value of capital advanced. Leaving aside for the moment the distributional complications that arise in the latter, in both systems the relation of exchange-value is structural in character, by which is meant that irrespective of the particular *numéraire* adopted, be it labour, Standard commodity, or otherwise, the 'directly sprung' unique exchange relation that ensures systemic restoration is maintained: wheat-as-*numéraire* prices equally restore the system as iron-as-*numéraire* prices, the only difference being that the former 'commensurates' according to quarters of 'homogenous wheat' and the latter according to tons of 'homogenous iron'. When living labour is made explicit, the system can equally be expressed in terms of 'hours of homogenous labour'; and the same applies when the system is rendered to its Standard proportions and valuation is expressed via units of 'homogenous composite Standard commodity'. This is the nature of the relation of exchange-value that Sraffa develops in his first system of subsistence production. There he shows that irrespective of the fact that both living labour and a net product are not considered, a well-defined set of exchange-values between the commodities no less arises. These exchange-values are unequivocal. Things change when we consider both the production of a net output as well as the introduction of the labour input, the latter of which, as Sraffa notes in 1942 (recorded in Bellofiore's conclusion below), 'kick'. Hence the struggle over the net output involves the real accrual of actual net product by the various contenders or 'men who kick', here conceived as the classes of wage-labourers versus capitalists. This real accrual of net output results in changes in distribution which in turn changes the overall configuration of value and price and hence of the physical exchange between the different commodities as well as living labour. Referring to the distibution of the net product or 'surplus' between wages and profits, Sraffa writes in the Majorca Draft that 'it is indeed the stress and strain arising from this possibility that has given economic theory its shape' (D3/12/52/6).

It is in my opinion that here is where the theory of value belongs, specifically the labour theory of value (LTV), as distinct from the theory of exchange-value. This is my reading of the approach to the

LTV advanced both by Bellofiore and Preti in the present Volume, although there are some significant differences I still have with their approaches and by no means do I necessarily think they would agree with my own interpretation. But what I read there is an extension of the analytical framework to include the working-day, from which the division of necessary and surplus labour becomes transparent. Hence living labour is posited as the net-value producing entity in the system, which as agreed in different ways in the present volume by Preti, Perri, and Bellofiore involves the New Interpretation-like normalisation of the value-added by living labour (§10) with the value of the net product (§12) *irrespective of the particular numéraire adopted*. This latter point is important, because here we conceive of the 'labour theory of value' as maintaining the fundamental equality in the values of labour-added and net product produced, whether that equality is measured in commensurate and homogenous 'hours of labour', 'quarters of wheat', 'tons of iron', or 'units of Standard commodity'.

Which brings us back to the Standard ratio, specifically its 'coincident' character. What Sraffa demonstrates is that when the system is conceived at the regime income distribution associated with maximal profit rate accrual to capital, that ratio, the maximum rate of profits (R), coincides with the labour to means of production (LMP) 'quantity ratio of direct to indirect labour employed' (Sraffa, 1960, §22, p. 16) as well as physicalist Standard ratio (ζ) associated with the 'given' structure of production. And this is where, to answer Professor Porta's query, the concept of exploitation enters the story. What it shows is that to a certain degree the 'Hypothesis of constancy' of an economic system can be maintained at the polar opposites of income distribution of (i) pure labour remuneration as well as (ii) pure profit accrual *qua* capital remuneration, which from the perspective of labour is pure unpaid labour extraction; in a word, *exploitation*.[4] Further, when expressed in its Standard proportions the relation of distribution at the intermediate cases between the extremes shows in linear fashion the antagonistic social relation that exists among these different classes of 'men who kick'.

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[4] It is my contention that the Marxian theory of wage-labour must incorporate the theory of exploitation into its theory of wage-remuneration. This connection is sometimes lost when the wage is conceived as a historically 'given' bundle rather than a command out of workers' net productivity. This is what the theory of exploitation must develop. Thus in the present context, the fact that the regime of distribution associated with pure labour exploitation exhibits no less the 'constant' Standard ratio is taken as corroboration of the merit of developing and advancing the exploitation theory of distribution.

Postscript

Upon the eve of publication of this volume the present writer was able to make a last-minute visit to the Wren in an effort to map out better the evolution of the final drafts leading to the publication *PCMC* (see Editors' Note, p. 140 above). While there a slip of paper written by Luigi Pasinetti was found in a copy of Sraffa' book that dates from the second printing of 1963 (*SC* 3749c). In this slip Pasinetti suggests that Sraffa include an explanatory footnote that has remarkable resonance with the notion of 'coincident ratios' developed in the chapter above. This slip reads as follows:

'Suggested as a possible <u>footnote</u> at the end of §39

It may be useful to remind the reader that it has been shown in §22 (see also §29) that the Maximum rate of profit and the Standard ratio are both represented by the same number. Since our arguments have been carried out on the same conceptual schemes, it is implied that the set of positive multipliers of §37 and the corresponding set of positive prices of §39 correspond to the same value of R' (Slip of paper found inserted inside front cover of SC 3749c; underline emphasis in original)

On the margin at the bottom right of this slip Sraffa simply writes the word 'no' and circles it.

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5
A New Perspective on Sraffa

Ajit Sinha

Introduction

In the 'Preface' to the *Production of Commodities by Means of Commodities* (*PCMC*) Sraffa makes four specific remarks that are essential to understanding his book. These remarks are: (i) do not think in terms of equilibrium of demand and supply; (ii) there is no assumption regarding returns to scale; (iii) this standpoint is the standpoint of classical political economy from Adam Smith to Ricardo; and (iv) this book is a *prelude* to a critique of modern economic theory and if the propositions of the book are proved to be correct then it might provide a foundation for launching a critique of the modern economic theory. Unfortunately, none of these clear-cut statements by Sraffa have been given careful attention either by his followers or his critics in interpreting his book. In this chapter, I discuss the above four points to develop a new perspective on Sraffa's book. In Section 'Equilibrium of supply and demand and returns of scale', I take up points (i) and (ii) and try to motivate a new interpretation of Sraffa's equations. In Sections 'A standpoint of classical political economy' and 'The foundation for a new critique of modern economic theory', points (iii) and (iv) are taken up respectively, albeit in a highly brief and provisional manner. Here I have decided to state my position without giving it too much of a controversial air, as I have already presented my refutations of the received interpretations elsewhere (Sinha, 2007, 2010, 2012; Sinha and Dupertuis, 2009a, b).

Equilibrium of supply and demand and returns of scale

Anyone accustomed to think in terms of the equilibrium of demand and supply may be inclined, on reading these pages, to suppose that

the argument rests on a tacit assumption of constant returns in all industries. ... In fact, however, no such assumption is made. (Sraffa, 1960, p. v)

This is how the Preface of Sraffa's book, *Production of Commodities by Means of Commodities*, begins. In clear terms it makes one logical point: you would suppose that my equations are based on a tacit assumption of constant returns if you think that the solution of my equations must represent the equilibrium of demand and supply. Then he drops the bomb by stating that he, however, makes no such assumption. The fact that he makes no such assumption is so important to him that he reinforces it in the same Preface by recollecting that: 'when in 1928 Lord Keynes read a draft of the opening propositions of this paper, he recommended that, if constant returns were *not* to be assumed, an emphatic warning to that effect should be given' (p. vi).

Let me first explain how the logic of 'the equilibrium of demand and supply' is necessarily connected with the assumption of constant returns. We can divide the problem into two parts: (i) the mechanism through which demand and supply are supposed to reach an equilibrium and (ii) the system is assumed to be at rest in the equilibrium. In the first case, when the quantities demanded and the quantities supplied of all the industries are not in equilibrium then it is assumed that the prices of the commodities that are in excess demand rise, and the prices of the commodities that are in excess supply fall. The rise in prices increases the rates of profits in the industries with excess demand and vice versa for the industries with excess supply. Such movements in the rates of profits engender capital movements from the lower rates of profits industries to the higher rates of profits industries, increasing the quantities supplied by the higher rates of profits industries and lowering the quantities supplied by the lower rates of profits industries. Such market mechanics apparently pull the quantities supplied toward the given demands and eventually equates them with quantities demanded. When this happens for all the industries simultaneously then the rates of profits received by all the industries must also become equal. Otherwise this position will not be of rest (or equilibrium) for the system, as supplies move in response to the differentials in the rates of profits.

Leaving aside the vagueness of the description of the process and a lack of proof that such an equilibrium exists, let us ask what does 'demand' stand for in the above story? In the classical story the 'demand' is characterised as 'effectual demand' by which Adam Smith means the demand that is backed by the real ability to purchase, that

is, income (Smith, 1981, p. 73). In other words, the set of 'effectual demands' must be attainable by the income generated by production. So let us suppose we start when the economy is in equilibrium, that is, the output set of the commodities match commodity-for-commodity the 'effectual demands' set. Now suppose taste changes from wool to silk (to take Ricardo's example; Ricardo, 1951, p. 91). For the increase in the demand for silk to be 'effectual' the total value of the increased demand for silk must be equal to the total value of the decline in the demand for wool on the given set of prices. Now a discrepancy has taken place between the set of 'effectual demands' and the given set of outputs. The gravitation mechanism is designed to show that in such cases the price and supply movements would engender a reallocation of the total labour employed in production such that the produced set of outputs would equate the new set of 'effectual demands'. Now, if constant returns prevail in all the industries then a reallocation of labour should be able to produce the new set of 'effectual demands', as the income generated by the two sets of outputs must remain the same since prices are not affected by the movements of resources. It should, however, be noted that the logical possibility that the new set of 'effectual demands' can be produced, when constant returns prevail, does not *ipso facto* imply that a gravitation mechanism ensures that it must happen. As a matter of fact, Dupertuis and Sinha (2009) have shown that the mathematical probability of such a result is zero for a system of three or more basic goods.

Now, let us suppose that industries are characterised by variable returns. If variable returns prevail then the reallocation of total labour would necessarily change the relative prices and thus the income generated by new sets of outputs. Therefore, in this case the new set of 'effectual demands' may become unattainable as the system tries to achieve it. This proves that the idea of 'centres of gravitation' given by 'effectual demand' points tacitly assumes constant returns.

What about point (ii)? Suppose that somehow we know the industrial effectual demands (though I don't know how). Given this information, can we write down equations of production for each industry such that it produces the exact effectual demands? If that was possible then we could perhaps assume that the system is in equilibrium given the supplies, without having to think in terms of movements in supplies and therefore without having to assume returns to scale of any kind. The answer, however, is: no, unless constant returns are assumed. Why? Because the given set of effectual demands tells us what should be the set of outputs for the system to be in equilibrium but it does not tell us

what input configurations must accompany that set of outputs. So how can we write the equations? Our knowledge of the processes of production is the knowledge of *actual* input-output data 'after the harvest'. If the empirical set of outputs does not happen to be equal, commodity by commodity, to the given set of 'effectual demands', which would be the most likely case, then any linear adjustment of the actual outputs to the corresponding 'effectual demands' can only be made on the assumption of constant returns.

Once it is clear that the idea of an equilibrium of demand and supply is intrinsically linked to the tacit assumption of constant returns then it follows that Sraffa's equations do not necessarily represent an equilibrium condition since they are not based on the tacit assumption of constant returns. The problem now we must solve is: how do we justify the condition of equal rate of profits in his equations?

In Chapter 1 of the book Sraffa takes up a system of 'subsistence' economy and asks the question: at what ratios must the commodities exchange so the system can reproduce itself? He finds that the information available in the data of inputs and outputs of this system, irrespective of whether the system is in 'equilibrium' or not, is sufficient to determine the necessary price ratios (for details on this point see Sraffa, 1962; Sinha, 2007, 2010, 2012). However, when the system produces a surplus then this information appears to be no longer sufficient for determining the necessary prices. He first puts the problem in technical terms. In the case of a 'subsistence' economy there are $n - 1$ independent equations and $n - 1$ unknown relative prices and the system of equations is fully determined. A consequence of the emergence of the surplus in the system is such that the number of independent equations rises to n; however, the number of relative prices to be determined remains $n - 1$. But then, we now have to account for the surplus within the equation system. Sraffa claims that the surplus of the system must be distributed as a mark-up or a percentage of the value of capital invested by the industries. If that is the case, then the problem shows up in a form of circularity. We cannot know the prices unless we know the mark-ups and we cannot know the mark-ups unless we know the prices. Thus the two must be simultaneously determined and not sequentially. Logically there is only one simultaneous solution to the $n - 1$ relative prices and the rates of profits possible; and that is when all the industrial rates of profits are equal. This is because the case of unequal rates of profits implies more unknowns than independent equations in the system; that is, in this case some prices must be imposed from outside on the system to solve the equations.

Now let us break the condition of simultaneous determination of prices and the rate of profits to understand the nature of the problem. Let us suppose relative prices are imposed from outside the system, say by the state, in such a way that the industrial rates of profits are unequal but positive. This set of prices gives us an homogeneous measure of the total surplus as well as the total capital. By dividing the total surplus with the total capital we derive the average rate of profits of the system. Now one of the properties of the 'average' of anything is that it can be equally distributed over the whole population. In this case, however, when we try to distribute this 'average' rate of profits equally to all the industries we find that the system breaks down. The reason for this is that we cannot take prices as independent variables and the rates of profits as dependent variables. Is there an 'average' rate of profit that can be distributed equally over all the industries? Of course, it is the solution to the simultaneous equation system that determines prices and the equal rates of profits in all the industries. In this case, by definition, the 'average' rate must coincide with the equal industrial rate.

Let us further elaborate this abstract mathematical argument with some economic reasoning and examples. Let us take an empirical system of production that has produced surplus:

$$90\text{t. iron} + 120\text{t. coal} + 60\text{qr. wheat} + 3/16 \text{ labour} \rightarrow 180\text{t. iron}$$
$$50\text{t. iron} + 125\text{t. coal} + 150\text{qr. wheat} + 5/16 \text{ labour} \rightarrow 450\text{t. coal} \quad \textbf{I}$$
$$\underline{40\text{t. iron} + 40\text{t. coal} + 200\text{qr. wheat} + 8/16 \text{ labour} \rightarrow 480\text{qr. wheat}}$$
$$180\text{t. iron} + 285\text{t. coal} + 410\text{qr. wheat} + 1 \text{ labour} \rightarrow 180\text{t. iron} +$$
$$450\text{t. coal} + 480\text{qr. wheat}$$

And in terms of its price equations the system is represented by:

$$(\ 90P_i + 120P_c + 60P_w)\ (1 + r_i) + 3/16\ \omega = 180P_i$$
$$(\ 50P_i + 125P_c + 150P_w)\ (1 + r_c) + 5/16\ \omega = 450P_c \quad \textbf{I'}$$
$$\underline{(\ 40P_i + 40P_c + 200P_w)\ (1 + r_w) + 8/16\ \omega = 480P_w}$$
$$(180P_i + 285P_c + 410P_w)\ (1 + R) + \omega = 180P_i + 450P_c + 480P_w$$

Take the empirical system-I. For simplicity, let us assume wages to be zero. Now, its global (or systemic) rate of profit R is given by the ratio (165t. coal + 70qr. wheat)/(180t. iron + 285t. coal + 410qr. wheat). This physical ratio is not well defined, since it is a ratio of heterogeneous goods. However, the value of R could be determined if we knew the set of prices that could be applied to those physical quantities. It is clear

that the value of *R* will most likely change with changes in the set of prices, even though the physical ratio remains the same. In other words, prices can have a nominal effect on *R*. The usual way of looking at such a problem is to treat prices (i.e., market prices) as the independent variables and *R* as the dependent variable. In my opinion, Sraffa refuses to accept the terms of the problem as *R* being dependent on the set of market prices. His argument seems to be that the real empirical system-I has expanded at a certain rate *R*. This rate is well defined though we are unable to 'see' it because of the complications created by the heterogeneity of physical inputs and outputs (e.g., in a one-good 'corn' economy no such problem could arise and R could be directly determined by the physical ratio). It is the quest for the value of *R* independently of prices that takes Sraffa on to the journey of discovering the Standard system and the Standard commodity, to which we now turn.

Let us assume an imaginary system given by:

$$120t.\ iron + 160t.\ coal + 80qr.\ wheat + 1/4\ labour \rightarrow 240t.\ iron$$
$$40t.\ iron + 100t.\ coal + 120qr.\ wheat + 1/4\ labour \rightarrow 360t.\ coal \quad \textbf{II}$$
$$40t.\ iron + 40t.\ coal + 200qr.\ wheat + 2/4\ labour \rightarrow 480qr.\ wheat$$

200t. iron + 300t. coal + 400qr. wheat + 1 labour $\rightarrow$ 240t. iron + 360t. coal + 480qr. wheat

And in terms of its price equations, the system is represented by:

$$(120P_i + 160P_c + 80P_w)\ (1 + r_i) + 1/4\ \omega = 240P_i$$
$$(40P_i + 100P_c + 120P_w)\ (1 + r_c) + 1/4\ \omega = 360P_c \quad \textbf{II}'$$
$$(40P_i + 40P_c + 200P_w)\ (1 + r_w) + 2/4\ \omega = 480P_w$$
$$(200P_i + 300P_c + 400P_w)\ (1 + R^*) + \omega = 240P_i + 360P_c + 480P_w$$

System-II is nothing but Sraffa's Standard system, which is unique to the given empirical system-I. It redistributes the total labour of the system or rescales the real system in such a way that the aggregates of its inputs and outputs come out in the same proportions. Let us again assume that wages are zero, then in the above given example of system-II', it is clear that the rate of profits of the system as a whole, that is, *R** is equal to 1/5 or 20 per cent. This is because in this case the ratio of the aggregate physical net output to the physical aggregate inputs can be known without the knowledge of prices since it is a ratio of heterogeneous goods made up in the same proportion. This ratio is completely independent of prices – no matter what prices prevail, it will not affect the global rate

of profits (i.e., R*) of the *Standard system*. But the empirical system-I is nothing but an equivalent system to the Standard system-II, since the total labour used in the two systems as well as the techniques used are the same. Thus the rate of expansion of the two systems must be the same. In other words, R must be equal to R* and this condition must hold for all possible rescaled systems of the Standard system. However, this condition can hold if and only if all the industrial rates of profits must be uniform or equal, which happens to be the system's only solution to the unknown prices. From here it is a small step to show that this condition must hold for any positive wages, as long as wages are given and measured in Standard commodity, which is a composite commodity made up of all the basic goods in the Standard proportion. Thus prices are not independent variables but are dependent on the given R independently of prices. It is interesting to note that prior to the publication of the book, Sraffa had written a couple of slogans that captured the spirit of the book but he finally decided not to use them. One of the slogans was: 'A Dividend could be declared before knowing what is the price of the company's product.' The other slogan was: 'The St. Syst [Standard System] provides tangible evidence of the rate of profits as a non-price phenomenon.' (D3/12/68/14; quoted in Pasinetti, 2001).

The above argument can also be illustrated in another manner. Take the empirical or the 'actual' system-I'. Its net output-capital ratio is given by (165t. coal + 70 quarter wheat)/(180t. iron + 285t. coal + 410 qr. wheat). Though this ratio is not well defined without the knowledge of prices, it is clear that it is a technical relation of the system and any change in the distribution of the net output between the workers and the capitalists should not affect the value of this technical ratio. Now, on one hand, it is clear that if the distribution of the net income has effect on relative prices then in most circumstances it will affect the value of the net output-capital ratio, since the physical composition of the net output is not the same as the physical composition of the capital. On the other hand, it is also clear that if prices were not affected by changes in the distribution of income then the value of the net output-capital ratio would also remain unaffected. Below I first argue that relative prices cannot remain constant when the distribution changes (of course, in the systems with unequal ratios of industrial means of production to labour such as our system-I). Therefore, the constancy of the net output-capital ratio cannot be maintained on the basis of constancy of prices. After which I argue that for the net output-capital ratio to remain constant, the changes in prices must be such that the industrial rates of profits are always equal.

Let us take system-I and begin with wages equal to the net output (i.e., $165P_c + 70P_w$) and therefore, R = 0. In this case it is the technical requirement of the system that all the r's are also equal (i.e., = 0). This is because if any r were to be positive some r had to be negative, which would imply that the whole system was economically unviable. In this case the solution to the set of prices exists; as is well known, the prices will be in the ratios of their labour-values. Let us put $(165P_c + 70P_w)$ = 1. Now rescale the system to its Standard proportion. We know that the solution of a system of equations does not change by rescaling the system. Thus the same labour-values or P's and r's will follow for the Standard system-II'. From this it follows that $(40P_i + 60P_c + 80P_w)$ = $(165P_c + 70P_w)$ = 1, when R = R* = 0. Now let us reduce wages by half and assume that it has no impact on relative prices. These prices would give rise to unequal rates of industrial profits in both the systems as the ratios of means of production to labour in all the industries are not uniform. These prices would also generate a value for R, which in our example turns out to be about 10.5 per cent. Now, reduce wages by half in the Standard system-II' as well. Since prices have remained constant, the wage in the Standard system is given by $\frac{1}{2}(40P_i + 60P_c + 80P_w)$. This wage generates a value for R* = 10 per cent. This rate, however, is not contingent on the labour-value prices. No matter what prices prevail, if the wage is given by $\frac{1}{2}(40P_i + 60P_c + 80P_w)$ then the value of R* must be 10 per cent. Among all possible prices, there must be at least one set of prices that would be a solution for the real system for the wages given by $\frac{1}{2}(40P_i + 60P_c + 80P_w)$, if the real system has a solution. Thus if wages in system-I' is taken to be equal to $\frac{1}{2}(40P_i + 60P_c + 80P_w)$, then its price solution must generate R = 10 per cent. However, as we have calculated above, if prices remain at their labour-values then wages given by $\frac{1}{2}(40P_i + 60P_c + 80P_w)$ generates the value of R equal to about 10.5 per cent (remember, since prices have remained constant at labour-value ratios, $\frac{1}{2}\{40P_i + 60P_c + 80P_w\} = \frac{1}{2}\{165P_c + 70P_w\}$), which contradicts the mathematical solution of the system. This proves that in a system where the ratios of industrial means of production to labour are unequal relative prices cannot remain constant when distribution of income changes.

Now I show that the ratio of net output to capital remains constant if R is always equal to R*. Let us assume that wages are paid or measured in Standard net product in both the Standard system as well as the real or empirical system. Let us also normalise the Standard net product to one, that is, $(40P_i + 60P_c + 80P_w)$ = 1. Let us give wages (in terms of the Standard net product) in the Standard system from 1 to zero and plot the resulting R*'s. We will plot a straight line relationship between ω

(wages) and R* with R*$_{max}$ = 1/5 when ω is zero. If R in the real system is always equal to R* then it is clear that we would draw exactly the same relationship between R and ω in the real system as well. The general form of this straight-line relationship is given by $R = R_{max}(1 - \omega)$. This implies that R_{max} is equal to $R/(1 - \omega)$, which is a constant as it is a slope of a straight line. But R_{max} is nothing but the ratio of the value of net output to the value of aggregate capital, that is, the net output-capital ratio. Hence we have shown that the condition of equality of global rates of profits 'R' of the empirical system with the global rates of profits 'R*' of the Standard system is the technical requirement of the system and this technical requirement can be fulfilled if and only if all the industrial rates of profits are equal.

This is a remarkable result. It shows that the production equations of basic goods along with the knowledge of the wages in terms of the Standard commodity have sufficient information to determine prices irrespective of the demand conditions. Here I should point out that Sraffa's propositions are not built on the usual mechanical cause and effect relationships. All the dependence and changes of variables in Sraffa's propositions describe logically necessary relationships between those variables, such as a change of 10° of an angle in a Euclidian triangle must be associated with a 10° combined change of the other two angles in the opposite direction.[1]

A standpoint of classical political economy

> The investigation is concerned exclusively with such properties of an economic system as do not depend on changes in the scale of production or in the proportions of 'factors'.
>
> This standpoint, which is that of the old classical economists from Adam Smith to Ricardo has been submerged and forgotten since the advent of the 'marginal' method. (Sraffa, 1960, p. v)

I would like to draw the reader's attention to two points in the above statement: (i) The standpoint that Sraffa attributes to the 'old classical economists' does not seem to deal with Ricardo's silk and wool problem as described above; (ii) Sraffa does not refer or attribute this standpoint

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[1] Sen (2003, p. 1253) has also argued that '[t]he temptation to see Sraffa's contribution as a causal theory of price determination...must be resisted....The sense of 'determination' invoked by Sraffa concerns the mathematical determination of one set of facts from another set.'

to only Adam Smith and Ricardo but rather the reference is to a period of time from 1776 (Adam Smith) to 1821 (Ricardo). Thus the list of 'old classical economists' must also include other major economists of this period such as Malthus and J.-B. Say. Furthermore, it particularly excludes J.S. Mill and Marx.

Regarding the first point, it should be noted that Sraffa very early on had rejected the mechanism of gravitation as a part of the classical standpoint. In one of the notes of the period of 1927–31 he writes:

> When A. Smith etc. said <u>'natural'</u> he did not in the least mean the 'normal' or the 'average' nor the 'long run' value. He meant that physical, truly natural relations between commodities, that is determined by the equations, and that is not disturbed by the process of securing a greater share in the product. ... (D3/12/11/83; also quoted in Garegnani, 2005, p. 474, underline in original)

The evidence shows that when Sraffa uses the term 'natural price' of the classical economists, he is not using it as the long-run equilibrium or centre of gravitation price. It should also be noted that in his Lecture Notes on the Advanced Theory of Value of 1928–31 (archived as D2/4), Sraffa deals at length with the classical theory of value but it is the *objective* aspect of the classical theory of value that he emphasises and completely ignores the classical notion of 'centre of gravitation'.

As far as the second point is concerned, it calls for a fresh look at what Sraffa actually means by the 'classical standpoint'. In the Sraffian literature it is customary to refer to a list of three: Adam Smith, David Ricardo and Karl Marx. But this is clearly not Sraffa's list. In Sinha (2010), I have suggested that Malthus's and J.-B. Say's apparent attacks on Ricardo's labour theory of value were rather defensive in nature, in the sense that they were designed to defend Smith's theory of value from Ricardo's attack. On this ground, at least, there is a case for their membership in Sraffa's club of the 'old classical economists'.

But why are J. S. Mill and Marx not on the list? I do not know enough about J.S. Mill to be able to comment on this point. But when it comes to Marx, it appears to me that Sraffa must have concluded that the fundamental question that Marx poses about value is metaphysical in nature, and hence he had to keep Marx off the list. The role of value in Adam Smith and in Sraffa's reading of Ricardo ('Introduction', Sraffa, 1951) is functional in nature. They asked themselves the question about the rate of exchange between produced goods such that the income generated in the production is properly accounted for. Marx, on the other hand, seems

to be interested in asking: from where do commodities get their price? This is a question about the *essence* of price – all such questions of *essence* in Sraffa's understanding are a *metaphysical* quest. Marx's insistence that labour is the *essence* of price is something that Sraffa could not square with his own philosophical and methodological position and due to this Marx must have been left off the list, even though he remained very close to Marx's thinking in other respects. These are obviously highly preliminary observations that only call for further in-depth studies.

The foundation for a new critique of modern economic theory

> It is, however, a peculiar feature of the set of propositions now published that, although they do not enter into any discussion of the marginal theory of value and distribution, they have nevertheless been designed to serve as the basis for a critique of that theory. If the foundation holds, the critique may be attempted later, either by the writer or by someone younger and better equipped for the task. (Sraffa, 1960, p. vi)

In the Sraffian literature it is generally understood that Sraffa's main target was the neoclassical theory of profit based on the marginal productivity of capital. Hence his remark about the logical possibility of multiple switches between two techniques of production as a result of variations of wages or the rate of profits in the last chapter of the book is hailed as the grand finale to which the book was leading. But a close reading of the last chapter does not suggest anything of the sort. It is entitled, 'Switch in Methods of Production' rather than 'Re-switching in Methods of Production'. The famous remark about the re-switching is made in a 'matter of fact' manner in §92 on the first page of the chapter with a reference to the earlier §48 for its theoretical antecedent. The rest of the chapter contains five and a half more pages and four more numbered sections. The main concern here is the problem of showing the existence of an inverse relation between wages and the rate of profits even when a system switches from one to another and therefore loses a distinct Standard commodity in which to measure wages. Reswitching does not appear to be the main concern of this chapter. If reswitching was the result that Sraffa was driving at then he could have easily concluded the book after Chapter 6 on 'Reduction to Dated Quantities of Labour'. Furthermore, if the 'marginal productivity of capital' theory was his main target, then one fails to understand why he would sub-title

the book, '*Prelude to a Critique of Economic Theory*'. Since the critique had already been carried in the book, there was no reason to call it a 'prelude'. Following Marx, he could have simply sub-titled the book, '*Critique of Economic Theory*'.

Let us read the above quotation from the Preface closely. The propositions of the book are 'designed to serve as the basis for a critique of that theory'. What are the foundations of 'that' theory? They are: (i) the condition of *equilibrium* of demand and supply; and (ii) the 'marginal' method, which necessarily requires thinking in terms of *change*. Yet in the beginning of the Preface it is announced that the propositions now published do not rest on the condition of the equilibrium of demand and supply nor changes in the proportions of factors or the scale of production. Thus the idea is clear. Build an alternative theory of value and distribution that does not share the foundations of the old, and if the new foundations prove to be solid then it can be used as a basis for launching a critique of the latter.

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6
The Standard System and the Tendency of the (Maximum) Rate of Profit to Fall – Marx and Sraffa: There and Back

Stefano Perri

Introduction

In notes written in the 1940s Sraffa rejected Bortkiewicz's critique of Marx's theory of the tendency of the rate of profit to fall. First, he claimed that Marx's law was logically consistent and not flawed and that Bortkiewicz's criticism failed to grasp the essential meaning of Marx's theory, based on the determination of the maximum rate of profit in the economic system. However, Sraffa interpreted technical change that causes an increase in the organic composition of capital as a change that occurs given the technical knowledge available. The substitution of already-invented machinery for labour becomes profitable only when the wage rate increases. On the contrary, according to Sraffa, 'real' technological progress is generally neutral and does not involve an increase in the organic composition of capital. This interpretation is very interesting because it stresses the distinction between the analytical and logical aspects on the one hand, and the historical aspect of Marx's analysis on the other. Second, when writing his notes, Sraffa believed that even in the 'actual' economic system the relationship between aggregate

income and aggregated capital does not change when the distribution of income varies. This assumption seems to play an important role in Sraffa's vindication of Marx's law. Thus the problem arises whether Sraffa's defence of the logical structure of Marx's law can be upheld even when this 'Hypo' regarding the ratio between aggregate income and aggregate capital is dropped.

In the following pages I will try to show that Sraffa's argument can be reformulated in terms of the Standard system and the Standard relationship between wage and profit rates. It will be shown that Sraffa himself maintained that the Standard system is a powerful tool in the interpretation of the classical and Marxian theory of value. Moreover it is possible to compare two different Standard relationships because the quantities involved are comparable. In fact, they are the actual rates of profit and the maximum rate of profit.

The section immediately following this Introduction puts forward an interpretation of Marx's law of the falling rate of profit. On the one hand, Marx maintains that if the organic composition of capital increases, the rate of profit will tend to fall. This is the purely theoretical and logical part of the law. And although according to Marx several factors can counteract the fall of the rate of profit, this is the long run tendency. On the other hand Marx studies the prevailing form of technological change in his time, that is the increasing use of machinery in industrial capitalist production. In this framework Marx's analysis is grounded on an historical basis. Several authors criticised Marx's law. Some (such as Benedetto Croce) refuted the tendency of the organic composition to rise, while others (such as Ladislaus Bortkiewicz, Joan Robinson and Paul Sweezy) criticised Marx's logic, claiming that even if the organic composition of capital rises, the contemporaneous increase in the rate of surplus value can prevent the rate of profit from falling. In the next section it is shown that Sraffa rejected this latter criticism and demonstrated that when the organic composition of capital increases, the maximum rate of profit will fall. If the decrease in the maximum rate of profit lasts long enough, the actual rate of profit must also fall, no matter how the rate of surplus value increases.

In section after that aims to reconstruct Sraffa's interpretation of the law. When writing his notes on Bortkiewicz, Sraffa believed that the ratio between income and capital was not affected by changes in distribution, and was equal to the ratio between direct and past labour. However this peculiar Hypothesis was soon dropped. Within this framework, Sraffa's vindication of Marx's law no longer seems defensible. This

chapter shows the contrary of this where the notions of the Standard commodity and the Standard system can be used to reformulate Sraffa's argument. However, an interpretation of Sraffa's Standard system, based on a 'macro' interpretation of the theory of labour value, must be put forward in order to achieve this conclusion. The description of the process that leads to the adoption of the new technique and the fall in the rate of profit implies a comparison between the actual system and the Standard system, because it needs to take into account the movements of the real wage rate. In the final section some conclusions are drawn.

Marx's law of the falling rate of profit: the historical and the theoretical

Marx's law of the falling rate of profit can be split into two parts. The first deals with the technological change that, according to Marx, is peculiar to the capitalist mode of production. This constitutes the historical aspect of Marx's law: according to him the form of technological progress peculiar to capitalism consists of the substitution of machinery for labour and results in the increase of the organic composition of capital. This technical change causes the organic composition (i.e. the ratio between constant and variable capital) to rise. The second part of the law deals with the analytical consequences of such a rise. In the long run the increase of the organic composition results in a decline in the rate of profit.

It is useful to start with the logical part of Marx's law. Calling C the constant capital, V the variable capital and S the surplus value, C/V the organic composition of capital and r the rate of profit, we have:

$$r = \frac{S/V}{(C/V)+1} \tag{6.1}$$

where S/V is the rate of surplus value.

In Equation (6.1) it is assumed that wages are paid at the beginning of the productive process. For the sake of simplicity, however, it is useful in our discussion to suppose that wages are paid at the end of the process. In this case the equation of the rate of profit becomes:

$$r = \frac{S/V}{C/V} \tag{6.1.1}$$

If the organic composition increases and the rate of surplus value stays constant, the rate of profit must fall. However the rate of surplus value does not remain constant when the organic composition rises. The productivity of labour increases with technical changes, and when the wage rate does not rise proportionally, the rate of surplus value increases. Thus it appears that there is no clear trend in the movement of the rate of profit.[1]

Marx's analysis can be reformulated in this way. From Equation (6.1.1), because $S + V = L$ (the value of the income produced is equal to the living labour employed), we can write:

$$r = \frac{L - V}{C} = \frac{L}{C}\left(1 - \frac{V}{L}\right) \tag{6.2}$$

Although Marx does not explicitly define this relationship, L/C is the value form of 'the [inverse] relationship between the mass of the means of production employed on the one hand, and the mass of labour necessary for their employment on the other' (technical composition of capital). Changes in the organic composition of capital are considered 'in so far as it is determined by its technical composition' (Marx, 1990, p. 762). Within this framework, it is clear that the ratio between constant capital and living labour is the fundamental factor. Following Okishio, this ratio will be called 'organic composition of production' OCP.[2]

In Marxian accounting terms, V/L is the ratio of wages to the net product, or the variable capital per unit of net product or per unit of labour. When this ratio is set to 0 the rate of profit is equal to the ratio of the net product to the constant capital, or the aggregate 'living labour' to aggregate 'dead labour'. This is the (theoretical) maximum rate of profit of the economic system. Thus, according to Marx technological progress causes the ratio of net product to capital, and consequently the *maximum* rate of profit, to decrease. Changes in the wage share of

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[1] This forms the basis of a widespread criticism of Marx. For example, according to Sweezy: 'in the general case, therefore, we ought to assume that the increasing organic composition of capital proceeds pari passu with a rising rate of surplus value. If both the organic composition of capital and the rate of surplus value are assumed variable, as we think they should be, then the direction in which the rate of profit will change becomes indeterminate' (Sweezy, 1942, p. 102). See also Robinson (1975, II, pp. 21).

[2] See Okishio (1961).

the net product (variable capital per unit of labour) and in the rate of surplus value,[3] in the short run, may counteract the fall of the *actual* rate of profit. However, according to this interpretation of Marx's law, in the long run if the maximum rate of profit keeps falling, the actual rate of profit must also fall.

In his exposition of the law, Marx starts by assuming that the rate of surplus value remains unchanged. In Equation (6.2) this is equivalent to taking the variable capital per unit of labour as given. However, he maintains that the development of the productive forces reduces the paid portion of employed labour, and raises the surplus-value and its rate, thus causing a decrease in the variable capital per unit of labour. Although the same cause sooner or later reduces the total mass of labour employed by a given capital and increases the rate of surplus labour, and even if workers 'were able to live on air and hence scarcely needed to work at all for themselves', the actual rate of profit must decrease. In our formulation that must necessarily happen when the maximum rate of profit falls below the actual rate of profit prevailing at the beginning of the process. 'In this connection, therefore, the compensation for the reduced number of workers provided by a rise in the level of exploitation of labour has certain limits that cannot be overstepped; this can certainly check the fall in the profit rate, but it cannot cancel it out' (Marx, 1991, p. 356).

As far as the historical part of the law is concerned, Marx 'spotted the increasing number of working machines as the decisive factor of the Industrial Revolution in the eighteenth-century' (Roth, 2010, p. 1244). It is important to stress that, according to Marx, technical change and the process of mechanisation cannot be analysed abstracting from history: even the definition of machine put forward by mathematicians and experts on mechanics 'from the economic standpoint [...] is worth nothing, because the historical element is missing from it' (Marx, 1990, p. 493). Thus Marx analyses the use of machinery as the distinctive feature of technical change at a particular stage of history: capitalist industrialisation. In this context he views the use of machinery as the process of substituting machinery for labour: machines do the same work previously performed by labourers, at the same time increasing the productivity of labour: 'The machine,

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[3] In fact the rate of surplus value is an inverse function of the variable capital per unit of labour: $s' = \dfrac{L}{C}\left(1 - \dfrac{V}{L}\right)$.

therefore, is a mechanism that, after being set in motion, performs with its tools the same operations as the worker formerly did with similar tools' (Marx, 1990, p. 495). In this framework, 'the productivity of the machine is therefore measured by the human labour power it replaces' (Marx, 1990, p. 513). Thus according to Marx, the hallmark of technical progress in capitalist economies was the introduction of machinery that replaced labour. This is a reasonable vision given the particular stage of economic development he was analysing, the process of industrialisation. This idea was largely shared by many classical economists, who viewed technological progress chiefly as a process of replacing labour with machinery, namely a labour-saving and capital-using process (see Karayiannis, 2005).

However, Marx also analyses a more specific process of substituting machinery for labour, linked to the evolution and stages of the process of capitalist accumulation. During the process of capitalist accumulation, if the organic composition of capital stays constant, the demand for labour increases and may exceed the supply, and, therefore, the wage rate and the wage share rise, while the rate of profit falls. 'This must, indeed, ultimately be the case if the conditions supposed above continue' (Marx, 1990, p. 763). As a consequence, machines that substitute labour are employed, the organic composition of capital grows and the demand for labour decreases. Thus the wage rate and the wage share of income fall, and the fall of the rate of profit caused by the increase in the demand for labour is arrested.

The profitable employment of machinery, in this context, depends on the wage rate, or the value of labour-power:

> The use of machinery for the exclusive purpose of cheapening the product is limited by the requirement that less labour must be expended in producing the machinery than is displaced by the employment of that machinery. For the capitalist, however, there is a further limit on its use. Instead of paying for the labour, he pays only the value of the labour-power employed; the limit to his using a machine is therefore fixed by the difference between the value of the machine and the value of labour-power replaced by it. (Marx, 1990, p. 515)

This quotation raises an interesting issue. Marx and classical economists do not distinguish as sharply as neoclassical economists between the use of more capital given the available technology and technical progress. According to Marx the discovery of a new machine is always the result

of a progress in technical knowledge. Whether the utilisation of this machine is profitable or not, and thus can become an economic innovation, depends on its price compared to the price of the labour-power it substitutes.

According to Marx technical progress causes the organic composition of capital to increase:

> It has been shown to be a law of capitalist mode of production that its development does in fact involve a relative decline in the relation of variable capital to constant, and hence also to the total capital set in motion. This simply means that the same number of workers or the same quantity of labour-power that is made available by a variable capital of a given value, as a result of the specific methods of production that develop within capitalist production, sets in motion, works up, and productively consumes, within the same period, an ever growing mass of means of labour, machinery and fixed capital of all kinds, and raw and auxiliary materials – in other words, the same number of workers operate with a constant capital of ever growing scale. (Marx, 1991, p. 318)

The growing number of machines put in motion by the same amount of labour and the growing productivity of labour in the industry are the basis of the increasing organic composition of capital.

However Marx's law is not a mechanical law in either its theoretical or its historical parts. From the theoretical point of view, the law is not mechanical because short-run movements of the wage share caused by an increase in labour productivity can counteract the movement of the ratio between net product and capital. From the historical point of view, the form of technical change that Marx considers to be peculiar to the capitalist economy is not the only possible change. As Marx himself underlines, the rise in the productivity of labour can possibly occur in the production of machines, thus the quantity of labour necessary for their production decreases, and the organic composition does not necessarily increase:

> In other words, the same development that raises the mass of constant capital in comparison with variable reduces the value of its elements, as a result of the higher productivity of labour, and hence prevents the value of constant capital, even though it grows steadily, from growing in the same degree as its material volume, *i.e.*, the material volume of the means of production that

are set in motion by the same amount of labour-power. In certain cases, the mass of the constant capital elements may increase, while their total value remains the same or even falls. (Marx, 1991, p. 343)

In discussing the counteracting influences of his law, Marx acknowledges that the increase of the mass of constant capital can even result in a decrease of its value, although he thinks that this can happen only in isolated cases.[4] However this is an important passage, because it demonstrated that the law, according to Marx, does not have a deterministic character. One could add that if these 'counteracting influences' are possible in the process of industrialisation, they are far more probable in mature economies, where technical progress is also characterised by the substitution of improved machines for old ones. During the tumultuous early stages of industrialisation, the substitution of machinery for labour symbolised technical progress. In this case one could say that 'dead labour' replaces 'living labour', resulting in a tendency for the constant capital per unit of labour to rise. However, in full-grown economies, machinery can also substitute older machinery and the tendency is less evident.[5]

Sraffa's defence of Marx's analytical law and his interpretation of the historical or empirical aspect

Sraffa upheld Marx's law of the falling rate of profit when writing his critical notes on Bortkiewicz in the mid-1940s. As Gehrke and Kurz (2006) have shown, according to Sraffa Bortkiewicz did not consider the process of production as a circular process, and reduced capital to a finite series of dated quantities of labour. Thus he was not able to define the maximum rate of profit of an economic system. When writing his notes, Sraffa thought that the Hypothesis that the ratio between the aggregate net product (*NP*) and aggregate (constant) capital (*K*), or (*NP/K*), does not change when the distribution of the net product between

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[4] Actually Benedetto Croce's criticism of Marx's law of the falling rate of profit is based on the possibility of a reduction in the value of machines employed as a result of technical progress (Croce, 1973, p. 147). Croce seems to criticise Marx's logic instead of Marx's assumptions about the prevailing technical progress in capitalist economies. However, as we have seen, Marx acknowledges the possibility of a decrease of the value of constant capital as a result of technical progress.

[5] According to Joan Robinson 'Marx's theory of the falling rate of profit must have ceased to apply to advanced capitalist economies, even if it was true at earlier stages of capitalist development' (Robinson, 1975, III, p. 165).

wages and profits changes. It can easily be shown that under this 'Hypo' Sraffa's maximum rate of profit is equal to the inverse of Marx's *OCP*:

Under the 'Hypo', the ratio of aggregate net product to capital is also equal to the ratio of labour to capital, and also to the maximum rate of profit (*R*):

$$\frac{NP}{K} = \frac{L}{C} = R \tag{6.3}$$

When the rate of profit is equal to zero, the prices of commodities are proportional to the quantities of labour employed in their production, so Equation (6.3) holds. The 'Hypothesis' states that (*NP/K*) does not change for any possible value of the rate of profit, so in this case Equation (6.3) holds true when the distribution of income changes (in fact the *OCP* and the maximum rate of profit do not depend on the actual rate of profit). Under the 'Hypo' the ratio of net product to capital can be expressed as the ratio of living labour to the value of constant capital. When machinery replaces living labour, this ratio – and thus the maximum rate of profit – falls. If the process of a falling rate of maximum profit is continuous, according to Sraffa, in the end the actual rate of profit also tends to fall, despite the increase in the rate of surplus value. It is worth quoting Sraffa's statement of 29 August 1946 (archived as D3/12/44/11):

The idea of the falling rate of profit is based on:

1. The existence of a Maximum rate of prof.
2. The identity with the Org. Comp. of Cap.
3. The tendency of the Org. Comp. of Cap. to fall with accumulation; and thus a tendency to fall of the Marx Rate of Prof.

See Marx on 'even if workers lived on air'

Those who deny the tendency always are unaware of the existence of a max. Rate of Prof.: this is due to their belief (on Böhm Bawerk's line) that 'ultimately' i.e. in a finite series, goods are made entirely by labour. This is swallowed even by Bortkiewicz...

More briefly: Falling rate of Prof. is based on

a. Existence of Maximum rate of Prof.
b. Tendency for Max. R. of P. to fall with accumulation

Hence, however much wages may fall, they cannot always make up for it. Those who argue against it always say: a sufficient fall in

wages can offset any fall in the rate of profits. (Bortkiewicz, Joan Robinson)[6]

According to Sraffa, Marx shows that the process of capital accumulation leads to an increase of the *OCP* and thus to a decrease in the maximum rate of profit. And since it does not matter 'however much wages may fall, they cannot always make up for it', in the end the actual rate of profit must fall. This is Sraffa's analytical defence of Marx's law of the falling rate of profit. In the next section we will see how this argument can still hold when the 'Hypo' is dropped.

Now it is important to analyse Sraffa's interpretation of the historical aspect of Marx's theory.

In fact Sraffa does not believe that in general technological progress involves an increase in the *OCP*, but rather that innovations usually leave the ratio between net product and constant capital, and the rate of profit unchanged. In a letter to Antonio Gramsci, Sraffa is clear in revealing his vision:

> '[M]y view is [that] Marx's law is methodological and not historical, and therefore not statistically verifiable. From what we know, it seems that in any given society both the capitalist rate of surplus value and the profit margin are remarkably stable over time. This does not contradict Marx's law when the word 'trend' is understood in relation to a particular abstraction, i.e., it is the result of the action of a group of forces (accumulation), assuming that other forces (technical progress, inventions and discoveries) are not present. The result is that the tendency to fall forces the capitalists into constant technical revolutions to prevent the fall of the rate of profit'[7].

Marx's and Sraffa's visions are thus different as far as the technical change peculiar to the capitalist mode of production is concerned. As we have already seen above Marx believed that the typical form of technical change in the capitalist economy was characterised by the substitution of machinery for labour. On the other hand, according to Sraffa,

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[6] Gehrke and Kurz (2006), p. 135. It is worth noting that Sraffa calls the organic composition of capital the inverse of what in this chapter is called 'the organic composition of production' i.e. the ratio of living labour to constant capital, which is, as we have seen, equal to the maximum rate of profit.

[7] My translation. Quoted by G. Lunghini in *Introduzione* (Gramsci, 1994).

Marx's law describes the trend of the process of capital accumulation, abstracting from the action of technical progress, inventions and discoveries. In Sraffa's view it is actually the tendency of the profit rate to fall that promotes, as a reaction, the continual technical revolutions typical of the capitalist mode of production.

However, Sraffa's interpretation of the Marxian law is still grounded on some parts of Marxian analysis: he refers to the analysis developed in chapter 15 of the first book of *Capital* ('Machinery and Large-Scale Industry') rather than to Marx's more general ideas on the technical change in capitalist economies. As showed by Gehrke and Kurz, Sraffa maintained that the process of capital accumulation leads to an increase in the demand for labour. Thus the industrial reserve army falls and the real wage rate rises. And according to Marx, when wages rise and the profit rate falls, the value of the machine falls compared to the value of the labour-power it replaces, and thus it becomes profitable to employ the machinery.[8] In this context, Marx's analysis is similar to Ricardo's.[9]

According to Sraffa, the increase of the *OCP* and the fall of the maximum rate of profit are caused by the employment of previously known technologies that become profitable only when the rate of profit falls as the result of the increase in real wages. It is interesting to note that Maurice Dobb in his *Political Economy and Capitalism*[10] put forward a similar interpretation. Recently Okishio advanced a reconstructive interpretation of Marx's law that starts from the same analyses as Dobb and Sraffa. If we abstract from technological progress, a continuous process of capital accumulation and the consequent continuous increase in the demand for labour tends to lower the rate of profit to zero. To check the increase in the demand for labour, capitalists are forced to adopt forms of technological change that allow the substitution of machinery for labour and lead to an increase of the *OCP*.

> For capitalistic society to reproduce itself, the rate of exploitation must remain positive. But the rate of exploitation converges to zero if the organic composition is constant and there is no technical change. ... . So Marx introduced the argument concerning change in the organic composition. (Okishio, 2000, pp. 495–6)

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[8] Marx (1990, pp. 515–17).
[9] Ricardo (1817–21, p. 40).
[10] Dobb (1972). The book was published for the first time in 1937.

Okishio is more flexible in allowing Marxian technical change to be interpreted as a form of technical progress, stimulated by the process of capitalist accumulation. However, according to Okishio this is only one of the possible forms of technical progress, and thus in the long run a falling rate of profit in capitalist economies is only a possibility, not a highly probable tendency.[11]

To conclude this section: from an analytical point of view, Sraffa upheld Marx's analysis against Bortckiwicz's criticism. However he did not support Marx's historical ideas about the technical change typical of capitalist economies. Sraffa's analytical defence, however, seems to rely on the Hypothesis of a constant ratio between net product and capital when distribution of income changes. But this Hypothesis, as Sraffa clearly stated soon after writing his notes on Bortkiewicz, could not be upheld. The next section will investigate if Sraffa's statements are still rigourous when the Hypothesis is dropped.

The Standard system and the logical soundness of the law of the falling rate of profit

When it is recognised that the ratio between the aggregate net product and capital does not remain constant when the distribution of income changes, Equation (6.3) only holds when the rate of profit is equal to zero. Thus, in general, in all other possible cases we have:

$$\frac{NP}{K} \neq R \tag{6.3.1}$$

Equation (6.3.1) seems to question Sraffa's defence of Marx's law. In the following section I will try to reconstruct Sraffa's argument in light of his own analysis after the 'Hypo' is dropped. To achieve this result it is convenient to split our discussion into two parts. In the first part an interpretation of the Standard system is developed, following what Sraffa himself wrote after *PCMC* was published on the relationship between the Standard system, Marx's transformation of values into prices, and Ricardo's invariable measure of value. In the second part of the discussion I will show that the Standard system can be used as a tool to analyse the effects on the maximum rate of profit (and eventually the actual rate of profit) of a technical change that increases the *OCP*.

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[11] On the possible forms of technical change in a Sraffian perspective see Schefold (1976). The Marxian case is discussed among other possible cases.

The Standard system as a 'necessary adjunct': Sraffa's interpretation of the transformation problem

Sraffa's Standard system is a hypothetical economic system developed from the actual system, 'endowed with the propriety that the various commodities are represented among its aggregate means of production in *the same proportions* as they are among its products' (Sraffa, 1960, p. 19). In this case the relationship between wages (as a proportion of the Standard net product) and the rate of profit is linear and does not depend on commodity prices (Sraffa, 1960, §25, p. 22). Sraffa states that the Standard commodity provides the correct solution to Marx's transformation of value into prices in a draft written as a reply to a projected review of *PCMC* by Claudio Napoleoni.[12] According to Sraffa there is no contradiction between the first and the third volumes of *Capital*, as well as between the first and the third editions of Ricardo's *Principles*. Both Ricardo and Marx recognised that exchange values are influenced by the distribution of income when profits are proportional to invested capital. However, 'when considering large aggregates, the fluctuations of single commodities approximately balance out and the aggregates can be measured again by means of the labour value' (Ranchetti, 2004, p. 9). In Sraffa's opinion this is exactly the procedure adopted by both Ricardo (developing his invariable measure of values) and Marx (with the transformation of value into prices and the determination of the general rate of profit as the average of the rates of profit of the single industries). However, to resolve Ricardo's and Marx's problem rigorously rather than approximately, the Standard commodity must be used. Thus according to Sraffa, the Standard commodity allows for the value of labour to be used to determine the general rate of profit of the economic system. In a letter to Maurice Dobb dated 9 October 1960 (archived as D3/12/111/118), this line of argument is clarified:

> If we want to follow in Marx's footsteps and pass from value to the price of production and from the rate of surplus value to the rate of profit, the Standard system is a necessary adjunct: for that passage implies going through certain averages & if these are calculated without weights (or with weights of the real system), a result which

[12] Napoleoni's '*Schema della recensione Sraffa*' and Sraffa's '*Risposta a Napoleoni*' are published in Ranchetti (2004). Napoleoni subsequently published '*Sulla teoria della produzione come processo circolare*' (Napoleoni, 1961). An interesting interpretation on the relationship between Sraffa and Marx is in Bellofiore (2008). See also Perri (2010).

is only approximately (numerically) correct is obtained. If an exact result is wanted, the proportions of the Standard system must be applied as weights.[13]

Sraffa's statements involve an interesting interpretation of Marx's (and Ricardo's) theory of value: the theory of labour value is not a 'micro' theory of prices, but a 'macro' theory of the determination of the general rate of profit. Only aggregates such as total product, surplus and capital can be measured in terms of the quantity of labour employed. In other words Sraffa is not interested in the transformation of the value of single commodities into prices, but in Marx's conclusions about the equality between the values and prices of production of the aggregates. However, in the actual economy this equality is only approximately true. Only in the Standard system is this equality rigourously exact, thus the Standard commodity is a 'necessary adjunct' to solve the transformation problem i.e. to support Marx's equalities between aggregates.

Sraffa's Standard system is usually interpreted as the result of an analysis directly linked to Ricardo's corn model, avoiding any connection with the theory of labour value. However, soon after the publication of *PCMC*, several scholars stressed the Marxian aspects of the Standard system.[14] More recently it has been shown that Sraffa's first steps in his analysis of the Standard system was influenced by Marx's analysis of reproduction in *Capital*, Volume II.[15]

I will return later to the links between the Standard system and the 'macro' theory of value. For our current purposes it is interesting to note that, according to Sraffa, Ricardo's invariable measure and Marx's transformation procedure are substantially similar. However, Marx himself criticised Ricardo's invariable measure:

> Ricardo often gives the impression, and sometimes indeed writes, that the quantity of labour is the solution to the *false, or falsely conceived problem of an 'invariable measure of value'.* (Marx, 2000, III, p. 137, my italics)

According to Marx the problem of the invariable measure is 'a spurious name for the quest for the concept, the nature, of *value* itself, the

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[13] Ranchetti (2004, p. 9). See also Bellofiore (2008).
[14] See for example Eatwell (1975).
[15] Gilibert (2004) and de Vivo (2003).

definition of which could not be another value, and consequently could not be subject to variations in value' (Marx, 2000, III, pp. 134–5). For our purposes, however, it is interesting to restrict ourselves to the comparison of Ricardo's invariable measure and Marx's 'branches of production whose [capital] composition chanced to coincide with the social average'. According to Marx, the price of production is exactly equal to the value of commodities produced in these branches (Marx, 1991, p. 264).

Ricardo, while developing his invariable measure, tried to define a commodity whose value remains unchanged, i.e., in the first instance, it requires at all times the same quantity of labour in its production and, secondly, it is not subject to 'relative variations from a rise or fall of wages' (Ricardo, 1817–21, p. 44), that is it is produced in conditions 'equally distant from the two extremes, the one where little fixed capital is used, the other where little labour is employed, as to form a just mean between them' (Ricardo, 1817–21, pp. 45–6). Ricardo could not fully discriminate between the two causes of variation of value (changes in the condition of production, and changes in the distribution of income) because his main purpose was to analyse the effects of changes in the conditions of the production of wage goods on the rate of profit.

In his analysis, Sraffa is interested only in one of the two aspects of Ricardo's invariable measure, the effect of a change in the distribution on prices, *given* the conditions of production. Generally, any change in the coefficients of production of any base commodity leads to a change in the composition of the Standard commodity. Within this framework, Marx developed his arguments concerning the branches of production with an average organic composition of capital, abstracting from changes in the conditions of production. When criticising the 'trinity formula', according to which prices are determined by the sum of rents, profits and wages, in chapter 51 of *Capital*, Volume III, Marx states: 'what is given…, therefore, is the mass of commodity values to be divided into wages, profit and rent, i.e. the absolute limit to the sum of value portions in theses commodities' (Marx, 1991, p. 998). It is clear that in this context the conditions of production are assumed to be constant. Sraffa compares Ricardo's invariable measure and Marx's branch of production with the average organic composition of capital because he focuses only on the problem of distribution, given the conditions of production.

As we have seen, according to Sraffa in the Standard system large aggregates of commodities and their relationships are measured precisely by

the quantities of labour employed in their production. It is very interesting to note that Sraffa chooses his units of measure by equating the Standard net product with the quantity of labour employed in its production. In this way the physical quantities of the Standard commodity are represented by the quantities of labour.[16] The linear Standard relationship between wages and the rate of profit is:

$$r = R(1 - w) \tag{6.4}$$

where $R = \dfrac{NP}{K}$ and w is the wage rate expressed as a proportion of the Standard net product.

To express the wage rate as the share of wages of the net product, Sraffa, in §10 and §12 of *PCMC,* chooses as the unit of measure for labour total employment of the economy, and the aggregate net product as the unit of measure for prices. As both the aggregate total labour employed and the aggregate net product are set equal to one, the value of the net product is equal to total employment $(L = NP)$.[17] In this case, and only in this case, the wage rate corresponds to the wage share of the net product. In fact, by definition the wage rate is the aggregate wages (W) divided by the quantity of labour employed:

$$W = \frac{W}{L} \tag{6.5}$$

while the share of wages (SW) is the aggregate wages divided by the net product.

$$SW = \frac{W}{NP} \tag{6.6}$$

Thus, to have $w = SW,$ we must set $L = NP$.

In a Standard system, if the net product is equal to total employment, then Standard aggregate wages will be equal to Marxian variable capital, and Standard aggregate capital is equal to Marxian aggregate constant capital. As a result of this choice of the units of

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[16] The genesis of this choice is reconstructed in Gilibert (2004) and de Vivo (2000), (2003) and (2004).
[17] Sraffa's choice of the units of measures of labour and the net product is very similar to Duménil and Foley's 'New Solution'. See Perri (2010).

measure for labour and prices in *PCMC*, Sraffa's Standard relationship is equivalent to our Marxian relationship in Equation (6.5). In fact

$$K = C, R = \frac{NP}{K} = \frac{L}{C}, \quad \text{and} \quad w = \frac{W}{NP} = \frac{W}{L} = \frac{V}{L}.$$

Thus:

$$r = R(1 - w) = \frac{L}{C}\left(1 - \frac{V}{L}\right) \tag{6.7}$$

The Standard system and the tendency of the rate of profit to fall

As far as the problem of the tendency of the (maximum) rate of profit to fall is concerned, it is important to stress here that in this context the Standard relationship can be interpreted as a value relationship, and not only as a relationship between the physical quantities of the Standard commodity.

Although, as we have already seen, the Standard system presupposes an abstraction from changes in the conditions of production, it is always possible to compare the maximum rates of profit of two different Standard systems. Thus it is possible to determine the system with the higher maximum rate of profit, and to state that the growth of the *OCP* in the Standard system necessarily involves a decrease in the maximum rate of profit. Clearly our demonstration is limited to the Standard system i.e. technical changes that cause a rise in the *OCP* of the aggregate economy where commodities are produced in the same proportion as their aggregate means of production. However, it is important to keep in mind that the coefficients of production are the same in the Standard system as in the actual economy. This conclusion is congruent with Sraffa's interpretation of the logical part of Marx's law.[18]

However, the wage rates of different Standard systems are not comparable. When the coefficients of production of some basic commodities change, the composition of the Standard system changes, and the Standard commodities related to different Standard systems are indeed different, and not comparable. Nevertheless, it is still possible to verify that in two different Standard systems, the same rate of profit corresponds

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[18] See also Perri (2011).

to different Standard wage shares. Moreover, in the 'Marxian–Sraffian' interpretation of the Standard relationship, it is meaningful to compare the variable capital per unit of labour for different systems. This line of argument seems consistent with Sraffa's ideas. In fact, he criticised Bortkiewicz because he was still tarred with the brush of 'commodity fetishism', considering only the 'fodder-and-fuel aspect of wages' that is the commodity composition of the wage-basket, while 'it was necessary to bring out the Revenue aspect of wages', in other words their share of the net product.[19]

In light of Sraffa's interpretation and of his analysis in *PCMC,* the logical part of the Marxian law (the tendency of the rate of profit to fall) can be expressed in these terms. When the *OCP* increases continuously in the Standard system, and thus the maximum rate of profit falls, the effective profit rate, say *r**, can remain constant only if the share of wages declines (and the rate of surplus value increases). But when the maximum profit rate equals *r**, the actual rate of profit cannot be maintained unless workers 'could live on air'. Further decreases in the maximum rate of profit, even assuming wages equal to zero, must therefore cause a decrease in the actual rate of profit.

In Figure 6.1 three different relationships between wages (henceforth the Standard wage share) and the rate of profit are drawn, referring respectively to Standard systems α, β and δ with different technologies and maximum rates of profit. In the transition from the Standard system α (maximum rate of profit R^α) to the Standard system β (maximum rate
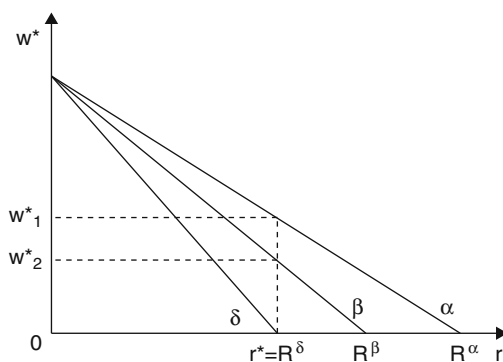

Figure 6.1   The maximum and the actual rates of profit

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[19] Quoted from Sraffa's Black Notebook, archived as D1/91. See this volume below pp. 215–6 for extended passage.

of profit R^β), the rate of profit r^* will be kept constant if the Standard wage share decreases from w_1^* to w_2^*. But if the *OCP* continues to grow as in the Standard system δ we have $R^\delta = r^*$, thus the rate of profit obviously cannot remain constant unless wages fall to zero.

The logical part of the Marxian law – the proposition that when the *OCP* increases, the maximum rate of profit must decline as must also (in the end) the actual rate of profit – can be supported on the basis of Sraffa's interpretation of Marx and of his Standard system. However, it is not clear why the 'labour-saving and capital-using' new techniques are adopted, when their result is a decrease in the actual rate of profit. In Figure 6.1, it is possible to say that the transition from technique α to technique β is profitable only when – as a result of the increase in the productivity of labour – the Standard wage share falls under the
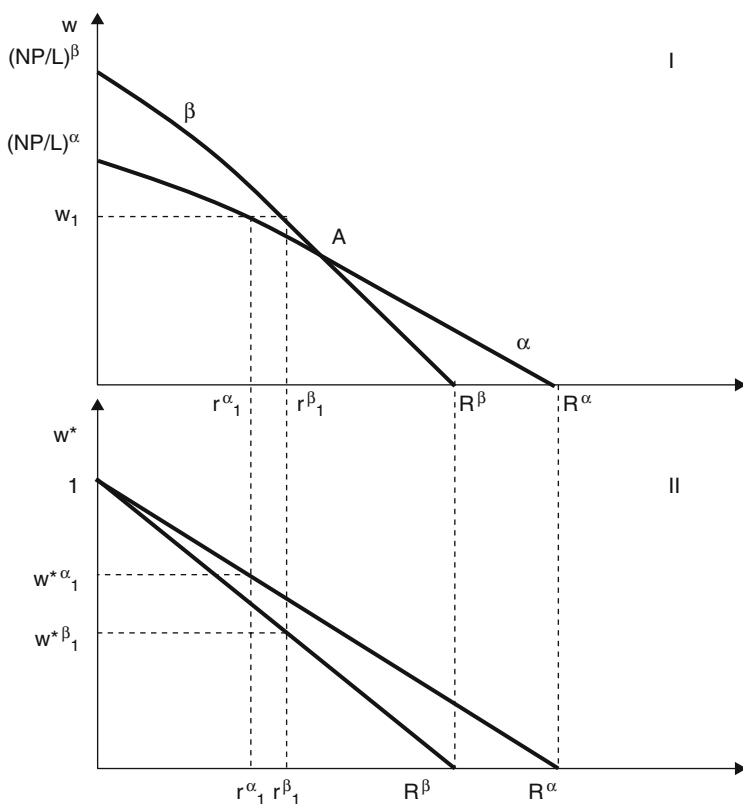

Figure 6.2   Profitable change of technique with increasing organic composition of capital

value of w_2^*, so that the actual rate of profit rises.[20] However, in order to describe the process of the adoption of the new technique that causes the fall in the maximum rate of profit, we need to take into account the real wage rate (hereafter the wage rate) and its relationship with the Standard wage rate.

In part I of Figure 6.2, two typical curves showing the relationship between the wage rate and the profit rate for techniques α and β are drawn. The maximum rate of profit of technique β is lower than in technique α (i.e. the Standard *OCP* of the former technique is higher), and its productivity of labour greater as reflected in the vertical intercept representing the productivity of labour (*NP/L*)[21] which is higher for curve β. For the sake of simplicity we assume that the two curves have only one point of intersection in common.[22] To the right of intersection point *A,* technique α is more profitable, while to the left of point *A* technique β is more profitable.

In Part II of Figure 6.2, the corresponding curves for the Standard wage share–rate of profit relationship are drawn. The horizontal intercept of the two curves represents the maximum rates of profit *R*. By definition the vertical intercept is equal to a wage share of unity. Given the wage rate w_1, the rates of profits are respectively r_1^α and r_1^β. Thus in graph II it is possible to determine the Standard wage share associated with the two techniques, respectively $w_1^{*\alpha}$ and $w_2^{*\beta}$. When the wage rate is w_1, technique β is adopted and the Standard wage share falls enough to allow the actual rate of profit to rise, notwithstanding the fall of *R*.

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[20] The so-called Okishio theorem asserts that if the wage rate is constant in real terms, and a new technique which lowers unit costs in terms of the present production prices is introduced into a basic sector, then the rate of profit must be higher when the new equilibrium is established. For the type of technological change we are discussing, Okishio's theorem implies that even when the maximum rate of profit falls, the technology that uses more capital and less labour is adopted only if it leads not to a fall, but to a growth in the effective equilibrium rate of profit (Okishio, 1961). It is interesting to note that the Okishio theorem can also easily be demonstrated in a one-commodity model of production, See Foley (1986, pp. 136–39).

[21] *NP* and *w* are here expressed in terms of a commodity produced in both the systems. For our purposes it is convenient to choose a given basket of wage goods as the unit of measure of prices.

[22] In theory it is possible that the re-switching of techniques might happen and curve α cuts curve β more than once. However, given the assumptions about the two curves, the number of intercept points must always be odd. Moreover, in the case of the substitution of machinery for labour, there is only one intercept point because the price of machinery falls in comparison with the wage rate when the wage rate itself rises (see Sraffa, 1960, p. 39).
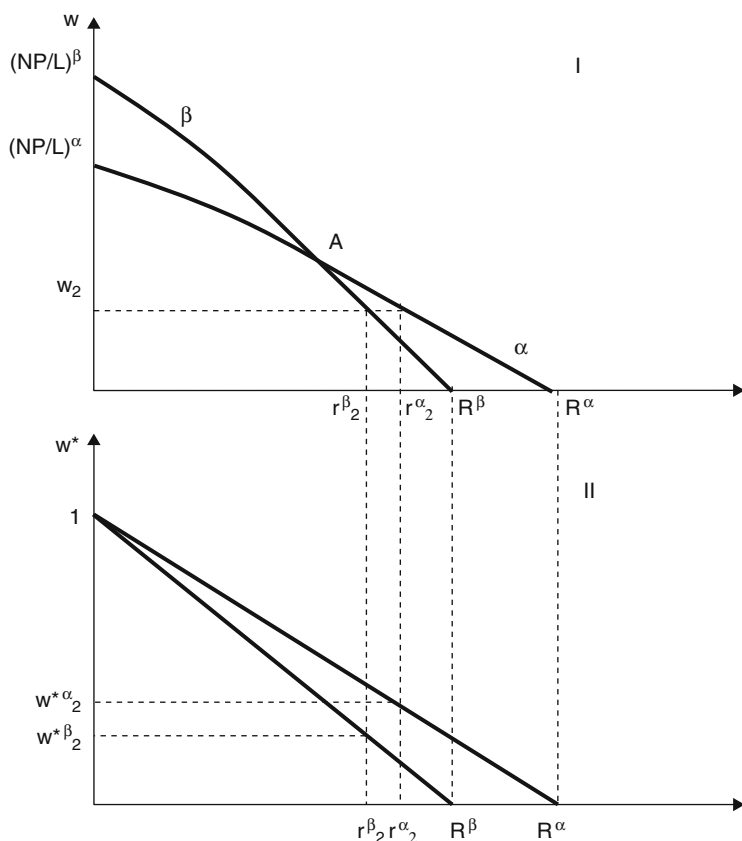
Figure 6.3   Non profitable change of technique with increasing organic composition of capital

In the reverse case, to the right of point A technique α is more profitable than technique β. In Figure 6.3, given the wage rate w_2, the Standard wage share falls[23] as well when technique β is adopted, but not in such a way as to counteract the decrease of R. Thus the rate of profit falls from r^α_2 to r^β_2. In what follows we assume that the adoption of the new technique only takes place when it is profitable, i.e. when we are to the left of point A in graph I in Figure 6.3.

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[23]   Clearly the wage share of the actual net product, given by $w/(NP/L)$, also falls when technique β is adopted.
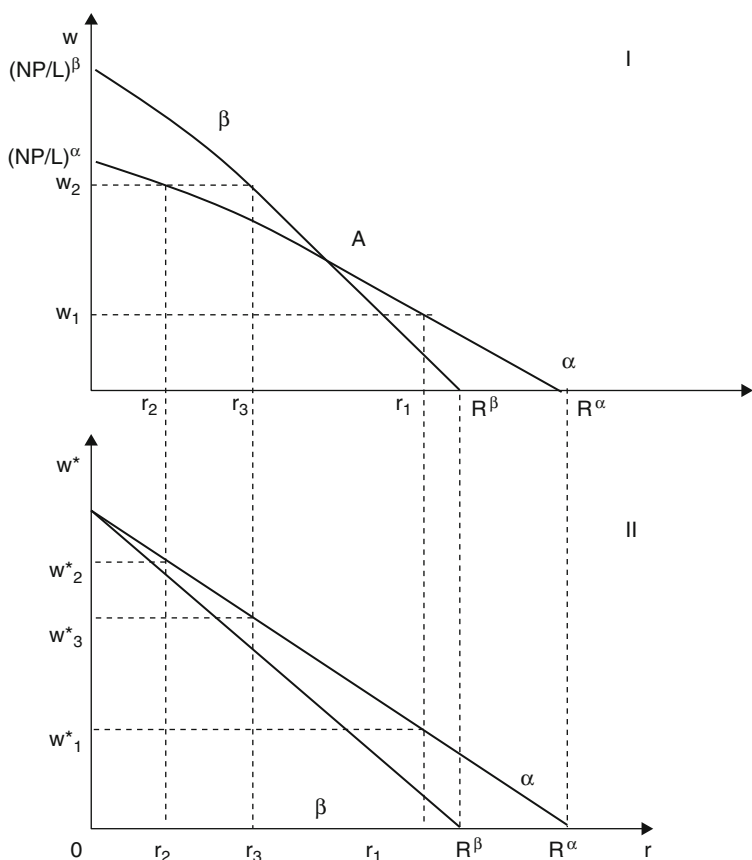
Figure 6.4 Sraffa's model of the falling rate of profit

It becomes clear, in this context, why Sraffa strongly linked the analysis of the fall of the (maximum) rate of profit to the analysis of the process of capital accumulation in the first book of *Capital*.

In Figure 6.4, at the beginning of the process of capital accumulation, technology α is used: the maximum rate of profit is R^α, the actual rate of profit is r_1, the wage rate is w_1 (graph I), and the Standard wage share is w_1^* (graph II). During the process of capital accumulation, the increase in the demand for labour causes the wage rate to rise to w_2, the profit rate falls to r_2, and the standard wage share rises to w_2^*. It therefore becomes profitable to adopt the labour-saving technique β. The maximum rate of profit falls to R^β, but the increase in the productivity of labour causes
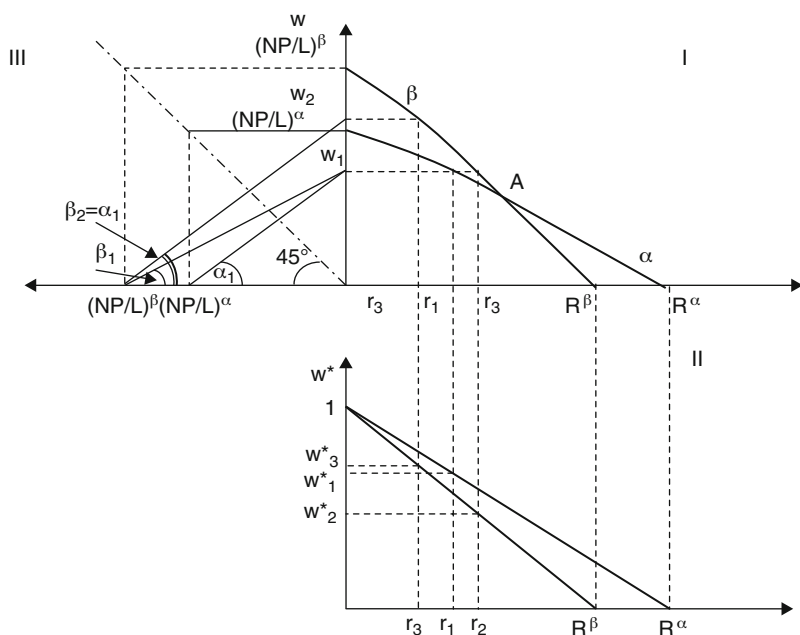
Figure 6.5 Foley and Michl's model of the falling rate of profit

the wage share to fall to w_3^*, given the wage rate. Now the rate of profit is r_3, higher than r_2, but still lower than the initial rate of profit.[24] The tendency of the rate of profit to fall, in this interpretation, is a process that involves the analysis of the process of capital accumulation. In this sense, one could say that the increase in the organic composition of capital checks the fall in the rate of profit caused by the process of capital accumulation in the absence of technical changes. The result is still a decrease in the maximum rate of profit and, in the long run, a fall in the actual rate of profit.

However, as we have already seen, according to Sraffa 'real' technical progress leaves both the capitalist rate of surplus value and the profit margin stable over time. Sraffa seems to think that technical progress is usually 'Harrod-neutral': the capital-labour ratio, the wage and profit shares, and the rate of profit all hold steady. In this case the

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[24] It is also possible that the wage rate and the Standard wage share will fall after the introduction of technique β, due to the lower demand for labour, but technique β still remains more profitable.

Standard relationship between wages and profits does not shift after the technical change, because the maximum rate of profit remains the same.

It is interesting to note that Foley and Michl's 'classical conventional wage share model with biased technical change',[25] although different from Sraffa's analysis, can be developed on the basis of a similar interpretation of the logical part of Marx's theory. In Foley and Michl's model, the first step is not an increase in wages. As Figure 6.5 shows, it is assumed that the adoption of technique β is profitable in the short period, because the increase in the productivity of labour, given the wage rate w_1, causes a decrease in the Standard wage share from w_1^* to w_2^* and the actual rate of profit rises from r_1 to r_2, although the maximum rate of profit falls from R^α to R^β, as graph II shows. In graph III on the left, the values of the output per unit of work are transferred to the horizontal axis by means of the 45° line. The wage share of the actual net product is measured by the magnitudes of the angles on the horizontal axis formed by the straight lines that start from the corresponding value of *NP/L,* and meet the value of the wage rate on the Y-axis. The actual wage share decreases from the magnitude of angle α_1 to the magnitude of angle β_1 when technology β is adopted and the wage rate does not change.

However, Foley and Michl maintain on the basis of statistical evidence that the fall in the wage share is only temporary. In fact in the long run real wages generally tend to rise proportionally to the increase of the productivity of labour, because of the institutional forces of the capitalist economy.[26] In the end, the wage rate increases to w_2. Indeed, when technology β is used, w_2 correspond to the previous wage share on the actual product (angle β_2 equals angle α_1 in graph III, because the straight line $(NP/L)^\beta - w_2$ is parallel to the straight line $(NP/L)^\alpha - w_1$, and the profit rate falls to $r_3 < r_1$. The Standard wage share does not match the previous value (w_1^*), but in this case rises to w_3^*. The same wage rate actually corresponds to different wage shares, when the composition of the net product changes. According to Foley and Michl, however, 'biased technical change' is not the only possible form of technical change. Only

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[25] See Foley and Michl (1999, pp. 117–135).

[26] However, it should be noted that in the last thirty years in many capitalist countries the wage share has been decreasing. See for example AMECO, the statistical database of the European Commission.

historical and statistical evidence can verify if the economic system is going through a period in which the tendency of the rate of profit to fall prevails or not.

Conclusions

Some conclusions can be developed about Sraffa's interpretation of Marx's theory of the tendency of the rate of profit to fall:

1. Marx's theory can be split into two parts. The first is predominantly historical and focuses on the process of substituting machinery for labour during the process of capitalist industrialisation. Although Marx strongly emphasises the importance of this process in shaping the prevailing type of technological change in capitalist economies, his analysis is not mechanical. The second part is predominantly logical: if the *OCP* increases due to the introduction of new machines in the process of production, the rate of profit tends to fall in the long run.
2. Sraffa's defence of Marx's law focuses on its logical aspect. An increase in the *OCP* causes a fall in the maximum profit rate of the economic system. In the long run, in Sraffa's opinion, if the maximum rate of profit tends to fall steadily, the effective profit rate must also fall. However, Sraffa does not support the historical dimension of Marx's law: he believes that technological progress generally does not involve an increase in the *OCP*. According to Sraffa, Marx's law refers to the process of capital accumulation, abstracting from real technical progress.
3. Sraffa's defence of Marx's law involves the 'Hypo' that the ratio of the value of net product to capital does not depend on the distribution of income. When this Hypothesis is dropped, the relationship between changes in the *OCP* and the maximum rate of profit must be proven. It can be proved that in Sraffa's Standard system the inverse of the *OCP* corresponds exactly to the maximum rate of profit. It is possible to compare different Standard systems in terms of their maximum rate of profits and their Standard shares of wages.
4. If we want to describe the process of substituting machinery for labour during the process of capital accumulation, we also have to take into account the real wage rate and its changes. In this case we cannot limit ourselves to the comparison of different Standard systems. However, it is easy to develop the curves of the relationship between

the real wage rate and the profit rate, and the corresponding Standard relationships when Marx's biased technological change prevails.

Thus two processes of the fall of the rate of profit can be described: the first is related to Sraffa's interpretation, the second to Foley and Michl's 'classical conventional wage share model with biased technical change'.

When interpreted this way, Marx's logical part of the tendency of the falling rate of profit is not flawed. Whether his description of the prevailing type of technical progress in capitalist economies corresponds to the actual historical process cannot be decided once and for all in abstract terms and it is far beyond the aims of this chapter.

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Comment: On Sinha and Perri: Hamlet without the Prince: Sraffa (and Marx) without Competition

Andrea Salanti

The two chapters by Stefano Perri and Ajit Sinha that the editors of the present volume kindly requested me to comment upon surely deal with quite different issues. Yet they share at least two common features that deserve mention from the outset, if only because they may offer a justification for such an editorial arrangement. The first is easily detectable even on the surface, being given by their extensive use of the 'auxiliary construction' of the Standard commodity (and the related notion of Standard system) as developed in *Production of Commodities by Means of Commodities* (*PCMC*). The second is perhaps less immediately obvious, but nonetheless characterises their analyses as well, and in my opinion – as I will try to show in what follows – is in need of further reflection. I am referring to the disregard, which in one case becomes an open refusal, of the usual justification of a uniform rate of profit through the entire system as a consequence of some kind of competitive mechanism among capitalists.

And a third common element can be detected as well. Both chapters deal with questions that have been investigated for decades, together with a number of others more or less strictly connected, without reaching a general consensus. This is usually more typical of philosophical debates than of a self-proclaimed 'scientific' discipline which, after all, ought to have the possibility of settling a number of issues with reference to what really happens in the world. This brings to my mind 'an old epigram of Professor Kalecki in his characteristic vein: 'Economics consists of theoretical laws which nobody has verified and of empirical laws which nobody can explain' (Steindl, 1965, p. 18), but that is another story.

On the falling (maximum) rate of profit

If we read Perri's (2014) chapter 6 as an exercise in history of ideas, we may well conclude that the author succeeds in vindicating, at least partially, the content of Sraffa's unpublished notes on the inner logic of the Marxian 'law' of the falling rate of profit. These notes date

back to the 1940s and were apparently conceived as a rejection of Bortkiewicz's critique of Marx's analysis of the tendency of the rate of profit to fall. Sraffa's original argument, as Perri aptly points out, suffered from the adoption of the (faulty) Hypothesis that '…the relationship between aggregate income and aggregated capital does not change when the distribution of income varies' (this volume above pp. 94–5). In this respect the author convincingly shows that if Sraffa's argument is reformulated by means of the analytical device of the Standard relation between wages and the profit rate, the thesis of the falling *maximum* rate of profit as a consequence of a particular form of technical progress, which can be dubbed 'mechanisation', is logically sound.

So far, so good. What is far less convincing, however, is the extension of this result from the *maximum* to the *actual* rate of profit, which seems simply to be taken for granted, as in the following passage: 'If the decrease in the maximum rate of profit *lasts long enough*, the actual rate of profit must also fall, no matter how the rate of surplus value increases' (p. 95; emphasis added). This is only the first example of several statements of the same kind that the reader encounters in the chapter.[1]

At times it is not clear whether Perri is speaking for himself, is interpreting Sraffa and/or Marx, or else is giving his own account of Sraffa's

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[1] A fairly complete list of similar statements is as follows: '…in the long run if the maximum rate of profit keeps falling, *the actual rate of profit must also fall*.' (p. 98); 'When machinery replaces living labour, this ratio – and thus the maximum rate of profit – falls. If the process of a falling rate of maximum profit is continuous, … *in the end the actual rate of profit also tends to fall*, despite the increase in the rate of surplus value.' (p. 102); 'In the second part of the discussion I will show that the Standard system can be used as a tool to analyse the effects on the maximum rate of profit *(and eventually the actual rate of profit)* of a technical change that increases the *OCP* [Organic Composition of Production.' (p. 105); 'But when the maximum profit rate equals $r*$, the actual rate of profit cannot be maintained unless workers 'could live on air'. *Further decreases in the maximum rate of profit, even assuming wages equal to zero, must therefore cause a decrease of the actual rate of profit.*' (p. 111); 'The logical part of the Marxian law – the proposition that when the *OCP* increases, the maximum rate of profit must decline *as must also (in the end) the actual rate of profit* – can be supported on the basis of Sraffa's interpretation of Marx and of his Standard system.' (p. 112); 'The result is still a decrease in the maximum rate of profit *and, in the long run, a fall in the actual rate of profit.*' (p. 116); 'Sraffa's defence of Marx's law focuses on its logical aspect. An increase in the *OCP* causes a fall in the maximum profit rate of the economic system. In the long run, if the maximum rate of profit tends to fall steadily, *the effective profit rate must also fall*.' (p. 118); apart from acronyms all italicised emphases added.

interpretation of Marx's law of the falling rate of profit. Be that as it may, I think that simply extending propositions which undoubtedly hold for the *maximum* rate of profit to what should eventually happen to the *actual* rate of profit is somewhat illegitimate.

Indeed, while we know from the analysis of different forms of technical progress in terms of w–r relations that mechanisation can be described as a technique displaying a higher maximum real wage rate and, contemporaneously, a lower maximum rate of profit,[2] we should also know, at least from the so-called Okishio (1961) theorem,[3] that the 'new' technique, for it to be chosen at the current wage rate, must be cost-minimising and therefore allowing a higher (actual) rate of profit.[4] If only for the sake of completeness, it must be acknowledged that Okishio himself subsequently pointed out: (i) that even from a Marxist perspective, there are not *a priori* reasons to reject the possibility of finding superior techniques having both a greater productivity of labour and a higher maximum rate of profit (Okishio, 1977), and (ii) the comparative statics character of his previous result and the possibility of obtaining completely different ones if the assumption of a constant real wage rate is abandoned and different paths towards equilibrium, according to different competitive mechanisms, are examined (Okishio, 2001).

We may well agree that a comparative statics result cannot provide us with definitive conclusions about the actual path of technical progress in capitalist economies, if only because 'logical' and 'historical' concepts of time should not be muddled up, as Joan Robinson repeatedly reminded us.[5] But if we make use of such an analytical method to check the logic of the argument about the falling rate of profit, then we have to accept all the constraints inevitably associated with this method. Indeed, Perri himself acknowledges that 'Marx's theory can be split into two parts. The first is predominantly historical and focuses on the process of substituting machinery for labour during the process of capitalist industrialisation. [...] The second part is predominantly logical....' (p. 118)

To sum up: my contention here is precisely that an analysis in terms of the *w – r* relationship cannot logically sustain a conclusion about a tendency towards a falling *actual* rate of profit. If I may indulge in a

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[2] See, for example, Schefold (1976, 1979), Fujimoto (1983) and Salanti (1985).
[3] See also Bowles (1981).
[4] This can be verified even in figures from 6.2 to 6.5 in Perri's chapter.
[5] See, for instance, Robinson (1978, 1980).

self-quotation, as I wrote more than a quarter century ago (Salanti, 1985, pp. 107–8):

> Mechanisation [...] implies a diminishing maximum rate of profit, so that some Marxists have widely speculated on this characteristic in an attempt to restore the Marxian 'law' of falling rate of profit. Their argument usually consist of maintaining that if the *maximum* rate of profit is always decreasing (because of technical progress implies increasing mechanisation), sooner or later the *actual* rate of profit must do the same; but they have never succeeded in explaining why capitalists should be compelled to introduce less profitable (even if more productive) techniques. The reason of this failure is simply that, if the choice of technique is assumed to be accomplished according to the 'profitability rule', mechanisation cannot be taken as the unique form of technical progress in the long run without falling in the above contradiction. Indeed, if the rate of growth is supposed to be equal or inferior to the rate of profit, technical progress is compatible with lasting accumulation only if it does not cause the maximum rate of profit to decline without end, *i.e.* if mechanisation is introduced in conjunction with other kinds of technical progress such as to counteract the falling rate of profit effect of it.

On the preface to *Production of Commodities by Means of Commodities*

Sinha's 'new perspective on Sraffa' in Chapter 5 starts from the contention that none of the four well-known and widely cited remarks made by Piero Sraffa in the preface to *PCMC* to provide the reader with his authentic interpretation of the content of the following chapters 'have been given careful attention either by his followers or his critics in interpreting his book' (this volume above p. 81). Those remarks encourage the reader to understand Sraffa's prices of production as independent from any assumption on returns to scale and any consideration about the equilibrium of demand and supply. This perspective, it is also maintained, is in agreement with the standpoint of classical political economy and ought to serve as a prelude to a critique of economic theory.

The main problem I see in all this is that I can understand these assertions only if interpreted strictly with reference to the classical theory of value (or, if you prefer, of prices of production), while I

cannot imagine how it could be possible to adopt the same perspective in reconstructing the 'magnificent dynamics' of classical economists[6] or other important pieces of classical economics.[7] But if Sraffa's contribution in *PCMC* is strictly identified with a simple *model* of determination of prices of production, then the question of how his model is related to what we may observe in real economies immediately materialises.

In this respect it may be worthy to remember the widely held common sense view of models where simplified/stylised representations (or features) of the 'real world' can be 'manipulated' as an aid to understanding 'mechanisms' supposedly at work within the model as well as in the 'real world'. Two problems immediately arise in this respect: how to *construct* useful models and how to *interpret* them. Model building is a matter of selecting the appropriate scope, level of detail, and issues to be emphasised. Of course there is no set formula to do this, because the appropriate levels of each depend on what the model seeks to accomplish. In any case, whether we look at models according to the 'models-as-mediators' standpoint, or whether we adopt the perspective of the so-called semantic view of theories,[8] we may well agree that models have to accomplish some representational functions. As noted by Frigg and Hartmann (2009, p. 2):

> Models can perform two fundamentally different representational functions. On the one hand, a model can be a representation of a selected part of the world (the 'target system'). Depending on the nature of the target, such models are either models of phenomena or models of data. On the other hand, a model can represent a theory in the sense that it interprets the laws and axioms of that theory.

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[6] For a recent and stimulating survey of classical economists' analyses of technical progress and capital accumulation, see Kurz (2010).

[7] Just to stick to Ricardo: how could it be possible to understand the principle of comparative advantage, or the famous chapter 'on machinery' in the third edition of the *Principles,* without any assumption about returns and/or demand?

[8] The 'models-as-mediators' view regard models as mediating entities between abstract theories and concrete systems in the world (see Morgan and Morrison, 1999), while according to the semantic view of theories models are the objects that satisfy the axioms of the theory and two sets of axioms are two formulations of the same theory if the same set of models satisfies both of them (Suppe, 1989).

Note, however, that the two senses in which a model can be said to have a representational function (that is, with reference either to a theoretical framework or to a target and/or real world system) are not mutually exclusive: models can be representations in both senses at the same time.[9] What the semantic view stresses in this respect is that the helpfulness of any specific model should be theoretically justified and, in any case, that the main assumptions characterising a specific model are unavoidably 'theory laden'. But a theoretical justification is also necessary because we should offer good reasons for believing that what happens within the model holds also outside it, that is, with reference to those phenomena in the real world we are trying to 'understand' by means of that model.[10]

As far as possible interpretations of *PCMC* are concerned, I have never been fully convinced by the interpretation of prices of production as 'centres of gravitation' (cf. Salanti, 1985 and 1990). Nevertheless I am prepared to recognise that such a construal has at least the merit of trying to bridge the gap between the model and the real world. Once we cut this possible linkage, as Sinha seems to be quite eager to do,[11] we remain with the problem of the possible use of Sraffa's prices of production (defined as prices adhering to the requirement of a uniform rate of profit) to aid our understanding of what happens in real economies. To put it more generally, the principal task of any economic theory is not logical consistency but rather shedding light on real world economies. Sinha seems to be fascinated by arguments concerning the inner logic of Sraffian theoretical construction, but I doubt arguments of this kind can ever be conclusive.

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[9] Such a possibility is precisely the source of a potential trade-off between rigour and relevance, one of the spectres which have continuously haunted methodological appraisals of economics. Rigour is a matter of being consistent with theoretical principles, while relevance has to do with the possibility of transferring conclusions or predictions obtained within the model to what actually happens in the external world.

[10] It should also be noticed that the possible linkages between the model and its target (empirical) object are seen as more problematic than in traditional verificationist or falsificationist approaches. Here emphasis is placed on the idealisations and abstractions within the model on one side, and on the non-demonstrative patterns of reasoning that we usually encounter when dealing with its 'external validity' on the other.

[11] In addition to his chapter in this volume see also Sinha (2010) and Sinha and Dupertuis (2009a, b).

If we abandon the interpretation of the prices of production as the (long period) outcome of competition among capitalists, sooner or later knowledge obtained by empirical investigation gets its revenge. If only from casual observation, it is well known, for instance, that actual profit rates are far from uniform across sectors. As Flaschel (2010, p. 204), to quote an assuredly heterodox author, puts it:

> An economy in the real world cannot be expected to be character-ised by a uniform rate of profit [...]. One objection is the concep-tual problem of different sectoral turnover times of the intermediate inputs, that is, the time it takes until the capital outlays are recov-ered. Moreover, the sectoral profitabilities will differ from each other for various systematic reasons. Even if the profit rates were directly comparable, some sectors will persistently maintain a profit rate above average as a premium for a higher risk they incur, or because of certain oligopolistic or monopolistic features, which are mainly connected to the degree of concentration, the extent of entry barriers, and the degree of collusion between firms.

Admittedly, in all fairness to Sinha it has to be acknowledged that Sraffa's methodological attitude towards the right balance between logical consistency and empirical relevance within economic theory is some-what puzzling, if only because in his published works he never tackled extensive discussions of methodological issues. In any case, however, I cannot believe that 'our knowledge of the process of production is the (only?) knowledge of the *actual* input-ouptut data after the "harvest"' (p. 84), and all that follows is a matter of logical consistency alone. Things cannot be so simple.[12]

Surely Sraffa would not have tolerated a trade-off between logical rigour and empirical relevance, but he would have been equally uneasy with a theory completely divorced from 'facts'. Indeed, his famous criticism of Marshallian economics can be read as an attempt to reconstruct in a logi-cally consistent way Marshallian partial equilibrium models to single out the logically admissible accounts of empirical situations to which those models could be applied and those to which they could not. In doing this, he first clarified the basic explicit premises of the model under scrutiny, then he worked out the additional implicit assumptions that are required

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[12] For interesting discussions of some methodological pitfalls of the long-pe-riod method of analysis, see D'Orlando (2005, 2007).

to gain logical consistency, and finally he looked for the empirical situations logically deducible from the model so reconstructed.[13]

My suggestion, to conclude, is that we ought to appraise *Production of Commodities* according to the same methodological stance. This is, of course, nothing but a rough suggestion for further research (and by implication a not so veiled criticism of a substantial part of past literature on Sraffa).

In the meantime, however, at least one problem would have to be seriously considered: we cannot claim we are taking quantities as 'given' and calculating prices of production corresponding to such quantities *and* contemporaneously insist that no assumptions whatsoever on returns and/or equilibrium are required to obtain a meaningful theory of (long period) prices. Such a procedure is simply illegitimate because either (i) the system is in a stationary state (or on a balanced growth path) wherein we have observed the 'right' quantities of net outputs corresponding to an equilibrium however defined; or (ii) we have observed the 'wrong' quantities (because the system is not in equilibrium) in which case prices calculated continue to hold for a different composition of net output *only if* we assume constant returns to scale (because of their non-substitution properties).

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[13] The famous reply to Robertson's criticism in the 1930 symposium on increasing returns could not be more illuminating in this respect: 'I am trying to find what are the assumptions implicit in Marshall's theory; if Mr Robertson regards them as extremely unreal, I sympathise with him. We seem to be agreed that the theory cannot be interpreted in a way which makes it logically self-consistent and, at the same time, reconciles it with the facts it sets out to explain. Mr Robertson's remedy is to discard mathematics, and he suggests that my remedy is to discard the facts; perhaps I ought to have explained that, in the circumstances, I think it is Marshall's theory that should be discarded.' (Sraffa, 1930, p. 93)

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A Response to the comments by Professor Salanti

Ajit Sinha

I thank Professor Salanti for his considered comments on my 'new perspective' on Sraffa's *PCMC*. Salanti characterises my interpretation as 'Hamlet without the Prince'. He apparently believes that the role of competitive mechanism (or the gravitation mechanism of classical economics) in Sraffa's *PCMC* is similar to the role of Prince of Denmark in Shakespeare's *Hamlet*. But if this was so, then one would expect Salanti to offer some evidence to this effect. He, however, does not do so. And how could he? The word 'competition' or phrase 'gravitation mechanism' simply does not appear even once in the entire book. Actually, it is strange that after characterising my interpretation as 'Hamlet without the Prince', Salanti himself goes on to write: 'As far as possible interpretations of *PCMC* are concerned, I have never been fully convinced by the interpretation of prices of production as "centres of gravitation"' (this volume p.126). He goes on to add: 'we cannot claim we are taking quantities as "given" and calculating prices of production corresponding to such quantities *and* contemporaneously insist that no assumptions whatsoever on returns and/or equilibrium are required to obtain a meaningful theory of (long period) prices' (p. 128). But the fact remains that Sraffa insists on making no assumption regarding returns to scale. Thus if, as Salanti argues, the received interpretation requires some assumptions regarding returns to scale, then he must agree that it (i.e., the received interpretation) takes a position that is contrary to what Sraffa claims he was doing in his book. And since my chapter is an interpretation of that book, I am at a complete loss as to the meaning of the 'missing Prince' in Salanti's characterisation of the said interpretation. It should by now be clear that Salanti has not offered any criticism of my interpretation of Sraffa's book – rather he appears to be sympathetic to it. His main concern, however, seems to be with an entirely different question: how to relate Sraffa's prices to the real world?

Salanti believes that the classical 'gravitation mechanism' is a good representation of the real world and once this is removed from an explanation of Sraffa's theory of prices, the latter loses its relevance for this

world. That is why he thinks that, even though the 'centre of gravitation' interpretation does not fit well with Sraffa's own position, it should be maintained as an appendage to his theory. But his belief that the 'gravitation mechanism' is a good representation of the real world it is only that – a belief! There is no evidence that the 'gravitation mechanism' works in the real world and in a theoretical paper Dupertuis and Sinha (2009) show that in a system of three or more basic goods the mathematical probability of convergence of prices to their 'centres of gravitation' is zero. Instead of providing some evidence in support of his belief, Salanti offers a quotation from Flaschel who claims that 'an economy in the real world cannot be characterised by a uniform rate of profit' because of: (1) different turnover times of intermediate inputs in different industries; (2) different risk assessments of different industries; and (3) oligopolistic and monopolistic features prevailing in different industries.

   This argument, however, can be easily answered. (i) Sraffa assumes an 'annual' turnover period for all industries. But this assumption is made only to simplify the mathematical treatment of the equations. Different turnover time cannot make any difference to the industrial rates of profits simply because the rate of profits on any capital investment takes into account the compounding of capital over periods of time. Therefore, the differential time dimension of turnover of capital cannot make any difference to the result. (ii) When it comes to different risks, it should be kept in mind that Sraffa's equations are for the inputs and outputs of *industries* and not those of *firms*. A high-risk industry will have a higher proportion of firms (or capital investment) failing as compared to a low-risk industry. But the input–utput data of the industry must take into account all capital inputs and outputs made by all the firms in the industry (both successful and unsuccessful). Thus there is no contradiction in two industries having equal profit rates and the successful firms in the high-risk industry regularly receiving a higher rate of profits than the successful firms in the lower-risk industry. (iii) That the so-called 'market structures' cannot have any impact on industrial rate of profits is one of the startling conclusions of my interpretation of Sraffa's work. This is why the terms such as 'competition', 'monopoly', 'oligopoly', 'monopolistic or imperfect competition' do not appear even once in his book, which is a book on price theory. Market structures can affect the total profits of individual firms in these markets but prices and the rate of profits in an interconnected economic system of basic goods are determined simultaneously and cannot be understood through the prism of *partial equilibrium price theory*. Yet again, I find it

strange that on the one hand Salanti claims that the classical competitive mechanism represents real world phenomena while on the other hand, he invokes Flaschel, who claims that the real world is characterised by oligopolistic and monopolistic features, to (incorrectly) deny the possibility of uniform rate of profits in this world. But, of course, Salanti cannot have both – either the competitive conditions exist in the real world or they don't; and if they don't, as Flaschel claims, then the classical long-period theory of 'natural prices' must be declared invalid since it does not apply to the real world situation.

One problem with Salanti's understanding of Sraffa's theory of prices is that he conceives it as a 'model'. Models are generally built on supposed cause and effect relationships that *predict* certain outcomes. Sraffa's equations are not of this nature, they are a description of an *ex post* reality. The purpose of Sraffa's theory is to show that: (i) the distribution of income can be taken as given independently of prices, and (ii) given the distribution of income, prices are completely and uniquely determined irrespective of the demand considerations. These are logical arguments with no claims to *predictions*. The only falsifying entailment in Sraffa's logical structure is his *assumption* of at least one basic good in the system. If it could be demonstrated that in the real world no basic good exists then it could be argued that Sraffa's logic loses all contact with reality. It should also be noted that Sraffa does not argue that distribution of income *must* be given from outside. His argument is that *if* the distribution is given from outside (as is logically possible) then prices are completely determined without any consideration of demand; and this is what he maintained was the standpoint of the classical economists from Adam Smith to Ricardo. What Sraffa has demonstrated is that the 'gravitation mechanism' was an inessential appendage to the classical theory of prices and can be easily removed from it.

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A Note on Professor Salanti's Comments

Stefano Perri

First and foremost, I wish to thank Professor Salanti for his comments. That he deems my chapter successful in vindicating Sraffa's unpublished notes on the inner logic of the Marxian law of the falling rate of profit is surely a rather positive comment and overall means that the chapter hits its intended target. However he finds the extension of my results from the maximum to the actual rate of profit far less convincing. According to Professor Salanti I take for granted the possibility of such an extension with the proposition that if the decrease in the maximum rate of profit lasts long enough, the actual rate of profit must also fall no matter how much the rate of surplus value increases. Frankly speaking, I must confess to not having been able fully to understand Salanti's criticism until reading the quotation drawn from his 1985 essay together with his comments on Sinha's chapter included in this volume.

Indeed, the proposition criticised by Salanti in-text and those quoted in the ensuing footnote are but logical propositions and conditional clauses: *if* the maximum rate of profit keeps falling for a consistent period of time, the actual rate of profit *must* also fall. This is a necessary conclusion if the maximum rate falls below the original actual one, where 'actual' does not refer to the 'real world' but simply to the model. This is but a consequence of the proposition, as I have shown (see Chapter 6, Figure 6.1). Thus my 'extension' is demonstrated and not simply taken for granted, and even though Salanti's footnoted list of my statements contains comments to this demonstration, he does not show why in his opinion my demonstration is wrong.

This conditional clause interpretation is also my interpretation of how Sraffa conceived of the matter as seen through his archival notes. In fact, I quoted Sraffa's statement that according to Marx the maximum rate of profit tends to fall and that 'hence, however much wages may fall, they cannot always make up for it' (this volume p. 102). I also tried to show the reason why Sraffa believed that this is not a process that can hold true in the 'real world' (See Sraffa's letter to Antonio Gramsci, p. 103). Therefore,

given this framework, the real issue is to explain the reason why Sraffa gave such an importance to the law of the falling maximum rate of profit (and the 'extension' to the actual rate) despite the fact the he did not believe this law referred to the 'real world'.

As a matter of fact, Salanti does not reject the logical proposition according to which a hypothetical continuous fall of the maximum rate of profit finally provokes also a decrease in the actual rate of profit. Rather, he simply does not believe that a continuous increase of the organic composition of capital can occur, due to the 'profitability rule'. Actually, I agree with Salanti, as I tried to show in my chapter (Chapter 6, in section 'The Standard system as a 'necessary adjunct': Sraffa's interpretation of the transformation problem'), if it is specified that changes in the real wage rate are not allowed. In his *Prices of Production, Market Prices, and the Analysis of the Choice of Techniques*, Salanti states that mechanisation cannot be taken as the unique form of technical progress. Mechanisation presupposes a decrease in the maximum rate of profit, but such a decrease, according to Salanti, clashes with the assumption that the choice of the technique is accomplished according to the 'profitability rule'. Thus, in the 'real world', mechanisation is introduced in conjunction with other kinds of technical progress so as to counteract the falling rate of profit.

I do not intend here to discuss whether or not a fall in the rate of profits has actually occurred in the 'real world' over significant periods of time[1]. However, my chapter tried to show how this process *could* occur, even taking into account the so-called Okishio theorem[2] and the 'profitability rule'. The Okishio theorem simply states that the 'new' technique is chosen only if it helps to achieve a higher actual rate of profit, once its adoption is generalised and new prices of production prevail, *given a constant real wage rate*. By the way, it is worth noting that Salanti acknowledges that I did not contradict Okishio theorem in Figures 6.2 to 6.5 of my chapter. But then he loses sight of the fact that these figures are but the 'extension' of my interpretation of Sraffa's notes on Marx's law of the falling rate of profit. Surprisingly enough, Salanti quotes them only in a note and does not take them further into account. Actually, I developed two models in my chapter the first can be called the Sraffa–Dobb–Okishio model, the second the Foley–Michl model.[3]

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[1] On this subject see, among the others, Shaikh (1992), Duménil and Levy (1993), Foley and Michl (1999).

[2] Okishio (1961).

[3] See Figures 6.4 and 6.5 of my chapter.

Both the models presuppose that *the assumption of a constant real wage rate is abandoned*.

In the Sraffa–Dobb–Okishio[4] model the process of accumulation of capital, without technical change, induces an increase in the demand for labour and, therefore, the real wage rate increases and the actual rate of profit falls. Organic composition of capital-increasing techniques become profitable, although the maximum rate of profit falls when they are introduced. However, as the actual rate of profit cannot rise again to its initial value, in the long run the process leads to both a falling maximum and actual rate of profits. One may even say that the real cause of this process is the rise in the real wage rate during the process of capital accumulation rather than the increase of the organic composition of capital. However this seems to be a 'which came first, the chicken or the egg' problem. As a matter of fact the process involves both a rise in the real wage rate and a decrease in the maximum rate of profit. In the Foley–Michl model the adoption of the technique of organic composition of capital-increasing causes – in the short term (i.e. when the real wage rate is constant) – both a decrease in the maximum rate of profit (and of the share of wages in national income) and an increase of the actual rate of profit. However – in the long term – real wages, according to empirical evidence, rise in proportion to the productivity of labour. Thus, in the long term the actual rate of profit falls.

My chapter did not intend to demonstrate that the process of the falling rate of profit *must* happen in the real world. I did intend to show that the two models are not logically flawed or inconsistent and that the conditions assumed in the model *can* possibly occur in the real world. Of course the clause 'everything else remaining unchanged' must be assumed. Thus, as I stated in my chapter, 'whether [Marx's] description of the prevailing type of technical progress in capitalist economies corresponds to the actual historical process, cannot be decided once and for all in abstract terms and it is far beyond the aims of this paper'. I also clearly indicated at its very beginning that Marx's law had two aspects. The first refers to technological progress as a historical (and not mechanical) trend towards the increase of constant capital per unit of labour as the main source of a growing productivity of labour whereas second aspect is analytical: when this historical trend prevails, the organic composition of capital grows, the maximum rate of profit decreases, and eventually the actual rate of profit falls. In my chapter I dealt only with the (second) analytical aspect of Marx's law.

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[4] See Dobb (1945), Okishio (1972, 1977, 2000), Foley and Michl (1999).

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7
The Essentiality of Money in the Sraffa Papers

Ghislain Deleplace

Since the publication of *Production of Commodities by Means of Commodities* (*PCMC*) in 1960 there has been much debate about the nature of prices in the Sraffa system. Some authors have argued that they were only a special case of Walrasian equilibrium prices, while others have insisted that, reflecting the conditions of the production of commodities and the state of distribution, they have a specificity which goes back to the old classical surplus approach. Little attention, however, has been devoted to one particular aspect of such prices: their real versus their monetary character. As is well known, modern Walrasian equilibrium prices are real prices, since their determination depends on forces that can be understood regardless of any assumption about money. Although the theory supposedly deals with with a monetary economy, money is considered neutral with respect to the determination of relative prices: whether or not money is 'integrated', the equilibrium price system remains unaffected. The question then arises as to whether it is the same with the Sraffa system, in other words should money also be considered as neutral with respect to the determination of relative prices. The object of the present chapter is an enquiry into what may be learned on this question from the Sraffa Papers (*SP*).

A central issue of this chapter is the distinction between the question of the essentiality of money and the neutrality of money. Hence in the section following this introduction I first use the drafts of *PCMC*[1] to consider the essentiality of money in relation to the two candidates for a role of money in the determination of prices: *via* the rate of profits as the independent distributive variable and *via* the Standard commodity in which prices are measured. In the section that follows this introduction I concentrate on the unpublished notes written by Sraffa for his 1932 article against Hayek, where Sraffa discusses the relation between money and equilibrium and criticises the 'subjective point of view' on money. This leads to the next section and an analysis of Sraffa's position about hoarding, against Hayek and also Keynes's *The General*

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[1] Editors' note: In March of 1956 Sraffa sent to the Cambridge University Typewriting Office a handwritten manuscript (D3/12/71) of what would become the first five chapters of *PCMC*. In August of 1956 Sraffa sent revisions back to the Typist (D3/12/72) in the form of annotations on the typed MS returned to him as well as handwritten drafts of Appendix A on subsystems and Appendix B and self-reproducing non-basics. In March of 1957 (D3/12/80) Sraffa drafts by hand the sections on the reduction to dated quantities of labour as well as joint production. The above three manuscripts constitute an initial phase in the final push to publish *PCMC*. The next manuscript-proper to appear in the archive comes two years later in February 1959 (D3/12/103). Here we find a complete typescript of Sraffa's book. For the next year until final publication in April 1960 Sraffa will heavily annotate and correct five additional copies of the manuscript, two consisting of loose-leaf galley sheets (D3/12/106 and D3/12/108) and three bound copies (D3/12/107, *SC* 3370 and *SC* 3371; note that the latter two appear in Sraffa's library). A conceptual and chronological arrangement of the relevant archival material tracing the evolution of the various drafts of *PCMC* is as follows:

D3/12/71 'Copy used by Typist for (pp. [paragraphs] 1–23)' (March 1956)
D3/12/72 'Copy used for Second Typing (pp. [paragraphs] 1–34)' (Aug 1956)
D3/12/80 'Copy used for Typist § 46–65 (and rewriting of 41–2)' (March 1957)
D3/12/103 'Typescript' (February–April 1959)
SC 3371 Galley copy of *PCMC* (September 1959)
D3/12/106 'First Proof' (November 1959)
D3/12/107 'Bound first proof' (December 1959)
SC 3370 Galley copy of *PCMC* (January 1960)
D3/12/108 'Second proof' (January–February 1960)

Four more copies of Sraffa's book post-publication related to the corrections made in the second printing of 1963 appear in his library. Archived as *SC* 2706 and *SC* 3748 a, b, c, only the former and *SC* 3748c contain the relevant annotations and corrections; *SC* 3748c also includes several inserted annotated slips of paper dating from 1962–3, 1966, 1968, and 1971.

Theory. The section which follows stresses Sraffa's insistence on money as the standard of deferred payments, which belongs to institutional 'constants'. The chapter concludes by suggesting that, in Sraffa's two-tier approach to money, the essentiality of money is not exempt from an ambiguity that is nevertheless consistent with Sraffa's project to separate, in the determination of the system of prices, what is 'natural' from what is 'institutional'.

Money in the drafts of *Production of Commodities*[2]

The link between money and the rate of profits

The word 'money' appears only once in *PCMC*, in the famous §44 on the independent variable: 'It [the rate of profits] is accordingly susceptible of being determined from outside the system of production, in particular by the level of the money rates of interest' (Sraffa, 1960, p. 33). This causal determination of the rate of profits by the money rates of interest has been interpreted by several authors as a proof of Sraffa's concern with the relation between money and distribution. The *SP* have thereby been scrutinised with a view at substantiating that interpretation, although in various ways. In the last line of his 1988 book and article, Panico (1988a,b) concludes: 'The examination of the Sraffa Papers confirms the results reached by the literature on the links between Sraffa's earlier papers on monetary questions and his later work on the theory of value and distribution' (Panico, 1988b, p. 302). Looking for a 'unifying theme' in Sraffa's and Keynes's research programmes, Ranchetti (2001) finds it in 'the relationship between the rate of money interest and the rate of profit, within the context of an "entrepreneur economy"' (Ranchetti, 2001, p. 312), and concludes: 'the new evidence available [the *SP*] clearly confirm a strong agreement between Sraffa and Keynes both on a monetary and conventional determination of the rate of interest and on the direction of the causal nexus between the two (namely, from the money rate of interest to the rate of profits)' (Ranchetti, 2001, p. 327). More inclined to read §44 in the light of Marx than of Keynes, Bellofiore

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[2] Part of the material from the Sraffa Papers used below is gathered in an envelope (catalogued D3/12/78) bearing in Sraffa's hand: 'March' 57 Redrafting of §§41–2 Discarding Standard System as Scaffolding' (§§41–2 were the original numbers of the final §§43–4). The envelope contains 15 pieces, where the bits of text are written in pencil on the back of proofs of Ricardo's correspondence and cover sheets of *The Economic Journal*.

(2001) comments on a quotation from Sraffa's Lectures on Industry in the following way: 'the "distribution" […] must be understood as the result of choices that are not merely technical and that should be analysed "before the harvest". These, presumably, are choices where money, not in its extremely simple role as measure of value, but as monetary *capital* is of the utmost importance.' (Bellofiore, 2001, p. 374; author's italics)

What does the drafting of §44 bring to light on this issue? Until March 1957, the formulation of §44 only contained the discarding of the wage as the independent variable and its replacement by the rate of profits, without any mention of the way in which it could be determined; this remained the case in the pencilled changes introduced at that time in the typescript of the 1956 text (D3/12/80/11). A piece of paper heavily crossed-out then gave birth to a new formulation: '…it is possible to conceive of it [the rate of profits] as being "given" ~~from~~ of being determined by circumstances outside the system of production, such as the necessity for it to ~~conform~~ conforming with the pattern of money rates of interest determined independently by the banking system or the Stock Exchange' (D3/12/78/6).[3] This 'determination' survived in a later formulation (D3/12/78/13), but, on 29 March 1957, it became: 'It [the rate of profits] is accordingly susceptible of being ~~given~~ determined from outside the system of production, in particular by the level of the money rates of interest' (D3/12/80/9). This formulation would remain unchanged in the typescript dated 20 May 1959 (D3/12/103/69), in the first proof of 4 December 1959 (D3/12/106/24), in the first bound proof also of December 1959 (D3/12/107/6: 33) and in the published volume (Sraffa, 1960, p. 33).

This final change is not trivial: although retaining the 'outside' determination of 'the level of the money rates of interest', bluntly eliminated in the published account is 'the banking system or the Stock Exchange'. Why did this mention disappear? We have no indication about that, but this change may be put into perspective when we consider what Sraffa wrote concerning §44 in a letter to Pierangelo Garegnani dated 13 March 1962: 'I did not want to commit myself much, and in general I only wanted to signal something […] the review would do well not to insist too heavily on the passing remark about the monetary interest rate' (quoted in Panico, 2001, pp. 301–2; Bellofiore, 2001, pp. 366–7). One may think that deleting the mention of 'the banking system or the Stock Exchange' was part of a strategy of low commitment on that issue. Nevertheless, the fact that these words showed up during a few days in March 1957 before being deleted gives two indications. First, the mention of 'the Stock

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[3] All passages crossed-out from the Sraffa Papers are done so by Sraffa.

Exchange' as a determinant of 'the pattern of money rates of interest' suggests that Sraffa had *not* in mind a purely monetary theory of the rates of interest – which is not surprising with respect to his critique (in the *SP*) of liquidity preference in Keynes's *General Theory* (see for example Kurz, 2010). Secondly, it gives some credence to the above interpretations of *PCMC* in which money influences distribution and prices through the rate of interest, determined 'from outside the system of production' by the whole monetary and financial system.

Such an approach focuses the attention on the relation between money and capital. As is well known, this relation had been analysed by Sraffa, a quarter of a century before, in his famous 1932 article 'Dr. Hayek on Money and Capital'. Although Sraffa explicitly limited the scope of his article to a critique of Hayek's approach in his book *Prices and Production*,[4] it gave him the opportunity, in a discussion of the notion of the neutrality of money, to single out a particular question highly important for the present inquiry: that of the essentiality of money. The 'unintelligibility' (Sraffa, 1932a, p. 42) of Hayek's theory of money obscures that distinction, and it is necessary to recall Sraffa's argument as it is exposed in the introductory part of his article.

By 'neutral money', according to Sraffa, Hayek means 'a kind of money which leaves production and the relative prices of goods, including the rate of interest, "undisturbed", exactly as they would be if there were no money at all' (Sraffa, 1932a, p. 42). So one would expect 'a comparison between the conditions of a specified non-monetary economy and those of various monetary systems [...]. This would bring out what are the *essential characteristics common to every kind of money*, as well as their differences, thus supplying the elements for an estimate of the merits of alternative policies' (Sraffa, 1932a, p. 43; italics added). Hence, under the label 'neutrality of money', Hayek intends to inquire about a situation in which the same results are obtained with

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[4] Sraffa resisted Hayek's pressure who wrote in his 'Reply' to the article: 'I should also like to ask him [Sraffa] to define his own attitude to these problems more clearly than he has yet done. From his article one gains the impression that his attitude is a curious mixture of, on the one hand, an extreme theoretical nihilism [...]; and, on the other hand, of an ultraconservatism' (Hayek, 193, p. 238). The answer by Sraffa in his 'Rejoinder' was the following: 'After this Dr Hayek will allow me not to take seriously his questions as to what I 'really believe'. Nobody could believe that anything that logically follows from such fantastic assumptions is true in reality. But I admit the abstract possibility that conclusions deduced from them by faulty reasoning may, by lucky accident, prove quite plausible' (Sraffa, 1932b, p. 250).

and without money. Unfortunately, 'the reader [of Hayek's book *Prices and Production*] soon realises that Dr. Hayek completely forgets to deal with the task which he has set himself, and that he is only concerned with [a] *wholly different problem*' (Sraffa, 1932a, p. 43; italics added): the comparison between a monetary economy endowed with a particular 'banking policy' (that which maintains constant the quantity of money multiplied by its velocity of circulation) and 'alternative monetary policies'. Hayek wants then to demonstrate that only the former 'succeeds in giving full effect to the "voluntary decisions of individuals"', and 'he identifies it with "neutral money"' (Sraffa, 1932a, p. 43). In so doing, he confuses under the same label ('neutrality of money') two distinct problems: what makes a monetary economy differ or not from a non-monetary one, and what makes two distinct monetary economies differ or not from one another. According to Sraffa, this confusion is the consequence of Hayek's reduction of the definition of money to 'purely and simply a medium of exchange', rejecting 'every notion of the value of money in any sense whatever'; and although any such 'emasculated money' should be equally 'neutral', Hayek insists that it is only the case with his particular 'maxim of [monetary] policy': the confusion ends up in contradiction (Sraffa, 1932a, p. 44).

Behind the denunciation of Hayek's confusion, Sraffa then introduces an important distinction between two levels of analysis of money in an economy. The first one is the study of what makes money 'essential'; a way to perform that study is to compare what happens in any monetary economy with what would happen in any non-monetary economy. The second level is to compare the properties of various monetary economies. The first level of analysis is logically prior to the second, since, by bringing out 'the essential characteristics' of money, it is 'supplying the elements' of the latter. Drawing on the adjective used by Sraffa himself, one may call the first level of analysis the question of the essentiality of money. As for the second level, Sraffa does not name it; he only criticises the use of the label 'neutrality of money' to cover both the comparison between various monetary economies and the comparison between a monetary economy and a non-monetary one.

Although the concept of a non-monetary economy is not easy to isolate in Sraffa (1932),[5] one conclusion emerges from that article: it is one thing to inquire about the essentiality of money, it is another is to compare different states of a monetary economy. A first addition made by the *SP* is the affirmation by Sraffa that the confusion between these

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[5] For a preliminary study, see Deleplace (2004).

two levels of analysis is an unfortunate novelty introduced by Hayek (more on this quotation later):

> According to Dr H[ayek] the task of monetary theory 'is nothing less than to cover a second time the whole field which is treated by pure theory [i.e. what is usually called the theory of value and distribution] under the assumption of barter, and to investigate what changes in the conclusions of pure theory are made necessary by the introduction of indirect exchange' (Sraffa, 1932, p. 110). This is not the common opinion, and it does not correspond to the line along which in fact the division of labour between monetary and non-monetary economists takes place. It is sufficient to refer to a standard treatise on value and distribution, e.g. to Marshall's Principles, to see that these theories are expounded directly in terms of a monetary economy: and this is true even in the case of one like Marshall who rightly or wrongly thought that the consideration of money was essential to the truth of his conclusions. (see Principles, Appendix on Barter) (D3/9/181; the parentheses in Hayek's quotation is added by Sraffa)

Sraffa then suggested that authors prior to Hayek, such as Marshall, did not make Hayek's confusion. Although they may have tried to show that variations in the quantity of money left relative prices unchanged, they did not derive from that property the completely different conclusion that this price system would be the one that would rule in a non-monetary economy. On the contrary, they restricted the validity of their propositions (including the most central ones, concerning value and distribution) to a monetary economy, because they considered (no matter the reasons, right or wrong) that money was 'essential'. The neutrality of money in Hayek's sense was simply not consistent with their view of an economy.[6]

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[6] Although isolated at the time of Sraffa's critique, Hayek's confusion would have a long legacy. Schumpeter repeated it: 'So long as [money] functions normally, it does not affect the economic process, which behaves in the same way as it would in a barter economy: this is essentially what the concept of neutral money implies' (Schumpeter, 1954, p. 277). Referring explicitly to Hayek's *Prices and Production*, Patinkin (1965) adopted the same definition of neutrality: 'Strictly speaking, such neutrality [of money] obtains if the mere conversion of a barter economy to a money economy does not affect equilibrium relative prices and interest'; however, he pointed to a major difficulty raised by this definition; namely that 'it is difficult, if not impossible, to make such a comparison in a general way' before proposing a method to overcome it, while recognising that this method 'has one serious drawback' (Patinkin, 1965, p. 75). In modern general equilibrium theory, Wallace (2001) makes a clear distinction between the 'essentiality' and the 'neutrality' of money (I thank Jean Cartelier for this reference).

In this extract of the *SP* Sraffa played Marshall against Hayek, in spite of his own strong disagreement with the marginal theory of value and distribution and, as we will see below, with the characteristics of money which made it 'essential' in that tradition. This reinforces the methodological statement which could already be derived from the 1932 article: the question of the essentiality of money was seen at that time by Sraffa as distinct from and prior to the study of the way in which money affects prices in various states of the economy.

Some of the interpretations of *PCMC* in which money influences distribution and prices through the rate of interest draw a parallel between Sraffa and Marx.[7] The necessity to make the distinction stressed above should not be found surprising by their proponents. Marx starts his analysis of the exchange of commodities (in Chapter 2 of *Capital*) by opposing 'the direct barter of products', where 'they do not confront each other as commodities, but only as products or use-values', to a monetary economy where 'the social action of all other commodities sets apart the particular commodity in which they all represent their values [and which] becomes money' (Marx, 1967, pp. 86–7). Money is therefore the condition of the existence of commodities as values (and not only as use-values), and Marx studies the characteristics of money which allow it to perform that role. Having dealt with the question of the essentiality of money, Marx was able to proceed further and analyse the transformation of money into capital and its consequences for the determination of prices.

It is beyond the scope of the present chapter to inquire about the relevance of this approach in Marx in comparison to that of Sraffa. I only contend that such a two-tier approach may be helpful to make sense of the existence of money in *PCMC*. In other words, the inquiry about the way money may affect Sraffa-prices through the rate of interest is logically posterior to the inquiry about the characteristics of money that make Sraffa-prices money prices (the essentiality question). The present chapter is devoted to the latter question only, as it may be clarified thanks to the *SP*.

A link between money and the Standard

When asking whether prices in *PCMC* are money prices, one is tempted to look for the answer in the role of the Standard commodity as a

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[7] See Bellofiore (2001) and the contribution of the same author to the present volume; the comment by Guglielmo Chiodi on the present chapter also insists on the link between Sraffa and Marx.

measure of prices. Indeed, in some drafts of §43, the reference to money appeared in relation to the 'abstract' character of the Standard. In a manuscript dated 16 September 1956, PS wrote: 'The use in our calculations of a standard of which we do not know what it consists of should not present much difficulty. The degree of abstraction required is nothing as compared with that involved in the current use of an inconvertible paper-money of which even less is known' (D3/12/76/ 6). Sraffa later hesitated about the 'degree of abstraction' involved respectively in the Standard commodity and inconvertible paper-money: in March 1957, a sentence mentioning 'a comparable degree of abstraction' is crossed-out and replaced in the margin by: 'although the degree of abstraction involved in the use of inc. paper money would seem even greater' (D3/12/78/7). In a typescript dated the same month (March 1957) and containing the 1956 formulation, Sraffa pencil marked the relevant page 'cancelled' and changed the sentence into: 'The use for the purpose of calculation of a standard of which the composition is not known does not involve as high a degree of abstraction as does the current use of an inconvertible paper-money of which even less is known' (D3/12/80/11). It was the last time that the 'inconvertible paper-money' showed up: on 29 March 1957, the manuscript pages sent to the typist to replace the already typed ones simply state: 'And it is curious that we ~~are~~ should thus be enabled to use a standard of which we do not know what it consists of' (D3/12/80/7).[8] This formulation would only be grammatically altered at the first proof-stage, to become the definitive one on 4 December 1959: 'And it is curious that we should thus be enabled to use a standard without knowing what it consists of' (D3/12/106/23; Sraffa, 1960, p. 32).

One should observe that the cancellation of the comparison between the Standard commodity and inconvertible paper-money eliminated any mention of 'abstraction' for both terms; nevertheless, this notion re-emerged for the Standard in the final version of the subsequent §44, in a way which echoes the hesitations of Sraffa about its level: 'And when the wage is to be regarded as "given" in terms of a more or less abstract standard, ... ' (Sraffa, 1960, p. 33). This was enough, in Sraffa's eyes, to convey the notion of abstraction about the Standard, without needing a comparison with anything. But the story of that aborted comparison is meaningful: money was nothing else but a term of

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[8] This mention of 'inconvertible paper-money' disappeared from §43 on the same day as the mention of 'the banking system or the Stock Exchange' in §44 (see above).

comparison, deprived of any analytical link with the Standard hence Sraffa's decision to dispense with it, probably to avoid any confusion.

The same prudence is to be found in a letter dated 14 April 1970 and sent to the French translator of *PCMC*, where Sraffa wrote: 'The point I am most unhappy about is your translation of "Standard ratio" by "ratio-étalon". I do not think this right. I am sure "ratio" should be "rapport"; and "standard" should <u>not</u> be "étalon" (which is only one of the many senses of "standard" and not the one intended here)' (underlined by Sraffa). The economic meaning usually associated with the French word 'étalon' is the monetary one, as in 'étalon-or' (for 'gold standard'), and it is most likely that Sraffa had this meaning in mind when he observed that it was 'not the one intended' in his own use of the word 'standard'[9]. This wish to avoid the confusion between the Standard commodity and the standard of money seems at odds with the following assertion made by Sraffa in Appendix D of *PCMC* on the 'References to the literature': 'The conception of a standard measure of value as a medium between two extremes (§17 ff.) also belongs to Ricardo[1]' (Sraffa, 1960: 94). Footnote 1 directs the reader to Sraffa's own introduction to his edition of *On the Principles of Political Economy and Taxation*, where he wrote: 'In edition 3 [of *Principles*], therefore, the standard adopted was money "produced with such proportions of the two kinds of capital as approach nearest to the average quantity employed in the production of most commodities"' (Sraffa and Dobb, 1951, *Works I*, p. xliv). This excerpt from the third edition of Ricardo's *Principles* (Sraffa and Dobb, 1951 *Works I*, p. 45) was in fact attached to 'gold considered as a commodity', and not to money as Sraffa writes, but this matters little since Ricardo himself ended his argument saying: 'To facilitate, then, the object of this enquiry, although I fully allow that *money made of gold* is subject to most of the variations of other things, I shall suppose it to be invariable' (Sraffa and Dobb, 1951

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[9] In a previous letter dated 18 February 1969, Sraffa already wondered about the translation of 'standard', asking whether this word was 'usable in French'; he referred to his own Italian translation of 'Standard commodity' by 'merce tipo'. In his April 1970 letter he again referred to it, writing after his remark on 'Standard ratio': 'Similarly the phrase 'Standard commodity' is not properly rendered by 'étalon-marchandise' (which in any case, should be 'marchandise-étalon' – étalon for standard here being adjectival). I suggest that 'marchandise type' (modelled on the Italian 'merce tipo') would render literally what is meant'. There was no further indication given by Sraffa on that matter, and the translation for 'standard' remained 'étalon'. I thank the original French translator of the book, Serge Latouche, for having given me access to this correspondence. For problems raised by the French translation of *PCMC*, see Deleplace (1999).

Works I, p. 46; emphasis added). It is striking that here Sraffa suggests a link between his standard and gold-money in Ricardo's Chapter 1 of *Principles*. If proved significant, that link could be extended to paper-money convertible in gold, even in the case when gold would cease to be money and remain only the standard of money, as in Ricardo's Ingot plan (Ricardo, 1816, pp. 54–69; Ricardo, 1821, pp. 356–61).

But the link so established by Sraffa between his Standard commodity and 'gold' in Ricardo leads to a dilemma. On the one hand, if 'gold' is money or the standard of convertible paper-money, it is in both cases anything but 'abstract', since every owner of gold specie or of convertible notes can obtain the concrete form of gold in bullion through melting or conversion at the issuing bank; the 'more or less abstract' character of the Standard commodity is then difficult to reconcile with this concreteness of gold. On the other hand, if 'gold' is a commodity supposedly produced in average conditions as compared to 'most commodities', it is as 'abstract' as Sraffa's Standard commodity, but has nothing to do with actual gold as money or standard of convertible paper-money. This dilemma is of course not Sraffa's but Ricardo's; it nevertheless invites the reader to repress the temptation of linking the Standard commodity with money under the name of gold and to keep strictly to what Sraffa wrote in Appendix D to *PCMC*: the Standard commodity is akin to that 'medium between two extremes' which Ricardo called gold in Chapter 1 of *Principles* but which has no monetary character.

The adoption of this branch of the dilemma is reinforced by the exploration of the *SP*. In the same Appendix D to *PCMC*, Sraffa underlined that his 'interpretation of Ricardo's theory suggested itself as a natural consequence [...] in the course of the present investigation' (Sraffa, 1960, p. 93); as is well known, this 'interpretation' is presented in Sraffa's *Introduction* to his edition of *Principles*. Nothing of the kind may be found in Sraffa's published 'Notes' on Ricardo's monetary writings (in Volume III and IV of the *Works*), and, to the best of my knowledge, the *SP* do not contain any comment on the conception of gold as 'a medium between two extremes' in relation to Ricardo's writings on money or to Sraffa's own reflections on money.

In the end, the *SP* show that the question of the Standard in *PCMC* gave the occasion of two allusions to money. One was to inconvertible paper-money, but it did not survive the final redrafting. The other was to gold money or convertible paper-money, but the alluded link expressed in print has no echo in the material related to money contained in the *SP*. It seems then that we should rule out the introduction of money in *PCMC* through the Standard commodity.

There seems to be no other element in the drafts of *Production of Commodities* that could help for an inquiry about the essentiality of money in that volume. Assuming that Sraffa remained consistent with what he had written 25 years before, one may turn to the part of the *SP* where this question, as mentioned above, was discussed: the preparatory notes for the 1932 article against Hayek.

The drafts against Hayek's neutrality of money

Equilibrium, the theory of value and the theory of money

Among the notes for Sraffa (1932a) the following text written in ink is marked in pencil 'Introductory'; part of this text has been already quoted above, but it is necessary to reproduce it in full:

> A long review of a short book requires some apology: the more so that the book is a monetary one, and the reviewer is a non-monetary economist. According to Dr H[ayek] the task of monetary theory 'is nothing less than to cover a second time the whole field which is treated by pure theory [i.e. what is usually called the theory of value and distribution] under the assumption of barter, and to investigate what changes in the conclusions of pure theory are made necessary by the introduction of indirect exchange' (p. 110). This is not the common opinion, and it does not correspond to the line along which in fact the division of labour between monetary and non-monetary economists takes place. It is sufficient to refer to a standard treatise on value and distribution, e.g. to Marshall's Principles, to see that these theories are expounded directly in terms of a monetary economy: and this is true even in the case of one like Marshall who rightly or wrongly thought that the consideration of money was essential to the truth of his conclusions (see Principles, Appendix on Barter). And it is sufficient to refer to a standard book on money, e.g. Keynes's *Treatise*, to see that it is the subject matter, or the field covered, that is almost entirely different.

> The dividing line, which appears to assert itself more and more definitely, is another one. The non monetary theory studies a state of equilibrium, and the conditions which determine it: it goes as far as comparing two, or more states of equilibrium, and measuring the differences in their conditions – but goes no further. Here begins the field of monetary theory: or rather, jumping over the study of the path followed in the transition from one position to another, it sets to study states of disequilibrium. I suppose that every monetary

economist to-day regards trade fluctuations as his exclusive subject. (D3/9/181; the parenthesis in Hayek's quotation is added by PS)

This text does not appear in the published article. The *SP* give no indication about the reasons why Sraffa did not find it accurate for publication, and we are left to conjectures about the link between Sraffa's critique of Hayek and the way the concept of equilibrium was perceived by economists.[10]

Sraffa blames Hayek for departing from 'the common opinion' on two complementary aspects: on the one hand, by abstracting from money in an inquiry about value theory (contrary to the approach illustrated by Marshall's *Principles*); on the other, by attributing to monetary theory a field – value theory – which is commonly not its own (that is fluctuations, as illustrated by Keynes's *Treatise on Money*). This means that, as regards equilibrium, the novelty of Hayek's 'book [which] is a monetary one' is to study equilibrium in a moneyless economy, in order to locate the consequences of the introduction of money on equilibrium, while monetary theory, according to Sraffa, is usually concerned with disequilibrium.

Today, more than fifty years after Arrow-Debreu, Sraffa's statement would seem strange to a general-equilibrium theorist, because the method which it attributes to Hayek is precisely that advocated by this now-dominant theory of value. A modern defender of 'real business cycles' would add that fluctuations themselves are part of the theory of a moneyless equilibrium. For Sraffa, however, 'the dividing line, which appears to assert itself more and more definitely' is *inside* the study of an economy *with money prices*: the theory of value is concerned with money prices in equilibrium, and the monetary theory with money prices in disequilibrium.

Whether Sraffa describes accurately 'the common opinion' of his time beyond the scope of the present chapter. The question is rather: does he share it? We may approach this question with two preliminary remarks. First, contrasting Hayek's approach with this opinion may be powerful only inasmuch as there is no logical contradiction in the fact that 'the non monetary theory' (i.e. the theory of value) deals with money prices. Hence one may suppose that Sraffa endorses this characterisation of the theory of value. Second, this is confirmed by the fact that, at the

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[10] Panico (2001) quotes this text in full and points to changes in the concept of equilibrium occurring in the literature of the time. Bellofiore (2001) also quotes this passage and concentrates on the 'division of labour between monetary and non-monetary economists' (in Sraffa's terms).

beginning of the text, Sraffa describes himself as 'a non-monetary econo-mist'. This assertion may look surprising in a draft of the introduction to an article where most of the argument is pursued in terms of disequilib-rium and which ends up with a reference (Sraffa, 1932a, p. 53) to Keynes's *Treatise on Money* – precisely the illustration given here of 'a standard book on money'. Probably the reason for this self-labelling is that 'the reviewer' having established himself previously (in his 1926 paper of the same *Economic Journal*) in the field of the theory of value, feels the neces-sity for 'some apology' for being 'a non-monetary economist' – which means that he shares the view that although dealing with money prices, the theory of equilibrium prices is distinct from the monetary theory.

Marshall, Hayek, and the 'subjective point of view' on money

The above text suggests that Sraffa approves – against Hayek – Marshall's view that equilibrium prices are 'directly' money prices. But this approval is immediately played down by observing that Marshall 'rightly or wrongly thought that the consideration of money was essen-tial to the truth of his conclusions'. This means that Marshall may be right in considering equilibrium prices as money prices but wrong in the way he considers money when explaining why it is so. Sraffa's reference to the 'Appendix on Barter' in *Principles of Economics* provides the clue of this statement.

 The central topic of this appendix is the relation between equilibrium and money prices: Marshall examines the formation of the equilibrium price in a barter between apples and nuts and shows with different examples that the result will depend on the particular conditions of the exchange, so that 'in each case *an* equilibrium would be attained, but not *the* equilibrium' (Marshall, 1920, p. 653; italics in original). The reason is the following:

> This uncertainty of the rate at which equilibrium is reached depends indirectly on the fact that one commodity is being bartered for another instead of being sold for money. For, since money is a general purchasing medium, there are likely to be many dealers who can conveniently take in, or give out, large supplies of it; and this tends to steady the market. (Marshall, 1920, p. 654)

And Marshall concludes:

> The real distinction then between the theory of buying and selling and that of barter is that in the former it generally is, and in the latter it generally is not, right to assume that the stock of one of the things which is in the market and ready to be exchanged for

the other is very large and in many hands; and that therefore its marginal utility is practically constant. (Marshall, 1920, p. 654)

Three propositions may be inferred from these quotations: (i) considering that the theory of value deals with money prices is important for the determination of equilibrium, because the uniqueness of *the* equilibrium is only guaranteed if the process of formation of the price has no influence on it (no path-dependency); (ii) what in barter impairs the uniqueness of the equilibrium price is the fact that, during this process (hence in disequilibrium), the marginal utility of each good varies; therefore, the condition for avoiding this difficulty is to ensure that one of the objects of the exchange has a constant marginal utility; and (iii) money performs that condition, because its character of 'general purchasing medium' makes it abundant in the market.

Now, which of these propositions is endorsed by Sraffa? On the one hand there must be something true in Marshall's position if Sraffa wants to use it as a weapon against Hayek, and on the other hand the reserve expressed towards that position by the words 'rightly or wrongly' should not concern 'the truth of his conclusions' – which Sraffa had strongly rejected in his 1925 and 1926 articles – but the fact that 'the consideration of money was essential' to it. Proposition (i) is consistent with the general line of argument used against Hayek in the 1932 article. Sraffa does not criticise Hayek for extending the theory of value to that of fluctuations, but rather for depriving money from any role in either field:

It is one of the merits of H[ayek] that he shifts the centre of interest away from the fluctuation in the general price-level […]. He is right to emphasise the importance of 'relative prices', rate of interest, and production on trade fluctuations. But this shows that his book has nothing to do with the theory of money: on the contrary it is an attempt to show how the general theory of value and distribution is not merely a study of equilibrium but can be extended to trade cycle. On top of this he puts money: which, all the work having been done, must be 'neutral'. Is this a theory of money? (D3/9/89)

Moreover, in mocking the multiple-equilibria solution advocated in Hayek's reply to his article,[11] Sraffa's rejoinder (1932b) suggests the importance that he gives to the uniqueness of equilibrium defended by Marshall. But the fact that he shares proposition (i) does not imply

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[11] Hayek (1932). This solution was later called by the self-proclaimed Hayekian Ludwig Lachmann 'a fatal concession' (Lachmann, 1986, p. 237; quoted by Caldwell, 1995, p. 39n).

that he endorses propositions (ii) and (iii), that is the reason why this uniqueness is jeopardised in barter and the way it is ensured in monetary exchange. Both propositions in Marshall rely on the adoption of the marginal-utility concept in monetary theory. This adoption reflects a 'subjective' point of view, rejected by Sraffa in his attacks against Hayek:

> Dr H. moves from the 'decisions of individuals' (p. 4) as to how much to save. This is natural enough for one who boasts of taking a 'subjective' point of view, and *claims to extend the application of this method to monetary economics*. Although the present reviewer strongly disagrees with this view,[12] the reader will be spared the interminable methodological disquisition that would be appropriate to the occasion. The object will be more simply attained by following H. in his argument and attempting to disentangle the jumble of contradictions into which he is led. (D3/9/22; emphasis added)

This critique is repeated later on in the *SP*:

> H. wants to introduce subjective method in money. Therefore we must start from 'decisions of ind.[ividuals]'. But he cannot make up his mind as to *which* individuals take these decisions. (D3/9/25; emphasis added)

The *SP* allows for drawing a first conclusion: against Hayek, Sraffa agrees with Marshall on the point that the theory of value deals with equilibrium money prices, but he disagrees on why such equilibrium prices should be money prices. This disagreement is, for the time being, purely negative: the reason why money prices are the only ones to fulfil the condition to be equilibrium prices is *not* the constancy of the marginal utility of money. This rejection was part of Sraffa's critique of both Marshall and Hayek for their adoption of a 'subjective point of view' on money. Although this may look like a digression, it remains useful to ask how Sraffa's view relates to the modern subjective (i.e. microeconomic) approach to money; this implies looking at the way he considered forward markets.

Money and forward markets

In his 1932 article, Sraffa introduced the concept of commodity-rate of interest, defined as the interest rate on money plus the difference (in percentage) between the spot and the forward prices of the commodity

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[12] The whole passage is written in ink, but above the word 'view' is added in pencil: 'which?'.

(Sraffa, 1932a, p. 50). Forward prices are then explicitly considered in the framework of a monetary economy. This method is in striking contrast with the modern general-equilibrium (Arrow-Debreu) approach in which the assumption of a complete system of contingent forward markets is *alternative* to the existence of money, raising the main obstacle to the so-called 'integration' of money in the theory of value. Under such an assumption, all transactions are contracted at the same date, whatever the dates at which the commodities will be delivered, to then be cleared through a centralised system of accounts. Since this procedure rules out money,[13] various solutions have been suggested 'to find an alternative construction without thereby sacrificing the clarity and logical coherence that are such outstanding features of Arrow-Debreu' (Hahn, 1981, p. 1), including the assumption that forward markets are missing or too costly for some of the commodities, so that their trading takes place sequentially and money might enter the picture.

The rough notes for the 1932 article contained in the *SP* testify to the fact that, nearly thirty years before Debreu's 1959 *Theory of Value*, Sraffa was conscious of the contradiction between *complete* forward markets and money:

> If money did not exist, all effects would be identical as if there were perfect forward markets for all commodities. In this case, money would not be stand.[ard] of d.[eferred] p.[ayments], because everybody would hedge. (D3/9/44)

Fifty years before Hahn, sequential trading was considered by Sraffa as characteristic of a monetary economy:

> The use of money as a 'medium of exchange' cannot go without its being 'a standard of deferred payments' or a 'store of value', two attributes which are included in the above: this is obvious if money transactions succeed each other in time; and if they are simultaneous, they must be cleared against each other and no money is required. (D3/9/104)

Still more, the modern problem of a zero-price for money when the horizon is finite (Hahn, 1981, p. 5) was anticipated by Sraffa in relation to the question of hoarding.

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[13] 'The most serious challenge that the existence of money poses to the theorist is this: the best developed model of the economy cannot find room for it. The best developed model is, of course, the Arrow-Debreu version of a Walrasian general equilibrium. A world in which all conceivable contingent future contracts are possible neither needs nor wants intrinsically worthless money.' (Hahn, 1981, p. 1)

Sraffa on money and hoarding

In a notebook dated 'Lent term, 1928', Sraffa tested several arithmetic examples of relations between sectors of production in a no-surplus economy, a method which would eventually lead to *PCMC*. On a page entitled 'Hoarding of money in no-surplus', he wrote:

> In the case of no-surplus, instead of barter, we might assume monetary exchange. The money would be used during market day, but what would happen to it during the rest of the year? It would be necessary to assume that the farmers want to hoard: this would be used as an insurance fund against crop failures for the individuals, but of course not for society. *If we did not assume hoarding, the money would dwindle in value during market day, since every one would be trying to get rid of it before the end of the day*. The same result might be reached through a clearing home, for book credits between buyers and sellers: of course everybody ought not to leave the markets with any credits or debts. (D3/12/10/27; emphasis added)

One recognises here the two options offered by modern general-equilibrium theory for the realisation of exchange: either a centralised clearing system, based on the constraint that every account should be balanced at the end of each trading period, or a decentralised means of exchange, which requires that some agents still have a demand for it at the end of the trading period. Does that mean that Sraffa shares this way of handling money in a theory of the market economy? To answer in the negative, it is necessary to go back to Sraffa's critique of the 'subjective' point of view on money, as it is developed in his notes for his 1932 article against Hayek.

Hoarding and Hayek's neutral-money rule

Sraffa discussed hoarding in a long text that did not find its way to publication in the 1932 article although it went into the form of a typescript.[14] An extract of this text reads as follows:

> Now in our [Hayek's] case it is expected that, in the final equilibrium, the prices of all commodities will be lower in terms of money,

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[14] This text of nearly ten pages (catalogued as D3/9/160–9) is a 'discussion [of] the period of transition in the case of voluntary saving, under his [Hayek] conditions of a constant monetary circulation' (D3/9/161), more precisely a refutation of 'the curious argument by which Dr Hayek tries to prove that his policy of keeping the quantity of money constant is the only possible method of equalising the equilibrium (or natural) rate and the money rate' (D3/9/164). Sraffa

though in various degrees, than they can be at any moment during the period of transition; consequently, during that period, all forward prices of commodities will be lower than their spot prices, in other words the rate on money loans, in the market, must be lower than the natural rate on *any* other commodity. [...]

Now, this market rate, far from being identical with the expected ultimate equilibrium rate, is only very remotely related to it. In fact, if the <u>expected</u> fall of prices is big enough the market rate may easily fall to zero; it cannot become negative, simply because money not being perishable, it can be hoarded. But if all the money issued by the banks goes into hoards, as it certainly will if a zero rate of interest is not sufficient to counterbalance the <u>anticipated</u> fall in prices, the task of the banks in attempting to maintain the quantity of money multiplied by its velocity constant, become[s] impossible; unless indeed they are prepared to subsidise borrowers on condition that they use the proceeds to purchase producers' or consumers' goods, which amounts to reducing the rate of interest to a negative level (in this case they would <u>charge</u> a similar rate on deposits). (D3/9/165–7; Sraffa's underline)

When a deflation of prices is expected for all commodities, the demand for bank money to purchase goods falls to zero, hence also the money rate of interest. Only a negative rate could 'counterbalance the anticipated fall in prices', but this cannot happen since 'money not being perishable, it can be hoarded'.[15] Hayek's neutral-money rule breaks

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added in pencil on the typescript: 'To refute the argument it will be sufficient to find the rate of interest which keeps the quantity of money constant, and to show that it has no relation to the final equilibrium rate' (D3/9/165). One may think that the whole text was eventually deleted by Sraffa because he contented himself to show that, during the transition, there was no single 'natural' rate to which the money rate might be equated, so that it appeared redundant to show that, again *during the transition*, the money rate could not be equated to the *final* equilibrium rate, even 'supposing it is known from the start' (D3/9/147: 6).

[15] By contrast, in a moneyless economy, the rate of interest on perishable goods can become negative, because their owners, when they have no immediate use of them, are ready to subsidise borrowers in order to get the goods back later, rather than let them go to waste: 'If no money (nor other stand.[ard] of def.[erred] pay.[ments]) there would be no single rate of interest. Every article would be lent at a different rate, pos.[itive] or neg.[ative]. Perishable arts. [articles] might be lent at enormous neg.[ative] rates. Cp. commodity markets: only, this would be extended to every article' (D3/9/42). This passage (in the margin of which are two vertical lines in red pencil) is immediately followed by the above passage on 'perfect forward markets for all commodities' (D3/9/44; there is no D3/9/43).

down, since 'all the money issued by the banks goes into hoards' (unless banks pay borrowers and oblige them to spend the money lent, but this would imply a *de facto* negative rate of interest, which in any case would not be equal to the final equilibrium rate).

Two remarks can be made on this passage. First, it is part of Sraffa's internal critique to Hayek, and, for the sake of argument, it adopts a 'subjective point of view' on money, based on the behaviour of agents towards hoarding. Second, the same example of a general deflation of prices was considered by Sraffa five years later in his critique of Keynes's *General Theory*, and the *SP* are also useful in this context to specify how Sraffa dealt with the concept of hoarding.

Hoarding and the limitation of output in Keynes

It is no surprise that most of Sraffa's comments and annotations on *General Theory* refer to Chapter 17, where Keynes mentions Sraffa's 1932 article to introduce his own use of the 'own-rates of interest' of durable commodities (Keynes, 1936, p. 223n.). A general deflation of prices is evoked by Sraffa in the following comment of what he calls 'the Keynes case':

> What K.[eynes] ought to have spoken of throughout (e.g. [page] 229 [of *General Theory*] top) is *marg.*[inal] *efficiencies* of various articles, and not their rates of interest. Then, if there is one article the marg. eff. of which never falls below say 5% (this being the valuation of the pleasure people derived from hoarding *any* quantity of it) the production of all other durable assets will stop when their stocks are such that marg. eff. has come down to that level – for otherwise they could not be sold at cost – and all resources saved will be used for producing the hoardable asset. If this asset cannot be produced (paper money), its demand will increase and can only be met by a continuous rise in its value, i.e. fall in general prices. If this hoarding is expected to go on steadily, and all prices are expected to fall in terms of money, the result will be that all own rates of interest of commodities will be higher than the money rate (this is Fisher's case: and the expected appreciation or depr.[eciation] is the only possible cause of divergence in rates of interest).
>
> Thus in the K. case, the result on rates of int.[erest] is opposite to K's conclusion. (*SP* I 100/11)

Again for the sake of argument, Sraffa accepted Keynes's assumption that there exists such a behaviour explaining the level of the rate of interest on money by 'the valuation of the pleasure people derived

from hoarding *any* quantity of it'. In 'the Keynes case' which is at the heart of Chapter 17 of *General Theory*, all durable assets other than money are produced as long as their own-rates of interest are above the money rate of interest; but since these own-rates of interest tend to fall when production increases, investment stops when the own-rate of interest which declines most slowly (here the supposedly fixed rate of interest on money) becomes *higher* than the own-rate of interest of any asset:

> As output increases, own-rates of interest decline to levels at which one asset after another falls below the standard of profitable production; – until, finally, one or more own-rates of interest remain at a level which is above that of the marginal efficiency of any asset whatever. (Keynes, 1936, p. 229)

The argument may be summarised in the following way. If i_k is the own-rate of interest of the durable asset k and i_m is the money rate of interest, k is produced as long as $i_k > i_m$. The increase in production lowers i_k and the same occurs for every asset until:

$$i_k < i_m \ \forall k \tag{7.1}$$

Then production stops for all k and money is hoarded.

For Sraffa, however, the fact that in that case money becomes the only asset still demanded means that, since 'it cannot be produced' – an assumption made by Keynes at this stage of his argument[16] – this higher demand is translated into 'a continuous rise in its value, i.e. fall in general prices'. This general deflation is the case which Sraffa had already discussed in the *SP* about Hayek (see above), that is one in which 'the rate on money loans, in the market, must be lower than

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[16] Money differs from other assets in that it does not result from private decisions; hence its own-rate of interest cannot decline, by contrast with the own-rates of other assets, which one after the other fall to the unchanging level of the own-rate of money. Six pages later, Keynes concludes the argument by emphasising the necessity to 'produce' money, not on a private basis but publicly, in a way consistent with an appropriate (full-employment) rate of interest on money: 'Unemployment develops, that is to say, because people want the moon; – men cannot be employed when the object of desire (i.e. money) is something which cannot be produced and the demand for which cannot be readily choked off. There is no remedy but to persuade the public that green cheese is practically the same thing and to have a green cheese factory (i.e. a central bank) under public control' (Keynes, 1936, p. 235).

the natural rate on *any* other commodity' (D3/9/166; Sraffa's italics). In Sraffa's terms, a general deflation means that the spot price is above the forward price for all commodities, and the rate of interest on money is thus *lower* than the rate of interest on any commodity.

Formally, the interest rate i_j of commodity j (whether durable or not) being defined as $i_j = i_m + [(p_j - f_j)/p_j]$, with i_m the money rate of interest, p_j the spot price of j, and f_j its forward price, since a general deflation means $p_j > f_j$ for all j, then:

$$i_j > i_m \; \forall j \tag{7.2}$$

The comparison between Equations (7.1) and (7.2) shows the contradiction highlighted by the end of the above quotation from Sraffa's manuscript: 'Thus in the *K*. case, the result on rates of int.[erest] is opposite to *K*'s conclusion.'

How was such a contradiction possible? The explanation was given by Sraffa at the beginning of the above extract: 'What Keynes ought to have spoken of throughout [...] is *marginal efficiencies* of various articles, and not their rates of interest.'[17] For Sraffa, the concept of own-rate of interest used by Keynes was not the one that he himself had used in his 1932 article, in spite of Keynes's reference at the beginning of chapter 17.[18] A consequence of that difference was that Keynes's concept only applied to durable assets, while Sraffa's one applied to any commodity, durable or not, for which a forward market existed.

Another comment by Sraffa on 'the Keynes case' is worth noting. In the same page 229 of *General Theory* already mentioned, Keynes insisted on the fact that the rate of interest which 'sets the limit of the rate of output' is 'that asset's rate of interest which declines most slowly as the stock of assets in general increases' (Keynes, 1936, p. 229) – not necessarily the money-rate of interest:

> If by *money* we mean the standard of value, it is clear that it is not
> necessarily the money-rate of interest which makes the trouble. We

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[17] See also, about the notions used by Keynes: 'Sect. II. [of *General Theory*, chapter 17] Entirely different definition of rates of interest. These are marginal productivities. Confusion of lumping two def.[initions] together in own rates of own interest' (*SP* I 100/6 ; underlined by Sraffa).

[18] This raises the question of the consistency between two different definitions of the own-rate of interest, both of them being present in Chapter 17 of *General Theory*. This question was central in an exchange of letters between Keynes (on 8 September 1936) and John Hicks (on 16 October 1936); see Keynes (1973, pp. 76–8).

could not get out of our difficulties (as some have supposed) merely by decreeing that wheat or houses shall be the standard of value instead of gold or sterling. For, it now appears that the same difficulties will ensue if there continues to exist *any* asset of which the own-rate of interest is reluctant to decline as output increases. It may be, for example, that gold will continue to fill this rôle in a country which has gone over to an inconvertible paper standard. (Keynes, 1936, p. 229; Keynes's italics)

Later in Chapter 17, Keynes observed that

it is conceivable that there have been occasions in history in which the desire to hold land has played the same rôle in keeping up the rate of interest at too high a level which money has played in recent times. (Keynes, 1936, p. 241)

Sraffa objected strongly these statements:

It is <u>only</u> liquidity preference in the case of the standard of value that has any importance for employment: and not for anything (such as land) as K. says p. 241 – If people, as they save, wanted to hold more land, for the sake of the prestige and independently of its return in product, this would have no important effects: the price of land would rise, but prices, employment and investment would be unaffected. (*SP* I 100/8; underlined by Sraffa)[19]

Again, Sraffa adopts Keynes's point of view to show the wrong conclusion to which it leads: *if* liquidity preference prevents the rate of interest on money from falling, *then* it only sets a limit to investment in 'the Keynes case' because money is the standard of value. This does not mean for Sraffa endorsing the liquidity-preference theory of the rate of interest; but it nonetheless draws attention on the importance of money as a standard of value.

Sraffa's comments in the *SP* on hoarding of money in Hayek and in Keynes suggest three conclusions. First, Sraffa does not endorse the

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[19] As far as I know, the first to have stressed this point in a published work is Nicholas Kaldor 25 years later: '[The rate of interest on money] does so [limits output] solely by virtue of its serving as a standard of value. If any other asset – say apples – were chosen as a standard of value, it would automatically acquire this property' (Kaldor, 1960, p. 70).

view that the analysis of money should be based on the existence of a behaviour towards hoarding it; on the contrary, he shows that both Hayek and Keynes are driven into contradictions when they consider such a behaviour. Secondly, Sraffa's remark that the *possibility* to hoard money prevents it from having a negative rate of interest does not imply that the *desire* to hoard money may explain a positive rate of interest. A corollary is that the definition of money does not rest for Sraffa on its durable (non perishable) character. Thirdly, this raises the question of the relation between money as a *standard* of value and as a *store* of value: it invites to clarify the above quotation from the *SP*: 'The use of money as a "medium of exchange" cannot go without its being "a standard of deferred payments' or a 'store of value"' (D3/9/104).

Which monetary economy? Money as the means of exchange and the standard of deferred payments

Sraffa's critique of the own-rate of interest in Keynes helps to understand that for him the store-of-value character of money is only a corollary of its being the standard of deferred payments, and has nothing to do with its being an asset owned in and of itself. The following extract belongs to the same comments of *General Theory* as above:

> P. 228 last para.[graph of General Theory]

> The idea that the advantages of possessing a given article have something to do with the own rate of *that* article, leads to this extraordinary paragraph.

> To understand it, notice that the underlying assumption is that people borrow an article in order to *keep it* and enjoy its advantages (liquidity for money, use for house, carrying costs for wheat) and therefore he [Keynes] has in mind permanent assets. But in fact people borrow money for parting from it, and buying things: the thing they borrow is, not what they want to use, but the standard in which they fix their debt: thus they might borrow fresh fish for 100 years, although it has neither liquid.[ity] pref.[erence], nor use at so much per annum – and it would have almost infinite carrying costs. (*SP* I 100/11)[20]

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[20] This statement is repeated in another comment: 'From the whole treatment of this section, from the examples he gives (houses – use; money – liq. pref.; wheat – carry cost) it is obvious that K. has in the back of his mind two wrong notions, which have entirely misled him: (i) that commodities are borrowed for holding them till the end of the loan; (ii) that only durable articles can therefore be borrowed – But in fact it is as convenient to make a loan of fresh fish for 100 years, as it is to make it of gold' (*SP* I 100/9).

Does it mean that, although the 'standard in which [to] fix [one's] debt' has nothing to do with an asset in which to own one's wealth, in both cases it is a matter of choice, hence they imply a 'subjective point of view'? Going back to the 1932 article allows answering in the negative. Borrowing 'fresh fish for 100 years' is the same behaviour as the cotton spinner borrowing cotton for three months by simply purchasing it spot (with money borrowed) and selling it forward (for money). The choice may only be to switch from the social standard to a private one; but the social standard (money) rules since it is 'the standard in terms of which debts, and other legal obligations, habits, opinions, conventions, in short all kinds of relations between men, are more or less rigidly fixed' (Sraffa, 1932a, p. 43).

This 'fixity' is more lengthily evoked by Sraffa in the following draft:

> It is impossible to avoid prefacing a discussion of neutral money, without analysing however briefly what is the essential feature which distinguishes any monetary from [what] may be called a non monetary economy. This I should describe as the existence of 'monetary constants'. They may be debts or any other legal obligations, habits or fixed decisions of individuals of the kind predilected by H.[1] (D3/9/49)[21]

According to Sraffa, the lack of consideration by Hayek for these 'monetary constants' explains why his neutral money is so evanescent:

> Now, in his discussion, Dr H. never takes into account these monetary constants. He speaks of flows of money, and of monetary debts and credits; but never supposes that their existence may cause people to act differently, e.g. in the case of a steady general fall in money prices, from how they would have acted if no one were in possession of money and debts were fixed in various commodities. [...] Now we might ask, whether the 'monetary constants' referred to above are in terms of this money, or not; and if yes, how can it

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[21] The superscript (1) after 'H.' refers to the extract quoted above (D3/9/104; above p. 155): '(1) The use of money as a 'medium of exchange' cannot go without its being 'a standard of deferred payments' or a 'store of value', two attributes which are included in the above: this is obvious if money transactions succeed each other in time; and if they are simultaneous, they must be cleared against each other and no money is required'. This extract has been catalogued under the number D3/9/104 at the end of the file folder (1), but it is a slip of paper which matches perfectly the bottom of document D3/9/49, which had been cut.

be indifferent for a debtor, when the money price of wheat falls, whether his debt is fixed in money or wheat. (D3/9/50)

Under the critique of Hayek a positive statement shows up: as a standard of deferred payments, money is essential, since it 'may cause people to act differently' from how they would act if 'debts were fixed in various commodities'. But this essentiality of money is not just the contrary of the neutrality assumed by the 'subjective point of view' of money: it is not the consequence of a choice made by the agents but one of the 'constants' defining the kind of economy in which they behave. Money as a standard of deferred payments in Sraffa contrasts then with money as a store of value in the 'subjective' approach: it is not chosen as an asset, because it is neither an asset nor something to be chosen.

   To which domain does this 'constant' belong? The answer to that question has probably something to do with the distinction made elsewhere by Sraffa about 'cost', between 'natural economics' and 'institutional economics'.[22] If the 'monetary constants' belong to institutions, then money in *PCMC* may at the same time be essential and outside the 'natural' system of production.

Concluding remarks

This exploration of the *SP* to clarify the question of the essentiality of money in *PCMC* has first stressed the existence of a two-tier approach to money in Sraffa. The usual insistence on the way money affects prices in *PCMC* through the influence of the money rates of interest on the rate of

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[22] See for example D3/12/11/98 (*Notebook*, November 1927): 'Cost is <u>means</u> not <u>inducement</u>. The <u>possibility</u> to produce depends upon the absolute real size of the remuneration: there is no trick possible, it is a physical material necessity. The <u>willingness</u> to produce depends upon the way in which payment is made: time wages or piece wages, premiums etc. (which can be deducted from initial wage, so as to make the total wage equal to physical necessaries), payment conditional upon delivery of the goods (Robertson, in Economica) etc. it is a psychological necessity only, and can be overcome by tricks, cheating, etc. P.T.O. Cost in the sense of <u>means</u> belong to <u>natural economics</u>, i.e. they are equal in all forms of society, and are independent of institutions. Cost in the sense of <u>inducements</u> belong to <u>institutional economics</u>, they vary according to "social standards", examples, envy, desire for equality, for rising in social standing etc. (slavery, wage earners, managers, politicians, artists, all have the same physical needs, but require varying inducements) (<u>Means</u> are habitual necessaries, as Ricardo says, i.e. physical since that habit is physical; <u>not</u> conventional necessaries, as Marshall says – these are psychological and therefore are part of inducement, not of possibility)' (Sraffa's underlines).

profits may only show up at a second level of the analysis – the only one explicit in *PCMC* since the Standard commodity must be ruled out as a candidate for giving a role to money. But there is another level of analysis – this one subterranean – which is logically prior: the one that studies the characteristics of money which make it essential, that is explain why prices are money prices. The Sraffa Papers provide some hints of what it could have been, had Sraffa committed himself more in print on the question of money than he did in his 1932 article against Hayek.

The drafts of that article show that Sraffa drew an opposition between Hayek's notion of neutral money and a tradition illustrated by Marshall, where all the theoretical propositions – including the ones relative to value and distribution – referred to a monetary economy. But Sraffa also strongly rejected the way this tradition explained the essentiality of money, that is its treatment from a 'subjective point of view'. This led him to show the contradictions into which both Hayek's *Prices and Production* and Keynes's *General Theory* were driven when hoarding of money entered the picture. If the store-of-value function of money was then excluded as foundation of its role in a monetary economy, the *SP* finally suggest that, according to Sraffa, money should be defined as the means of exchange and the standard of deferred payments, and as such belongs to the institutional domain of the 'monetary constants'.

One may then understand that, even if prices in *PCMC* should be considered as money prices, money stays outside the price system. As a means of exchange, money can have no role in a framework leaving aside the process by which prices are 'adopted by the market' (Sraffa, 1960, p. 3) and respecting the 'dividing line' between the theory of value (whose task is to determine equilibrium prices) and the theory of money (whose task is to study disequilibrium prices). As a standard of deferred payments, money can have no role in the static framework of *PCMC* which ignores debts. There lies the ambiguity of money in *Production of Commodities*: prices are money prices but money, as it is defined in the Sraffa Papers, does not affect them. This ambiguity is however consistent with Sraffa's project to separate, in the determination of the system of prices, what is 'natural' from what is 'institutional'.

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8
The Positive Surplus Hypothesis: Social versus Physical Objectivity

Jean Cartelier

Introduction

The study of Sraffa's unpublished papers has revived interest in *Production of Commodities by Means of Commodities* (*PCMC*).[1] The process of its elaboration is better understood now than before and many efforts have been devoted to its epistemology. An outstanding contribution is that of Kurz and Salvadori (2005) who insist on Sraffa's *objectivism* and its evolution after 1931, a crucial year indeed. They show clearly how this evolution is linked with Sraffa's *tâtonnements* in his quest for an objective and scientific theory of prices. More recently, John Davis (2012) has extended Kurz and Salvadori's discussion to philosophy of sciences more generally conceived.

Here is not the right place to summarise all the points and propositions of these authors. But it is necessary to present the reader with certain of the most important in order to discuss some conditions necessary for an objective theory of price. This is the purpose of the present chapter.

The most important of these points are as follows:

(1) Sraffa radically opposed the subjectivism of neoclassical theory and grounds his own theory on physical quantities as being both measurable and objective quantities of commodities produced and used in production. Consequntly prior to 1931 the notion that Sraffa emphasises is *physical real cost*.

> Sraffa put forward the view that production involves 'destruction' and that the 'real cost' of a commodity consists in the commodities

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actually destroyed in the course of its production. (Kurz and Salvadori, 2005, p. 417)

Consequently Sraffa at this time considers the labour theory of value advocated by Smith and Ricardo as a deviation from the correct path initiated by Petty.

(2) Yet as a result Sraffa encounters a difficulty with the notion of surplus. By construction quantities of commodities produced beyond quantities of commodities used in production cannot be explained in terms of *physical real cost*. Sraffa is well aware of the contradiction between an explanation in terms of a physical real cost and the hypothesis of a positive surplus:

> This is the great difficulty: the surplus is the object of the inquiry, but as soon as it is explained, a cause is found for it, and [it] ceases to be a surplus. This sounds as if the object of the inquiry had been defined as 'the unknown', but if the inquiry is successful it becomes known, + the object of the inquiry ceases to exist! (D3/12/7/161: 3–4, quoted in Kurz and Salvadori, 2005, p. 432)

Sraffa decides then to consider his economic system as open which allows events taking place 'outside' of the system to influence prices. Existence of a surplus implies an inducement of capitalists not to de-accumulate and hence consume their circulating capital as luxury goods:

> These absolute values *with* surplus are no more what is necessary to *enable* to produce [a given amount of commodity] A, but what is necessary to *induce* to produce A. (D3/12/6/11, quoted in Kurz and Salvadori, 2005, p. 431)

(3) Sraffa is obliged to introduce a mental phenomenon into the framework conceived so far as a strictly physical one. And here a philosophical problem arises as indentified by Davis (2012). According to him, the solution adopted by Sraffa is to enlarge his view about objectivism. Davis shows that Sraffa is a non-reductionist but is less certain about whether any mental alteration of an object must be accompanied by a physical one. He suggests that Sraffa's distinction between basic and non-basic commodities gives a clue to that question:

> The value of luxury goods includes a subjective element, but alteration in their value must be accompanied by alteration in the value of basic goods used up in their production. (2012, p. 1349)

Davis concludes:

> [Sraffa] saw a need to expand his objectivist point of view along lines that anticipated some of the ways in which philosophers have since explored reinterpreting physicalism. (2012, p. 1347)

(4) The possibility of wage-earners getting a fraction of the surplus is the most visible influence coming from 'outside'. According to Kurz and Salvadori this is the origin of the rehabilitation of the quantities of labour and of the possible expression of prices in terms of dated quantities of labour in which such quantities determine the distribution of the fraction of the surplus going to wage-earners among industries.

The aim of this chapter is not to discuss the different points above *per se* but to raise a closely related question: does it make sense to look for an objective theory of price, and if so what kind of objectivity can we claim? It is this question that Kurz and Salvadori have in mind when they take over Sraffa's question of:

> which kind of quantities could in principle be taken as given in order to determine some other quantities. (Kurz and Salvadori, 2005, p. 426)

Here the possibility of an objectivism *à la* Sraffa is put into question. At the heart of Sraffa's epistemological position is a desire *to explain*, that is to reveal the causal chain starting from an objective basis (the technique) and ending in an objective phenomenon (the natural prices). The point here is that a preliminary question should first have been addressed: *what are the conditions for objectively observing the technique taken as a starting point?* Contrary to what may appear at first sight, we claim that the objectivity in *PCMC* is neither physical nor material, but rather *social*. The 'man from the moon'[2], supposed to be able to observe physical phenomena only, cannot 'see' the technique that Sraffa takes as his objective starting point. The given 'technique' of *PCMC* is conditional on assumptions regarding the social conditions of production. Not only a market economy has to be presupposed but also whether producers are independent or not. The positive surplus hypothesis does not make sense unless a portion of the individuals populating the economy are supposed to be wage earners working for a separate portion of individuals called entrepreneurs. It is quite possible to express the

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[2] Archived as D3/12/7/87; see Bellofiore's chapter below, p. 235, note 16 for passage.

social objectivity at the root of the positive surplus hypothesis without physical commodities but only monetary relations, with money being (in an accounting sense) the most obvious and specific example of the said social objectivity.

Of what kind is *PCMC's* objectivity: physical or social? 'Technique' and social organisation

At first sight, *PCMC*'s starting hypothesis appears to be free of any ambiguity: a given technique is described as the relation $A \rightarrow I$ between two irreducible square matrices of quantities of commodities A and I respectively used as means of production and produced output, where A is the matrix of inter-industry coefficients for single-product industries and I is the identity matrix whose principal diagonal is unity and the off-diagonal elements are zero. Nothing seems to prevent a 'man from the moon' from measuring such physical quantities, all being measurable and objective. However, it is not however so simple.

Chapter I's two first sentences read as follows:

> Let us consider an extremely simple society which produces just enough to maintain itself. Commodities are produced by separate industries and are exchanged for one another at a market held after the harvest. (Sraffa, 1960, p. 3)

In a given economy, if $\underline{x}$ and x are the vectors of the quantities of commodities available respectively before and after production, the first sentence suggests only $\underline{x} \rightarrow x$ (with $\underline{x} = x$) as the appropriate description of the technique. Such a description would be sufficient if it were not for the second sentence which implies that commodities circulate according to *market prices*. It is the need for a determination of prices that commands a description of the technique, where separate industries (in the same number as as commodities) produce one or several types of commodities. Sraffa's technique makes sense only in a theory of a market economy. In a domanial economy things would be different. Production and circulation of goods would be ruled by '*les humeurs, les modes et les façons de vivre du Prince, et principalement des propriétaires de terres*'[3] and no longer by the market. In such an economy *à la* Cantillon where domains are managed by landlords, it would be necessary to explicitly assume something about returns to make clear

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[3] Cantillon (1755, p. 33).

the manner in which landlords allocate their available global inputs among the different industries, given their desired final production.[4] *There is no physical description of the technique of an economy independent from a specific problem to be solved, the problem depending on the social framework.* In other words there is no objective technique observable by the 'man from the moon' for observing only physical objects.

Considering only the case of single-product industries, the fact that Sraffa considers a market economy is responsible for the specific technique he takes as given: each type of commodity is produced by a single industry, the number of industries being equal to the number of commodities: if A is the matrix of a_{ij}, representing quantities of commodity i necessary for the production of a given quantity of commodity j (taken as the physical unit of that commodity), the technique can be expressed by $A \rightarrow I$ where A is non-negative and irreducible (all commodities are basic) and I the unit matrix. The assumption of strict reproduction (Sraffa's production for subsistence) imposes $s' \equiv e'(I - A) = 0$, where e' is the unit (row) vector and s' is the (row) vector of physical surplus product. Prices, called *natural prices* in the classical tradition, represent the solution to the system of equations:

$$Ap = p \tag{8.1}$$

Equation (8.1) has the unique solution p^* up to a scalar factor and prices are relative and not absolute.

The brief and partial summary of particular points above raise doubts on the *physicalism* attributed to Sraffa; not on his convictions as expressed in his papers, but rather on the *physicalism* of *PCMC* itself as distinct from his own opinions and, more generally, on the *physicalism* of any theory of price. Indeed, the objectivity of the starting point of *PCMC* is not physical but *social*: assumed here is not *only* a certain state of the material world but *also* a certain type of social organisation.[5] This is not *per se* a

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[4] Sraffa excludes such assumptions for *PCMC*:

> The investigation is concerned exclusively with such properties of an economic system as do not depend on changes in the scale of production. (Sraffa, 1960, p. v)

[5] A certain scepticism is in order concerning the alleged 'physical' nature of commodities in economic theory since there goods are considered as mere dimensions of Euclidian space. No lack of relevance should be inferred from this observation, no more so than from the fact that things are considered in pure mechanics as mere material points to which forces apply. In both cases we should not confuse theoretical categories (either in physics or in economics) with categories used in our daily life. The 'man from the moon' does not see material points but things. He does not see techniques either.

critique of *PCMC*. Sraffa explicitly reasons in a market economy. As such this is not problematic except that the social objectivity in chapter I of *PCMC* may appear as a necessary requirement for the assumption of zero surplus. So far, it is only for a market economy where producers are differentiated only by the commodity produced that the observed technique has the form $A{\rightarrow}I$ with $s' = 0$. It is not by fluke. As it will appear now, it is a straight consequence of the homogeneity of individuals as producers. Contrary to what a strict *objectivism* would suggest, some social conditions orient or determine a 'physically objective observation'. This is the case for the hypothesis of a positive surplus.

A social condition for observing a surplus

What are the conditions allowing an external observer, capable of looking at physical reality only, to decide whether the observed economy generates a surplus? How is it possible to 'see' that the technique is $A{\rightarrow}I$ such that the (row) vector of physical surplus product contains at least one positive element, i.e. $s' = e'(I - A) > 0$?

Consider a market economy where each industry is owned and operated by an independent producer. Assume that the 'man from the moon' observes a particular process of production, say a cabinet-maker producing a table. For the observer to decide whether the commodities used by the producer, either in his workroom or at home, are necessary for the production of the table, it must be ascertained whether the independent cabinet-maker really needs to go to theatre and/or drink an excellent Burgundy wine. Neither morality nor common sense provides relevant criteria for solving that problem. There are no objective criteria involved in this decision except market prices. If market prices are such that the cabinet maker can afford drinking Burgundy wine and going to the theatre, Burgundy wine and the theatre must be considered as objectively and socially necessary to the production *of tables*. Society as a whole recognises through the market process that the cabinet-maker's consumption is economically necessary and well-founded. It would be non-sensical to ask: would not the cabinet-maker be able to produce tables without drinking Burgundy wine and drinking only water? The answer to which is: yes he could! But if this is not observed then it must not be mentioned.

But *market prices* are not *natural prices*, a fact of which Sraffa is well aware. Relevant prices for his theory are not natural prices *sans phrase* but *natural prices validated by the market*:

> There is a unique set of exchange-values which if adopted by the market restores the original distribution of the products and makes

it possible for the process to be repeated; such values spring directly from the methods of production. (Sraffa, 1960, p. 3)

In a market economy where producers are independent in the sense that they work on their own account, it is impossible to observe a surplus. Social conditions are such that no surplus can be objectively observed. All commodities sold in the market are socially necessary for production no matter whether they are consumed in producers' workplaces (let us denote them by A_F) or in producers' homes (let us denote them by A_H with $A = A_F + A_H$).[6] Therefore:

Proposition 1: In a market economy à la Sraffa (no changes in scale), if natural prices are adopted by the market no surplus can be objectively observed when all producers are independent.[7]

Given this distinction between workplace and home consumption, Equation (8.1) can alternatively be written as:

$$(A_F + A_H)p = p \tag{8.2}$$

There is no sense in speaking of the existence of a positive surplus in such a market economy. The fact that the surplus is identically equal to zero has nothing to do with any physical objectivity the 'man from the moon' could be able to observe. This is simply an effect of a social characteristic of the economy where all individuals have the same social condition as private persons specialised in production freely working for their own account. Inasmuch as they are all independent producers they are accordingly homogeneous from that point of view. What Sraffa calls 'production for subsistence', with a strong physical and natural connotation, is in fact a simple market economy, the type of which Marx deals with in the first section of *Capital* before he introduces capitalists and surplus value. There is nothing purely physical in it.[8]

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[6] The distinction between consumption in the workroom versus the home is arbitrary since both are private spaces.

[7] Were it possible to observe the economy at two successive periods 1 and 2, and if A_{F2} were greater than A_{F1}, we could conclude that a surplus had existed and was accumulated in the first period. But this is only because we have assumed a clear separation between workplaces and homes, an arbitrary assumption in that environment.

[8] Not an atom of matter enters into the objectivity of commodities as values; in this it the direct opposite of the coarsely sensuous objectivity of commodities as physical objects (Marx, 1976, p. 138).

Correlatively, assuming a positive surplus – as Sraffa does in chapter II of *PCMC* – requires assuming also a change in the social relations of production. Social relations of production must be such that objective observation reveals a difference between commodities necessarily used in production either in workrooms or homes versus those not. A market economy wherein a portion of individuals produce not for themselves, as they would be no longer independent, but rather for the account of the other portion would fulfil that condition. A capitalist economy is of that type: the first group of individuals are called *wage-earners*, the others *entrepreneurs*. Let see how that kind of market economy creates conditions for an objective observation of a surplus.

Let us retain the assumption that workrooms and homes are kept distinct so that the only problem in assessing which quantities of commodities are socially necessary to production concerns that of homes only. How do we separate productive and non-productive consumption, or in Sraffa's terminology how do we objectively distinguish between physical real cost and surplus? The homogeneity of individuals' conditions makes impossible that distinction, as seen above. On the contrary, the heterogeneity of conditions between entrepreneurs on the one hand, and wage-earners on the other, creates a favourable condition. The entrepreneur producing tables will hire a worker. Now, what the worker consumes no longer depends only on market prices but also and specifically on wages.

In classical tradition, entrepreneurs possess or have a command over the means of production whereas wage-earners do not. Consequently, wage-earners have no choice but to work under the direction and for the account of entrepreneurs. Entrepreneurs and wage-earners are objectively distinct and their incomes are determined according to different principles.[9] Workers receive a wage and entrepreneurs get a profit. Here, entrepreneurs are the only individuals able to decide about production. They are the producers. Wage-earners are not producers since they do not decide neither what nor how much to produce. All the commodities produced belong to entrepreneurs less those *given* to wage-earners as real wages.[10] From the point of view of the producers

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[9] Adam Smith reminds us that the distinction between profits and wages rests on a difference between the quantitative rule which governs them: wages are proportional to labour and profits to capital (price of means of production) (Smith, 1976, Book I, p. 66).

[10] The term 'given' is somewhat provocative. Of course, the wage is not a *gift* but it is not the result of a sale or of an exchange either. Wage-earners get their consumption goods thanks to the money paid by entrepreneurs. Unless labour is considered as a commodity sold against money – which does not make sense when commodities are produced by commodities – we have to face the very special character of the wage-relationship.

(i.e. the entrepreneurs), as a whole the real wage is objectively a cost. Commodities bought out of profits for entrepreneurs' consumption are not a cost.[11] They constitute the (net) surplus. What happens in the market (i.e. transactions and prices) is socially objective and in principle is observable by everybody, including the 'man from the moon' but only after he has been told about the social relations of production.

If B is the matrix of b_{ij}'s, quantities of commodity i consumed by the wage-earners working in industry j, the technique of this economy is now $(A_F + B) \to I$ where $(A_F + B)$ is an irreducible square matrix. This technique differs from that of a simple market economy $(A_F + A_H) \to I$ since in general $A_H \neq B$ even if we have assumed that quantities of commodities consumed directly in the workrooms are the same. In the latter case we necessarily have $e' (A_F + A_H) = e'$, *i.e.* a zero surplus, whereas in the former we have $e' (A_F + A_H) \neq e'$ in general and possibly $e' (A_F + B) < e'$, that is a positive surplus. Let consider that case with the implicit assumption that, with all other things being equal, wage-earners get less than they would as independent producers.

The following proposition sums up the reasoning above:

> Proposition 2: Heterogeneity of social condition is a necessary condition for a socially objective observation of a surplus (positive or negative), that is a difference between the quantities of commodities which constitute the physical real cost and the quantities which do not. An economy with wage-earners and entrepreneurs fulfils that condition. A simple market economy does not.

Proposition 2 is not as such a critique of *PCMC* since Sraffa is well aware that economies with surpluses are capitalist in character. But the manner in which he introduces the surplus and the problem of its distribution may lead the reader to think that the observation of the surplus is logically prior to any proposition about the existence of capitalists (or entrepreneurs). An indirect proof of that is Sraffa's treatment of wages which appears as self-contradictory:

> We have up to this point regarded wages as consisting of the necessary subsistence of the workers and thus entering the system on the

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[11] Here the quest for a 'physical explanation' would be misleading. Even if we admit the idea of an inducement for entrepreneurs to hire workers to make them produce – a very reasonable idea indeed – that explanation falls short. The entrepreneur who runs industry i may be not interested at all by any quantity of commodity i. Hence entrepreneurs' inducement are not physical. They are intelligible only in terms of prices and money. Very different would be a landlord in an economy *à la* Cantillon.

same footing as the fuel for the engines or the feed for the cattle. (Sraffa, 1960, p. 9)

Here Sraffa seems to consider real wages as physically determined (subsistence) and juxtaposed to:

> ... the other aspect of wages since, besides the ever-present element of subsistence, they may include a share of the surplus product. (Sraffa, 1960, p. 9)

Sraffa's dual view about wages makes sense only if the surplus could be observed independently of the wages. This is precisely what developments above prove to be impossible. What is objectively observable is not the level of subsistence but rather all of the commodities bought by the wage-earners in the market. The surplus is observed only *logically after* matrix B is known. Matrix $(A_F + B)$ represents the quantities of commodities socially necessary to produce I. Real wages are all included in that matrix not because wage-earners could not work without them (a physical necessity), but only because real wages are what they are. Whatever the process of determination of B may be – market, negotiation, class struggle, etc. – real wages are as (socially) objective as prices. Consequently, the idea of a partial or total distribution of the surplus to wage-earners is a contradiction in terms:

> Proposition 3: Given the social conditions of an objective observation of the surplus in an economy with entrepreneurs and wage-earners, assuming that wage-earners may get a fraction of the surplus is self-contradictory

Contrary to Sraffa's analysis – he thought that the absence of physical real cost was a problem for explaining the surplus – here arises the possibility to objectively observe a surplus grounding the notion of physical real cost. That notion is fully meaningful only in an economy with wage-earners. For entrepreneurs as a whole, the price of wages ($e'Bp$) is the exclusive objective cost. Commodities acquired by entrepreneurs to replace circulating capital (A_F) and/or consumption ($I - (A_F + B)$) are for entrepreneurs as a whole a cost and a receipt at the same time.

Natural prices of such an economy are determined by:

$$(1+r)(A_F + B)p = p \qquad (8.3)$$

where r is the uniform rate of profit. Equation (8.3) differs from Equation (8.1), not only by the rule of distribution of the surplus but also by the

technique, although we have supposed that commodities used in the workrooms are the same in both; i.e. A_F in Equations (8.2) and (8.3) are assumed to be equivalent

What economists (Sraffa included) call a 'technique' cannot be conceived as a purely physical reality. Such techniques cannot be objectively observed but rather are subject to appropriate social conditions. What is true for a technique is also true for commodities. The 'man from the moon' would not be able to identify commodities by taking into consideration merely their physical character. Notwithstanding this proposition, all theories of value start with the assumption of a given commodity space. Every individual is supposed to be endowed with a perfect natural knowledge of all the goods or commodities. That starting point would be highly debatable if interpreted in a naturalist way. One should refrain from paying too much tribute to naturalism. Taking as given a common commodity space for all individuals has a more interesting and more favourable interpretation. In value theories the commodity space plays the role of a common language. It ensures that there is a socially objective reality allowing people to engage in determinate and intelligible actions. A common language is necessary to conclude contracts, to transact in the market and to make any objective observation possible. In economic theory commodities are dimensions of Euclidian space where no physicality is to be found. Marx, probably more lucid than many others, adopts the assumption of a given material reality[12] but in a specific social context, namely that of a market economy where goods are not purely physical entities but also commodities:

> the use-values of commodities provide the material for a special branch of knowledge, namely the commercial knowledge of commodities. (Marx, 1976, p. 126)

Here, Marx sees the commodity space as the outcome of a social process of learning resulting in a common language, the language of commerce.

In this line of reasoning, the most obvious common social language in the market is not commodities but money. If the interpretation of the present chapter is correct and social objectivity takes analytical precedence over physical objectivity, it should be possible to observe the

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[12] They [use-values] constitute the material content of wealth, whatever its social form may be. In the form of the society to be considered here they are also the material bearers of exchange-value (Marx, 1976, p. 126).

surplus with the help of the knowledge of money flows only. It is to this that we now turn.

Monetary relations and the surplus hypothesis

In a monetary economy at least two types of operations take place: (i) sales and purchases which circulate commodities in one direction and and money as means of payment in the oppostie direction, and (ii) issuance of money by which individuals obtain such means of payment without selling or purchasing anything.

Homogeneity or heterogeneity in a monetary economy

Excluding gifts and robbery, how can any individual obtain money as a means of payment without selling a commodity? The specific answer seems to depend on the type of monetary system involved, but it is possible to give a general one: every system observed in the history of developed market economies adopts a specific procedure, let us call it *mintage*, by which 'something' is monetised according to certain rules. Metallic systems are a well-known example. In a metallic system, the condition to get new means of payment is to hold positive quantities of precious metals and to bring them to the Mint. Gold or silver ingots are transformed into legal gold or silver coins. It is important to emphasise that in such systems gold and silver are not sold to the Mint nor are legal coins bought. The same is true in modern economies where, via the banking system, individuals monetise a promise to pay back at a future date a certain quantum of units of account (dollars, euros, etc.). Instead of gold or silver what are monetised in modern economies are discounted sums of future money flows, that is to say individuals monetise *capital*.[13] In the metallic as in the credit system, the issuance of means of payment is subject to legal rules and regulation by a monetary authority. Issuance of means of payment has something to do with *sovereignty*: rules of mintage logically pre-exist prior to market purchases and sales.

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[13] There are of course many differences between the two types of monetary systems but *mintage* is present in both. Capital is not the same thing as gold but it plays more or less the same role in the issuance of money. In the metallic system only a fraction of the total quantity of gold is brought to the Mint. In the credit system, only a fraction of capital is monetised, that which appears among banks' assets. That fraction of capital is not sold by individuals nor is bought by banks. There exists markets for capital but the monetisation of capital by the banks does not take place in the market. The fact that bank loans must be transformed when they are sold in financial markets is an indirect proof of this assertion.

Proposition 4: Issuance of money cannot be reduced to purchases and sales; it involves an authority distinct from private individuals.

Obtaining and/or holding means of payment is a necessary condition for being able to buy inputs and produce something to sell in the market. In the absence of money it is not possible for an individual to take the initiative to be an independent producer and bring a commodity to market. To keep the story simple, let us assume that existing cash balances are held only for precautious or speculative motives such that financing production requires additional means of payment. Obtaining new means of payment is therefore the only way to become an independent producer. Individuals not having access to mintage, for whatever reason, cannot engage in production for their own account and hence are unable to sell anything in the market. But, given that they must get means of payment to survive, they have no choice other than to obtain means of payment from those whose are able to monetise capital. An economic hierarchy therefore results from this difference of condition.[14] Here, homogeneity or heterogeneity in social conditions are relative to individuals' positions vis-à-vis the process of mintage. *Homogeneity exists if all individuals are able to obtain new means of payment whereas heterogeneity results when only a fraction of individuals are able to do so. Monetary relations, which are objective, observable and measurable, are not the same in a homogeneous versus a heterogeneous economy.*[15] An homogeneous market economy is one in which all individuals are independent producers. Each member of the said economy can decide to produce commodities for sale on the market and, consequently, to purchase other commodities socially necessary for production. What are purchases from the perspective of the buyers are sales from the perspective of the sellers. Money flows act to design a matrix of payments. In a self-replacing state, we have nothing but a monetary description of an economy where no surplus can be observed for the reason alleged above. Note that the argument

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[14] In principle that hierarchy is purely economic and is not established forever. Things may change from one period to another even if such changes occur slowly in the 'real world'.

[15] At this point an objection may be raised: why not admit that individuals having access to mintage are just those who possess the means of production? Is not the monetary expression of the division of society into classes nothing but a roundabout way to avoid a Marxian language? It is not the case. Property of means of production must be explained as a consequence of the working of the economy and not taken as granted. More generally private property is validated by the market and cannot be presupposed. Capitalism is not a caste society; it is an open system where individuals may change their position.

does not rest on a physical description of what happens in the market but rather on pure monetary relations and transactions.

In a heterogeneous economy, individuals unable to obtain new means of payment cannot produce for their own account and may instead attempt to acquire means of payment from those who are able to mone- tise gold or capital. Why would the latter give money to the former who, by construction, have nothing to sell since they are prevented from producing a commodity? Several motives may be invoked: charity, evergetism (ancient Rome), ostentation, and well-being (Smith's menial servants) come to mind. But the most interesting and relevant motive for the present chapter is the desire by those able to monetise to become richer by associating other people to their own production for the market. The latter example is called 'productive labour' by Adam Smith in contrast with 'non- productive labour' which encompasses all the former examples.[16] Here the wage relationship appears as objectively defined once heterogeneity between individuals has been observed.

A social condition for observing an objective positive surplus

Let us come back to a strict monetary description of the economy by considering the particular conditions given by the structure of observ- able money-flows of which three different forms may occur. An indi- vidual having acquired means of payment by mintage may experience three types of payment according to the type of payee:

- The individual may settle transactions with other individuals having also access to mintage. (market relations).
- The individual may pay other individuals not having access to mintage in order to coerce them to participate to his/her own produc- tion process in view of selling commodities in the market to other people, wage-earners included. (wage relationship).
- The individual may pay individuals not having access to mintage for other reasons. (domestic relation).

An important remark is that appellations like *market relations*, *wage rela- tionship* and *domestic relation* stand by themselves without any reference to the material content of the different types of activity. In other words, they are defined by their abstract form only. A music lesson may be

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[16] That part of the annual produce of the land and labour of any country which replaces a capital, never is immediately employed to maintain any but productive hands. It pays the wages of productive labour only (Smith 1976 [1776] , I, p. 332).

either a market relation when the teacher and the pupil' are both independent musicians (professor and concert player); a wage relationship if the one who pays the teacher runs a music school where pupils pay for attending the lesson; or a domestic relation (Haydn and Esterhazy). Hence the following proposition:

Proposition 5: The monetary form of a social relation is logically independent from its material content.

In the schema shown in Figure 8.1 below, two sorts of individuals are distinguished according to their relation to the mintage: entrepreneurs (octagons) and wage-earners (small circles). Domestic relations are not

MONETARY RELATIONS

| Enterprise | Entrepreneur Enterprise | Wage-earner | Total class of Wage-earners |
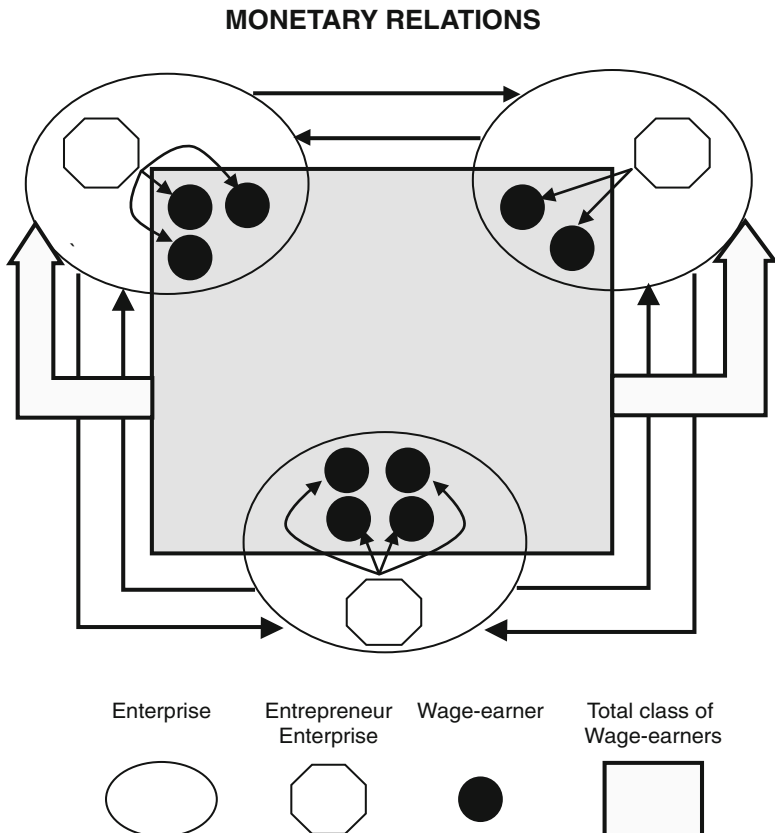
Figure 8.1   Monetary relations

indicated. Wage payments are figured by thin arrows from entrepreneurs to wage-earners and wage expenses by thick and coloured arrows.[17] Market relations are drawn in medium arrows. To make explicit the association of wage-earners with individuals having access to mintage, they are drawn together in an oval (the enterprise). Mutual relations of enterprises are market relations. Finally, wage-earners are all put into a box to show that they constitute an entity as such, let us say a class.

From the schema it is possible to derive a 'technique' where coefficients of circulation have the same general meaning as the a_{ij}'s above.[18] Assume that only n individuals are able to get new means of payment. The others become wage-earners. They get new means of payment, only indirectly, by wages paid by entrepreneurs. They spend them back toward entrepreneurs. For the sake of simplicity (and to keep up with Sraffa's case where no room is left for wage-earners saving) we assume that wage-earners do not save and that entrepreneurs spend exactly as much as they get from other people (monetary equilibrium). Observation of flows of payment allows us to present the payment matrix shown in Table 8.1 below:

Table 8.1   Flows of payments

$\downarrow\rightarrow$	1	...	n	Subtotal	Wages	Total
1	0	...	$m_{n1}+c_{n1}$	m_1+c_1	W_1	E_1
...	...	...	...	...	...	...
N	$m_{1n}+c_{1n}$	...	0	m_n+c_n	W_1	E_n
Subtotal	$m^1 + c^1$	...	$m^n + c^n$	μ	W	E
Wages – earners	W^1	...	W^n	W	–	–
Total receipts	R_1	...	R_n	R	–	M

E_j represents the sale of entrepreneur j's production, that is the product of the total production, taken as the physical unit of 'commodity' j, *times* the price: $E_j = p_j$. A flow m_{ij} or c_{ij} is an expenditure of entrepreneur j toward entrepreneur i. Keeping our assumption that it is possible to distinguish between workplaces and homes, it is possible to distinguish purchase of inputs m_{ij} and consumption purchases c_{ij}. To calculate 'technical' coefficients of circulation between entrepreneurs is straightforward: $\theta_{ij} = m_{ij}/E_i$ is the quantity of 'commodity i used for

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[17] For the sake of readability it has been assumed that wage-earners do not consume commodities produced by the third enterprise.

[18] In the 'real world' social accountants calculate the input-output tables mainly from money flows.

the production of a unit of 'commodity' j (entrepreneur j spends m_{ij} toward entrepreneur i and gets a quantity of 'commodity' i equal to $\theta_{ij}/E_i = \theta_{ij}/p_i = \theta_{ij}$). The same procedure applies to the c_{ij} to determine the coefficients of consumption of the entrepreneurs. The quantity of 'commodity' i consumed by the wage-earners employed by entrepreneur j (assume they are alike)[19] is $\omega_{ij} = W_j W^i / W E_i$ (W_j/W is the proportion of total wage labour employed for the production of 'commodity' j and W_j/E_i is the quantity of 'commodity' i consumed by wage-earners).

The 'technique' is $(\Theta + \Omega) \rightarrow I$ where Θ and Ω are respectively the matrices of the θ_{ij}'s and of the ω_{ij}'s. Matrix $(\Theta + \Omega + C)$ where C is the matrix of the c_{ij}, is such that $e'(\Theta + \Omega + C) = e'I$. Unless the c_{ij} are all equal to zero, we have $e'(\Theta + \Omega) < e'I$. Starting from socially observable money flows only, we have a 'technique' yielding a positive surplus. Payment flows distribute the total price of production between classes of individuals. Entrepreneurs receive $(I - (\Theta + \Omega))$, the jth line being the vector of real net profit of the jth entrepreneur, and wage-earners receive Ω, the jth line being the vector of real wage of wage-earners working for the jth entrepreneur.

Remuneration to wage-earners is an objective cost for entrepreneurs; the latter are independent producers whereas wage-earners are only associates, not working for themselves. Relations among entrepreneurs are of the same type as relations between the independent producers of the simple market economy without surplus. If $W_j = 0$ for all j, all the production would remain in the hands of entrepreneurs and it would not be possible to observe any surplus since all the expenditures would appear to be socially necessary (in this case, the economy would not differ from a simple market economy in spite of individuals working for others without any wage). Money flows between entrepreneurs distribute among themselves all that wage-earners cannot buy. Depending on whether or not it is possible to distinguish between workplaces and homes, what is left for entrepreneurs is net or gross profit (including the replacement of circulating capital).[20]

> Proposition 6: Surplus is observable only if an objective cost different from total production can be measured. Heterogeneity of individuals' vis-à-vis the mintage is a necessary condition of that measure.

Kalecki has summed up the reasoning just presented by the felicitous sentence that entrepreneurs earn what they spend and wage-earners

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[19] There is no loss of generality here since it is possible to observe every flow of payment from every wage-earner.

[20] Note that the existence of enterprises, as distinct from individuals, makes the assumption above quite natural but highly debatable in the pure independent producers' case.

spend what they earn. There is no way to objectively observe and measure the surplus void of any physical content except as transfers of units of account throughout the economy. It is inferred that the entrepreneurs' expenditures among themselves are expected gross profits, and that these gross profits are the inducement to run an enterprise. But this 'mental' or 'subjective' element comes after a more fundamental one: prior to any explanation of a phenomenon one should *observe* it. Inquiring into the objective conditions of that observation seems more fruitful than looking for a psychological argument. Accordingly the social conditions developed above emerge as the best 'explanation' of the existence of a surplus.

Conclusions

Sraffa was convinced that the notions of (physical real) cost and surplus could not easily co-exist in his framework (see quotations above) because he sought a physical explanation of production and prices. In this chapter we have attempted to address the question of surplus with a preliminary inquiry into the conditions of an objective observation of economic activity. Not surprisingly we show that these conditions are relative to the social relations of production for the market. What has heretofore been conceived as physical reality – the technique – is in fact an effect of some specific assumptions concerning social relations. Social objectivity remains prior even in *PCMC*, despite Sraffa's philosophical convictions. A purely monetary description of economic activity avoids any confusion between a physical objectivity (claimed by natural scientists) and a social one (actually not acknowledged by economists who prefer to view themselves as true scientists). Economic relations manifest through a social procedure (accounting) that objectively measures costs and profits. The term 'objectively' here does not refer to the existence of a physical object measured by accountants as a naturalist interpretation argues but rather only that accounting is socially validated and performative. In a pure real approach (value theory) as well as in a pure monetary approach, the surplus is not explained in terms of cost; Sraffa is right on that point. Instead *cost and surplus come together as a consequence of the heterogeneity among individuals which make cost and surplus simultaneously objectively observable*.

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Comment: On Surplus and Money in Sraffa: A Comment on Cartelier and Deleplace

Guglielmo Chiodi

1. The two chapters by Cartelier and by Deleplace, on which the present writer has been invited to comment, are both very interesting on their own account, not least for the reason that they address aspects of Sraffa's works, published and unpublished, which for so long have been neglected or seldom analysed.

In the comments which follow, however, my attention will be given only to specific points of the above chapters which seem to me to be leading to an incorrect interpretation of some aspects Sraffa's theory.

Comment on Cartelier

2. The basic aim of Cartelier's chapter is that of showing the impossibility of observing, within the Sraffian framework, a technique expressed uniquely in physical terms (i.e. by means of mere quantities of commodities used and produced) independently of the social conditions of production. The underlying intention of Cartelier's analysis, in fact, is ultimately that of clarifying the sense in which the supposed 'objectivity' characterising the whole structure of Sraffa's *Production of Commodities by Means of Commodities* (*PCMC*) should be interpreted.

The necessity of making an analysis from an 'objective' point of view seems to have been felt by Sraffa himself since the 1930s, in his strong opposition to the 'subjective' analysis, pervasively characterising the neoclassical economic theory. Witness his emphasis on the 'physical real cost' and the image of 'the man from the moon', which can be found in some of his unpublished papers.

However, in his effort at bringing about the conditions in which a technique can 'objectively' be observed within the Sraffian framework, Cartelier's reasoning – in the opinion of the present writer – contains infelicities, which contribute to the shaping of a distorted interpretation of some crucial aspects of Sraffa's theory.

3. As a preliminary, a clarification is necessary as to what the 'given quantities of commodities' appearing at the very outset of *PCMC* would precisely represent in the opinion of the present writer. Although those quantities can obviously be *expressed* by numbers, it can safely be maintained that they cannot be but the *reflection* of decisions taken within the community concerned, whatever the power relationships therein prevailing, as well as of the existing social conditions of production. From a different viewpoint, those numbers, by representing – in a given community and in a given period of time – *which* commodities and *how much* of them are used and produced in each production process, concisely convey the information which Sraffa calls the 'methods of production and productive consumption', and which compactly summarises the historical profile of the community.

The reason why those numbers summarise and convey the historical profile of the community lies in the fact that the set of commodities used and produced is, from a quantitative and qualitative point of view, the obvious reflection of the degree and the quality of knowledge thus far achieved by the community in adopting the specific methods of production in use; of the social norms ruling in the work organisation; and of the prevailing social opinion of what is considered 'subsistence' of the workers and of their families. These characterisations are part and parcel of the more general social conditions of production.

The above statements apply to any set of numbers representing the 'methods of production and productive consumption', no matter whether the economy is producing for subsistence, with a surplus, or even whether it is not 'viable' at all.[1]

It should be recalled, in this connection, that in Sraffa's *PCMC* the knowledge of the physical composition of the set of commodities used and produced is a necessary requirement to ascertain whether a system is 'viable' or not, that is whether its *reproduction* is concretely possible. This is in fact the fundamental aim an economy must pursue – an aim which is a characterising feature of all the classical economist-based models, worth contrasting with the absolutely different one characterising neoclassical theory, which is represented instead by the simultaneous achievement of a maximal objective by each and every individual in the economy, subject to given constraints.[2]

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[1] On this specific point see Chiodi (1998).

[2] A discussion on the different aims characterising classical and neoclassical models can be found in Chiodi and Ditta (2013). See also Chiodi (2008).

The physical composition of that set of commodities must then for Sraffa's classical-based approach be known *before* any further calculation be made on the basis of it, and therefore independently of any market condition and mechanism. Moreover, a subset of these commodities, namely the means of production and the means of subsistence, must be known even before the production processes start.

It should be noted that systems which produce for subsistence and systems which produce with a surplus are characterised by their being in a *self-replacing state* – that is a state for which the system produces either with a positive or with a zero surplus. This subset belongs to the wider set of 'viable' systems – systems that are capable of achieving a self-replacing state. 'Viable' systems that are *not* in a self-replacing state possess surpluses and deficits simultaneously. But, being 'viable', they could become self-replacing states by suitably changing the proportions of their industries, and thus becoming capable of reproducing themselves.[3]

4. In chapter I of *PCMC*, Sraffa (1960, p. 3) explicitly puts the 'sustenance for those who work' among the 'given quantities of commodities', without any quantitative distinction from the means of production – that sustenance 'thus entering the system on the same footing as the fuel for the engines and the feed for the cattle' (Sraffa, 1960, p. 9). In chapter II, once the possibility for the workers to share the surplus is taken into account, the subsistence of the workers as an 'ever-present element' of the wage is duly emphasised by Sraffa, in contrast with the 'surplus' part of it, which he considers instead as 'variable'.

The importance of the crucial distinction between these two elements of the wage has generally been overlooked by the literature, not least for the analytical treatment of the *whole* of the wage as *variable*, which perhaps contributed to the falling into 'oblivion' of the subsistence element as an essential and autonomous component of the wage – notwithstanding the explicit warning by Sraffa himself (1960, p. 10), according to which necessaries 'are essentially basic and if they are prevented from exerting their influence on prices and profits under that label, they must do so in devious ways'.

The notion of the 'subsistence wage', in fact, is of the utmost importance in framing the representation of an economy along the lines and in the spirit of the old classical economists and of Marx – as Sraffa wanted to make explicitly clear. The means of subsistence must be *specified* one by one in their physical terms, although the corresponding wage is generally being *paid* in money terms. Also, the subsistence wage,

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[3] See Sraffa (1960, p. 5, n. 1).

by its own nature, *cannot* be subject to negotiation on the same footing as the surplus part of the wage is. The latter, in fact, cannot be specified other than in value terms and, as a consequence, the most suitable variable to be fixed from outside the system of production, in order to determine production prices, appears to be the rate of profits, which by definition is simply a ratio.

It is also worth emphasising that 'subsistence' must conceptually be considered a genuine *social* notion – notwithstanding the fact that the bundles of commodities which concretely give expression to that notion are obviously consumed by *individuals*. It springs, in fact, from the historical process undertaken by the community and it is the crucial element for the condition of 'viability' to be satisfied.[4]

5. The 'viability' of a system, as a condition of its functioning, is exclusively based on the 'given quantities of commodities', which in their entirety represent the 'core' of the economy, that is, its production system. It should be borne in mind, however, that the 'core' is just *a part* of the *whole* economy, the characterisation and the functioning of which always require preliminary information regarding the means of production *and subsistence*, as well as an active role to be played by institutions. Thus, the possibility of production processes to be repeated means the possibility for the economy as a whole *to survive*. Reproduction, therefore, means *social* reproduction. For example, even the simplest economy envisaged by Sraffa at the beginning of his *PCMC* (the economy producing for subsistence) could operate temporarily either with a huge amount of unemployment or with considerable flows of emigration – had this state been the result of a downward rescaling of its industries which had been judged to be a necessary undertaking for the survival of the system; or it might be the case that its structure has been the effect of a decision taken by an ultra-egalitarian government of the economy, which has imposed the payment of an identical amount of income to each and every worker, irrespective of their different professional qualities.

Systems producing with a surplus (under the assumption of a single-product industries and circulating capital framework) are obviously far more complex than those producing for subsistence: far more information is needed for the determination of production prices, and thus for the reproduction of the economy to become effective. To this end, it is

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[4] An analytical and historical reconstruction of the notion of 'subsistence' in relation to that of 'viability' is contained in Chiodi (2010).

absolutely necessary to know to *whom* the surplus has to accrue and by means of which *rule* the distribution of the surplus has to take place.

In this light, the role assigned to production prices appears to be precisely that of accomplishing and validating the *social* reproduction of *any* 'viable' system, and the 'given quantities of commodities' turn out to be simply the common basis for *calculating* production prices, whose eventual adoption by the market would make social reproduction concretely possible.

Ascertaining the *existence* of a surplus, analysing its *distribution*, and explaining its *origin* are thus logically distinct problems. A 'system of quantities' is the only thing required to ascertain the existence of a surplus; whereas a 'system of prices' is just what is required to analyse its distribution. Neither of these systems, however, would suffice for *explaining* the origin of a surplus.

It should be recalled that it is in the very distinction between the 'system of quantities' and the 'system of prices' that we can find the genuine link between Sraffa's standpoint and that of the old classical economists and of Marx. It is in fact strategically crucial for Sraffa to neatly *separate* quantities from prices before representing and analysing an economy – in radical opposition to the traditional neoclassical theory within which, as is well known, quantities *and* prices are determined *simultaneously*.

6. On the basis of the considerations made above, Cartelier's analysis contains several infelicities. Contrary to what he seems to maintain, in fact, the 'man from the moon' must *not* decide whether, say, 'an independent cabinet-maker really needs to go to the theatre or to drink an excellent Burgundy wine' (this volume above p. 172). This is because he needs *not* to know the *individual preference* of anybody but rather the *social* requirements for subsistence, as they are physically expressed within the 'given quantities of commodities'. And Cartelier's statement, according to which '[s]ociety as a whole recognises through the market process that the cabinet-maker's consumption is economically necessary and well-founded' patently appears beside the point altogether within the *PCMC* framework, wherein the 'given quantities of commodities', which includes workers' subsistence, must necessarily be known in their exact physical composition *prior to* and *independently of* any evaluation by the market whatsoever.

A further limit of Cartelier's interpretation of Sraffa consists in his identification of surplus-producing systems exclusively with capitalist economies. However, within the Sraffian framework of chapter II of *PCMC*, other possible alternative scenarios seem more generally

admissible. A cooperative society, for example, can in fact be imag-
ined, with the corresponding system producing a surplus. It should
not be so difficult to imagine, in this case, that the workers – who are
supposed to own the means of production and the means of subsist-
ence – would manage the processes of production in such a way as to
obtain a surplus, because they *voluntarily* decide to work more. In such
a circumstance, the system of equations representing the economy
would be the following:

$$Mp + \hat{L}w = \hat{Q}p \tag{1}$$

M being the $n \times n$ matrix of the means of production; $\hat{L}$ the $n \times n$ diag-
onal matrix of the quantities of labour employed; $\hat{Q}$ the $n \times n$ diagonal
matrix of the quantities of commodities produced; w the unit labour
income.

   Equation (1) corresponds to the particular system to which Sraffa
(1960, p. 12), is referring when 'the whole national income goes to wages
and r is eliminated', composed of n independent equations which leaves
as unknowns the $n - 1$ relative prices and the rate of labour income w.
It should be noted that Equation (1) can aptly accommodate the case of
labour of different qualities, with the matrix $\hat{L}$ being the *implicit* end-
result of a process of reduction to equivalences.

   As an alternative to the latter procedure, the following system of equa-
tions can equivalently be written:

$$Mp + Lw = \hat{Q}p \tag{2}$$

where L stands now for the $n \times m$ matrix of quantities of m different
qualities of labour employed, with $m \gtrless n$, and w the m-vector of the
rates of labour income, corresponding to the m specified different quali-
ties of labour. In this case, there would be n independent equations with
$n + m - 1$ unknowns to be determined, *viz.* the $n - 1$ prices and the m
rates of labour income, and therefore with $m - 1$ degrees of freedom in
fixing the *proportions* among the rates of labour income corresponding
to the m different qualities of labour.

   It is very much worth noticing that in either system a decision must
be taken to define the *scale* of equivalences, as in Equation (1), or to
define the *proportions* among the rates of labour income, as in Equation
(2). Such a decision, which is obviously a *political* decision by its own
nature, must be taken not only from *outside* the system of production
but it must also be known *beforehand* in order to determine the $n - 1$

commodity relative prices and the *m* rates of labour income. The above scenarios thus open the way to considering a wider and more complex class of conflicts within society.

It might then be concluded that what are 'objective' in Sraffa are not simply the 'given quantities of commodities' used and produced, seen uniquely from the *physical* point of view. Those 'given quantities of commodities' must above all be seen and interpreted from a *social* viewpoint, without incurring – as Cartelier does – improper extensions to unnecessary market processes and individualistic points of view. Within the Sraffian framework, what ultimately count in the determination of prices and income distribution are the far more general *conditions of production* – the latter being only *partly* expressed by the 'given quantities of commodities' referred to now, besides which further information must still be conveyed to the 'man from the moon' for putting him in the condition of determining 'objectively' prices and distribution.

Comment on Deleplace

7. The central theme of Deleplace's chapter is the placement and the role of 'money' within the Sraffian framework of *PCMC*. To that end, he actually makes a very useful reconstruction of Sraffa's approach to 'money'. By going meticulously through selected documents among the unpublished Sraffa Papers (*SP*), he tries to find some meaningful connection between fundamental concepts contained in *PCMC*, such as the Standard commodity and the rate of profits, on the one hand, and the role that 'money' might supposedly have in influencing prices, on the other.

As much as Deleplace's investigation might be appreciable and rigorous, it nevertheless contains – in the opinion of the writer – some crucial missing points, as well as some disputable statements, which definitely deserve careful scrutiny and criticism. Deleplace rightly emphasised the *essentiality* of 'money' as the main feature coming out of *SP* and Sraffa's (1932) review of Hayek's book, insofar as it represents, in Sraffa's own words, 'not only the medium of exchange, but also a store of value, and the standard in terms of which debts, and other legal obligation, habits, opinions, conventions, in short all kinds of relations between men, are more or less rigidly fixed', (Sraffa, 1932, p. 43), After such emphasis Deleplace ends with the following concluding remarks concerning Sraffa's *PCMC*: (i) that '[t]he usual insistence on the way money affects prices in [*PCMC*] through the

influence of the money rates of interest on the rate of profits may only show up at a *second level* of the analysis' (italics added), whereas explaining why prices are money prices should be the 'logically prior' level of the analysis; (ii) that 'money stays outside the price system'; (iii) that 'money can have no role in a static framework which ignores debts'; (iv) that therefore '[t]here lies the ambiguity of money in *Production of Commodities*: prices are money prices but money, as it is defined in the Sraffa Papers, does not affect them', and lastly (v) that '[t]his ambiguity is however consistent with Sraffa's project to separate, in the determination of the system of prices, what is "natural" from what is "institutional"' (pp. 164–5).

8. It must be said at the outset that Sraffa's hint that the rate of profits as 'susceptible of being determined…in particular by the money rates of interest' is a highly remarkable suggestion indeed, which far from showing it up at a 'second level' instead brings directly to the fore the *essentiality* of 'money' in the economy, as well as emphasising the unavoidable crucial role the financial sector plays in regulating the power relationships within society.

Having proved that no significance can be attached to concepts like 'productivity of capital', Sraffa takes into account the possibility of workers sharing in the surplus. The choice of the wage as the variable to be fixed from outside the system of production is always possible when it is regarded as consisting of specified necessaries determined, as has previously been noted, by physiological or social conditions independent of prices or the rate of profits. Once the wage, however, is looked at as not tied to any specific necessaries but rather as a part of the surplus to be divided between workers and capitalists, it would become extremely difficult to fix the wage without considering the prices of commodities entering into the wage itself. Hence the alternative of fixing the rate of profits as a ratio independent of prices.

It is worth noticing in this connection that once the 'surplus wage' enters the picture, only *political* factors can explain the distribution of the surplus between workers and capitalists – otherwise, if this were not so, it would be sufficient to make reference to the physiological or social conditions, thus falling back to the 'subsistence wage'. It is precisely here, however, that the reference to the money rates of interest turns out to be crucial by opening the analysis of the influence of 'money' on commodities prices and income distribution. In fact, by means of complex relations – left to be analysed outside the 'core' of the economy – alternative levels of the rates of profit are susceptible of being determined as well as the corresponding alternative level of wages and prices.

The money rates of interest are the ultimate results and the most visible signs of the complex and intricate relationships characterising the functioning of the financial sector – a sector which, by its own very 'mission', has been throughout time continuously inventing new credit instruments and refining strategies for the control and governance of the productive sector in any 'capitalist' economy. All the characteristics of 'money', which Sraffa is referring to in the passage quoted above in his review of Hayek, are already contained here. This was essentially Marx's view which – in the opinion of the present writer – exactly coincides with Sraffa's. This is a crucial point in the argument here under discussion, which Deleplace seems to have missed, albeit he greatly emphasises the *social* character attributed by Sraffa to 'money', as opposed to the individualistic viewpoint typical of the 'subjective' theory of money.

9. To appreciate the connection between Marx and Sraffa, on the relation between the rate of profits and the money interest rates,[5] suffice it here to refer to some passages of Marx's works, in which at least two fundamental ideas clearly emerge: (i) the idea of 'money' as something structurally linked to the production processes (and therefore far from being considered as a 'veil'); (ii) the idea that the money rates of interest have an independent determination from that of the general rate of profits, the former appearing as the yield of capital as *property*, namely capital *outside* the production process.

For Marx (1974, p. 365), the money rate of interest 'appears as a uniform, definite and tangible magnitude', whereas, by contrast, the general rate of profits appears as a 'tendency', a 'movement to equalise specific rates of profits' (Marx, 1974, p. 366). All loanable capital has 'a simultaneous mass effect' which determines the money rate of interest, whereas no counterpart exists in the case of commodity capital, due to the structural heterogeneity of commodity production. It is thus the *difference* among the rates of profits rather than their uniformity that will be manifested. One of the consequences of this is that the two parts of which the gross profit is composed, namely interest on loanable capital and profit of enterprise, can be thought as having – according to Marx – two distinct *different* sources. He writes:

> [...] interest appears as the mere fruit of owing capital, of capital as such *abstracted from the reproduction process* of capital [...] while profit

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[5] Bellofiore (2001) is very much worth reading on this particular topic. See also Chiodi and Messori (1984).

of enterprise appears to him [the 'active' capitalist] as the exclusive fruit of the functions which he performs with capital [...].

This qualitative distinction between the two portions of gross profit that interest is the fruit of capital as such, of the ownership of capital *irrespective of the production process* and that profit of enterprise is the fruit of performing capital [...] is by no means merely a subjective notion of the money-capitalist, on the one hand, and the industrial capitalist, on the other. It rests upon an objective fact, for interest flows to the money-capitalist, to the lender, who is the mere owner of capital, hence represents only ownership of capital *before the production process and outside of it*; while the profit of enterprise flows to the functioning capitalist alone, who is non-owner of the capital. (Marx, 1974, p. 374, italics added)

Moreover, Marx points out:

In the money market only lenders and borrowers face one another. The commodity has the same form – money. All specific forms of capital in accordance with its investment in particular spheres of production or circulation are here obliterated. It exists in the undifferentiated homogeneous form of independent value – money. The competition of individual spheres does not affect it. They are all thrown together as borrowers of money, and capital confronts them in a form in which it is as yet indifferent to the prospective manner of its investment. It obtains most emphatically in the supply and demand of capital as *essentially the common capital of a class*. (Marx, 1974, p. 368, italics in the original)

The 'autonomy' of the money market with respect to the production sphere leads directly to concentration of attention over the control of the 'money supply', however defined, by a Monetary Authority. The latter should be seen as an expression of the power relationships existing in the society, and its actions as interacting pressures on the money rates of interest – the yields of a disembodied capital. As a consequence, both rates of profits and wages should make appropriate adjustments, in a process in which 'money' and the Monetary Authority, far from their being exogenous and neutral forces, have a crucial role to play in the coordination of the production processes, in which actions and reactions do follow each other continually.

The 'autonomy' of the money market, as exposed above, cannot be stretched too far. Although both Marx and Sraffa have the same

conception in putting antagonism in distribution *outside* the production process, some care is called for in the proper understanding of the relationship between the two spheres. Antagonism in distribution taking place *outside* the system of production means that it is a question of *political* economy only, without any *technical* connection to production whatsoever. It is rather the 'mode of production' which creates the form of that antagonism, and thus it is precisely in this way that 'production' and 'distribution' are linked together. As Marx puts it:

> The contradictory social features of material wealth – its antagonism to labour as wage labour – are expressed in capitalist property as such *independently of the production process*. (Marx, 1974, p. 355, italics added)
>
> [...] the *structure* of distribution is entirely determined by the *structure* of production [...] distribution itself is a product of production [...] since the particular *mode* of men's participation in production determines the *specific form* of distribution, the form in which they share in distribution. (Marx, 1971, p. 200, italics added)

Antagonism in distribution can then be expressed 'independently of the production process' (Marx) or, equivalently, by saying that it takes place 'outside the system of production' (Sraffa).

10. In the light of the reflections made in the previous section, Deleplace's treatment of 'money' in Sraffa's *PCMC*, punctual and refined as it is in so many respects, does contain however disputable aspects still open to some criticism. In particular – in opposition to Deleplace's own opinion – no *separation* seems to exist, within the Sraffian framework, between the 'natural' part of the 'core' and what might be called the 'institutional' – at most, it is only a matter of an analytical *distinction*. And the 'core', the only part dealt with explicitly by Sraffa, appears to be, from the present writer's standpoint, just a part of the whole economy, and the fact that 'money' stays outside the price system is of no hindrance in exerting its influence, with all its characteristics, on prices and income distribution.

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9
The Loneliness of the Long Distance Thinker: Sraffa, Marx, and the Critique of Economic Theory

Riccardo Bellofiore

> To say what Sraffa's cultural project was which he pursued with persistence and extreme coherence through the whole of his life both in practical behaviour or in theoretical work, I would put it in this way. First of all, Sraffa was a communist, in the negative sense in which the word is used by Marx, to imply an ongoing critique of the given historical process. This is what he was, and always aimed to be. However, at the same time, he was convinced that the critique should be entirely rewritten, because the old one was no longer sufficient. Napoleoni (1996 [1988], p. 299)

Introduction

Sraffa's relationship to Marx remains a controversial topic. After the opening of Sraffa's Archive in 1993, with the Sraffa Papers (*SP*) and the Sraffa Collection (*SC*), we know that the Italian economist changed his attitude on the labour theory of value (LTV). In 1927–31 he was very critical of the LTV whereas in the early 1940s Sraffa thought that his inquiry would vindicate the 'Old Moor'. A few years later he abandoned

this view of strong continuity, however even after the publication of *Production of Commodities by Means of Commodities* (*PCMC*) Sraffa maintained a positive judgment on Marx's transformation procedure and even more than that he interpreted the results of his book in terms of capitalist exploitation within an amended Marxian discourse. It is perhaps with such restropsective that Sraffa would write in October 1975 that 'in economic theory the conclusions are sometimes less interesting than the route by which they are reached' (*SP* C26; Letter to C P Blitch).

The unpublished Sraffa Papers at the Wren Library may help to break the non-communicative monologues between Marxists and Sraffa's followers. This is possible only if what is contested is the *vulgata* that, 'after Sraffa', the surplus approach must be dismembered from the LTV, and only if the connection between value and labour (through money) is argued differently from both old and new interpretations of Marx. As part of this research project, in the present chapter I shall first review some of the original debates of the 1960s and 1970s and then reconstruct Sraffa's 'making' of *PCMC*, taking into account the (conflicting) views among Sraffian interpreters about the Marx–Sraffa relationship. Sraffa's normalisations in §10 and §12 of *PCMC*, may be interpreted as implying that national income is nothing but a monetary exhibition or objectification of living labour. This, together with Sraffa's redefinition of the rate of surplus value at prices of production rather than at labour-values, allows us to build a bridge with the New Interpretation (NI) of Marx. The chapter, however, stresses also some differences: between Sraffa and the NI and between the two and Marx. The chapter also provides a critique of some writings proposing Sraffa as the 'true' Marxist, and ends with some personal considerations.

The value of the *SP* for having a fresh look at these, and other, questions cannot be exaggerated. Sraffa's long journey in making *PCMC* was very solitary, marked by a deep internal dialogue and constant revision: a long-distance, lonely run, towards a masterful revival of not only classical but also Marxian critical political economy.

From the debate in the 1970s to the new approaches to Marx

When Sraffa's *PCMC* was published the relationship between 'values' and 'prices' was interpreted along the lines of a received opinion dating from the 1940s. According to it, Marx would have determined capitalist exchange ratios through a sequence of 'successive' approximations. The

proportionality of relative prices to the labour contained in the commodities exchanged – 'labour-values' – is the first approximation embraced by Marx in the first volume of *Capital*. It is an imperfect approximation to full-fledged competitive capitalism. In fact, if relative prices were equal to commodities' relative labour-content, it would be impossible for individual capitals of the same magnitude but different composition of capital to receive the same rate of profits. This imperfection accounts for the search of a second approximation to the determination of capitalist exchange ratios, the one Marx sketched out in the third volume of *Capital* with his theory of prices of production. The justification for this sequence of approximations lies in the fact that the distribution of the social product between capital and labour can be adequately represented in terms of labour-content. This transformation of labour-values into production prices had no feedback on the capital-labour exchange ratio.

The chief representative of this traditional Marxism was Dobb (1937), who maintained that the equations forming the core of Sraffa's book – where methods of production and the (real) wage were taken as the givens from which prices of production and the rate of profits are simultaneously determined – implicitly showed the soundness of the logical structure of Marx's work. This opinion was open to criticism after *PCMC* since it could be argued that there was no need to start from labour-values to determine production prices: the latter can be calculated directly from the same data from which the former are derived. The debate in the 1960s and the 1970s evidenced the failure of this view. Two justifications can be given for such a judgement. The first refers to the debate upon the relationship between the twin categories of 'abstract labour' and 'value'. The second refers to the 'Marx after Sraffa' international controversy in the late 1970s. Peculiar attention will be given here to the less well-known Italian discussion.

Italian Marxist economists, followers as well as critics of Sraffa, were deeply influenced by Colletti's path-breaking re-reading of Marx's LTV (Colletti, 1972, 1979). All seemed to agree with the view that abstract labour as the substance of value had to be interpreted as the labour actually separated in exchange from the subjectivity of individual workers who concretely performed it in production. As a consequence, only labour producing for exchange is what counts as the (quantitatively determined) expenditure of labour 'without properties'. 'Value' is generic- or abstract- wealth which closely reflects the 'pure and simple' labour producing it. Abstract labour and value are the same thing, the former considered as the activity whose result is the latter.

Some young Marxists followers of Sraffa – Vianello (1970, 1973) the most interesting among them – tried to extend this interpretation into an analytic combination of Marx and Sraffa. In Vianello's view, commodities are objectified abstract labour prior to and independent of exchange and the setting of individual prices. Thus it is always possible (i) to bring back the social product to total direct labour, (ii) to define as 'necessary labour' that part going back to workers, and (iii) to define the residual part as 'surplus labour'. This conclusion, however, was challenged by Napoleoni (1972). It is true that one cannot scientifically understand capitalism without some notion of 'absolute' or 'intrinsic' value. However, this concept – namely, the 'magnitude' of value as the result of the amount of abstract labour expended in its production prior to final exchange on the commodity market – must extend into the category of price of production, and this prolongation cannot be provided by Sraffa's prices. The reason is that arguments like the one proposed by Vianello leave out the category of 'exchange value', as Napoleoni called it – namely, the relative ratio between magnitudes of value, what other Marxists define as 'simple prices', and which we may here identify with (relative) labour-values. Exchange value is here understood as the 'necessary form of appearance' of the absolute value intrinsic in the commodity; it is then the essential mediation for the determination of prices (of production).

Colletti sided with Napoleoni against the young Sraffians. Both these authors strongly criticised the two-approximations view. Labour-values, far from being the first approximation to prices, are rather the true outcome of capitalist commodity production as it necessarily manifests itself in universal exchange through money. It thus accurately reflects capitalist reality. Abstract labour is not only derived from exchange 'as such', it is also deduced as the living labour performed by the wage workers in capitalist production as production for universal exchange (Napoleoni, 1975). Production of value is at the same time production of surplus value.

The following decades have seen the practical disappearance of the debate, in Italy as elsewhere. The Marxists were increasingly isolated in universities, and the Sraffians were forced to be on the defensive by the revival of orthodox economics. With very few exceptions, a substantial indifference and reciprocal ignorance of what was going on in the Marxist versus Sraffian theoretical territory won the day. What is more relevant here however is, first, the fact that there were important developments in international Marxian political economy during the 1980s and 1990s and, second, that since the mid-1990s there was access to *SP*. This should have opened the way for a dialogue, maybe even for a deepening

of each other's criticism, but on a new and different terrain from that in the 1970s. Unfortunately the two scholarships remained rigidly at odds. Most of the scholars in the Sraffian camp did not care to be up to date with the new understanding of Marx's LTV that was becoming widespread into the Marxian camp, thereby repeating obsolete criticisms. Most of the Marxists insisted on taking for granted a reading of Sraffa's intentions and results as Neo-Ricardian and un-Marxian which may be open to discussion.

Let us begin with the new approaches to Marx's value theory which, by taking seriously the link between value and money, attempted to rescue its internal consistency. The NI is the most representative: here I will refer to Foley (1986). On this outlook, Marx starts from the 'postulate' that at the aggregate level the (new) value added in the period, when exchanged on the market, is the monetary expression of the total direct labour time. Some scholars define this as Marx's 'law of value': it amounts to establishing a strict correspondence between, on the one hand, the monetary form taken by the current labour originating the social product, net of non-wage costs, and, on the other, national income, that is, in a two-class society, the sum of wages and gross profits. Once it is assumed that there is nothing but labour behind the production of the (money) value added, we may ask how much abstract labour is 'exhibited' in one monetary unit. The answer is provided by the notion of the 'value of money' – namely, the ratio between the aggregate direct labour expended in production and the money value added. The value of money, then, is the quantity of labour objectified in the national income which can be 'commanded' on the market by one unit of money. It is the reciprocal of the 'monetary expression of (socially necessary) labour-time' (MELT), or the money value of workers' productivity (the money value added per unit of labour).

NI's 'postulate' implies that the only thing susceptible to change in the transformation of (labour-) values into (production-) prices is the allocation of the given amount of social (direct) labour among the different commodities. The 'law of value' holds true whatever 'law of exchange' is adopted. The rule of price determination may alternatively imply either the proportionality between prices and contained labours, as with the labour-values in *Capital I*, or their systematic divergence, as with the prices of production in *Capital III*. With labour-values the quantity of money 'commanded' by every individual commodity, that is obtained on the market by selling it, will exhibit a quantity of labour exactly equal to that 'contained' in it, in other words required for the production of the commodity itself. On the contrary, when prices diverge from

labour-values, the quantity of labour 'commanded' by every individual commodity must be different from the labour 'contained'. Labour 'contained' and labour 'commanded' are assumed to be equal for the money net product of the whole system.

The next and crucial step consists in the definition of the 'value of labour power'. This is no longer interpreted as the labour contained in the commodities constituting some kind of subsistence wage-bundle, but rather as the labour commanded by the money wage. It is calculated multiplying the money wage by the value of money, thus determining how much social (direct) labour 'goes back' to workers, a quantity that can well diverge from the labour 'congealed' in the wage goods actually bought by workers. Thanks to the possibility provided by the value of money to 'translate' any monetary magnitude in the labour quantity that that magnitude is able to purchase on the market, and abstracting here from the issue of productive versus unproductive labour, the value of labour power becomes just another name for the share of (money) wages within (money) national income.

Such an approach easily allows us to achieve results similar to Marx's. Indeed, by interpreting the equality between the sum of labour-values and the sum of prices of production as that between the net product accounted in labour-values and production prices, while keeping constant in the transformation the value of labour power as defined above, also the other Marxian equality between the sum of gross profits and the sum of surplus values results by definition. Here the total surplus value is the (money) value added in the period from which variable capital (the money wage bill) is subtracted. As with the minuend, the money value added resolves in the sum of wages and profits. We know that for the aggregate net product the labour 'commanded' in exchange by the money value added and the labour 'contained' from production are one and the same. As concerns the subtrahend, variable capital, the NI's definition of the value of labour power makes it nothing but the labour 'commanded' by the money wage bill. The difference, which is the total surplus value, cannot then but be equal to the labour 'commanded' by money gross profits. The aggregate equivalence between gross profits and surplus value necessarily follows from the premises and from the definitions adopted, as indeed their proponents claim.

Compared to interpretations like Dobb's, unquestionable progress has been made, since here the notions of 'value' and 'money' are made inseparable. It is now literally impossible to talk of the former without immediately referring to the latter. Value is the intermediate notion between the labour producing that same value (according to the 'law of

value'), on the one hand, and the money exhibiting it into some price-form (following various alternative 'laws of exchange'), on the other. The monetary nature of universal exchange imposes from the start the introduction of the concept of 'price', whose standard is the monetary unit, as distinct from the concept of (absolute or intrinsic) 'value', whose measure is (socially necessary) labour time: this is true whether prices correspond or not to labour-values. The 'two-approximations' argument becomes meaningless, and dualism is replaced by a single system where 'simple prices' and production prices are just two among many possible and alternative price-forms. Labour-value is the price-form in a universal but not-yet capitalist commodity exchange. Production price is the price-form in a universal and already-capitalist commodity exchange, where competition is expressed as the distribution of gross profits according to a uniform rate of profits in the various industries.

The reader will remember, however, that Sraffa-inspired authors such as Vianello anticipated the idea in the NI that 'values' and 'prices' are two alternative, and not successive, laws of exchange. As Napoleoni observed labour-values lose, in the NI just like in Vianello, the role of the 'real mediation' in the deduction going from value production to the production price exchange-rule. From this arises a dubious dichotomy between capitalist production of commodities by living labour, exemplified by the 'law of value', and circulation-distribution of objectified labour in terms of the capitalist 'law of exchange'. The notions which should connect the two spheres – the value of money and the value of labour power – are in the nature of *ex post* observational magnitudes, and hence they cannot provide the desired theoretical bridge.

In the late 1970s another author, who was a then-pupil of Napoleoni but still working in the 'abstract' LTV tradition, Marcello Messori, in the context of a criticism of both Sraffa and Vianello, proposed a re-reading of the transformation problem which was intended to open the way to a determination of prices of production alternative to Sraffa's. He reconstructed Marx's argument on a normalisation procedure founded on what he called the equalisation of the 'surpluses' – namely, the equalisation between variable capital and surplus value expressed at labour-values or at production-prices (Messori, 1979). The gist of the NI's postulate was already there. Unfortunately Messori, as Napoleoni, was convinced that Marx could be reinstated only if a solution to the transformation problem was found that differed from that which had appeared in *PCMC*. This remained a chimera, and Messori too left Marxism a few years later. Already at the time (Bellofiore, 1980) I was convinced that Sraffa's prices *are* the prices of production; that a world

where the methods of production are given *does* make the LTV redundant; but that, notwithstanding all this, prices of production are *meaningless* if they are not grounded in Marx's LTV. Indeed, my perspective is quite similar to Augusto Graziani, when he writes:

> In fact, Marx's theory of value has nothing to say directly about the phenomenon of prices, since there is no problem of valorisation to analyze in it…analysis of the relations between the classes, or social macroeconomic analysis on the one hand, and analysis of relations within a class or competitive microeconomic analysis on the other, are disparate phenomena that for that reason are governed each by its own logic. (Graziani (1997 [1983], p. 24)

Sraffa before and after the opening of the archives

It is now time to move to Sraffa's unpublished material, and to see if it opens new perspectives on these matters. The Sraffa archives – at the Wren Library, Trinity College, Cambridge, UK – were opened for consultation in the 1990s, and I began some work there in the second half of that decade. The most widespread reading of the Marx–Sraffa relationship at that time remained Steedman's *Marx after Sraffa* (Steedman, 1977). What *PCMC* showed, he argued, was that the LTV was dispensable in a scientific analysis of capitalism. What was needed was just a set of objective data – physical and material – about the methods of production. In a Classical-Marxian approach this had to be complemented by the real wage as determined from outside. Labour-values themselves are derived from these 'givens'. Marx's magnitudes of value are redundant in relation to the task of the simultaneous determination of an equal profit rate and production prices. This irrelevance of LTV does not necessarily mean a criticism of other parts of Marx's economic legacy, since most of it may be confirmed within the Sraffa-based 'surplus approach'.

These bold conclusions met Sraffa's silence. This is in contrast with the anecdotal evidence put forward by his friends and colleagues, like Joan Robinson (1977, p. 56), Antonio Giolitti (1992, p. 80), and Paul Sweezy (1987, pp. 13–14) according to whom he was always an adherent of the LTV. One could have expected that access to *SP* would have led scholars to inquire whether there was something unexpected about the Marx–Sraffa connection. At first, definitely, it was not so. The relationships with Marshall, Keynes, Ricardo, Hayek, and others were at the centre of the debate for most scholars. But not Marx. It was customary to argue

that the received wisdom was correct, and that the *SP* confirmed it. On the contrary, I must confess that I was very much *surprised* by what I found (on the meaning of surprise in archival research, a sophisticated account is the chapter by Smith in this volume). So much so, that I did not refrain from inserting some references to the Sraffa–Marx topic in a couple of papers in 1998: one with Jean-Pierre Potier, on new findings from the Sraffa archives (Bellofiore and Potier, 1998), and the other an extended commentary on a paper by Panico on Sraffa's monetary analyses (Bellofiore, 2001). At a conference in Turin that same year, after my exposition, an economist privately asked me if 'really' the materials I referred to 'were there'. To my affirmative answer, she replied: you will never be allowed to write about this. Luckily she was wrong!

An authoritative example of the attitude of the followers of Sraffa on the topic under discussion can be found in the many publications Kurz presented in several conferences and published in journals, especially between 1998 and 2002 (Kurz, 1998a, 1998b, 1998c, 2002). According to Kurz, there are some widespread but untenable views on the relationship between the LTV and Sraffa's work which have to be dispelled. The starting point of Sraffa's research was not Marx but Marshall. Moreover, Sraffa was critical of the idea that labour had a special gift in the determination of value, a proposition which he dubbed as metaphysical. It was actually nothing but a corruption of Petty's and the Phisiocrats' 'physical real costs'. From here Kurz goes on to stress that Sraffa knew well that in special cases, and in exceedingly special circumstances – for example, when there are no profits, or when equal proportions between direct labour and means of production in all industries are assumed – prices conform to labour-values, and relative exchange ratios are proportional to the labour contained in the various commodities. But this commentator is very resolute in affirming that there was nothing interesting in these cases.

If this was the situation in 1998, things changed in a few years. Some conjectural histories about how Sraffa related to Marx in the long preparation of *PCMC* have been penned out: indeed, some of the best – with some shift of emphasis, if not conclusions, relative to his early articles – are Kurz's. I myself will follow this path, stressing the discontinuity between the various periods in which Sraffa developed his argument. Sraffa's path of discovery began at the end of 1927. The first span of time in which the Italian economist worked on his book lasted until the beginning of the 1930s (most likely 1931). In this period, as Kurz rightly remarks, Sraffa appears mostly critical against the LTV (Kurz, 2002, p. 185). Things are different in the second period

in which Sraffa worked on his book (1940–5), especially the sub-period until mid-1943. In 1940 Sraffa read again the first volume of *Capital*: this re-reading was crucial for him. The object of inquiry with which Sraffa dealt was however typically Ricardian: the determination of relative prices in a free-competition setting, given what may be called the 'productive configuration' (that is, both the means of production and the output are known 'given' magnitudes), and given the rule of distribution of the surplus (equal rate of profits). It was Ricardian because the length of the social working day is taken as given (Rowthorn, 1974; and Preti in this volume).

Contrary to what the 1998–2002 readers of Kurz's papers might easily have guessed, the hero of Sraffa in this phase was Marx, even more than Ricardo. The *SP* show that Sraffa was then convinced that his book was a restatement of the substantial soundness of Marx's economics, and strong rejection of Bortkiewicz's criticism. This in a sense was true even of Marx's LTV, his price theory, and his law of the tendential fall in the profit rate. Sraffa – reluctantly – had to change his mind on this, but how far this change of mind goes has yet to be assessed. Then we have the final round of elaboration for the book, mostly between 1955 and 1958. What is sure is that even after publishing his book in 1960 he maintained a positive judgment on Marx's transformation procedure. He even used his conclusions to propose a redefinition of the notion of exploitation based on labour commanded rather than labour contained, but still in relation to Marx. And we do even find some points of contact with the NI which have to be evaluated.

The 1920s: From the 'metaphysics' of value to the equations

Before the end of 1927, Sraffa considered Marx in some notes titled *Avventure della teoria del valore* (D1/3/3–4). At this stage, for Sraffa the opposition between the classical and a neoclassical like Marshall lies mainly in their respective metaphysics. The two perspectives, rather than alternative or complementary, are for Sraffa simply aiming at different problems (D3/12/3/16). Classicals start from a social point of view, and their main theme is, first of all, the macro-determination (and thereby the cause and nature) of the value of all commodities, and then its consequent distribution. The Moderns, as Sraffa calls the neoclassicals, concentrate on the micro determination of individual prices, and identify the distribution among factors with the price determination (D3/12/3/4–5). According to

the Italian economist, the two approaches should be named differently: the first 'value theory', the second 'price theory'. Each one is deemed adequate relative to its own chosen object of analysis.

Sraffa 'begins' from Marshall because he thought that he was (partly) compatible with Marx. What is for sure is that Sraffa's perspective on Marx, as well as on the classical started to change from the autumn of 1927 and the winter of 1927–8, when the theoretical construction of *PCMC* begins. Garegnani (2005) sees in these months a fundamental 'turning point'. The methodological view, and the historiographical position, may appear at first sight to remain the same. But it is in these months that we see the beginning of Sraffa's reconstructive theoretical effort based on 'physical real costs', which in the end refers to the subsistence directly and indirectly necessary to produce the commodities. Physical real costs were in opposition to Marshall's subjective real costs. It meant a break with his prior reading of the classical in terms of constant returns (Garegnani, 2005, p. 475), and the rediscovery of the Quesnay–Smith–Ricardo 'surplus approach' (with surplus being the excess of the product over the initial stock, and hence over cost).

In notes from at the end of November 1927 Sraffa writes:

> I foresee that the ultimate result will be a restatement of Marx, by substituting to his Hegelian metaphysics and terminology our own modern metaphysics and terminology [...] This would be simply a translation of Marx into English, from the forms of Hegelian metaphysics to the forms of Hume's metaphysics. (D3/12/4/15)

In this first period of the formation of *PCMC* 'physicalism' takes an extreme shape. The wage is given in real terms, as an inventory of commodities, almost biological. Sraffa refers to a 'degeneration' in the notion of cost and value, leading from what he sees as the correct view, of Petty, reducing cost to 'food' and looking at subsistence as a 'physical' entity, to the less clear-cut perspective of Ricardo and Marx, which substitutes 'labour' for cost. However, Sraffa insists that the notion of labour in Ricardo and Marx 'was still near enough to be in many cases equivalent' (D3/12/4/5). It is then quite natural that in the *Lectures on the Advanced Theory of Value* of 1928–31 the divide between the two value theories is found in the different notion of cost: Petty–Physiocrats on one side; Marshall on the other. For the former, it is mainly the stock of material (i.e., food for the workers) required to produce a commodity. For the latter, the cost of production is the sum of efforts and sacrifices involved in abstinence and in labour of all kinds that is directly or

indirectly required to produce a commodity (D2/4/18). In the one case, cost is something concrete and tangible that can be observed and measured empirically, necessary for production on the same foot as primary commodities of means of production. In the other case, cost is something private (i.e., subjective) that can be measured only through the money that must be disbursed to overcome the disutility. That is: quantity of things used up in production versus individual motives and satisfactions. From here it follows the presence, or absence, of the 'surplus' (the 'net product'), in competing theoretical approaches.

In this 'physicalist' approach value is linked to nothing more than the material cost. What about labour properly speaking? Sraffa writes that Marx's metaphysics was quite reasonable: unfortunately, after so many decades, it was no longer understood. The difficulty to be overcome is one of 'translation'. Kurz and Garegnani are right that in the late 1920s Sraffa strongly criticised the idea that relative prices has anything to do with human labour (D3/12/9/89 and D3/12/11/36). But this does not lead Sraffa to a wholesale rejection of the LTV, if the latter is disjointed from just a too-crude theory of relative prices. The Italian economist distinguishes between two notions of human labour: first, as the cause of value, which creates all outputs and values; second, as 'one of the factors of production ("hours of labour" or "q. of labour" has a meaning only in the latter sense)' (D3/12/11/64). Sraffa is criticising only the view according to which the value of the individual commodity can be traced back to the quantity of labour alone, and not the other perspective. This latter is not far from the 'macrosocial' point of view which, one way or another, is at the heart of the current macro-monetary approaches to Marx. There is however a problem with this macro perspective, Sraffa suggests. It cannot be observed, and then it cannot be measured. It is merely a qualitative perspective.

Sraffa was then slowly building an alternative way for the determination of prices, in the Classical-Marxian line of 'natural' or production prices. In this prehistory of *PCMC* he started from what he called 'first' and 'second' equations. The former are equations without surplus; the latter are equations with surplus, with labour reduced to the means of subsistence reproducing it. On this issue we find a remarkable divide among Sraffa's followers. Kurz and Garegnani are keen to separate Sraffa's discovery procedure of his equations from reference to Marx. They insist that the drafting of the equations must be situated on the background of the problem with which Sraffa opened his 1925–6 articles and his critique of Marshall, and the difficulties he met on the way so that eventually he encountered Ricardo, and before him Petty and the

Physiocrats. Marx has no privileged status in the analytical construction of the 'core' (although he may have had in preparing the way, or on other issues). De Vivo (2003, pp. 6, 9–10) and Gilibert (2003, p. 28), on the contrary, put forward a different hypothesis: that from the late 1920s Marx – not Marshall nor, Ricardo nor Petty plus the Physiocrats – was the inspiration. Not, however, as one might expect, the Marx of *Capital*, Volume I (the Marx of 'labour-values') or the Marx of *Capital,* Volume III (the Marx of the prices of production). Rather, the Marx of *Capital*, Volume II: the Marx of the schemes of reproduction. According to both authors, Sraffa already knew Volume I before the War. But before his *Lectures on the Advanced Theory of Value* Sraffa was able to read in French *Theories of Surplus Value* and *Capital II*. Marx was then Sraffa's true starting point, even though these authors maintain that this had nothing to do with adopting a 'strict' Marxist point of view on the LTV.

The 1940s: From the Hypothesis to the Standard commodity

Coming back to work on his book in the early 1940s Sraffa sketched a 'Hypothesis' which he believed was close to Marx, and which he also labelled 'My' Hypothesis. The 'Hypo', as he often shortened it, will crucially drive his research, and will be reluctantly abandoned a few years later, leaving however permanent traces. The 'surplus rate' (i.e., the physical ratio of the social product over the whole of the anticipated means of production) is set equal to the 'maximum rate of profits' (i.e., to the value of profits over the value of anticipated capital when wages are zero: a ratio which may also be read as the value of the net product, or gross income, over the value of the means of production, or of the non-wage capital advanced). The Hypo asserts that, though income distribution may be influenced by prices, this ratio, on average, is not, and it is constant. Through the Hypo, Marx seems to be not so much the starting point of Sraffa's investigation but rather quite the end of the road. Let us see why. Sraffa's 'third' equations, with surplus and an equal rate of profit, were written down in the early 1940s (cf. Gilibert, 2003; de Vivo, 2003). At first, when labour was explicitly considered, it was considered as paid in advance, unlike in *PCMC*. Between 1940 and1943 Sraffa holds fast to the 'Hypo' as long as he can: it amounts to taking gross product and non-wage capital as identical composite commodities. It is like a one-commodity system, or a system where inputs and outputs have the same 'composition'. Nowadays this looks like the most un-Sraffian proposition of all, depending on the composition of capital being the same for product and capital (de Vivo, 2003, p. 16 ff.). If this condition could be granted – and

it cannot – the price determination could have been pursued referring to labour-values all the way through, despite deviations.

Sraffa starts with prices when the rate of profit is nil so that prices are equivalent to labour-values. This allows the evaluation of the net product and capital at these prices. According to the Hypo the ratio between the value of the product and the value of capital is taken to be constant, whatever the profit factor. That ratio is the same as R, the maximum rate of profits, which in its turn can also be read as corresponding to Marx's 'value' rate of profits with no variable capital – that is as the ratio of total surplus value over constant capital when there are no wages. The actual rate of profit is then determined, and through it the actual prices are fixed. In a way, this is a substitute to Marx's successivist transformation procedure. Indeed, if we assume that the value of net product and the total quantity of labour employed are 'normalised', setting both equal to unity (so that the former is the standard for prices, and the latter the standard for labour), two conclusions follow. First, the wage becomes Ricardo's 'proportional wage' (the share of wage in national income) and close to Marx's 'relative wage' (which is the inverse of the rate of surplus value). And, second, a clear and transparent fundamental relation emerges, $r = R (1 - w)$, with r and w inversely connected through a linear equation. From here, the actual prices of production can be computed at the different levels of the wage.

We are not too far away from the conclusions in Part I of *PCMC*. The route by which those conclusions are reached contrast with the view that Sraffa had no analytical role for labour-value. It is indisputable that under the presuppositions of the Hypo, and of an equal composition of capital, not only Marx's but also marginalist value theory would be rescued unscathed. It is also true that Sraffa quickly realised that his Hypo could not play the role he hoped for because it lacks generality. If compositions of capital differ, the proportions of surplus value and of profits in Social Income are not the same. But the Hypo, plus originally an argument about balanced reproduction, allowed Sraffa to see that prices are proportional to labour-values when the rate of profits is zero or is at its maximum, and to argue that the divergences of prices at the intermediate positions were nothing but 'deviations'. In the early 1940s, when Sraffa still hoped he could argue for the generality of his Hypo, he wrote a note, *Crosscap* (D3/12/16).[1] It showed, more or less, the sequence of the argument he had in mind to develop in the book. He was convinced that his study would have shown that Marx was

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[1] The note is in Italian. It is quoted in its entirety in Bellofiore (2008, pp. 89–90).

unequivocally correct. The point was, Sraffa insisted, that this should be kept *hidden* to the implied reader all the way through, and to be revealed only at the end of the book. It was an exceedingly confident program.

In August 1942 Sraffa realised that there was no way to escape the conclusion that the Hypo was not general. The argumentative sequence just sketched no longer holds: something that he felt as a 'disaster of the model' because the wage-profit relationship loses its linearity (de Vivo, 2003, pp. 17–18; Gilibert, 2006, p. 46; the lack of 'transparency' of exploitation in a Marxian meaning must have played a role here). As Gilibert reminds us, the procedure should rather be as in *PCMC*, with the wage paid *ante factum*: First, starting from a given productive configuration, computation of R, the maximum rate of profits; then, construction of the Standard system; at this point take this latter as the reference to measure wages and prices; eventually, determine the relative prices starting from the equal rate of profits going on at each wage rate. A mediation is now necessary to obtain this result, the Standard commodity, as an *ad hoc* construction derived from the Standard system which is implicit in the 'real' system.[2] The Standard commodity was first identified in January–February 1944 and progressively displaced the Hypo which, however, as we shall see, did not completely disappear, and will resurface much later.

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[2] For an argument about the reasons why Standard commodity was so important for Sraffa see Gilibert (2006, pp. 47–8). Sraffa was interested in showing the conditions which make prices 'necessary' so that the regular reproduction of the system may be granted. When labour is not explicitly introduced the necessity has to do with technological-biological matters and (in the case of an economy producing a surplus) with the institutional role of the equal distribution of profits amongst industries. When labour is introduced explicitly, however, the distribution of the surplus between (proportional) wage and profit (rate) creates the appearance that what is to be distributed is affected by distribution. If the wage is measured in terms of the Standard commodity the distributional setting seems to be fixed logically before prices. There is something more, however. As Claudio Napoleoni wrote: 'the measure problem, the reduction of things to a homogeneous state, has already been resolved in Sraffa by means of his system of equilibrium, in which the choice of standard measure is, at least in principle, totally indifferent. A functional relation between profit rate and wage can be obtained using any standard measure, and this is all that is required to proceed to a surplus value theory. The fact that such a relation is linear when the Standard product is used as a basis for measure, may perhaps make this particular standard measure

Bortkiewicz and the production of commodities by labour out of commodities

Let us now devote some attention to Sraffa's criticism in 1943 against Bortkiewicz (B). Concerning the 'Black Notebook' (archived as D1/91) where the critical reaction by Sraffa is embodied, we can profit from a very long and good article published in 2006 by Gehrke and Kurz (GK). It is most interesting because it signals a shift in emphasis relative to Kurz's earlier papers. To give the background essential to understanding the comments to B, GK have to recognise that 'Sraffa at the beginning of the 1940s credits Marx with a number of *analytical* achievements' (GK, 2006, p. 109, emphasis added). They observe that this was something peculiar to this period: in the period 1927–31 the Italian economist looked unaware of these achievements, and his findings 'must have come as a formidable surprise to him' (GK, 2006, p. 109). Amongst Marx's criticisms of Ricardo appreciated by Sraffa are the following: the proposition that Ricardo wrongly identified the rate of surplus value with the rate of profits, and that thus the latter may fall with the former remaining constant; even more so, the view of the system of production as a circular process, as in the Physiocrats, with capital composed also by constant capital (other commodities) and then not resolved entirely into variable capital (wages) in a finite number of steps; from which it follows that the actual rate of profits was bounded from above by a maximum rate of profits (total direct labour expended in the year over social constant capital), which, as we have already said, is nothing but the inverse of the composition of capital of the system as a whole.

According to GK, Sraffa's 'Hypo" is nothing more than Marx's 'Value Hypothesis" but with the refinement of making the social capital to social output ratio independent from the rate of profits; and GK admit that the terminology adopted by Sraffa is very often related to Marxian value theory. Let us consider some themes in the Notebook. Sraffa rejects B's criticisms against the transformation of values into prices as well as against the 'law' of the tendential fall of the rate of profit. Regarding the first issue, a recurring theme in Sraffa's considerations is

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more useful than others – it does not, however, give it any particular theoretical importance' (Napoleoni, 1961 [1992], p. 262). I shall show that actually the choice of the standard Sraffa operated in the first two chapters, and that has some parallel with NI, was not so neutral. At the same time, I agree with Napoleoni that the role of the Standard commodity should not be overstated, as I think is done by some Marxian intepreters of *SP* who are influenced by the NI.

that B, following Tugan-Baranowski, assumes different compositions of capital in the three sectors of the schemes of reproduction (D1/91/10–1). To affirm, like Marx, that the mass of profits is equal to the mass of surplus value, so that the two are in the same proportion relative to Social Income, the capital composition must be the same in the various sectors (D1/91/19–20). Marx argues that values and prices are identical for the products having the same composition of the social average. B complains that the reference should have been to the commodity taken as the standard. Sraffa retorts that Marx was implicitly taking the Social Product as the standard: and, for social capital, the organic composition is truly the most instructive element.

Against B, Sraffa brings up a formal objection, together with a more fundamental one. Let us start with the former. As GK remind us, B does not clearly distinguish constant and variable capital, and reduces their difference to the rotation period of capital. But the reduction to dated labour can be done only through an infinite series, not a finite one. This infinite reduction cannot ever be pursued to the end since in practice there always remains a commodity 'residue' which can never be set aside, as long as there is a positive rate of profits. Interestingly enough, however, Sraffa goes on adding that the true, basic objection to B is another one:

> [T]he real objection (though somewhat vaguer) is this: that B's point of view, for the sake of obtaining absolute exactness in a comparatively trifling matter, sacrifice (by concealing it) the essential nature of the question – that is, that commodities are produced *by labour* out of commodities. (D1/91/16; emphasis added)

As a consequence, the necessary 'correction' due to the deviations of prices from values must always be seen exactly like that: as a modification relative to another, different starting point. If this is forgotten, as in B, the solution 'while it supplies exactness, it obscures a fundamental fact'. With this comment by Sraffa, we are of course projected forward: we even see straight in front of us the same title of his 1960 book. But with an interesting qualification: production of commodities 'out of' commodities is done only through – and, then, owing to the expenditure of – labour. This is something that cannot be cancelled without obscuring a major fact, without disguising something vital and necessary to the theory. Almost the the title itself of *Production of Commodities* can be found in a paragraph of the very long book by T.A. Jackson *Dialectics*.

The Logic of Marxism included in the Sraffa Collection. In Sraffa's copy the following passage is marked on the margin:

> Marx begins with the most central fact in capitalist economy in its most general aspect: *the Commodity*. A commodity is something produced. But not all things produced at all times are commodities. They are commodities only so far as they are *exchanged*; and in their developed form exchanged for money. They are capitalistically produced when the labour of production is that of wage-labourers, hired, (i.e: *bought*) in a relatively 'open' or 'free' market. Capitalist production is therefore a system of producing commodities *from* commodities (raw materials, machinery etc.) *by means* of commodities (the labour power of wage labourers). This universalisation of the commodity and all that it implies is *the* distinguishing fact of the capitalist economy. (Chapter VI: The Dialectic of Capitalist Production)

In his notes against B, Sraffa insists that Marx's transformation is approximately correct, and that values must be taken as the starting point of the corrections. The argument is that there is no reason to think that capital compositions systematically differ. The point is clearly linked to reading Marx's Value Hypothesis through the prism of Sraffa's own Hypo, redefined as a Statistical Hypothesis (on which see also GK, 2006: pp. 111, 143), based on the compensation of large numbers (D3/12/35/28). We meet the same argument again in 1945, after the identification of the Standard commodity, in the context of a rebuttal levelled against Böhm-Bawerk. The correct profit rate is not in labour-value terms but in production price terms. However, the Hypothesis:

> that the average organic composition of the means of production + that the net product are approximately equal; + that therefore the price ratio of the two aggregates is approximately constant with respect to variations in the rate of profits is equivalent to saying that the <u>price</u> of the net social product, at all values of r, is equal to its <u>value</u>, if both are measured in terms of the Standard Commodity. This is the same as the well-known statement of Marx that 'in society, considering all branches of production as a whole, the sum of the prices of production of the commodities produced is equal to their values' (Kap. III, 1, p. 138). And he adds: 'It is <u>only</u> in capitalist production as a whole that this general law maintains itself as the governing tendency, always only in a very intricate and approximate manner,

as the constantly changing average of perpetual fluctuactions' (ib., p. 140). Böhm takes this for a tautology of which he makes fun at great length [...]. However, it is not <u>exactly</u> but <u>approximately</u> that the two a larger number of different commodities, which are chosen for their technical properties + these are quite independent of the organic compositions of the capital producing them. (D1/91/40–1)

We can now go back to the 1943 notes. Sraffa admits that B 'appears justified in concluding that, given the wages in commodities, + the methods of production of wage-commodities, the rate of profits is ipso facto determined, no matter what happens in luxury-industries'. But – Sraffa asks – what is the meaning of what Marx is trying to do? And why does he take a road which turns out to be partially wrong? This is Sraffa's answer:

What Marx does is, on the one hand (1) to take wages as given (inventory) in commodities, for subsistence, and on the other (2) to take the mass of profits as a given proportion of the product of labour. The two points of view are incongruous, and are bound to lead to contradictions. But B. wants to solve the contradiction by bringing (2) into agreement with (1). On the contrary, the correct solution is to bring (1) into agreement with (2). For the point of view of (1) useful as it is as a starting point considers only the fodder-and-fuel aspect of wages, it is still tarred with commodity-fetishism. It is necessary to bring out the Revenue aspect of wages; + this is done by regarding them as w, or a proportion of the Revenue. This is (1) brought to agree with (2); and the conclusion that all capital must be taken into account for the rate of profits becomes true. (D1/91/20)

Any mechanistic view of distribution must be abandoned, in favour of a view where distribution is linked to social aspects. More than that, the Italian economist clarifies that the transformation of wages into the proportion concept means introducing (in all but name) money, taking the Annual Revenue (the price of net product) as unit of money (D3/12/35/9:1). We are very far away from the strong 'physicalist' position of the Sraffa of the 1920s. Sraffa's 'objectivism' slides towards a 'conventionalist' position. GK are actually putting forward all these analytical elements but conclude with a defensive statement of the Sraffian position: 'Marx was only driven to adopting his *erroneous* transformation algorithm because it did not have the method of simultaneous equations at his disposal' (2006, p. 124, my italics). A phrase

like this is clearly at odds with Sraffa's own repeated statements on the transformation.

The notes on B also reject the latter's criticisms of the tendential fall in the rate of profit. Here I agree with GK. The rate of profits depends on the maximum rate of profits (the inverse of capital composition) and the rate of surplus value (the proportional wage). Sraffa reads Marx's argument as one in which accumulation abstracts from innovation, and technical knowledge is constant. This reading of Marx is untenable. Under Sraffa's assumptions, however, it is true that, if distribution does not change, and if the maximum rate of profits falls, the actual rate of profits must fall too.

Use of the notion of surplus value

The above reconstruction justifies a positive answer to the question if, arguing in the way he does against B, Sraffa changed his mind relative to the late 1920s significantly. But we may also raise a more intriguing and interesting question. Does the Sraffa of the early 1940s find room for a LTV in a different sense than a particular law of exchange determining individual prices, a sense which may give some quantitative content, and not only a qualitative understanding, to the connotation of labour as originating value? Different from most Sraffian authors, I do think that the Marxian LTV maintains a significant, though implicit, theoretical, explanatory, even quantitative, role for Sraffa. It is very unlikely that we shall ever find a 'smoking gun' to confirm the conjecture that Sraffa sides with the macro view that the social product can be traced back to nothing but labour, and that the latter has to be seen as the source of the former. But we may advance a speculative reconstruction, supported by many traces dispersed in the unpublished material, making that conjecture a reasonable one. More than that, it appears to be a promising starting point to locate Sraffa in a critical political economy perspective.

The most important series of documents for the view I am putting forward are the notes beginning from 13 November 1940, the first one being titled *Use of the notion of surplus value*. The discourse starts with a quote from *Capital*, Vol. I, chapter 16.[3] The quote must be read on the background of the second paragraph of Chapter 7. There Marx builds a hypothetical comparison between two situations: the one where living

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[3] 'The prolongation of the working day beyond the point at which the labour would have produced just an equivalent for the value of his labour power…'. This quote is taken from p. 518 of *Capital* Vol. I, edited by Dora Torr, in the Sraffa Collection.

labour is equal to necessary labour, and the other which assumes the *prolongation* of the social working day relative to that situation with prices unchanging. Since in the first situation there is no rate of profits, prices cannot but be proportional to labour-values. Sraffa turns on its head Marx's reasoning, speaking of a shortening of the social working day: the product is reduced, so that the surplus disappears. The choice, says Sraffa, is between starting from actual prices which equalise the rate of profits on advanced capital, or values which equalise surplus value for workers (D3/12/46/59). What is interesting is not only that Sraffa deems situations with prices proportional to labour-values as theoretically meaningful and the essential starting point for theorising, he also understands that Marx's comparison is based *not on a reduction of wages* which starts with given 'methods of production' (known levels of inputs and outputs) and the remuneration of labour exhausting the value of 'net product'. It is rather constructed around a thought-experiment with a 'lengthening' of the social working day relative to the situation in which living labour matches necessary labour (for an early interpretation on this line, cf. Bellofiore, 1980). Since Sraffa's object of analysis is a typically Ricardian one, he had to rephrase this comparison to make it adjusted to the issue of the simultaneous determination of prices and distribution. This meant to turn upside down Marx's contrast (as Kurz, 1998, 2002 rightly sees): that is, he had to 'cut down the product', which is the same thing as shortening the working day relative to the actual situation.

In the end Sraffa had to revert to the usual practice – namely, to begin his discourse when the process of production has ended. Living labour – which, for Marx, is intrinsically variable – is now just the direct labour expended in the period, and which is definitely dead in the commodity. This is in fact what we 'see' in the 'snapshot' depicted in *PCMC*. At that point, of course, the distinction between labour-power and living labour risks being forgotten. To talk of a variability of the social working day, on which Marx's comparison is predicated, is now out of the question.

The important point to be stressed is that the Sraffa of the *Use of the notion of surplus value* appears to grasp what others, including most Marxists, did not. Marx's main theoretical problem was first of all, and mainly, that of the 'constitution' – that is of the *formation* – of economic magnitudes. Marx's answer to the question about the origin of surplus value revolved around the extraction of living labour as a variable amount. We do not have here any comparison based on the capitalist distortion of some 'natural' economy (Croce), or of a 'generalised' commodity exchange (Rubin). In the no-surplus situation the 'true' costs of the actual economy are revealed: the not-so-hypothetical economy

which is the term for the comparison defines the 'necessary labour'; it also fixes those exchange ratios (labour-values) which for Marx are instrumental to explain the generation of the surplus, before the determination of (production) prices based on specific rules of distribution of the latter. Inside the capitalist labour processes the expenditure of the living labour 'making up' the productive configuration is going on *after* the buying and selling of labour power. Capital as a whole is able to get (surplus) value if and only if it is capable of forcing workers to work in immediate production as a 'contested terrain'. All this, of course, happens well before the production process comes to an end, and therefore before commodities are materialised and subsequently exchanged on the market. This is, in my view, the ultimate foundation of bringing the 'new value added' in the period back to the 'living labour' which has been extracted from the living bearers of labour power.

After Sraffa's book, and after the debate of the 1970s, we now know that looking at capitalist production *post factum* cannot but make Marx's LTV (as an individual price theory) redundant. This conclusion does not apply if economic theory begins from the *constitution* of the data which are taken as givens by the surplus approach. It is intriguing that Sraffa, in preparing his book, did in fact mete out exactly the argument which grounds the idea that national income, as the value added in the period comes out from a production of commodities by means of commodities which has to pass through the prolongation of the working day. This is something which cannot be taken for granted, if the distinction between labour power and living labour is taken seriously. Indeed, labour power is 'attached' to living human beings. Hence living labour, while being capital's labour after the buying and selling of the capacity to labour on the labour market, is (and cannot but be) at the same time workers' living labour, because it is *their* activity. Thus, (capitalist) production of commodities is *essentially* – and first of all – the *consumption of the bodies and minds of workers as bearers of labour power*, so that commodities may come out of commodities. If things are in this way, the (monetary) net product exists only as long as capital has won class struggle in production. The total social working day cannot be taken as given in price determination, as in Ricardian approaches, without always reminding us of this fact. And, I contend, *this* is the LTV. The LTV as encapsulated in this Marx's quote:

> By the purchase of labour-power, the capitalist incorporates labour, as a living ferment, with the lifeless constituents of the product. From his point of view, *the labour-process is nothing more than the consumption of the commodity purchased,* i.e., *of labour-power; but this consumption*

cannot be effected except by supplying the labour-power with the means of production. (Marx, 1976, p. 285; emphasis added)

Production of commodities by means of commodities and the rate of exploitation

In *PCMC* Sraffa had to revert to the usual procedure of moving the wage and not the amount of labour expended in the production process. He had to start from the 'simple' rule where prices are proportional to labour-values, with the wage, as a share of social income, equal to 1, and consequently the uniform rate of profits equal to 0. Sraffa subsequently decreases the wage, so that a positive rate of profits arises. This forces a change in prices because of the different proportions between labour to means of production in the various industries. When distribution changes, complex variations of prices set in. Yet, there is the extreme case when $w = 0$ and $r = R$, the maximum rate of profits. Sraffa remained firmly convinced of a strong parallel between his conclusions and Marx's. This remained true after the collapse of his Hypo, as well as after the 1960 book. This continuity may be easily framed referring to the 'macro' identity of the value added in the period by workers over and above constant capital, on one side, and the living labour which is exhibited in money, on the other.

In the early 1960s we still find a defence of Marx's transformation. This defence is found in Sraffa's replies to some commentators who questioned the continuity between *PCMC* and Marx. In his 'Rejoinder to Napoleoni' we meet again the Value Hypothesis interpreted as a Statistical Hypothesis. The argument is the one we already know. Marx's transformation, with aggregates measured in labour-values, is 'approximately' correct. But now the 'approximation' can be made precise through Sraffa's own Standard commodity. The Statistical Hypothesis looms even larger in what Sraffa wrote on John Eaton's (1960) review article (originally in Italian, and translated in Bellino, 2006):

> It is clear that M's pros…are based on the assumption (justified in general) that the aggregates <u>are</u> of some average composition. This is in general justified in fact, and since it is not intended to be applied to detailed minute differences it is all right…. This should be good enough till the tiresome objector arises. If then one must define which is the average to which the comp. should conform for the result to be exact and not only approximate, it is the St. Comm.

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> But what does this average 'approximate' to? i.e. what would it have to be composed of (what weights shd the average have) to be exactly the St. Com.?
>
> i.e. Marx <u>assumes</u> that wages and profits consist <u>approximately</u> of quantities of st. com. (D3/12/111/141)

I referred to this material in 1998 (in a paper with Potier[4] and in some comments to Panico). Among the very few authors considering these quotes are now Kurz and Salvadori (2010): but they sterilise the reference to the labour-value approach, and read it only through the lenses of the Standard commodity. It is unclear to me why one feels the need to defend the Value Hypothesis (as a Statistical Hypothesis), since Sraffa himself had already reached a superior determination of prices, given the methods of production, based on the equality of the rate of profits and the conflictual distribution of the surplus, erasing (so to speak) the Marxian one. That defence would be understandable before the collapse of the model in August 1943. Why is it maintained later?

In my view, this point cannot be fully appreciated if one stays within the boundaries of the analytical object described in *PCMC*. What is needed is to go 'behind' the given methods of production, beyond what may be called their fetish-character. The 'photograph'[5] of the inputs and the outputs 'after the harvest' must be recognised as simply the last instantaneous picture of a 'movie', so that the productive configuration has a history. In other words, one has to go back to the process

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[4] The relevant sections of our 1998 paper are now in English (Belloffiore and Potier, 2011), where the reception of Sraffa's book and his reaction is treated in detail, especially with reference to Marx. It contains also the integral translation of the Rejoinder to Napoleoni. On this correspondence there is also an excellent unpublished paper by Gehrke (2007).

[5] A student of the University of Saarbrücken, Rüdiger Soltwedel, preparing a PhD thesis on 'Sraffa's *Production of Commodities by Means of Commodities*' wrote to him on 28 February 1968 to get some advices (*SP* C294/1–2). Sraffa answers him on 1 March (*SP* C 294/2): As regards your own interpretation, I must say frankly that you have gone astray the moment you speak of 'equilibrium' or of 'elasticity of factor supply':

> all the quantities considered are what can be observed by taking a photograph, there are no rates of change, etc. This point of view was that of the classical economists (e. g. Ricardo) whereas supply and demand curves were introduced in the middle of the nineteenth-century. Economists are now obsessed with them and cannot think without them. My chapter V, which gives you such a headache, could be understood as an attempt to solve a problem set by Ricardo, and which I described in my Introduction (sections IV and V) of Vol. **I** of the *Works* of Ricardo. (1951)

of the 'constitution' of the 'givens' in Sraffa's book. And to understand how this has to be done, the long distance, lonely run Sraffa undertook to reach his conclusions – the many decades spent to write *PCMC* – is certainly not redundant.

What's for sure is that, if one has in mind Sraffa's note *Use of the Notion of Surplus Value*, the 'normalisations' in §10 and §12 of *PCMC* take a different, deeper meaning. In §12 the national money income, which is nothing but Marx's monetary 'value added' (under the hypothesis that all workers are productive) is taken as the standard of prices. In §10 the direct labour of the society, which is nothing but the objectification of living labour, is also set equal to 1. Putting arbitrarily the MELT also equal to 1, this looks analogous to the 'postulate' of the NI proposed by Duménil and Foley referred to above. Dario Preti, a non-academic Italian researcher, rightly has insisted in unpublished writings since the early 1990s that this in a sense is nothing but the LTV in disguise (for a published paper, cf. Preti, 2002). It is what another Italian scholar, Stefano Perri, labels the 'identity of the new labour-value'. Marx's argument that behind the new 'value added' exhibited in money there is nothing but the prolongation of 'living labour' over 'necessary labour' was rediscovered by Sraffa in his notes about the *Use of the notion of surplus value*. We cannot exclude that Sraffa had something like this at the back of his mind, as non-formal theoretical ground for his normalisations: and even if not, the attribution of a meaning like this is quite natural from a Marxian viewpoint.

Of course, if one gives this deeper meaning to the normalisations in §10 and §12 an important consequence follows. With a 'degree of freedom' in distribution, and with national income 'exhibiting' the total direct labour in the period, the wage as part of the (monetary) net product is, immediately, an expression of *nothing but* a quantity of labour. Not, however, as the labour 'contained' in a given real commodity basket, rather as the labour 'commanded' by the money wage as a variable share. This consequence was fully appreciated by Sraffa himself. He quite consciously, in his dialogue with Eaton, goes as far as to re-read his scheme as a novel characterisation of what he insisted on calling the 'rate of exploitation', seeing this latter as a division of the social working day (a point which seems to escape Porta's attention in this volume). For Sraffa the rate of surplus value, interpreted in the traditional way, becomes ill defined. For him, if there is 'freedom' on how to spend the money wage bill, the labour contained in it is indeterminate. It changes with the commodities bought by workers. Not so, however, if the rate of surplus value is interpreted at prices of production – namely, as the labour commanded by the (money) wage. As a further confirmation

of this interpretative suggestion it is interesting that, in the notes on Eaton, Sraffa offered his own 'Marxist' reading of the allusion in §44 of *PCMC* according to which the independent variable in distribution is taken to be not the wage but the rate of profits. The reason given is that the latter is ruled by the rate of interest fixed by monetary policy and by the banking system, and once again the rate of exploitation and the approximate nature of Marx's transformation are at the forefront:

> It seems to me that the only rational way to calculate is by starting with the interest rate *r* (which is a matter of observation) and to deduce from it *the rate of exploitation* that is, the standard wage *w* and from that arrive at the surplus value rate
>
> $$\frac{1-w}{w} = \frac{1}{w} - 1$$
>
> The wage and the aggregate profit in this situation are, at best, *rough approximations* of the standard wage and profit. But the profit rate in this situation is identical with the standard one.[6] (D3/12/111/139)

Sraffa as the true Marxist?

Some of these conclusions have been taken up in the last few years by other authors such as Gattei and Gozzi (2010) and Perri (in the various papers quoted below) in Italy and Scott Carter (2009, 2010a, 2014) in the US. We all agree that embedded in Sraffa's system is an implicit reference to Marxian value theory with his normalisations, equivalent to an identity between the new value added to constant capital by living labour and the price of the net product. We all see here a point of contact between *PCMC* and the NI reading of Marx's law of value. And then we all see a continuity between Marx and Sraffa, even on the controversial issue of the role of the LTV in his system, stronger than Sraffian authors customarily allow. That identity is a kind of 'conservation law' of value in terms of the net product of the economy, with the value of labour power redefined as a quota of the money net product.

There are however important differences between my reading and those proposed by these other authors. All of them (with the exception, maybe, of Preti, see his chapter in this volume) appear to identify the 'law of value' (the identity just recalled) and the 'theory of value': I rather

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[6] The original is in Italian.

think that the law of value has to be grounded, and that the grounding is precisely the theory of value. I have argued in this chapter that the 'LTV' – an expression which is a misnomer, since the 'value theory of labour' would be a much better expression (the reference here is to Elson, 1979); and 'monetary value theory of labour' would actually be the best to fit Marx's approach – has to do with the 'constitution' of the monetary magnitudes, hence the reference to the 'method of comparison', that is the variability of the living labour. These authors, in fact, never distinguish the flow of 'living' labour and the gelatine of 'direct' labour, which is living labour's objectification.[7] This seemingly innocent move erases the *differentia specifica* of Marx's LTV. Easy then to put Marx on the same footing of a Ricardian 'productive configuration' characterised by given methods of production, and then to reduce his analytical core to *PCMC* or NI. This is why the redundancy criticism is still valid.

Against the Steedman critique, Sraffa is resurrected as (conjecturally) the 'true' Marxist, whatever he could have thought. The transformation problem – Gattei and Gozzi (2010) insist – simply disappears. On this proposition I concur: but the line of reasoning is very different. In my approach, once that it is explained – thanks to Marx's LTV as a theory of the formation of economic magnitudes – why and how the net product is nothing but the monetary exhibition of (socially necessary) labour time, *any* price rule would just redistribute a labour amount, *without* any need to maintain an equality between the labour equivalent of gross profits and surplus labour as the substance of surplus value, and between the labour-equivalent of the wage bill and the necessary labour as the substance of variable capital. If there is a divergence between these pair of variables, the problem is to understand its meaning, not to water it down. For Gattei and Gozzi the starting point is a case of a 'pure' labour economy where the LTV holds (a 'hypotethical' reference, which in my view has no import in a Marxian approach, and is actually conflicting with it). Then, they show how Sraffa could have generalised that case in a coherent way to consider the case of production with labour and produced means of production through the adoption of the identity of the new value with direct

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[7] The term 'gelatine' is a translation of 'gallerte' which Marx used in the original German *Das Kapital*; and phrase '*bloße Gallerte unterschiedsloser menschlicher Arbeit*' has been erroneously translated in the first English edition as 'a mere congelation of homogeneous human labour'. The term 'gallerte' reflects something in between the living labour which is fluid and the objectified direct labour which is dead in the new value.

labour (i.e., thanks to the normalisation in §10 and §12). Following this suggestion, as in the NI, Marx's equalities (rewritten as referring to the net product) are maintained. As a consequence the transformation replicates Marx's results, and these authors conclude that 'gross profits are surplus labour'. In this way the historical immanence and the theoretical significance of Marx's notion of abstract labour – its break with both Smith's 'labour commanded' and Ricardo's 'difficulty of production' – are simply jettisoned away. For them, as for the NI, the role of the subsistence wage is downplayed.

The question of whether there is something important to be learned from the tension between Sraffa, the NI and Marx, is simply not asked: the implicit answer being that it is a 'philosophical' issue, not an 'analytical' one; as if in Marx the two aspects could ever be dissociated. A very similar line of attack is taken by Perri. In a first period, until 1997–8 (see Perri, 1991, 1996, 1997), Perri tried to articulate Foley's NI together with Pasinetti's analytical structure of vertically integrated sectors. He argued, against Marchionatti (1993), that it was possible to mathematically define exploitation in a Sraffa-based model. This however is clearly insufficient to rescue the significance of Marxian LTV, or even to answer properly Marchionatti's criticism. Salanti (1990) was the one who actually started this stream, but he always correctly insisted that exploitation can be neither confirmed nor rejected by formal arguments. I disagree however that, then, the matter is just about metaphysical beliefs.

Following some of my contributions, on Marx (Bellofiore, 1996a) and/or the *SP* (since 1998) Perri (1999, 2003) eventually undertook a much more promising perspective, and developed also analytically a view on the Marxian LTV as based on a 'counterfactual' argument. In more recent years, he looked at the relation in Sraffa between the profit rate and the proportional wage (Perri, 2010). The wage rate is described in terms of quantity of values and not as a 'subsistence'. However a given real wage is essential to the counterfactual comparison in the way Marx employs it – namely, as a discourse on the constitution of the givens (the economic magnitudes) through the exploitation (=use) of workers as living labour power. I see here, more than a contradiction, a true difficulty which asks for a true original theoretical development, going beyond Sraffa and NI.

Perri follows Sraffa in trying to look at the relation between the wage rate and the rate of profits in objective, even 'material', terms thanks to the Standard commodity. In his interpretation, technical change (in the form of mechanisation) gives way to a higher composition of capital, which leads to the tendential fall of the rate of profit (Perri, in

this volume and 2010). Sooner or later, in the dynamic process of accumulation, the actual rate of profits is bound to fall too. Perri acknowledges that Sraffa did not believe that this would apply over a long period of analysis since technical change will have a different quality, going beyond a given technical knowledge and embodying innovations. Capital composition may not rise, and hence the counter-tendency may well be stronger than the tendency. The temptation is to see the 'law' as theoretically sound, and to leave to history or data its 'confirmation' (a move made by other authors, and on which I confess I do not understand Perri's position). Sraffa becomes the platform from which to rehabilitate Marx's most controversial positions. The question at hand here however is much simpler: is there a 'necessary' law, or not. Perri's argument is in favour of a 'conditional' law: so conditional that the distance from critics such as Sweezy or Robinson to me appears only verbal. And I doubt that it is faithful to Marx to articulate a method looking at the fall of (maximum, and then actual) rates of profits with comparative static exercises and *given* methods of production.

Carter's writings on the Sraffa Papers (listed above) have the invaluable merit to consider also, if not mainly, the development of the Italian economist's reasoning in the third and last phase of his preparation of *PCMC*, after 1955: a period on which I have not yet seen many contributions. Carter reads the normalisation between the value added by living labour and the price of the net product as I do. It is an identity posed at the 'macro' level between the labour 'contained' in commodities and labour 'commanded' by their prices. Unfortunately, as the other Marxists I considered in this section, this seems to exhaust for him the LTV. And this is too weak an answer to the Sraffa-based criticisms coming from authors like Steedman or Kurz.

Carter's original paper at the Bergamo Conference was explicit in viewing the Standard commodity as the same thing as Marx's 'gold as money', assumed to be an 'invariable standard of value'.[8] The problem has to do with the fact that, as Kurz correctly argues (2002: 186, 188), the Standard commodity can*not* be considered as a surrogate for the LTV. In fact, Marx insists, his LTV needs a *non*-invariable standard of value: exactly because money is a non-invariable measure of value it distorts and dissimulates the origin of capitalist abstract wealth. The Standard

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[8] 'Sraffa…seems to equate the fact that the "scaffolding" of the *q*-system of quantity multipliers can be discarded with the idea of "paper-money". The Standard commodity thus *does* seem to serve *as money* in Sraffa's system.' (Carter 2010b, p. 17).

commodity only gives transparency to the mathematical properties of the system and makes visible what is hidden. It is true that it is possible to determine the maximum rate of profits, to have evidence of the rate of profits as a non-price phenomenon, and to make linear the wage–profit relationship: but only within a *given* set of methods of production.

In my view, we have here a similar problem as that in Perri's argument, which also relies too much on the Standard commodity as a 'synchronic' version of the invariable measure of value. This is not a Marxian notion, may be it is not even a Ricardian one (though it is partially of Ricardian heritage). This is shown by the fact that 'diachronically', that is when methods of production change, the Standard commodity is different: Ricardo's invariable standard of value had instead to be the same synchronically *and* diachronically. That this fictional entity, the Standard commodity, does not have much in common with Marx's money can be shown with references to the texts. Marx wrote in the *Theories of Surplus Value* that in the sixth section of Ricardo's *Principles* there is 'nothing important' (MECW, 31: 426), whereas Sraffa thought that the Standard commodity was instrumental to a better understanding of the relationship between prices and distribution. The Ricardian quest for an invariable standard had an interest for Marx only as an anticipation of the category of an 'intrinsic', 'absolute' value. As he writes again in *Theories of Surplus Value* discussing Bailey, '[t]he problem of an "invariable measure of value" was simply a spurious name for the quest for the concept, the nature, of *value* itself, the definition of which could not be another value, and consequently could not be subject to variations as value. This was *labour-time, social labour*, as it presents itself specifically in commodity production'. (MECW, 32: 322). Of course, the issue of absolute, intrinsic value is exactly what Sraffian interpreters going back to Steedman eliminate as a meaningful notion in economic theory.

The distance between Marx's and Ricardo's LTV can be measured by the fact that Marx's money has to be variable because of his dialectic of the form of value, whereas an invariable measure of value was seen by Ricardo as the last defence of his own LTV: because, as long as the invariable standard of value is the same when the methods of production change (that is, as long as the synchronic and diachronic aspects of it are maintained), the divergence of prices from labour-values can be accommodated theoretically. Once the two aspects are divorced, and only the synchronic version matters (because we have to admit that the Standard commodity is different in different productive configurations), the consideration of the Standard commodity adds nothing to

the argument about Sraffa's adherence or not to Marxian LTV. That argument rests only on the interpretation of the normalisation through §10 and §12 of *PCMC*, an interpretation which is now possible to offer on the background of Sraffa's path to the book: as I tried to show in this chapter.

This of course puts into question the defence of the tendential fall of the rate of profit as a 'law'. The difficulty is that one cannot analyse the dynamics of accumulation assuming that technical change increases labour productivity through a higher capital output ratio, which would entail a decrease in the maximum rate of profits. In my view the separation between a logical/analytical side and a historical side in Marx's argument is unwarranted. Marx's point was that capital's drive to self-valorisation leads *autonomously* to a relative expulsion of workers from capitalist labour processes: with zero wages and a 24-hour working day there is a limit to the living labour, and hence the surplus value, which can be extracted from a given working population; instead, there is no limit to the increase of constant capital. That's why – he said – a higher *value*[9] composition of capital is necessary, and a falling rate of profits is a law. Unfortunately, technical progress in a dynamic setting with structural change, as in Marx, may give way to a devaluation of the elements of constant capital which may (more than) counter the fall in the rate of profits: no necessity, no law. The falling rate of profits argument in Marx can and must be rescued, but this can be done only by showing how the dominant counter-tendencies promote forces that push down again the rate of profits, within the LTV framework.

Sraffa, the new interpretation and Marx

What has been proposed here is a conjectural history that attempts to make sense of some of the notes relating to Marx which we find dispersed

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[9] These commentators, as does Perri, speak only of the *technical* composition and the *organic* composition of capital, identifying the value composition with this latter. But the value composition of capital is the ratio of constant capital (elements of constant capital at their prices) to variable capital (money wage bill, or subsistence wage commodities at their prices), determined by the technical composition of capital, and *mirroring the changes* in that technical composition. It is clear that, following this definition, an increase in the ratio of the means of production over workers *must* determine a fall in the profit rate, because the organic composition has to rise *by definition*; but it is clear also that this tells absolutely nothing about the actual trend of the rate of profits.

in the *SP*. It is meant to raise questions and open debate, rather than to 'fix' the research into a pre-defined path. What I suggest is that the attitude of Sraffa towards Marx, and his LTV, was much more positive than was admitted by both friends and foes alike. More than that, even after *PCMC*, Sraffa tried to build bridges between his own scheme and Marx's LTV. Looking back to the path he followed to reach his conclusions, and taking stock of the debates within the Marxian tradition since the 1970s and 1980s, we registered some limited but relevant overlapping with the NI. In this last section of the chapter, and in very preliminary fashion, I give emphasis to the tensions inherent in this overlapping and propose a personal way to move forward. We have to explore not only the similarities but also the dissonances between the Sraffian tradition and the NI – and between both and Marx – and inquire whether these dissonances should be resolved beyond the interpretation of Marx proposed by these various tendencies and into the uncharted open seas of a wider reconstruction.

For both the NI and Sraffa what matters in defining 'exploitation' in a labour-value perspective is not the labour necessary to produce the subsistence commodities that workers buy, an amount which changes when workers modify the composition of their expenditure, but how much of (social) labour (producing national income as money) is 'commanded', or bought, by the money wage. In the NI the 'postulate' seeing in national income nothing but the 'exhibition' of total living labour is mediated by the MELT, whatever the price system. This notion is absent in Sraffa. As a consequence, money may appear as foreign to his theoretical picture (cf. Deleplace in this volume), and intervening quite abruptly and from outside the system of production as in §44. This is incompatible with Marx, if we interpret Sraffa's (1960) model (a word, by the way, that he fiercely disliked) as the 'core' from which economic theorising has to start. It is not if we see Sraffa's 'real' economic system as a snapshot of a specific moment in the monetary sequence of a capitalist production economy: 'after the harvest' but also 'before the market' (after production and before final exchange in the commodity market). Money as capital (i.e., as finance to production) and living labour (i.e., exploitation interpreted as the conflict-laden 'use' of wage workers' labour power) are therefore implicit. A development of Sraffa's results and his relationship to Marx requires making finance to production and class struggle in capitalist labour processes explicit, and showing the 'movie' behind the snapshot.

Another difference is that for the NI, as for Marx, the total (direct) labour expended in society in a given period is social, but the labour spent in the individual processes is immediately private: it must 'become' social. This can only be achieved through money. The NI perspective is after the harvest but also after the market. Sraffa takes the sociality of direct labour time for granted: hence, the metamorphosis (Marx speaks not-so-metaphorically of a 'transubstantiation') of the gelatine of value into money as the universal equivalent is taken as unproblematic. In *PCMC* the production process has ended: no need to make explicit finance to production, nor any need to refer to living labour as an activity within production before its crystallisation in objectified labour. We 'see' only the methods of production, and we can 'observe' the results of the distributive conflict. In this endeavour the NI helps us only up to a point. First, it does *not* explain *why* only (living) labour is the source of (new) value – here I see a superiority in Sraffa in the *Use of the notion of surplus value*. Sraffa in the 1940s somehow understands that the constitution of the 'productive configuration' and the emergence of the 'surplus value' are explained by Marx through a counterfactual comparison based on the prolongation of living labour over necessary labour. I advance the speculation that it is in the unpublished notes of the 1940s that we can understand why the Sraffa of the early 1960s insisted in referring the money net product at prices back to direct labour, and continued to talk of 'exploitation'.

Marx's argument, however, was in terms of the *variability* of working time, and not in terms of a *minus* wage with given inputs and outputs, as in *PCMC*. In my view, Sinha is right that Sraffa theorised capitalist prices with a uniform rate of profit outside any centre of gravitation perspective: but Salanti is not wrong in asking how a perspective like this can be used in an inquiry into capitalist reality. My understanding is that what is needed is a move forward: to embed Sraffa's rigourous outline of an economic system into a larger Marxian renewed critical political economy, rather than the other way round.

The second convergence between Sraffa and the NI is on the wage and the rate of surplus value. They both reject a view of the wage as a 'bundle' of commodities, and they are both in favour of a definition of the wage as a 'share' in a given new value. Contrary to a widespread opinion, I think that the second view is not compelled by the fact that the wage is advanced in money. As long as it is supposed – as very often Marx does – that the 'price' of labour power is equal to its 'value', the

fact that variable capital is advanced in money means only that the basket of commodities constituting the given subsistence level has to be evaluated at prices of production (rather than at 'simple prices'). The problematic point I had anticipated at the beginning of this chapter is that once necessary labour is redefined in terms of labour commanded, as in the NI, most of Marx's conclusion becomes tautologies, so that the NI itself is reduced to a postulate plus tautologies. Indeed, following this perspective, the same sequence of the three volumes of *Capital* becomes doubtful. The most consequent NI authors lately have taken conscience that in their perspective it is mysterious why Marx framed his picture of exploitation in two steps (Foley, 2008, p. 31). Under what they call 'the commodity law of exchange', that is with labour-values or simple prices as the price-rule, the labour contained in the commodities workers consume is equal to the labour time equivalent of the wage, and the surplus value over variable capital is proportional to surplus labour time over necessary labour time (measured in terms of labour contained in the real wage). Under what they call 'the capitalist law of exchange' realised money profits (surplus value) comes from exploitation, with the labour time equivalent of the value of labour power measured in terms of the labour commanded by the money wage. This gives rise to a discrepancy between two different ratios accounting for exploitation: this is the usual criticism of Marx, shared by Sraffian authors, and which actually is accepted by the NI, whose way out is the redefinition of 'necessary' labour so the discrepancy disappears. But what, then, about Volume I? And what about the image of the division of the social working day as coming out for Marx, first and foremost, from the prolongation of the working day as an outcome of class struggle in production, and only secondarily – in a logical sense – from the role of pricing and allocation of the surplus (value)?

What comes out from this argument seems to boil down to just this: once postulated that the new value produced exhibits nothing but labour, a surplus value is there because the labour-equivalent in money appropriated through the wage is less than the 'value productivity' of the workers. This is a Smithian deduction theory of profits, turned into a Ricardian minus-wage explanation, thanks to the articulation of the notions of labour commanded and labour contained. It leaves unresolved the key point about the tracing back of value to labour.

I think there is overwhelming textual evidence that Marx in *Capital*, Volume I, took the real wage as a given, fixed historically and

conflictually. But if one reads carefully that book, one sees that it is a kind of a true 'macrosocial' foundation of 'microeconomic' behaviour, whereas the recent so-called monetary approaches to Marx (including the NI) are rather 'aggregated'. The crucial exchange rate in *Capital I* is the ratio between the value added in the period and the value of labour power of all the workers employed. The given wage should be not understood individually, but as referring to the quantity and quality of the means of subsistence bought by the working class *as a whole*. Assuming the same social working day and the same employment, the subsistence basket which in Volume I was evaluated at labour-values in Volume III has to be evaluated at prices of production. That is why *both* notions of 'necessary labour' should be maintained if one wants to understand the *dissimulation* inherent in the transformation from values to prices.

Let us assume a circuit theory of money perspective (not too far from what Cartelier writes in the second part of his chapter in this book): because they get bank finance before producing and selling commodities, firms are free to decide where to assign and exploit the workers to which they have the right of disposal. Subject to the constraints of effective demand, capitalists as a class are able to determine not only the level but also the composition of output before entering the commodity market. The surplus commodity product and the surplus value are nothing but the result of a surplus labour over and above the necessary labour contained in wage goods. The commodity output emerging from production may therefore be divided into two parts. On the one hand there are the 'wage goods', or the commodities that the aggregate of the industrial capitalists actually will make 'available' to workers on the commodity market. On the other hand, there are all the other commodities 'not available' to workers, let us call them the 'profit goods' (including capital goods and luxury goods). Such profit goods are exchanged among firms. What is relevant is that the aggregate real consumption of the workers is *de facto* decided by the capitalist class (banks and firms together). Marx decided to assume in most of his analysis that firms granted to workers the 'subsistence' real wage-bundle as a social given – even though he knew quite well the historical reality that capitalists attempt to squeeze the wage below that level so that the price may diverge from the value of labour power. Although these conclusions on money and the wage are very different from what is customarily stressed by the NI, where money enters the picture as the universal equivalent on the commodity market and where the real wage is not known before circulation, they

are not incompatible with the ex-post accounting identities on which that approach builds.[10]

The thing to be understood is that the definition of the rate of surplus value at prices of production does not cancel out but must be added to its definition at labour-values. The fallacy in the criticism that the labour contained in the wage is indeterminate because it changes with any change in the commodities bought by workers applies only at the individual level, not for the working class as a whole. 'Industrial capital', thanks to the advance of money capital to acquire labour power, allows capital to command living labour, and to gain a certain amount of new value. Its objectification is a given for both Sraffa and the NI: and I agree with that. But also the wage bundle of the working class is known: either because we assume, as in Marx, that the wage is at the subsistence level; and/or because it is fixed by the autonomous demand by capitalists, as in Kalecki. Those two quantities – *total* direct labour expended obtained by *capital as a whole*, the real wage *for the working class* – cannot change, whatever the price system is. Exploitation as the use of labour power has 'added up' to the necessary labour congealed in the wage bundle a surplus labour, which is a function of class struggle in production. This surplus labour is monetarily exhibited as (potential, and then actualised) surplus value. From this 'macro' perspective, the accurate *measure* of the *class* relation between capitalists and workers cannot but be given by the rate of surplus value

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[10] The careful reader recognises here that this reconstruction of Marx makes him very near to Keynes's *Treatise on Money*, especially on the points where that book clashed with Hayek. Sraffa was involved in the debate, siding with Keynes. As Graziani (1996, pp. 296–7) wrote, Sraffa, in contrast with Hayek, asserted that if producers succeed in producing a given set of commodities, this is an 'order with no return': in a monetary market economy capitalist producers command monetary flows and can dispose of productive resources; they are then powerful enough to determine the quantities produced of each commodity, beyond any alleged consumers' sovereignty. Graziani advances the conjecture that this is why Sraffa's quantities in *PCMC* are considered as given magnitudes. This cannot be interpreted, like Frank Hahn does, as Sraffa being a halved-Marshall, and it can be seen as a strong line of continuity between the 1960 book and his criticisms of Marshall and Hayek. The critique of Marshall and the debate with Hayek 'turn out to be parts of a wider research project aimed at building an alternative vision of the entire economic process' (1996, pp. 296–7). This may be too much as an interpretation, but – with the Marx-Sraffa conjectures I put forward from the *SP* – may be a base camp to begin a reconstruction, going with Sraffa beyond Sraffa (cf. also Bellofiore, 1996b).

expressed *in terms of labour-values*. What is caused by prices of production diverging from labour-values is merely a doubling of the value of the labour power: a fetishistic duplication concealing the historical–social nature of production; the obscuration is compounded by money as a non-invariable standard of value.

We have, on the one side, a value of labour power as the labour-content of the real wage, and on the other a value of labour power as the labour-equivalent of the money wage. Both concepts are relative to the actual setting which is the object of analysis. The *labour-content value* of labour power expresses the *class balance of power* between capital and labour: within the production process, and on the buying and selling of labour power. The *labour-equivalent value* of labour power shows how this reality is exhibited through the money dimension and within inter-industry ('static') competition. On the market, if the branche(s) of production selling wage goods get a higher (lower) share of direct labour than the one actually expended, the branche(s) of production selling profit goods get a lower (higher) share of direct labour than the one actually expended. The gross profit/wage bill ratio translated in labour 'commanded' terms through the MELT may thus be lower (higher) than the rate of surplus value as defined in labour-values. Nevertheless, from the macro point of view nothing has changed: workers still get back the same share of living labour congealed in the wage goods they consume; and total capital still appropriates the same share of living labour congealed in profit goods.

Summing up: The rate of surplus value at 'labour-values' accurately depicts the macro-social outcome of the struggle over labour time between classes, and hence the division between the total living labour extracted by total capital and the amount of that labour which has to be given back to the working class. Prices of production redistribute the new value added among individual capitals in such a way that the producers of wage-goods may command a higher or lower labour amount than actually spent by the labour-power they employed. That is why the ratio of the gross money profits over the money wage rate, both entities translated into labour magnitudes thanks to the MELT, gives a different quantitative measure from the usual rate of surplus value. As some authors say, 'paid labour' may diverge from 'necessary labour'. But here there is no difficulty at all (though this was not realised by Marx). It is just a deceptive though necessary form of appearance in circulation, obscuring that the only source of the value added (and then of surplus value) is the living labour of human beings.

Conclusion

The Marxian macro-class determination of the (real) wage of the work-ing-class in a truly (capitalist) monetary economy seems not to be adequately conceptualised either by Sraffa or by the NI, whereas 'macro' is simply an aggregation, 'money' is just the universal equivalent, and the rate of surplus value fully depends on price determination. The essentiality of the variability of living labour is crucial in the LTV: some-thing which cannot but be downplayed in any approach starting from a given 'productive configuration'.

In this view one can paraphrase what Graziani says when he affirms that price determination in commodity markets takes place when the proper object of Marx's value theory is already completed. The basic process of class exploitation – namely, the prolongation of living labour over necessary labour in capitalist labour processes as a contested terrain – is over: only the resulting 'things' are there to be ascertained by the Sraffa's 'man from the moon'.[11] Marx's aim was rather to explain the source of value and surplus value, to understand from where capital-ists' gross profits were generated. This essentially refers to the fact that production is nothing but the consumption of the workers themselves in the vampire-like extraction of living labour: no possible 'redundancy' in this constitutive process. Once the stage of dead labour is reached – that is, once we are on the terrain of Ricardo's object of inquiry; the stage at which Sraffa's price and distribution theory and the NI of the transformation problem cannot but be situated – the given quantity of direct labour is already split between the two different classes according to the outcome of class struggle in production.

If theory becomes a truly monetary analysis in Schumpeter's and Keynes's sense, and is prolonged to become a truly macro-class monetary determination of production-with-distribution, the concept of labour-values as an 'intermediate' rule of exchange on the way to prices of production unexpectedly takes a new life, in a non-dualist approach. It

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[11] 'The significance of the equations is simply this: that if a man fell from the moon on the earth, and noted the amount of things consumed in each factory and the amount produced by each factory during a year, he would deduce at which values the commodities must be sold, if the rate of interest must be uniform and the process of production repeated. In short, the equations show that the conditions of exchange are entirely determined by the conditions of production.' (D/3/12/7: 87); see too Kurz and Salvadori (2004) and Cartelier's chapter and Chiodi's comment in this volume.

is not erased, nor it is reduced to just an alternative rule of exchange: the 'commodity rule of exchange', as Foley calls it. Kurz is right in remarking that the latter is not a very meaningful concept. In my perspective, on the contrary, 'labour-values' have become the pivotal concept connecting Volume I and Volume III of *Capital* for two reasons. First, they are the price-rule from which one has to start to pursue the 'method of comparison', and this grounds both NI's postulate and Sraffa's normalisation. Second, they give us the accountancy through which the basic class relation must be described as the outcome of capital-labour confrontation, and this asks for an approach which integrates, and goes beyond, both Sraffa and the NI

In a sense, Vianello, Dobb and Napoleoni were all correct. Vianello, because the value created is allocated in actual circulation through prices, without any need to give a role to labour-values as ruling prices. This non-dualist price perspective has only to be modified to take into account the identity between value added and direct labour as the objectification of living labour. Dobb, because the macro-distribution between classes is accurately portrayed in 'labour-values', as he argued. This, however, can be accepted only if the 'real' distribution between classes (and the 'real' wage for the working class) is determined through the independent though unconscious decisions of the capitalist class, banks and firms (and their autonomous investment demand). Napoleoni's unwillingness to cut out exchange-value as the intermediate step between intrinsic value and price of production is vindicated as well.

Capital produces and re-produces the systemic conditions forcing workers to alienate their labour power. This 'circularity' is thoroughly depicted in *PCMC*, where commodities are produced out of commodities. But that circularity depends on a 'linear' process of exploitation, where living labour stands as the originator of capital while the reverse is not true: therefore commodities are produced *by labour* out of commodities. A phrase from the late 1920s may perfectly represent this perspective: 'It is the *whole* process of production that must be called 'human labour', and thus *causes* all product and all values' (D3/12/11/64). We have to go beyond the 'vice of economists', who see in this a quasi-natural presupposition, which has not been questioned in its origin or in its potentially antagonistic reality.[12]

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[12]   In his *Lectures on Industry* given in 1942–43 Sraffa writes that '[t]his is characteristic of the vice of economists. Thinking that all can be reduced to the extreme simplicity of the money measure: also, that production is a purely technical question + that economic problems arise only in distribution' (D2/8/10).

In fact, as Marx wrote, it is only by incorporating the living bearers of labour power (and hence living labour) within the dead substance of the commodities serving as the material elements of a new product and as factors in the labour process that capitalists are able to convert value into more value, money into more money. The material body of capital internally 'subsumes' a living 'other' and only thus it becomes an 'animated monster' which begins to 'work' *as if its body were by love possessed* (Marx, 1976, p. 302). The point is as much capital's ability to be fruitful and multiply as it is its impossibility to escape the dependance on workers as the source of the whole of the value added, and hence of surplus value. The spectral objectivity of Sraffa's book requires it to be grounded in the constitutive process of the extraction of living labour from that very special commodity, labour power, 'attached' to living human beings.[13]

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[13] The 'special' character of the commodity labour-power is perhaps identified by Sraffa when writing in 1942 a comparison between 'horses' as an input versus that of 'men':

> Men however (and in this they are distinguished from horses) kick. (D3/12/16/18)

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Archival Index

Open for consultation since late 1993, the Sraffa Papers were arranged under the supervision of Jonathan Smith, Archivist and Modern Manuscript Cataloguer for the Wren Library, Trinity College, Cambridge. The entire massive archive is arranged under 10 large groupings of documents catalogued A through J as follows:

A. Personal and Family Papers
B. Academic Career
C. Correspondence
D. Notes, Lectures, and Publications
E. Diaries

F. Memoirs of colleagues
G. Publications by others
H. Bibliographical and manuscript interests
I. Items removed from printed books
J. Miscellaneous

With the exception of Chapter 7 (Deleplace) which cites Sraffa's notes on Keynes's *General Theory* (archived under 'I: Items removed from printed books') and Chapter 9 (Bellofiore) with Sraffa correspondence to Soltwedel and Blitch (archived under 'C: Correspondence'), the present volume cites solely from 'D. Notes, Lectures, and Publications'. Part 'D' of the archive contains three separate groupings of documents broken down according to the following plan (note bold indicates archival material cited in present volume):

D1: Notes (1923–63) (92 sub-groupings)   date
    D1/1

    ...
    D1/91: Black Notebook   **(1943)**
    D1/92
D2: Lectures (1927–43) (8 sub-groupings)
    D2/1: Lecture notes on economic theory   (n.d)
    D2/2: 'The corporative state', given to 'Keynes Club'   (1927)
    D2/3: 'Revalorization of the lira'   (3 Nov 1927)
    D2/4: Lecture Notes on the Advanced Theory of Value   (1928–31)
    D2/5: Lectures on continental banking   (1929)
    D2/6: 'Il banchieri fiorentini nel 200'   (14 May 1929)
    D2/7: Two lectures on Italian problems...   (1941–43)
    D2/8: Lectures on Industry   (1941–43)
D3: Publications (1920-73) (14 sub-groupings)
    D3/1: L'Inflazione monetaria in Italia durante e dopo la Guerra   (n.d)
    D3/2: 'The Bank crisis in Italy', *Economic Journal (EJ)*   (1922)
    D3/3: Untitled article on the economics of fascism   (1923)
    D3/4: Obituary of Maffeo Pantaleoni   (1924)
    D3/5: 'Sulla Relazione fra costo e quantita prodotta'   (1925)
    D3/6: 'The Laws of returns under competitive conditions,' *EJ*   (1926)

D3/12/1

... } 115 files and close to 10,000 mostly hand-written pages written over a 30-year period in 3 distinct time periods

D3/12/115

The main of the material cited in this volume comes from Sraffa's Black Notebook (D1/91), his Notes on Hayek (D3/9) and several of the 115 file folders that comprise Sraffa's unpublished notes related to the publication of *PCMC* (D3/12).