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Abstract

This paper was first presented at the conference on value of The Laboratory for Social Critique, Rome, May, 21, 2002 and subsequently at the 2002 conference of the Association for Heterodox Economics, July 2002. This is the most complete version, presented to the 2002 conference of the Middle East Technical University (METU) in Ankara, September 2002.

The Rome conference staged a debate on value theory involving Andrew Kliman, Alan Freeman, Mino Carchedi, Gary Mongiovi, Fabio Petri, Duncan Foley, and Ernesto Screpanti. The article was originally written for this discussion.

The article contains an initial response to Mongiovi's critique of the TSSI presented at the Eastern Economic Association and subsequently printed in the *Review of Radical Political Economy* [Mongiovi, G (2002), *Vulgar Economy in Marxian Garb: A Critique of Temporal Single System Marxism*, paper to the 2002 conference of the Eastern Economic Association; Mongiovi, Gary. 2002. *Vulgar Economy in Marxian Garb: A critique of temporal single-system Marxism*, *Review of Radical Political Economics* 34:4, 393–416.]

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Alan Freeman

For the METU conference, Ankara, September 11-14th 2002

1.1 Prefatory note

This paper was originally written for a conference organised by the Laboratory for Social Change in Rome, and presents arguments which respond chiefly to a paper (forthcoming, in the Review of Radical Political Economy) by Gary Mongiovi. A version of it was subsequently published by the laboratory for Social Change.

1.2 Introduction

The seminar for which this paper has been prepared is a watershed in a theoretical struggle, lasting nearly twenty years, to bring into the public arena the interpretation of Marx that has become known as the Temporal Single System Interpretation (TSSI).

The most welcome advance is a direct debate with supporters of Piero Sraffa, notably Mongiovi (2002) whose contribution allows us to begin with an agreement: that if Marx's concept of value is interpreted in the Sraffian framework, its magnitude is cannot be determined by labour time but must be determined uniquely by the use-value, or physical product, that this labour produces.

Every constructive discussion begin with a clear agreement about what it is one disagrees on. In previous objections to the TSSI, critics concentrated on denying Mongiovi's proposition; on trying to show that within the Sraffian framework, the magnitude of value in some sense remains determined by labour time. Neither ourselves nor the Sraffians defend this idea, and so it is a great relief to pass on to the question we both regard as substantive.

The distinction on which we are agreed is neither minor nor pedantic. If it holds good, Marx's 'principal scientific conclusions', as Mongiovi terms them, cannot be deduced from Marx's principal analytical concept. In my view, all other and previous positions in this debate represent more or less partial expressions of this view and I therefore respond primarily to his paper.¹ I will try to defend four propositions:

- (1) The post-Sraffian concept of value, whilst a valid theory in its own right, is invalid as an interpretation of Marx's concept of value because it rests on a static logic, which Marx did not use.
- (2) TSSI has provided a logically coherent alternative interpretation of Marx's concept of value, in which prices and values are both defined and determined within a completely different, temporal, logic, which Marx did use.
- (3) Within this interpretation the magnitude of value, as defined by Marx, is determined completely generally² by labour time.
- (4) The determination of the magnitude of value by labour time *makes a difference* to economic and political theory; it makes sense of the principal phenomena of capitalism.

I conclude that it is a *legitimate political and research project* to attempt to understand capitalism on the basis of the Marx's own work. The persistent denial of its validity, on the false grounds that Marx's theory has been proven incoherent, should be resisted by the political movement. Whatever the personal motivations of individuals that subscribe to this view, its actual effect is to deny access to Marx's

own economic views. To persist in promoting it now, above all, as is usually done, as an incontrovertible truth, must be treated as an unscientific act of censorship.

Before beginning I want to lay before the audience the exact nature of the debate.

First, it is not a scholastic debate. An audience of trade unionists, political activists, and professional intellectuals represents a genuine encounter, in Gramsci's words, between those who think because they suffer and those who suffer because they think. It is a debate whose purpose is to change the world.

Second, it is however a scholarly debate: between people who are prepared to spend time considering each other's views. We are discussing theory as such: our aim is not to settle which 'school' has the right theory and which the wrong, but to clarify, as far as possible, what each theory really says.

Third and most distinctively, the focus of this enquiry is *Marx's* theory. This debate is thus a complete break with tradition: we are discussing neither a dogmatic assertion that Marx was necessarily wrong, nor a dogmatic assertion that he was necessarily right, but a simple attempt to clarify what he actually said, and ascertain what does, and what does not, follow logically from it.

Fourth and most difficult, because the object of study is a theory, and the task is to establish what that theory really consists of, the debate is not between different theories of value but between different interpretations of Marx.

For us, this requires a long-absent recognition of the status of *hermeneutics* in the study of Marx's theory. We are all entitled to propose any theory of value we want. But it is one thing to propose a theory, and it is entirely another to attribute it to someone else. If you wish to contrast your theory with Marx's, or with Sraffa's, or if compare Sraffa's theory with Marx's theory, then you have a duty which has, until now, not been discharged. You cannot simply *declare* what Marx or Sraffa said; you must prove it, with evidence.

I can easily refute any theory if I can represent it as I choose. I can calumniate Negri by misreading him as the architect of terrorism. Aside from offenses against justice, this does not advance human knowledge. For, I prove nothing about *Negri's own theory*, unless I can prove that the chain of reasoning begins from *it*, and not from my private reading of it.

This is no different for Marx. If we genuinely wish to enquire whether his ideas help understand capitalism, we must first establish what these ideas actually are. This cannot be done by simply presenting our own views and claiming they coincide with Marx's, as usually happens. Nor can it be done by citing texts like a biblical sect. There is a standard professional practice to judge between alternative interpretations of a text; just as when judging alternative theories of the world, one considers the evidence. One reads what is written, according to each rival interpretation, and one judges which makes most sense of the argument.

This returns us to our starting point; this is *not* a scholastic debate; and on this we take the severest possible issue with Screpanti (2002), who dismisses the entire TSS theory without further reference on these grounds alone. The debate is scientific, because the primary criterion is evidence: on the one hand it obliges us to consider the evidence of the texts to assess what Marx's actual theory was, and on the other it demands that this actual theory be confronted like any other with the evidence of reality to see if it helps explain the world we live in.

The present debate is hence, in summary, to establish the analytical and logical characteristics of two different classes of interpretations of Marx's theory which we

term, respectively, the simultaneist-physicalist and the temporal single system interpretation, so as to establish what this theory was, in order to test it correctly against reality. To these interpretations we now turn.

1.3 Simultaneist-physical and Temporal-labour-time interpretations of Marx

1.3.1 *The simultaneist method*

The simultaneist interpretation, particularly identified with post-Sraffian authors, arose from Bortkiewicz's claim that one must suppose Marx defines value, price, profit and wage as properties of a hypothetical static economy. Its central analytical construct is to assume, in order to calculate the magnitude of value, that input prices equal output prices: more precisely, the price of anything consumed in production is equal to the price of the output which results from consuming it.

This is a construct, not a representation of reality. At the time the input is consumed, the future price of its output is not yet known. The price of any real thing at any time is the money it is worth at that time, and in period analysis must therefore be taken as equal, not to the future output price of the period in which it will be consumed, but the past output price of the previous period, in which it was produced.

The simultaneist view therefore postulates a price which cannot hold in monetary exchange. It is not a price in the normal sense of the word, that is, a ratio at which goods exchange. This is a difficulty, but does not rule out the construct: as Mongiovi (2002) notes and I accept, it is not claimed that such prices directly appear in the world, but that they explain what does appear.³ I have no logical objection to this assertion.⁴ The issue here, however, is not in the first instance whether such prices appear in the world but whether they appear in *Marx*.

Prima facie the texts do not support this view, and this is the origin of all 'corrections'. As Bortkiewicz recognises, in Marx's own transformation procedure, inputs are purchased at their values, and outputs are sold at prices of production. These magnitudes are definitely not equal. One may feel Marx's procedure is a mistake but one may not lightly substitute a new one whilst still claiming it is what Marx really meant.

Nevertheless, such a claim is the foundation of Bortkiewicz's interpretation of Marx, which has become the standard view. Since, he says, the economy corresponding to Marx's transformation scheme cannot reproduce itself (is not in equilibrium), it cannot exist.⁵ We must therefore 'correct' Marx – that is, say what he 'really meant' – by defining value as a rate of exchange at which society can reproduce itself perfectly, without change, if profits are not equalised, and by defining price of production to be a rate of exchange which secures reproduction if profits are perfectly equalised.⁶

This presentation of Marx is an *interpretation*. Moreover the scant evidence for it⁷ stands or falls on a dogmatic assertion: there is no *other* way of interpreting Marx. Maybe until around 1980 this was true. Now, however, there is another interpretation: the TSSI. Therefore, this dogmatic assertion cannot be taken as 'given' or 'known' until the evidence in favour of and against the two interpretations has been properly considered.

As noted, the simple textual evidence for the simultaneist interpretation is not very good. This does not necessarily rule it out. In developing a new idea, an author may be struggling to bring to existence something implicit, but textually unclear. The

problem is however this: the interpretation forces us to conclude not just that Marx's definition of value was wrong but also the most important conclusions he draws from it. In short, the interpretation ruins the argument. In particular one finds that the magnitude of value created by labour is not determined by the time of this labour, but by the quantity of use-value or 'physical product' to which it gives rise. It is this feature of the theory that leads us to characterise the theory as 'physicalist'.

Mongiovi argues that substituting a physical value concept for a labour time concept does not destroy Marx's 'principal scientific conclusions'. But let us list just a few scientific conclusions that are hard to defend on the basis of this value concept:

- labour is the only source of value.⁸
- the division of this value between classes cannot be changed in circulation. Class relations are determined by property relations, not by income.
- Competition between capitals is a 'zero-sum game' in which there must be both winners and losers; there is no policy through which everyone can win. For example if some nations become rich, others must become poor.
- Under capitalist accumulation, the rate of profit falls with cost-reducing technical change, and so capitalism contains *within itself* forces that set limits on it or, to put it another way, the biggest problem the free market faces is the free market itself. As Marx wrote: "capitalist production meets in the development of its productive forces a barrier which has nothing to do with the production of wealth as such; and this peculiar barrier testifies to the limitations and to the merely historical, transitory character of the capitalist mode of production;" (Volume III ch 15 section 2)

If the TSSI is valid, so that there is no reason to reject Marx's major premise that the magnitude of value is indeed determined by labour time, then these conclusions are all an immediate deduction from the analysis.

But if the simultaneous interpretation is accepted as true, then even if these conclusions can be rescued – which is disputable – a they *do not follow from his concept of value*. His argument must be treated as 'logically inconsistent' or 'incoherent' and therefore, unusable as a means of understanding the world.

This leads one to read this failure in an entirely different way: a hundred years of debate have shown that if you use the simultaneous interpretation, then

- a physical concept of value necessarily replaces a labour-time concept of value;
- as a result Marx's argument does not support a series of assertions which he considered decisive in his critique of capitalism.

But in that case an equally valid logical conclusion is not that Marx had a bad theory but that simultaneism is a bad interpretation of Marx. If this is accepted, then all criticisms so far applied to Marx have been posted to the wrong address; they should be redirected to the simultaneous method, which obliges us to try and reproduce, without allowing us to use a labour time concept, conclusions which only make sense on the basis of a labour time concept.

The issue is not whether one may explain exploitation on the basis of a labour time concept (one may) but whether one may explain it on the basis of a physical value concept (one may not). The issue is not whether price variations redistribute surplus labour between classes (they do not) but whether they redistribute physical surplus (they do). The issue is not whether the labour-time rate of profit can fall with cost-

reducing technical change (it can) but whether the physical rate of profit can so fall (it cannot).

Moreover empirical issues cannot be ignored. The labour-time concept simply explains a whole series of observable phenomena better than the physical concept. The money profit rate, for example, definitely does fall with technical change. The physicalist value concept predicts this should normally rise, and only exceptionally fall, while the labour-time concept predicts that normally fall, and only exceptionally rise. Which helps us understand this empirical reality better – Marx's or Sraffa's?

Thus the real issue at stake is, I would argue, as follows: what gives us the best understanding of the specific way that *capitalism* – a society organised specifically, and unlike any other, around exchange – works? Will we understand it better if we conceive of this exchange quantitatively as a relation between physical products, or as a relation between human labours?⁹

1.3.2 *The temporal single-system interpretation*

Were it impossible to formulate a theory of value in such a way that its magnitude is consistently determined by labour time, the debate between Marxism and the post-Sraffians would be a non-debate. We would not have two alternative value concepts to consider; *faute de mieux* there would be only one coherent concept, the physicalist concept, facing an incoherent attempt at a labour-time concept. Sraffa would embrace the entire, albeit barren, terrain of the debate in political economy.

But it *is* possible to formulate a theory of value consistently in such a way that its magnitude is determined by labour time, and this theory is highly consistent with Marx's writings.

This theory is simple to explain; the magnitude of value of a product is the sum of the dead and living labour contained in it – the sum of the value of constant capital and living labour. In this expression, however,

- (1) the magnitude of constant capital is given, not by the value of its elements, but by the value of the money-capital that represents them;
- (2) the value of this money-capital is given by the labour-time that this money represents, considered as an aliquot portion of the total capital actually or potentially in circulation;¹⁰
- (3) this magnitude is calculated at the time when the capital is consumed and not, as in the simultaneous calculation, at the time when its product emerges.

As a simple example suppose that when production begins there are in existence means of production worth £200,000 which took 4,000 hours to produce. Consider a branch of production in which the capitalists use up £80,000 worth of raw materials and machinery, and spend £20,000 on wages, to produce goods by causing labourers to work for 2,400 hours.

The TSSI argues that the £200,000 *represents* initially 4,000 hours. Each £1 represents, in circulation, 4,000/200,000 or 1/50 hour. This coefficient is termed, following Ramos, the Monetary Equivalent of Labour Time or the MELT.

The constant capital **C** is then £80,000 × 1/50 = 1,600 hours.

The variable capital **V** is then £20,000 × 1/50 = 400 hours.

Invested capital **C+ V** is 1,600 + 400 = 2,000 hours

The value added by living labour **L** is as stated 2,400 hours

Profit is **S = L – V = 2,400 hours – 400 hours = 2,000 hours**

The value of the product in hours is **C + L = 1,600 + 2,400 = 4,000 hours**

This value is determined completely independently of the price for which the product sells. So is profit, or surplus value.

Now suppose there is a second branch of production in which the capitalists use up £20,000 worth of raw materials and machinery, and spend £80,000 on wages to produce goods in 9,600 hours, implying a uniform rate of exploitation.¹¹ The two branches then have different organic compositions of capital. In the second branch

The constant capital **C** is $£20,000 \times 1/50 = 400$ hours.

The variable capital **V** is $£80,000 \times 1/50 = 1,600$ hours.

Invested capital **C+ V** is $1,600 + 400 = 2,000$ hours

The value added by living labour **L** is as stated 9,600 hours

Surplus value is $\mathbf{S} = \mathbf{L} - \mathbf{V} = 9,600 \text{ hours} - 1,600 \text{ hours} = 8,000 \text{ hours}$

The value of the product in hours is $\mathbf{C} + \mathbf{L} = 400 + 9,600 = 10,000 \text{ hours}$

Over the whole of society we have:

The constant capital **C** is $£100,000 \times 1/50 = 2,000$ hours.

The variable capital **V** is $£100,000 \times 1/50 = 2,000$ hours.

Invested capital **C+ V** is $2,000 + 2,000 = 4,000$ hours

The value added by living labour **L** is 12,000 hours

Surplus value is $\mathbf{S} = \mathbf{L} - \mathbf{V} = 12,000 \text{ hours} - 2,000 \text{ hours} = 10,000 \text{ hours}$

The value of the product in hours is $\mathbf{C} + \mathbf{L} = 2,000 + 12,000 = 14,000 \text{ hours}$

The rate of profit is therefore $\mathbf{S}_{\text{total}}/(\mathbf{C}_{\text{total}} + \mathbf{V}_{\text{total}}) = 10,000/4,000 = 250\%$

1.3.3 *Properties of the temporal single-system interpretation of Marx's concept of value*

Notice that:

- (1) No reference whatsoever has been made to the physical quantities consumed. Physical quantities cannot possibly enter the determination of value since we have calculated its magnitude without even knowing them.¹²
- (2) The value of the product of each branch and of society, the mass of profit, and the rate of profit, were determined without any reference to the price for which these goods actually sell; these magnitudes are independent of *sale* prices, the prices of outputs.

This directly contradicts two cardinal dicta which are frequently cited by Sraffians as if they were unchallengeable. Thus Mongiovi (2002:4): “prices themselves depend upon the profit rate and therefore cannot be treated as known prior to the determination of the latter. The solution to this puzzle, as is now well known, requires that relative prices and the profit rate be determined simultaneously (see Sraffa 1960: 6).”

Well known it may be, but it is nevertheless false. This Gordian knot can be cut in a different way. In the interpretation just given, the profit rate is indeed determined prior to prices – to the prices of *this period*. For the post-Sraffians this distinction is meaningless since input and output prices are equal by belief, definition and dogma: there *is* only one set of prices.

A further subtle point is that no definite period of time was assumed and, although I supposed that all capital was used up this assumption is not necessary for the calculation. This approach thus generalises directly to fixed capital, and moreover, to continuous time.

A further more subtle point is that the ‘temporal price’ at which inputs enter the production process is a genuine rate of exchange for money. Unlike the simultaneist ‘price of production’ it merits the name ‘price’. It is this feature of the single system approach which gives it its generality. Above, we considered one particular price, namely the profit-equalising price; however the transformation would have been just as valid if we wished to consider a price different from that such as a monopoly price, or a price including rent, or a market price.¹³

Now consider the transformation process. If goods were to sell at relative prices given by their labour values, the rate of profit in branch 1 would be

$$S/(C+V) = 2,000/2,000 = 100\%$$

and in branch 2

$$S/(C+V) = 8,000/2,000 = 400\%$$

In the actual market, these products will sell for definite amounts of money which are not known until after they are produced; these are determined in the sphere of circulation. Were they to sell for amounts of money that were proportionate to their values, the money rates of profit in the two branches would also be different. This would, *ceteris paribus*, bring into being economic forces that would tend to transfer capital into the second branch in search of the higher profits to be found there.¹⁴

Regardless of the actual course of this motion, which is historically specific, we can calculate a *general* profit rate as we have done, as an average over all of society. This as Marx suggests provides a simplified instrument for analysing the distribution of profit between sectors of society because it provides a general standard against which each individual profit rate is judged, and which influences whether the capitalists will invest in the sector concerned. On this basis we can calculate a *hypothetical* price of production in each sector, by adding this general profit rate to the capital costs.

This calculation, like the value calculation, does not require us to know the actual absolute magnitudes of money in which these prices of production are realised.

In branch 1 the profit Π is given by

$$\Pi = (C+V) \times 250\% = 2,000 \times 2.5 = 5,000 \text{ hours}$$

and the price of production is given by

$$(C+V) + \Pi = 2,000 + 5,000 = 7,000 \text{ hours}$$

In branch 2 the profit Π is given by

$$\Pi = (C+V) \times 250\% = 2,000 \times 2.5 = 5,000 \text{ hours}$$

and the price of production is likewise given by

$$(C+V) + \Pi = 2,000 + 5,000 = 7,000 \text{ hours}$$

Were these prices realised in money then, measured in hours, the branch 1 capitalists would have *lost* 3,000 hours and the branch 2 capitalists would have *gained* 3,000 hours.

1.3.4 *Properties of the temporal single system interpretation of Marx’s transformation of values into prices of production*

Note that

- (1) Inputs are transformed by the definition of value itself. Suppose the next period begins with inputs purchased at the prices of production just defined. The value output of that, next, period is directly specified by the

definition of value given in the previous section. These value outputs can then *in turn* be transformed into the prices of production of the next period.

- (2) Both values and prices of production in each period are fully determinate. The designation ‘single system’ refers to this fact; there is a single economic system with a single set of prices but, in each period, values and prices of production are fully defined but quantitatively distinct.
- (3) Marx’s two equalities are perfectly preserved. Total profit is $5,000 + 5,000 = 10,000$ and total surplus value is $2,000 + 8,000$; total price of production is $7,000 + 7,000 = 14,000$ and total value is $2,000 + 12,000 = 14,000$. It is not hard to see that this is not an arbitrary or contingent result and must hold regardless of the individual organic compositions of capital.
- (4) Value is conserved in circulation; no change in relative or money prices can alter the total value created.

In summary – and this is the political significance of the arid mathematics – the effect of circulation is to distribute a fixed, pre-existing magnitude of social labour, carried out in the past, between consumers of this social labour, in such a way that it cannot be moved between classes but *can* be moved within classes. It can raise capitalists up and down relative to other capitalists, but it cannot turn workers into capitalists;

This is more than just an ‘explanation’ of exploitation. Exploitation does not reduce to the idea that some people consume more and some consume less, or that some people consume what other people produce. This is easy to show and happens in all societies. Indeed nor is it necessarily a bad thing since, otherwise, children would not grow up and old and sick people would die. The problem is to explain how this happens *specifically under capitalism*, that is, through the mechanism of exchange. Marx’s explanation *locates the phenomenon in the fact that labour-power is itself exchanged*; that is, it locates it as the outcome of a *property relation specific to production*.

1.3.5 Properties of the TSS interpretation of money

We have dealt with value; we have dealt with price. We turn to the value-price distinction and hence to money.

TSSI does not collapse value onto price. There is no ‘trick’ as Mongiovi (2002:13) seems to think when he writes that: “[t]o establish Marx’s two invariance postulates – the sum of profits equals the sum of surplus-value; and, the sum of prices equals the sum of values – Temporal Single System theorists resort to a clumsy sleight of hand.”

Value is not reduced to its surface appearance; the price-value distinction is non-trivial both quantitatively and qualitatively.

To deal first with quantitative matters. In branch 1, the value of the goods produced was 4,000 hours but their price was 7,000; in branch 2 the value was 10,000 but the price was 7,000. These are not the same. Moreover any change in relative prices (for example, to non-profit-rate-equalising prices) brings about a redistribution of value.

This provides an analytical framework for conceptualising distribution which actually corresponds to the fundamental observed facts of capitalist history. In the world we live in there is class struggle, there is an ever-growing gulf between rich and poor nations, and there is an endless battle for each capital to survive.

From the standpoint of physical quantities this makes no sense. If wealth is no more than quantities of goods then competition is an irrational deviation. We can increase everyone’s access to social production simultaneously – all we must do is increase productivity, and we all get more. From the even more fantastical standpoint of the

banker, all we need do is make money and the nation is richer. But if either of these distorted views were true, it is impossible to understand why there is class struggle, or competition, or rich and poor nations. For, if all we need do to become better off is to produce more, why cannot everyone share in the results? Or if making wealth was no more than printing bits of paper, why doesn't society just print enough paper to make everyone happy?

Even more dramatically, why is it that now, when the world makes enough for everyone to live comfortably and decently, to provide every single person with well over \$7,000 a year, are billions of people scraping a living on less than \$1 a day? This is no longer a *natural* or *physical* limit; it is a consequence of the specifically capitalist method of allocating physical resources.

We can make sense of all these things only if recognise that immanent laws of capitalist distribution impose themselves on both monetary and physical magnitudes, organising society to fight over a *limited* quantity of social substance, namely, the results of an unchangeable magnitude of past labour time. Only then does it become clear that if there are winners, there must be losers. This is not an empty abstraction; anyone can see it. The problem is to find a theoretical framework that makes sense of it.

Behind all monetary relations lie social relations. Labour time is a universal abstract measure of social activity and measuring distribution in terms of it provides genuine analytical insight. What price variations actually bring about is the allocation of varying amounts of products of human labour between classes and within classes. If, for example, hi-tech goods become more expensive than those capitalists which use them are forced, as a result, to consume more human labour in order to make their product.¹⁵

This is disguised, or fetishised, in two ways. First, the labour is embodied in physical products, and so humans that consume them appropriate, not the labour in them but the product itself. They therefore perceive, and receive, this human labour as something inhuman, as a thing and so they constantly mistake things for people and people for things. But second, they purchase this product for money, also a thing but a very peculiar thing, since it has no use in itself except to buy other things.

Money then becomes converted into its opposite, as universal mediator between particular labours it becomes a representative of all labours and the source of all secular power and authority, at one and the same time universal splendour, gold and universal venality, corruption; it becomes also the object of universal veneration, supernatural power: Father, Son and Holy Ghost it becomes the New Trinity of the god Capital.

In our interpretation above, price is a quantity of hours. It differs from value because it is a different quantity of hours. In circulation it becomes something qualitatively different, a quantity of something else – money. It is a quantity of value, and in exchange its intrinsic magnitude which is the number of hours of human labour it represents, must be expressed in something else – its extrinsic magnitude, the amount of money in which this labour time is expressed in exchange.¹⁶ To this we now turn.

There are a variety of different money prices in which these prices of production could be realised. For example if the MELT remained constant so that each £1 still represented 1/50 hour, then these would be realised in sale prices totalling £700,000 in each sector. A careful calculation reveals that the profit rates in money terms are then the same as the profit rates in terms of labour hours.

But of course, these prices of production may be realised in different prices; in the next period we may encounter, as is common, *monetary inflation relative to labour*. Sale prices might for example be £420,000 in each sector so that the total social product will sell for £840,000.

But in that case we now have 14,000 worth of goods in hours, priced at £840,000 and the next period will begin production on a new basis, with each £1 representing 1/60 of a day. Now, in the Sraffian interpretation this can have no impact on anything material since money is reduced to a mere numéraire, a mere measure (as it is in Ricardo). In particular, the Sraffian profit rate is unaffected by this change in monetary measure. This weakness of the post-Sraffian position is not a minor one. It is inherited from Ricardo's own, quantity-theory-based treatment of money, and the superiority of Marx's analysis of money is often brushed under the table in the rush to dismiss him as a mere post-Ricardian.

Not so in the TSSI in which *money matters*. The money profit rate is different from the value profit rate. Goods will have been produced by society for an expenditure of £200,000 but will have realised £840,000, a profit of £640,000 and a profit rate of 320%. The profit rate thus depends on the monetary unit of measurement, as capitalists trading in a variety of currencies frequently discover to their cost or benefit.

We can understand this more generally if we realise that in effect, money is a *measure of value*. This allows us to understand why and how a difference can arise between the value or labour time profit rate and the physical rate of profit, which in the Sraffian interpretation are necessarily the same.

Suppose money prices were to increase in line with the rate of growth of the physical product, in that case the money rate of profit would be the same as the physical profit rate. *This rate of profit will however be higher than the value rate of profit if there is technical innovation* since in that case, the physical product will be rising even though the labour value of the product will not. This is why the celebrated disproof, by Okishio, of Marx's tendency of the rate of profit to fall, applies *only* to the physical rate and not to Marx's own, dynamically determined, value rate of profit.¹⁷

1.3.6 The falling rate of profit and the particular significance of the temporal method

Until now, all the results we have given can be derived equally in a simultaneous or in a temporal framework. They are compatible with the assumption that input prices are equal to output prices. The behaviour of the profit rate is, however strictly temporal and if we arbitrarily constrain input prices to be equal to output prices, it is logically impossible for it to fall.

The fall in the profit rate is not just an abstract possibility. First, it is a directly observable fact; for prolonged periods of history lasting 20-40 years, such as that we are now living through, the monetary profit rate falls.¹⁸ But second if the TSSI is right, this is a natural and not a forced consequence of Marx's theory. His deduction of the tendency of the profit rate to fall is a logical consequence of his value analysis. This, it must be stressed, does *not* mean that the profit rate inevitably falls. The precise point is that it falls *unless accumulation is interrupted*.¹⁹

Consider the 10,000 hours of profit. Some of this will, of course, be consumed by the capitalists. But unless the capitalists actually consume all, or more than all, of it, then at least a portion will be re-invested. This means that whereas the previous phase of production began with a capital stock of 4,000 the next will begin with a capital stock

of 4,000 *plus* whatever is not consumed. This invested capital will therefore grow, as part of the normal tendency of capitalist accumulation so conceived.

This is not true of the living labour employed to work on this stock. As Marx is at pains to point out, with the advent of Relative Surplus Value, there is no natural limit on the amount of capital that can be worked on by a given amount of labour. Technical innovation precisely means that the same amount of labour can produce a larger product; it can therefore work up or consume an indefinitely large amount of physical input and hence an indefinitely large amount of capital.

It follows that under the normal conditions of accumulation, the profit rate, whose maximum limit is the ratio between this living labour and the value of capital stock, will fall in value terms – exactly as Marx proposes. Capital, in other words, sets limits upon itself.

Precisely because, in the temporal framework, the value of the product is determined by labour time, and this value is in turn invariant with respect to price variation, the value which is embodied in the stock cannot be destroyed by simply devaluing or writing-down the stock. The value goes *somewhere* – in fact, into consumption. In order to reduce the value of stock, capital must consume it, or in other words, it must interrupt the accumulation of value – which is what takes place in a slump.²⁰ Indeed this analysis demonstrates why it is possible for the *value* of this capital stock to decline even though accumulation in physical terms continues, albeit at a reduced rate.

The difficulty which all simultaneism has with this idea is as follows: for simultaneist thinking, input prices are *necessarily* equal to output prices because, unless this constraint is imposed, the magnitude of value, price and profit is simply indeterminate; it cannot be calculated, therefore it does not exist.

The situation that we have just described is for this mode of thinking *logically absurd* and impossible and therefore, simultaneist authors to a person descend into an utterly dogmatic mode of thinking; they simply declare that what we have described, cannot exist. Articles that refer to it are an offense against logic and should not be published; arguments based on it are ‘scholastic’ and need not be answered; and politics based on it are ‘fundamentalist’ and should not be advocated.

This is no different than the reception accorded to Galileo; here are the exact words with which Clavius, possibly the most distinguished and astute Ptolemaic astronomer, dismissed Galileo’s findings:

If the position of Copernicus involved no falsities or absurdities there would be great doubt as to which of the two opinions – whether the Ptolemaic or the Copernican – should better be followed as appropriate for defending this kind of phenomena. But in fact many absurdities and errors are contained in the Copernican position – as that the earth is not at the centre of the firmament and is moved by a threefold motion (which I can hardly understand, because according to philosophers one simple body ought to have one motion) and moreover that the sun stands at the centre of the world and lacks any motion. All of which conflicts with the common teaching of philosophers and astronomers and also seem to contradict what the Scriptures teach.²¹

Compare this with the extraordinary assertion of Roemer (1979:380) who writes:

Responses to this claim, of Okishio and others, have been of three types. These are, first, what Fine and Harris (1976) call fundamentalist positions on FRP. Second, there are empirical discussions of whether or not the organic composition of capital is indeed rising. While this sort of investigation may be useful, it does not bear upon the *theoretical* issue of whether or not the rate of profit falls due to technical change. That is, either such investigation will be consistent with the Okishio conclusion, or it will not be; in the latter case, it would show the need for a different microeconomic argument of capitalist technical innovation; it would not, however, show Okishio's *argument* to be wrong. The empirical investigations, then, are certainly necessary, but they cannot provide refutation of a theory.

In short, the empirical evidence that the profit rate actually does fall is entirely irrelevant to whether Marx's reasoning was sound, because this reasoning is incompatible with Okishio's logic.

There are more things in heaven and earth than are dreamed of in this philosophy. As Kuhn (1961) writes:

Consider, for another example, the men who called Copernicus mad because he proclaimed that the earth moved. They were not either just wrong or quite wrong. Part of what they meant by 'earth' was fixed position. Their earth, at least, could not be moved. Correspondingly, Copernicus' innovation was not simply to move the earth. Rather, it was a whole new way of regarding the problems of physics and astronomy, one that necessarily changed the meaning of both 'earth' and 'motion.' Without those changes the concept of a moving earth was mad." (Kuhn 1961:149-150)

Roemer unwittingly endorses the identical mode of argument which the enemies of enlightenment applied five centuries before. He ignores the possibility – now an actuality – that the refutation of Okishio's argument could occur within a *different logical standpoint* arising from *different ontological premises*, that is, that the two accounts of the world rested on different meanings for the terms in which the accounts were framed. Galileo's ideas made sense only with a different concept of 'Earth' and a different concept of 'Motion'. Marx's make sense only with a different concept of 'Profit' and a different concept of 'Value'.

That is why Galileo could be right even though he made no sense to Clavius and this is how Marx can be right even though he makes no sense to Roemer. Simultaneous thinking drives those ensnared within it back to the oldest, most dogmatic and most religious use of logic, which is simply to decree that the things they cannot understand, cannot exist. *Eppur si muove*. The rate of profit in fact does fall, and the logic that explains this is in fact, we believe we have shown, to be found in Marx.

We now turn to the principal objections to this concept addressed by Sraffian contributors

1.4 Sraffian objections to the temporal concept

Two basic responses to the temporal concept are forthcoming from writers whose point of departure is, Sraffa's interpretation of Marx:

- (1) to write as if it did not exist

(2) to argue that it is logically impossible

The first response is unscientific. Science consists, not in developing the practical consequences of a single viewpoint to its ultimate limits, but in testing all possible viewpoints against evidence. If a legitimate theory is excluded arbitrarily, no matter how thorough the research, it is useless. The Catholic Church explored the thesis that heresy leads to error to extreme limits, exploring many practical consequences on the way. Unfortunately, these included silencing all the heretics with the result that 500 years elapsed before it recognised its own error in suppressing Galileo's ideas.

We therefore turn to the second response, expressed most clearly in the objections by Mongiovi (2002: 16) whose argument turns on his view that the TSSI leads to *indeterminacy*: “[W]e should not be surprised that both of Marx's invariance postulates can hold within it: no mathematical contradictions can arise because the model is spectacularly underdetermined... precisely because they hold as accounting identities rather than as constraints on the price solution, the Temporal Single System conceptualizations of the invariance postulates cannot be regarded as equivalent to Marx's.”

From Mongiovi's standpoint, therefore, TSSI values and prices of production are logically unacceptable because they are indeterminate. In effect, they do not exist.

Mongiovi then argues that the Sraffian concept is superior because its price of production does exist and functions as a vital abstraction, serving as *centre of gravity*; It is, he argues, the average around which actual prices fluctuate. If I understand him properly, he sees what Kurz and Salvatori (ref) describe as the 'long-period' price as equivalent to, or a superior theorisation of, Marx's own concept of price of production.

Mongiovi's second argument rests on his first, for the following reason. To be sure, the concept of centre of gravity certainly does appear in Marx and is as in important idea in his work. Moreover if it were true that there was only one logically possible determination of the price of production, namely Sraffa's, then it would have to be best candidate for this idea because there would be no other candidate. In a one-horse race a three-legged donkey can win. However, if TSSI prices of production are logically acceptable, this argument falls, since there are now two candidates. Moreover, as we shall show, the two candidates are quantitatively different. There can only be one centre of gravity; two of them would mean two long-term trends, two averages, two centres around which actual prices fluctuate. This is a proper race, and the question becomes: which horse wins?

To this, Mongiovi in effect replies: there is only one horse. TSSI only has a jockey. Its horse is a relative of Schrodinger's cat, an indeterminate, non-existent and mythical beast. This allegation is what we will now address

1.4.1 Static and dynamic determination

The most important response to both Mongiovi's objections is thus one and the same; he ignores the fact that there is a different concept of determination possible, namely dynamic determination. By this I mean precisely the following: what determines the fundamental variables in the TSS interpretation is *not what they are, but how they move*. This is universally and commonly recognised as superior form in mathematics and indeed all branches of science except economics.

If I fill a bowl with water, then its 'position' is determined, ignoring all motion, by the fact that no point of its surface can be higher than any other. Or if we take a string and

stretch it over two nails, its 'position' is given by the fact that it must be the shortest distance between the nails. This is the static view of determination.

But pour the water or pluck the string then what happens cannot be explained by these static laws. Nevertheless the shape of a plucked string or poured water is anything but indeterminate. The string sounds a definite note, the bowl displays a definite pattern of waves. Water poured from a jug follows a mathematically well-defined curve. The patterns assumed by a plucked string have shapes which, it has been known since Pythagoras, are perfectly regular and given by well-known laws.

Moreover we cannot understand these shapes on the basis of the undisturbed behaviour of the water or the string. A static taut string cannot bend. A static body of water cannot be curved. Yet we observe curved water and bent strings every day, and their behaviour is perfectly determinate.

This is because the position of the water and the string is governed by the *velocity* and *acceleration* of their material, and no law that is framed purely in terms of their absolute position can arrive at this result. If, moreover, we confine ourselves to the latter, then the shape of the string and the water becomes a complete mystery.

But this is the issue in relation to prices of production and indeed, is completely relevant to the vital concept of *tendency*. For Marx, as many passages show, the price of production is an average, an ideal, a reference point which governs the movement of actual prices. But *how* does it govern them? What happens if in a number of sectors the profit rate is different from the average (or, which is the same thing, if two sectors differ from each other, since it is impossible for only one sector to diverge from an average). Capital then, if there are no obstructions, move to where rates are higher.

Sraffa's system, a special case of Marx's; calculates the price of production as if this adjustment were *instantaneous*; as if all the capital movement needed to equalise profit rates actually took place within a single period. We calculate the price of production, not from the actually-existing economy with its divergent profit rates, but from a hypothetical economy which does not exist, but *would exist if* the awkward deviations were all removed. This is no different from calculating the shape of a vibrating string on the assumption that it has stopped vibrating, or the shape of a waterfall on the assumption that the water has stopped falling. *We ignore the effect of motion on position.*

In actual fact, however the differences of profit rates regulate the *speed and manner* in which convergence takes place. The mechanism not disputable. A higher than average profit attracts investment which raises the level of production which lowers the price which lowers the profit. There is thus clearly a tendency to reduce the differentials between profit rates.

The issue is that this movement of capital takes time. It takes time, incidentally, precisely because it is the product of labour. No matter how much money we throw at a branch of capital, the buildings must be constructed, the machines must come off the presses, ecc. This construction cannot possibly proceed faster than the limits set on it by the quantity of labour employed. Of course, it may be accelerated by employing more workers; but these workers must be drawn from other parts of the economy and will hence slow down the rate at which capital in other sectors can grow. It is simply not possible for all sectors simultaneously to grow at an arbitrary rate and so the profit-equalising movement of capital takes a definite amount of time.

But in that case the position to which the economy *would have tended* if the system were static, has changed by the time the motion has taken place. There is no reason at

all that the hypothetical static state of the economy should inform us adequately about the actual dynamic behaviour. There is also every reason that it should not, since the rate of change, that is, the *motion*, of the capital invested in the various branches and processes of the economy are decisive in determining whether or not they actually equalise.

1.4.2 A mathematical digression

While mathematics is not essential to understand the above, it is worth framing it in this way so that the general point can be made clear. Non-mathematical readers can skip this section.

Suppose that x_t is a vector giving the endogenous variables of an economic system and a_t another vector giving the exogenous variables. For example x_t could specify prices, quantities produced and consumed, and profits. a_t might be the technical coefficients of a Sraffian system or the demand and supply curves of a marginal system.

The basic movement of a system like this is in general ²²

$$x_{t+1} = f(x_t; a_t) \quad (1a)$$

wher f is some function that specifies the motion of the system. In differential equation form this would be

$$x' = f(x, a) \quad (1b)$$

This has a determinate solution or family of solutions, depending on f . The simultaneous approach *substitutes* for these solution by supposing that the average behaviour of the system is approximated by the fixed-point solution

$$x_t = f(x_t; a_t) \quad (2a)$$

or

$$x' = 0 = f(x, a) \quad (2b)$$

that is, it eliminates that all endogenous determines of motion and supposes that the only source of change is the exogenous parameters a_t .

The two systems of determination are incompatible. In order that system (1) should yield anything other than a trivial result, it is precisely necessary that at least some of the x_t should be statically indeterminate. If they are all *statically determinate*, then their *motion* would be overdetermined because there would be nothing left to determine. From the temporal point of view, therefore, the Sraffian system is grotesquely *overdetermined* because motion itself has been eliminated. There is no dependency of motion on position and once removed, it cannot be re-introduced.

Mathematically, this is the straightforward explanation of why the labour-time profit rate differs from the physical profit rate. Moreover this is not a general abstract objectiojn; it bears specifically on the profit rate: suppose that at the beginning of any period of time the stock of capital k in physical units is K hours of labour. Suppose that the value of a unit of capital is v .²³

$$K = vk$$

After some period of time, as a result of production, the capital stock will grow, net of capital consumption, to some magnitude

$$K + \Delta K$$

The capitalists' profit is ΔK ;²⁴. Hence the rate of profit is

$$r_{\text{hours}} = \frac{\Delta K}{K}$$

However this can be written in terms of hours of labour thus:

$$\begin{aligned}
 r_{\text{hours}} &= \frac{\Delta K}{K} \\
 &= \frac{\Delta(vk)}{vk} = \frac{k\Delta v + v\Delta k}{vk} = \frac{v\Delta k}{vk} + \frac{k\Delta v}{vk} = \frac{\Delta k}{k} + \frac{\Delta v}{v} \\
 &= r_{\text{physical}} + \frac{\Delta v}{v}
 \end{aligned}$$

In general, values are falling under technical change. It follows that the second term is negative; that is, the rate of profit in hours must be lower than the rate of profit in physical terms. Recalling that the physical profit rate is none other than the simultaneous, Sraffian profit rate, it follows that *if the TSSI of Marx is valid, Marx's prices of production cannot be equal to Sraffa's.*

This illustrates a fundamental point. *Why* is the simultaneous rate, which is also the physical rate, higher than the labour-time rate? Precisely because it omits the *dynamic* term $\frac{\Delta v}{v}$; the fundamental construction of simultaneism depends on assuming that

this is zero. It therefore eliminates all its effects; that is, it omits the most important determination of all, the impact of the system's motion. Once this missing determination is re-inserted, the mystery of the profit rate is solved.

The coincidence of the fixed-point and temporal solutions to equations of type (1,2) is mathematically false in any system in which there is *secular* change in a single direction. In a capitalist economy this is so for two reasons; the first which is more superficial is monetary inflation and the second, which is fundamental, is technical change, that is, the systematic downward fall of prices. The Sraffian profit rate, omits to take into account the impact of endogenous motion, that is, technical change; The labour-time profit rate, incorporates it. That is why the physical rate rises when the labour-time rate falls.

Section here to be expanded; underdetermination is not a sin against nature. For example consider the conservation of energy. This in no way specifies the exact movement of any particular system. Nevertheless, it constitutes a law because, once one moves to consider a specific system (eg a pendulum, a vibrating string, pouring water) one adds *further* determinations corresponding to the concrete reality that one is studying. If it really were the case that capitalism is fully determined by its technical coefficients, one is entitled to ask: why is capitalism in one period different from capitalism in any other? If one insists that every variable is fully determined from technology alone, one is obliged to treat everything else as *exogenous*, as non-economic. In that case, capitalism has no laws of motion whatsoever; what any capitalism system actually does is determined uniquely by things outside it.

In the system described in the previous section, prices it is true are not determinate. However, because values are independent of prices, these are indeed determinate. Moreover to conduct any specific analysis based on a specific view of capitalist behaviour, there is nothing at all to stop us introducing additional assumptions for example related to the speed and direction of the movement of capital; we would then end up with a fully determinate trajectory for the economy.

Section to be expanded: all commentators consider it an unfortunate oddity that Marx dedicated so little attention to algebra. Mongiovi for example writes, of Marx's mathematical notes, that (quote). But in fact (see Struik 1948, etc or just read the

bloody things) Marx's mathematical notes have a clear and coherent focus, which is the study of *differential calculus*. The exposition is quite systematic and moreover very modern; what Marx clearly wishes to get at, for example, is the notion that the Calculus of Operators now (ca 1930?) formalises, which is that differentiation is a *functional transform*; it takes one function into another.

The simplest explanation for Marx's 'ignorance' of algebra is that he considered differential calculus a great deal more relevant. And the simplest explanation for that, is that his approach was temporal.

1.4.3 Which horse?

To summarise, there is not a single candidate for centre of gravity; there are two. Mongiovi's central claim is that we must Sraffa's long-run prices as the true meaning of Marx's 'centre of gravity' because otherwise we have no such concept. Actually, however, we have a choice between *two* candidates for centre of gravity; the simultaneous and the temporal price of production.

As we have already shown, the rate of profit determined temporally is necessarily different from the rate of profit determined simultaneously unless there is no technical change. Which is the best? This cannot be settled here and I would not seek to; the whole point is that each candidate is valid and worthy of investigation. The key point is that they are different. Nevertheless, no harm results from introducing some of the considerations that weigh on the matter because as Moseley (0000) points out, along with Mongiovi, Marx uses this concept of 'centre of gravity'. We need, therefore, to consider how closely the idea of 'centre of gravity' matches the idea of 'equilibrium price' since there is no necessary logical reason that an equilibrium price should function as a centre of gravity. The two ideas cannot be made identical simply by declaring them to be so. So let us look at them.

The idea of a centre of gravity as an average is evidently the view of Marx from the very way that he poses it, as cited by Mongiovi (0000). Moreover Marx is fairly clear about the way that this average is formed; it is not some abstract long-run but a very definite empirically visible period, namely the *business cycle*, which because it is tightly linked to the turnover of capital and hence to the introduction of a new base technology, is a period over which the full impact of a technological change works its way through the process of price formation, as an average over the accumulation and disaccumulation phases. The idea is that the differences *average out over time*.

However, the Sraffian construction does not in fact calculate price of production as an average and therefore, first and foremost, it is a redundant construction. For, if the fixed point really were the long-run average, then it would be sufficient to use the long-run average *itself*; why not simply determine it with reference to the *current* moving average over a definite period? This gives perfectly determinate solutions.

Second and parenthetically, by virtue of the very fact that it is *not* an average but an independently-calculated magnitude, it of necessity must open up the possibility that it may differ from the average. It is scientifically very odd, although I am perhaps ignorant of the literature, that very little work seems to have been done to check this out. After all it is not difficult to calculate average prices over any period of time and it is not difficult to calculate the Sraffian price of production. It would be interesting to see if one coincides with the other, to say the least.

But the third and most decisive point is that the construction *assumes as a theoretical point of departure that the fixed point profit rate is in fact equal to the long-run average profit rate and that the prices of production determined from this profit rate*

are in fact equal to the long-run average price. That is, it supposes that there is no *other* determination of the price of production. But as we have seen, this is not so.

Fourth point: the argument that prices are ‘determinate’ is weaker than it sounds at first sight. In fact *actual* prices – market prices – are just as indeterminate in the Sraffa system as in the TSS system. What is determinate is a magnitude which may or may not have anything to do with the economy: it is merely asserted without proof that it constitutes the long-run centre of gravity.

Fifth point. *Analytically* it is entirely confusing to fail to distinguish between an approximation with an abstraction.

1.4.4 Which abstraction?

The accusation of vulgarity therefore falls; abstraction is present as abstract labour. Marx asserts moreover that this presents itself to observation as a long-period *average* which means literally what it says; we add up the magnitudes in question (weighted appropriately if necessary) over a period and divide by the length of the period.

But the difference is this: Marx’s abstraction does not demand what is to be proven as a presupposition. Abstract labour simply requires that production takes the form of commodities, that is, that the purpose of the labour is to produce an exchangeable thing. Whether the thing is sold, what it exchanges with, and in what ratios, is absolutely irrelevant to whether the abstraction can be made.

The whole point is therefore that it is an abstraction necessary as the point of departure for a non-equilibrium analysis, because it does not presuppose equilibrium.

And in fact the imposition of a simultaneist conception of production price introduces the vulgar view in a much more profound way. It imposes it *directly* by imposing the conclusion that the market consists of a relation, not between human labours, but between things. However it imposes it much more profoundly, and irretrievable, in the following way: it eliminates, a priori, the very possibility that the capitalist system can create crisis from within itself. If we assume *a priori* that systems can only be determined by their static properties, then we must perceive of all deviation from the ‘natural, static, state’ of perfection as an external intervention, as the result of a malign force.

This leads to a very basic question, which has to be asked; to what extent is the Sraffian system to be regarded as an *alternative* to the neoclassical view and to what extent as an *internal critique*, that is, *a working out of the internal contradictions of the neoclassical view*?

The Sraffian system has always been counterposed to the neoclassical view by virtue of its very valid demolition of the marginal principle. However I want to question whether the neoclassical view in the last analysis, relies uniquely on marginal determination or on whether the distinction between marginal and physical determination is as vast as the Sraffians have insisted. If the marginal principle was the most decisive foundation of the neoclassical view, why is it that one *particular* and rather obscure variant of it – the Walrasian view – triumphed over other presentations of marginalism, not least that of the Austrians, who are violently hostile to simultaneous valuation? (see for example O’Driscoll and Rizzo 0000) Indeed it was denounced by the founder of marginalism as ‘a mortal sin against logic’.

For me the two most essential properties of the neoclassical view, and those which are most ardently ideologically supported by capital, are on the one hand the idea that the market is a relation between *things* rather than *people*; that what happens in trade is

not the exchange of human labours but the exchange of mere objects; and secondly, the idea that such a system cannot produce crisis from within itself.

This is essentially the way that neoliberal economics regards the capitalist market. For neoliberalism the market is *by definition* perfect. If therefore it develops cycles or inequalities this cannot be the result of the market; water is curved because somebody bent it; the communists, the unions, bad government, incompetent monetary regulation, stupid and lazy people, corruption, terrorists – anything at all, except the market itself, is responsible for the failure of the market to follow its static course.

For me, one of the profoundest weaknesses of the Sraffian system, as a system, is that it does not contain within itself the necessary ontological and conceptual elements to overcome this most decisive characteristic of the neoliberal view and, to the contrary, it actually reenforces it.

This, I want to insist, neither leads me to the conclusion that the system should be omitted from consideration nor to the conclusion that anyone who believes it is ideologically committed to capitalism. It does, however, lead to the conclusion that Sraffians are doing no service either to themselves or to Marx by continuing to slam the door on alternative ways of thinking.

1.5 Conclusions

Galileo's opponents did not dispute his evidence. They dismissed them as illogical. They treated as 'crazy' the very idea that the earth might not be at the centre of the universe – because for them, *by definition*, it had to be. As Kuhn explains, being at the centre of the universe is part of what they meant by the word 'earth' Consequently, *no* logic applied to this definition could make sense of Galileo's theory. What was necessary was an acceptance that a *different* logic, arising from a *different* analytical framework, was needed before one could even begin to make sense of Galileo's argument, let alone test it to see if it explained the world.

Logic is just the mathematical expression of an analytical viewpoint and can yield nothing beyond this viewpoint. If it is used to exclude from discourse a view which is entirely coherent with the evidence, then this is a dogmatic use of logic, not a scientific one. A scientific approach considers *all* relevant theories and tests them against what we see in the world. If Marx's own theory is excluded, we have not science but religion.

This debate will therefore succeed, not if you recognise our interpretation of Marx to be 'correct' but if you concede it is *possible*. If you accept that it is *legitimate* to interpret Marx in the way we suggest, in so doing you reject the century-old dogmatic grounds for excluding Marx from the normal terrain of scientific discourse This is not an onerous challenge. It does not oblige the supporters of Sraffa to abandon either their approach to economics or their interpretation of Marx. It merely obliges them to abandon the view that this approach, and this interpretation, is the *only possible* one.

Our experience is that our opponents nevertheless find such concessions hard, and this is why we consider their approach dogmatic. Sraffians and post-Sraffians alike will no longer have the right to speak as if their reading of Marx was the only one. They will have to stop once and for all presenting as a universal truth a result that is *contingent upon an interpretation*. They will have to abandon many turns of phrase dear to them. Consider for example some of the expressions introduced already into this debate:

- “*We now know* however that, except in the special circumstances in which relative prices are proportional to labor-values, these [Marx’s] so-called invariance postulates cannot both hold simultaneously.” (Mongiovi 2002).

‘We’ do not know any such thing. What ‘we know’ is that *the Bortkiewicz-Sweezy-Seton-Sraffa interpretation of Marx* cannot reproduce these postulates.

- “*It has been shown* that whatever algorithm is used for [Marx’s] transformation, a paradoxical result is obtained: in any economy in which several commodities are produced, the rate of exploitation remains unchanged in the transformation of labour values into prices if and only if there is no exploitation.” (Screpanti 2002)

No such thing ‘has been shown’. What has been shown is that any algorithm *within the transformation procedure of Bortkiewicz* yields this paradoxical result.

- Characterising all attempts to understand Marx in his own terms as ‘fundamentalist’ or ‘sectarian’, or with the words of Laibman (2001:) who refers to TSS and SSS as ‘New Orthodox Marxism’. Such words are designed to imply that this research is motivated by a kind of religious adherence to text over fact, as evidenced by a refusal to consider logic.²⁵ It is first of all profoundly insulting to dismiss an alternative viewpoint with words that lean on the popular (and racist) association between Islam, terrorism, and backwardness. But more decisively, like so many academic debating techniques, it is simply a way of avoiding the issue. If one’s opponent is inspired by zeal and not logic, then there is no need to discuss what they say. But as we have shown, this form of denunciation *itself* substitutes dogmatism for science, as does any discourse which rules out theories *a priori*, without giving reasons which the reader may judge independent of the writer.
- One may not write as if the interpretation did not exist; as if in some sense ‘they can pursue their theory, and we will pursue ours, and therefore, we can carry on exactly as before’. In every article that we have written we have made copious references to the alternatives including those proceeding theories to which we owe a substantial debt, such as the New Solution and the Simultaneous Single System view, or Shaikh’s early experimentation with Temporal Dual System approaches. This is because science consists, reduced to its essence, in confronting evidence with *all* valid theories. If even one of these is missed out of the account, the result is itself not science but mere proclamation.

Perhaps the most important thing of all is that writers must ask themselves – and the political and trade union movement needs to remind them of this question – why, if they are opposed to dogmatism as they appear to sincerely believe, they find it so difficult to concede the extremely limited demand that our interpretation of Marx *might* be right. They are not being asked to concede that they themselves must be wrong. They are not being asked to concede that Marx must be right. They are not even being asked to concede that our interpretation must be correct. All they are being asked to concede is that such things are *possible*.

At the end of the day, the hallmark of the true enquiring spirit and the true scientist is precisely the willingness to consider that a theory or view which is different from the one that the thinker holds, is worthy of consideration.

Marx's theory is one such theory; our interpretation is one such view; if one dismisses either, particularly if one does so in full knowledge that they exist, one crosses a subtle but decisive threshold; it is the threshold which divides enlightenment from suppression.

What is required instead is mutual recognition based on an understanding of the legitimate role of the intellectual in political activity. Science consists, at every stage, in co therefore not simply to present his or her own view, indifferent to the existence of others. It is to clarify the differences between the variety of views at issue, to consider them in their own terms, draw out their implications, and contrast them with the view developed by the writer.

1.6 Why it matters whether the magnitude of value is determined by labour time

From the physicalist standpoint, it appears as though there is only one criterion for selecting or seeking one particular measure of value over another, namely, whether or not it can be calculated. This view has emerged gradually: this in Steedman's original critique the argument derived from inconsistency. It was stated that there were many valid and useful outcomes from a labour measure of value but, unfortunately, it was not possible consistently to measure the magnitude of value by labour time and, therefore, physical magnitudes were (notwithstanding the contradictions arising from the physical approach, of which somewhat less is said in the literature) the only available option.

However, as we have seen, physical magnitudes are not the only option. There is no inconsistency in measuring the magnitude of value by labour time.

Therefore, the original agenda of the debate, at the turn of the previous century, remains to be addressed: *given* that one may choose to measure value in any one of three ways – time of labour, physical magnitude or utility, and monetary measure – which allows the superior understanding of economic phenomena?

Exchange is a relation between human labours, not a relation between things. Therefore, the merit of not merely understanding (in some vague sense), but also *measuring* value in terms of labour, is that it permits is to establish the relation between exchange, or the market, and the other institutions of society within which, after all, the market and capital are simply inscribed and on which they depend for their existence.

Class, for example. This is not just an outcome of the division of the spoils, of exploitation. It is an outcome of property relations, specifically the fact that the worker owns her or his labour power and sells this to the producer; if value is not determined by labour time this cannot be so, since it can be created outside of production.

Capital, for example: does it, or does it not, sets limits upon itself? Where does crisis come from? From inside it; if we cannot explain the empirically-observed fact of falling profit rate as a product of the capitalist system, we do not grasp this.

The specifically capitalist nature of exploitation, for example. The problem is not to explain exploitation in general, which is an easy consequence of the existence of either a physical surplus or of surplus labour (though these are not the same thing). The difficulty is to explain how exploitation takes place under the specifically capitalist system. If the *only* requirement is a physical surplus, why is capitalism any different?

Competition, for example. It is impossible to understand why some nations become continually relatively richer unless one grasps that what is involved is a zero-sum game for a limited magnitude. If only physical product mattered, why doesn't technical innovation lift the world out of poverty?

These are just a short list of the many instances of social relations that make sense, and indeed, for which quantitative analysis is only possible, on the basis of a labour measure.

1.7 Bibliography

Mongiovi, G (2002), *Vulgar Economy in Marxian Garb: A Critique of Temporal Single System Marxism*, paper to the 2002 conference of the Eastern Economic Association

¹ Mongiovi's argument in effect rests on two propositions: first that Marx cannot save Marx's conclusions, and second that Sraffa can. I also dispute the second proposition but will limit my paper to the first.

² By 'completely generally' we mean for any set of prices. This includes both prices equal to values, and profit-rate-equalising prices of production, as special cases; it extends however to anything we observe in a real economy regardless of whether or not it accidentally coincides with one of these special cases, and can therefore be treated as a general law of political economy.

³ "Owing to ... accidental causes, the magnitudes determined by a theory cannot be expected to coincide exactly with the actual magnitudes observed in the market. If a theory is sound, the deviations between actual and theoretical magnitudes will tend to counterbalance one another over time, so that the averages of the observed magnitudes will be close to those established by the theory: a theory's usefulness is gauged by how accurately it depicts the tendential mechanisms that operate on the phenomena we observe.

⁴ I do find empirical weaknesses in it; the world, I think, does not behave as if value was regulated in this way. Most particularly, the rate of profit obstinately does fall under conditions where the theory dogmatically asserts that it cannot. But that can be settled in the normal scientific way, by amassing evidence in support of and against the theory and then testing it. Sraffians have a perfect right to develop their theory and collect evidence in support of it and I would strenuously oppose any attempt to restrict this.

⁵ Here lies the core ontological distinction between temporal and simultaneist approaches. A temporalist recognises, with Heraclitus, that identity is not a prerequisite of persistence. A tornado *exists* and *persists* but it is never at any time identically the same as it was at a previous instant. However from the Platonic standpoint of Bortkiewicz and all simultaneism, the only things that can, at the most abstract level, be said to exist are those things that do not change. *Unchangingness* is made a prerequisite of universality or, in Hegel's language, the 'empty abstraction of being' is elevated above the 'concrete reality of Becoming'.

⁶ The interpretation therefore views transformation as a problem of reconciling two sets of prices in two different economic systems; one in which profits equalise, and one in which they do not. This gives rise to our characterisation of the Bortkiewicz-Sweezy-Sraffa interpretation, following Ramos and Rodriguez, as 'dual-system'.

⁷ All that Sraffa himself (1960:v) claims on his own behalf is that his method validly interprets the concepts of Smith and Ricardo.

⁸ Screpanti and Cavallaro, following others, seek to distinguish between two assertions (1) that labour is the sole source of value (2) that the magnitude of value is determined by the magnitude of labour. They seem to feel that (1) can be defended even though (2) does not hold. I cannot see this. For suppose (2) does not hold. In that case, a circumstance must exist in which an economy may increase its output of value without altering its use of labour. In that case, where has the extra value come from? Since the labour is in the two cases the same, the extra value must have come from somewhere else.

⁹ It should be noted that neither TSS nor Marx claim that use-value is *irrelevant*. The commodity is the contradictory unit of use-value and exchange-value and it is precisely this contradiction, particularly when concentrated in the contradictory functions of money, that lies at the heart of the motion and crisis of capitalist society. The point is that if the physicalist concept holds true, then there is no such contradiction and no such unity; everything *reduces* to the use-value of the commodity. In a certain sense, the physicalist concept amounts to obliterating the very fact that the commodity exchanges at all, expressed most embarrassingly in the uncomfortable logical conclusion, shared with general equilibrium theory, that money is a veil.

¹⁰ This approach to money is not confined to temporal authors. TSS merely combines this concept with temporal analysis, and extends its earliest formulations to constant capital. On the precise definition and hence magnitude of the totals involved there are differences among authors although I think conceptually the framework is the same. The first authors to suggest that the value of money (the inverse of the MELT) could be conceived of in this way were the New Interpretation authors (cf Foley, Dumenil-Levy); they treat money as representing wage-goods. Simultaneous-Single-System authors such as Moseley, Wolff-Callari-Roberts or Lee treat money, implicitly or explicitly, as an aliquot proportion of all goods directly consumed in the current period. In circulating-capital examples this does not conflict with my definition. In papers by Kliman and McGlone, and by Ramos and Rodriguez which illustrate the argument with circulating-capital examples, this definition is maintained although the presentation is temporal and not simultaneist. I argue (Freeman 1995) that the most coherent and general treatment of money is to interpret Marx's concept of 'all commodities in circulation including money' (TBA ref) as referring to all commodities on which the market sets a price, which includes for example goods awaiting incorporation into production – which have a price implicitly as a part of the productive entity as a whole, priced on its books, and explicitly if the entity is broken up and asset-stripped, priced in the secondhand market.

¹¹ We have assumed for simplicity that the whole capital is used up at once. However the argument applies in its entirety if only a part of the capital is used. It may then turn out, however, that value is *transferred* either from the existing stock of capital to the product (depreciation of capital stock), which Marx terms the release of constant capital and occurs in a slump, or from the product to the stock of capital (appreciation of capital stock) which Marx terms the tie-up of capital and occurs in a boom. This 'value pump' is one of the principal mechanisms of the boom-slump cycle; the function in a slump is to slow down accumulation to the point where the value of capital stock may depreciate through the release of constant capital and so restore the rate of profit. This is exactly what is happening now as recognised in the enormous write-downs of capital values being undertaken by giant global companies. The effect of these write-downs is a major reduction in *current* profits since they constitute a deduction from current income; they will however raise the future rate of return on capital, which will be calculated against a much smaller capital stock (and a lower market valuation of this stock through the fall in equity prices)

¹² In practice 'physical properties' are more elusive than the earthy nineteenth-century tangibility the term evokes. Practically, research in the surplus school tradition uses input-output matrices which are treated as if their coefficients were direct measures of physical consumption and production. But the coefficient in an I/O matrix is a ratio of two money quantities and, if relative prices change, it alters. (TBA cite Leontieff) It is dimensionless but its *scale* is not at all independent of money. *In practice* money is the most general surface form of appearance of use-value not only in exchange, but in production also.

¹³ Mongiovi considers this a 'vulgar' approach in that market prices are near the surface of things. But this is not quite the point; the transformation above refers to an abstract 'price' which is serves as centre of gravity in just the way that Mongiovi claims for Sraffa's prices. The point is that Sraffa's prices *are not conceptually capable of functioning as prices*; they could not *possibly* serve as a monetary rate of exchange. Temporal prices – whether highly abstract or very concrete – are conceptually rates of exchange for money.

¹⁴ In actual fact the matter is more complex since, *within* each branch, there will be found processes of production of differing productivity. Those processes with a higher productivity will enjoy lower costs, which is the same thing. As a result they will appropriate *surplus* or exceptional profits, above the profit rate for that branch. Capital will therefore in part migrate to those *processes* yielding the highest profits which may be, and indeed usually are found, in the branches with a higher organic composition and hence a lower average sectoral profit rate. This explains why, for example, capital migrated throughout most of the earlier history of capitalism *away* from agriculture, with traditionally lower

organic composition of capital, *towards* industry with a traditionally higher organic composition. The exact process by which this nevertheless lowers the average profit rate in the backward sectors is quite historically concrete and is not automatic. Actually, branches of production with exceptional profit rates have been observed for rather long periods of history.

¹⁵ If wage-goods become more expensive then, actually, workers are able to acquire less human labour for the same monetary wage and thereby, become more exploited. The temporal approach allows us, notwithstanding, to allocate this change to the correct time-period (*after* the exploitation of the last period is complete and *before* the exploitation of the next period commences) and therefore to analyse the result as a change in the rate of exploitation, not as a post-hoc redistribution.

¹⁶ We have *calculated* the numbers in the transformation of value into price of production quite deliberately in terms of hours in order to show that it does not depend on output prices. As Rodriguez and Ramos note, in volume III Marx does not specify the units of the transformation. He does not need to since his ruling assumption (TBA locate the citation) is a constant value of money, £1 = 1 hour. However, money enters the determination qualitatively; were it not for exchange and the movement of capital, prices of production could not be formed.

¹⁷ The conclusion of this interpretation is that the rate of profit in money terms can be raised by monetary inflation. The Sraffa interpretation, as far as I can see, implies that the money profit rate is necessarily the same as the physical rate, which seems to me counter to the known facts. It is relevant to ask why the monetary rate cannot be increased without limit and why inflation is not a solution for capitalist accumulation. Clearly there is something 'underneath' money that constrains the money rate; Analysis by TSS authors suggest this constraint operates dynamically, through the mechanism of debt deflation (see Kliman **ref TBA**) and not statically, so that for periods of time the two can separate but the money rate is brought back to earth, as it were, by the value rate.

¹⁸ One of the most extraordinary features of the contemporary debate on the profit rate, manifested for example in Brenner's (1999) empirically excellent account of the present stage of the world economy, is that on the one hand the profit rate is observed to fall empirically; on the other hand Marx's account explains this fact; and no other theory explains it adequately; yet anyone that draws the obvious conclusion, that Marx might have a point, is labelled a fundamentalist, obscurantist, theoretical nincompoop. In all humility, if I signori economisti have trouble making sense of a theory which explains the facts better than they, they might conceivably entertain the minor possibility that the theory might just understand something they don't.

¹⁹ or unless offset by means that are mathematically limited in what they can achieve, such as raising the rate of exploitation

²⁰ This is obscured by National Accounts terminology, which hides constant capital. It is clear in company accounts, however. If a company writes down an asset (recognises that its actual value is less than its book value), then it conducts an enforced depreciation. Depreciation, however, is a *cost*. The company has to pay for it. In effect, a written-down asset is consumed in monetary terms but not in physical terms; to be precise, the accounts divorce the physical and monetary aspects of the consumption. However they can only ever displace the time at which the monetary consumption enters the accounts; they can never (except by simply lying) prevent the monetary consumption from appearing, and moreover even if they lie, they cannot prevent this cost from bearing down on what the capitalists do. An accurate value accounting would merely *recognise* the time at which the value consumption takes place..

²¹ From Clavius' commentary on Sacrobosco's *Sphaera*, cited in Lattis (1994:249)

²² It might seem that this is a first-order system since only first differences are explicitly mentioned. However as the theory of difference or differential equations explains, any higher-order system can be reduced to a system of this nature by a suitable choice of intermediate variables. Thus if for example $x_{1,t} = ax_{2,t-1} + bx_{2,t-2}$ we can write $x_{3,t} = x_{2,t-1}$ and we have the system $\{x_{1,t} = ax_{2,t-1} + bx_{3,t-1}; x_{3,t} = x_{2,t-1}\}$

²³ It may be objected that this presumes a homogenous physical composition of capital. Actually it can be made rigorous for an inhomogeneous collection; however the point is that once the divergence of physical from value profit rate is demonstrated in one instance, it cannot logically be asserted in any instance.

²⁴ K is the total volume of goods in society whether invested or not. Subsequent to production some part of ΔK will be consumed by the capitalists and some will be invested; all of it, however, is profit.

²⁵ It is ironic that many who use such terms so freely and abusively find no difficulty with detailed, careful and voluminous investigations into the interpretation of Ricardo, or Keynes. This in itself

shows the actual unconscious content of the abuse, which is not to invalidate the interpretation of texts in general but specifically the interpretation of *Marx's* texts; that is, to suppress a particular line of enquiry.