

TRENDS IN VALUE THEORY SINCE 1881

Alan Freeman

Alan Freeman is a visiting fellow at the University of Manitoba. He writes on cultural economics, value theory, and global poverty and has co-edited four books. With Radhika Desai, he co-edits the *Future of World Capitalism* book series, and with Andrew Kliman, co-edits the journal *Critique of Political Economy*. His main works are online at <http://ideas.repec.org/e/pfr102.html>



Abstract: This article surveys the key ideas and currents of thinking about Marx's value theory since he died. It does so by studying their evolution, in their historical context, through the lens of the Temporal Single System Interpretation (TSSI) of Marx's ideas, an approach to Marx's theory of value which has secured significant attention in recent years. The article explains the TSSI and highlights the milestones which led to the evolution of its key concepts.

Key words: theory of value; Marxian economics; TSSI; New Solution; temporalism

Introduction¹

This article summarizes the key ideas and currents of thinking about Marx's value theory since he died. It does so by studying their evolution, in their historical context, through the lens of the Temporal Single System Interpretation (TSSI) of Marx's ideas, an approach to Marx's theory of value which has secured significant attention in recent years. The article explains the TSSI and highlights the milestones which led to the evolution of its key concepts.

I argue in retrospect that TSSI was the logical completion of a long process of re-discovery in the face of a concentrated, century-long assault on Marx's ideas, much of it led, sadly, by Marxists. Other, more partial attempts to understand this theory, many valuable and interesting, were milestones along the way. In this article I therefore set TSSI in the context of the evolution of value theory as a whole since Marx's day.

The Beginning

The 20th century dawns. We are at the source of all modern debates on Marx's value theory, the intellectual center of gravity of Europe and bulwark of conservative thought: Vienna, capital of the mighty Austro-Hungarian Empire. Since the defeat of the Paris Commune, the crowned heads of Europe have slept easy in their beds. Enlightened absolutist "Josephinism" (Johnston 1983) vies with Bismarck's new welfarism to preside over a new phase of industrial expansion, cultural vitality and intellectual *lèse-majesté* recorded by historians as the "*Belle Époque*."

But there are distant tremors. The Second International, barely 25 years old, is establishing mass parties across Europe. Friedrich Engels has published the second and third volumes of *Capital* and Karl Marx's ideas are taking root in the rapidly-expanding workers' movement.

Emperor Franz Josef has reigned since 1848 and will die in 1916 as Europe's longest-serving absolutist monarch. He was once advised by the legendary Prince Metternich, who considered reading a subversive activity, Censorship is a normal practice, and vigilance against politically suspect ideas has become a profession in its own right. An ideological counter-offensive opens, led by Eugen von Böhm-Bawerk, Franz Josef's finance minister. He will shortly introduce principles of "financial stability" into government including drastic restraints on state spending which, when coupled with an unwinnable war, will soon summon a revolutionary tide that finishes his gilded empire forever.

Social forces, emerging from a new wave of expansion financed by a surge of imperialist conquest, confront political conditions in the Military-Christian Empires of Austria, Germany and Russia that have barely changed since the age of Absolutism. Marx's theory explains what the new generation of workers can see all around them: periodic uncontrollable crashes, grinding poverty side by side with ostentatiously corrupt displays of power and wealth, mass unemployment and misery, held together by barbaric political suppression and violence. Böhm-Bawerk (1949 [1896]: 3) peevishly acknowledges this:

As an author Karl Marx was enviably fortunate. No one will affirm that his work can be classed among the books which are easy to read or easy to understand. Most other books would have found their way to popularity hopelessly barred if they had laboured under an even lighter ballast of hard dialectic and wearisome mathematical deduction. But Marx, in spite of all this, has become the apostle of wide circles of readers, including many who are not as a rule given to the reading of difficult books.

He writes two key books: *Capital and Interest*² defines the field of value theory, and *Karl Marx and the Close of his System*³ is a scathing critique of Marx's theory.

Their three key propositions will dominate all discussion on Marx's theory from then on:

1. The measure of value of a good is the benefit derived from that good.⁴
2. There are two kinds of value: objective, and subjective.⁵ Marginalism tells us that the second explains the first,⁶ superseding classical theory's claim to locate the source of value in production.
3. Marx, in developing classical theory to its maximum extent, has proved it is at a dead end. Volume III of *Capital* produces conclusions which contradict those of Volume I. Marx's grandiose claims are empty and the classical tradition defunct.

The first, traditional marginalist, assertion is known to be deeply problematic. The second, which enters the literature as a "standard" classification of theories of value, is equally suspect for reasons we will examine. The third assertion is therefore critical: without it, the others would soon be exposed as indefensible. Establishing the inconsistency of Marx is an imperative. Böhm-Bawerk bends himself to the task.

Ideology and Science in Economic Thought

Böhm-Bawerk's strategy holds the key to the evolution of 20th-century economic thought. This latter should be understood as something quite other than normal scientific thought, in which the success of a theory depends ultimately on its conformity to observation, notwithstanding the light which Thomas Kuhn (1970) has shed on its processes.

Conformity to evidence is not the criterion by which economic theories are selected. Economics not only found itself utterly unprepared for the crash of 2008 and ensuing depression, but was the agent of its own unpreparedness. It carefully eliminated or marginalized all the insights gained in the last such crash in 1929 like those of Keynes, replacing them with such manifestly absurd theories as the Efficient Markets Hypothesis and on this basis dismantling most mechanisms of protection against financial excess inherited from that time.⁷ We can only properly understand this if we grasp that its theories are selected for ideological, political, or material advantage, not for their explanatory or predictive capacity. They are called on to rationalize the needs of the propertied classes, and to insulate them from challenge by those caused disadvantage by the gratification of these needs. It is therefore of paramount importance to economics that the subversive potential of ideas like Marx's is not realized, and that such ideas achieve neither recognition nor serious consideration. Marx is demonized because he is the foremost and most consistent representative of such ideas. Economics has never engaged with Marx's

own ideas, has never intended to engage them, and has devoted enormous resources to avoid engaging with them.

Marx's theory then, as now, offered a superior explanation of observed events, and when Böhm-Bawerk was writing, was widely promoted, with considerable justification, as a towering intellectual achievement which had solved all outstanding problems of classical theory.

Böhm-Bawerk's problem was therefore to ensure that such a scientific confrontation could never take place. He had to show that, notwithstanding the many holes in his own theory, there was no superior one. He therefore sought to prove that Marx's theory cannot be valid because it *does not make sense*. Its conclusions cannot then possibly hold, any predictive success must be accidental, and it can and should be suppressed and ignored. His intellectual perspicacity on this point was as visionary as it was reactionary. Marx's supporters were to find themselves impaled on this carefully baited hook for the next hundred years.

Two points require attention. First, no system of economic theory directly counterposed to Marx's own has ever stood on its own two feet. Theoretical instability surfaces in every great crisis, in the 1930s with the rise of Keynesianism and now in the unfolding intellectual crisis provoked by the 2008 crash. The drive to prove Marx incoherent is therefore neither incidental nor secondary. It is central to the project of ideological censorship initiated by Böhm-Bawerk and continued, ever since, by his successors and their converts—which sadly include, as we shall see, most Marxist economists.

Secondly the discussion is not academic. After the revolutionary wave driving political events in the first half of the 20th century subsided, academia became the theatre for apparently rarefied and obscure discussions around Marx's economic legacy. But if we understand it as a "normal" theoretical controversy such as those surrounding the causes of cancer, we will grasp neither its significance, nor the scurrilous manner in which Marx's opponents including Marxists settle accounts with their critics. The interests involved go beyond the private careers of professors and deans. As economic theories came by degrees to be selected for the assistance they rendered to the propertied classes and their various fractions, and as more and more sophisticated methods of control evolved—funding, recognition, publication, promotion, even simple free time—the subtle if venal enticements of academia have become an organized system for the purchase of ideologically useful economic theories.

Böhm-Bawerk was in this respect an archetype and, if the word can be used in this context, a pioneer. No dispassionate academic, he was a trained political ideologue. He wanted to justify unpopular policies directly reflecting, and imposing, the needs of the propertied rich on the propertyless poor. The ideological censorship of Marx's theory was a *political* imperative.

This has not changed. The policies of neoliberalism did not “evolve” out of some process of progressive refinement or discovery; they were a retrogression, imposed in what Todaro and Smith (2009) term the “neoconservative counter-revolution.” Such leading institutions as the World Bank and the International Monetary Fund were populated with economists who could be relied on to formulate and impose the doctrines of Structural Adjustment that consigned most Third World countries to an experience now known as the Lost Decades. The “Chicago School”—until the 1970s little more than an eccentric sect—came to prominence for its political utility, not its theoretical perspicacity. It provided justification for the policies the US needed third-world governments to adopt, to prop up its waning power, and for the austerity and mass unemployment which Reagan and Thatcher imposed on their own populations.

History moves forward but key features repeat. As 1968 and its aftermath were propelling a new generation towards Marx’s theories, a renewed ideological offensive against Marx picked up where Böhm-Bawerk left off. The neoclassical economist Paul Samuelson (1971) received a large grant to study for a full academic year and produce a famous article whose main finding was that Marx’s *reasoning* is so flawed as to render him useless for study. This has become the most persistent basis for the exclusion of Marx from nearly all orthodox journals and most economics curricula. When history repeats, as Marx once observed, it does so always in a new form. This time, the counter-offensive was conducted and carried through by Marxists,⁸ for reasons that are the subject of most of this article. This is the key to all subsequent evolution of Marxist theories of value.

Consistency and the Issue of Interpretation

In deciding whether Marx’s theory makes sense, a prior issue has to be dealt with: what, actually, was that theory? This is not easy to ascertain: to state the obvious, it isn’t possible to ask him.⁹ The texts he personally prepared for publication stop with Volume I of *Capital*. Initially, most Marxists and even some of their opponents preface their writings by first stating what they believed his theory to be, and why: that is, they stated their interpretation. Indeed writers such as Kautsky acquired their reputation in the workers’ movement to no small degree because of the seriousness with which he approached this task.

This valid practice gradually faded. It is difficult to place an exact date on the change, but by the late 1940s, following a famous exegesis by Sweezy (1942), writers on Marxist value theory stopped either stating or defending their interpretation of Marx and began, instead, referring to a “common consensus” reading of Marx whose details we will examine shortly. As a consensus, it became by degrees unnecessary to state. The subsequent literature on Marx has, in consequence,

assumed an interpretation of Marx derived from generations of Marxists standing between it and Marx himself.

But does this “common consensus” reading of Marx really represent his ideas? The new and rising school of thought known as the Temporal Single System Interpretation (TSSI) of Marx has re-opened this question. It argues that the common consensus is an imposed misreading which accepts, as correctly representing Marx’s theory, a fundamental restatement of that theory offered by the Austrian economist Ladislaus von Bortkiewicz shortly after Böhm-Bawerk’s attack. The consensus treats Marx’s ideas as a variant of general economic equilibrium, a paradigm originally constructed by the French economist Léon Walras in the 1860s, but which did not attain dominance in economics until well into the 1900s. TSSI scholars argue that Marx’s theory is in contrast *temporalist*, the normal paradigm for studying motion in all disciplines except economics—which yields different conclusions from general equilibrium. These conclusions are moreover testable; and Marx’s theory, interpreted in this way, yields superior results, in greater conformity with what can be observed, than those derived from the consensus interpretation (see Freeman 2009a; Kliman 2010b).

Is it in fact possible to ascertain what Marx’s ideas “really were”? Scholarly methods are no stranger to this investigation. When philosophers study Aristotle’s system of logic for example, they begin by assessing, carefully and according to known procedures, what Aristotle actually said. A substantial body of scholarly practice is dedicated to testing the validity of interpretations. The humanities are perfectly used to the principle that, in deciding what any writer says, it is essential to judge between interpretations. They have established criteria for doing so, which the economist Stigler (1965: 48) notes:

An accurate textual interpretation is one which can, on the basis of [an interpretation of] the text’s premises, derive [and hence replicate] its theoretical conclusions.

TSSI theorists have re-ignited the discussion on Marx’s theories and their validity by showing that the Marxist economic literature has failed to grasp just how much its verdicts on Marx depend on whether the consensus interpretation represents Marx’s actual theory. As Kliman (2007) shows, interpretation itself thus becomes central to scholarly theoretical development.

An important misunderstanding has to be addressed. Many Marxists regard TSSI scholars’ insistence on hermeneutics—establishing the validity of an interpretation—as a desire to establish doctrinal authority, a monopoly of truth in Marx’s ideas. Thus Laibman (2004):

The new orthodox Marxists (NOMists) assert that Marx’s formulations, in both the theory of value and the analysis of capitalist accumulation and crisis, are *literally* and *completely*

correct; that Marx made no errors, bequeathing to us a system that is complete in all essentials; that Marx was far ahead of his time, and totally misunderstood in the hapless 20th century.

In fact TSSI theorists take a very different stance: before accepting an interpretation we must study whether it validly represents the ideas it claims to, as with any other scientific proposition, using the laws of evidence. This is very different from saying that either the theory, or the interpretation, must be true. The point is that until we know what the ideas *are*, we cannot tell if they are true. The sole sources of dogmatism in this discussion are those who, by refusing to subject their own reading to any test, pronounce it *ex cathedra* the only possible reading.

Nor do TSSI scholars argue that interpretation itself is somehow wrong, or constitutes misrepresentation as such. To the contrary, they take other Marxists to task for their failure to understand that interpretation is unavoidable. It is almost impossible to frame any statement about someone else's theory without interpreting it. The point is not to do without an interpretation, but to recognize those conclusions which depend on it.

We can illustrate this by asking how science might react if a creationist demanded that schools cease teaching Darwin's theory, on the grounds of the anti-Darwinist Richard Spilsbury: that Darwinism "confers miraculous powers on inappropriate agents," notably the power of "unthinking process" to give rise to "creative thinkers."

Darwin was scrupulous to make no claim which in any way could be taken to imply that miracles are observable natural phenomena. If he had, this would indeed call for concern about teaching his ideas literally in schools, though not for the reasons Spilsbury proposes.

How should the Darwinians respond? It would be foolish in the extreme to "correct Darwin's theory" to remove the "erroneous ascription of miraculous powers to inappropriate agents," which simply concedes the grounds of the attack. If Darwin really made this mistake, why teach his misguided ideas, whether or not they have been corrected? The first task is to assess whether Darwin ever made this claim in the first place. Marxist economists, faced with nearly a century of frontal assaults from orthodoxy, have failed to recognize the importance of this elementary precaution.

The correct representation of past thought is as vital a part of the heritage of rational, scientific discourse as is the simple pursuit of correspondence between theory and fact. Without correct representation, the way is free for every mischievous rhetorical device in the world to substitute for the exercise of reason, simply by lying about what any protagonist actually has to say.

If follows, therefore, that when studying the history of Marxist value theory it is just as important—indeed, we shall see, more important—to take into account

how the protagonists in the discussion themselves interpreted Marx, as the actual conclusions they drew. To this issue, I now turn.

Equilibrium and Temporalism

As his life drew to a close, history was about to throw Böhm-Bawerk a curveball: the rise to dominance, within orthodox economic thought, of a paradigmatic approach formulated by the French social reformer and economist Léon Walras (1834 [1876]), and now known as *general equilibrium*.

Böhm-Bawerk did not agree with this approach, and to this day, the “neo-Austrian” current rejects general equilibrium, which Werner Sombart characterized as a “mortal sin against logic.”¹⁰ Yet, it was the general equilibrium reconstruction of the battle between Marx and his Austrian detractors that dominated the 20th century.

Thomas Sowell (1974: 127) explains the central issue at stake: that of *causation*.

Methods of analysis depend on some assumptions—implicit or explicit—about causation, and some preconception as to what kinds of phenomena should be explained. Causation can be thought of as sequential (A causes B causes C), as simultaneous mutual determination (as in Walrasian general equilibrium), or as a confluence of “tendencies” whose net result may bear little resemblance to any of the individual elements... during the classical period, both orthodox and dissenting economists tended to conceive of causation in a sequential sense—as distinguished from simultaneous equilibrium.

Böhm-Bawerk’s reconstruction requires that the subjective experience of a phenomenon explain the phenomenon itself.¹¹ But whereas the subjective experience of a good arises from consuming it, its objective properties are given to it in production—which precedes consumption *in time*. How can subjective experience explain something which occurs before it happens?

The ideological imperative behind the transition to general equilibrium hinges on this point, as explained admirably clearly by Maurice Dobb (1973: 184–185). It is singled out by Marshall (1890)¹² as a weakness which the English marginalist Jevons shares with the Austrians—including Böhm-Bawerk, who still “conceived of causation in a sequential sense.” Jevons supposes that value is determined in the following way:

- Cost of production determines supply
- Supply determines final degree of utility (marginal utility)
- Final degree of utility determines value

To this Marshall objects that “if this series of causation really existed, there could be no great harm in omitting the intermediate stages and saying that cost of production determines value.” To illustrate the problem, he seeks to invert Jevons’ statement:

- Utility determines the amount that has to be supplied
- The amount that has to be supplied determines cost of production
- Cost of production determines value

But this sequence of causation cannot take place in time: it requires that the future—the value of the good when sold—should causally determine the past—the cost of producing the good. This goes to the heart of the marginalist project as Böhm-Bawerk himself formulated it. The cost of producing any object of desire is incurred before the market can inform the producer of the extent of that desire. It is first produced, then sold. How can its conditions of sale “cause” its conditions of production?

Marshall concluded that economics should rest on the “*mutual*” determination of “supply price, demand price and amount produced.” This does not however eliminate the difficulty as long as consumption comes after production. The virtue of Walras’s system is that all magnitudes are fixed at the same time.¹³

The equilibrium theorist assumes an ideal, imaginary economy in which all possible sources of movement have been removed. In such an economy, prices and quantities can never change. Therefore, the equilibrium theorist reasons, we can study the mutual relation of utility and cost of production by abstracting from all the movement in the system, studying only what their relation *would be*, if the system were at rest. Equilibrium theory does not claim that real events happen in this way but something more subtle: that the world behaves as if they did (Friedman 1953). Unfortunately, as 2008 once again reminds us, the behavior of the observed world does not in fact resemble the theory’s predictions in the remotest fashion. Whether judged by its own standards of predictive capability, or by the Popperian criterion that a theory should be discarded when it encounters events it cannot explain, general equilibrium is, baldly put, untrue.

The adoption of general equilibrium was hence an ideological, not a scientific choice. The conclusion that cost of production determines value was to be avoided, not because it was false, but because it was socially dangerous. Even before Marx, socialist propagandists like Hodgskin were drawing from it the uncomfortable conclusion that profit is a deduction from the laborer’s output. With Marx’s popularity waxing strong, it was a prime requirement to construct economic theories devoid of such conclusions. General equilibrium was a perfect fit.

Deeper properties make it the method of choice for an ideologically serviceable doctrine. Recall that it begins from the presupposition that the economy is unchanging. But in that case, it is impossible to deduce, within the resulting theory, any source of change that comes from within the system. The theory, in short, describes an economy in which there is no possibility of internally-generated crisis. It can only explain when things go wrong by turning to *external* sources of trouble

such as bad banking practice, trade unions, misgovernment, terrorism, technological shocks, *e tutti quanti*. The system itself simply cannot go wrong, conferring on it the status of a uniquely optimal, eternal, and natural order.

In conclusion, with the transition to general equilibrium, a logically absurd system of thought was consciously substituted for the study of real economic life, because it led to politically acceptable conclusions. This was a defining moment in economic thought. From this point on, all economic theories that are expressed in general equilibrium form take on the character of doctrines, subordinate to the needs of one or other sections of the propertied classes. All scientific advances including works such as those of Keynes, take the form of a break with general equilibrium.

Was Marx an Equilibrium Theorist?

We now come to the real starting point of present debates. With Böhm-Bawerk's approval, two critical articles were published in the early years of the twentieth century by up-and-coming Austrian scholar Ladislaus von Bortkiewicz (1952 [1906, 1907]), an ardent disciple of Walras. Bortkiewicz corresponded with Walras since the age of 19. His first letter on November 9, 1887 (Jaffé 1965: Vol II, p. 230) ends as follows:

Your writings, sir, have awakened in me a lively interest in the application of mathematics to political economy, and has pointed out to me the road to travel in my researches into the methodology of economic science.

Fifteen years later, he explained how this oriented his thinking on the interpretation of Marx:

Alfred Marshall said once of Ricardo: "He does not state clearly, and in some cases he perhaps did not fully and clearly perceive how, in the problem of normal value, the various elements govern one another *mutually*, not *successively*, in a long chain of causation." This description applies even more to Marx ... [who] held firmly to the view that the elements concerned must be regarded as a kind of causal chain, in which each link is determined, in its composition and its magnitude, only by the preceding links... Modern economics is beginning to free itself gradually from the successivist prejudice, the chief merit being due to the mathematical school led by Léon Walras. (Bortkiewicz 1952: 23–24)

Bortkiewicz, an intelligent and careful mathematician whose contribution to economics was generally underrated—perhaps making him unduly anxious to please his Marginalist patrons (Gattei 1982)—was careful to distinguish his own system from Marx's. It was left to future generations to elide them. Bortkiewicz to the contrary set out to *correct* Marx, principally by proposing a new definition of value, price and profit consistent with Walras's equilibrium method. In doing so,

incidentally, he fully recognized—as we can see from the above citation—that Marx himself was not an equilibrium theorist. There are many Marxist commentators who excoriate TSSI scholars for their “dogmatism” for allegedly refusing to accept any corrections to Marx. None of them however bother to mention the actual content of Bortkiewicz’s own “correction.” To do so would force them to concur with Bortkiewicz’s own clear understanding that Marx was, as he put it, a “successivist” and that therefore his “correction” was in fact a different economic theory.

His argument has to be followed in a little bit of detail to appreciate its full subtlety. He contrasts Volume III not with Volume I—as Böhm-Bawerk did and most others still do—but with Volume II. He wants to reconcile Marx’s schemes of reproduction, from Volume II, with his transformation of values into prices, from Volume III. His argument, to which scant attention was paid until it was refuted by Kliman and McGlone (1988) is that if goods are exchanged at prices of production which *change* between one period and the next, then reproduction cannot occur. The quantities produced are determined by price signals which, since they arise in a previous time period, cannot correctly match these quantities to the demand for them in the present period, because this demand will be formed by new prices, different from the prices that shaped production.

Kliman and McGlone show that this reasoning is false and, actually, Marx’s reproduction schemas are in fact compatible with prices which vary in time, as Carchedi (1984) pointed out. Yet on this basis, Bortkiewicz produced a new, equilibrium-based theory of value—which has since become systematically represented as Marx’s own theory. What Marx *should have assumed*, he argues, is that prices do not change during production and that therefore, in modern language, “input prices are equal to output prices”: when a produced good is sold, which itself enters production—for example iron—it must be supposed that it sells for the same price, at the end of the production process, that reigned when its precursor entered production at the start of the process.

Bortkiewicz supposes three “branches of production,” in line with Marx’s schemas of simple reproduction: Department I, making machines, Department IIa, making wage goods, and Department IIb, making luxury goods for capitalist consumption. Marx should have, he asserts, reasoned thus: first, calculate the unit values of the outputs of each of these departments from the conditions for simple reproduction. Suppose, for example, Department IIa consumes 10 units of constant capital, employs 10 workers and produces 20 units of wage goods. Suppose the wage is w . If the unit value of constant capital is v_1 , that of wage goods v_{IIa} , then this department produces $10v_1 + 10$ units of value worth $20v_{IIa}$. Therefore

$$10v_1 + 10 = 20v_{IIa} \quad (1a)$$

In the same way, we can write two more equations (1b, 1c) for each of the other departments, and solve these three equations to get the values of the outputs of every department.

Now, suppose that the rate of profit is equal across all departments. We can write a different set of equations using prices p , etc., in place of values, and assuming that in each department, the cost price is marked up by an amount r , the rate of profit. Adding on a profit of r is the same as multiplying by $1 + r$. Hence, for example, Department IIa's costs are $10p_1$ for the constant capital, plus $10wp_{IIa}$ —the cost of the wage goods. Adding these two and multiplying by $1 + r$ gives us

$$(10p_1 + 10wp_{IIa})(1 + r) = 20p_{IIa} \quad (2a)$$

With two corresponding further equations (2b, 2c) for Departments IIa and IIb, these three equations can be solved to give a single rate of profit and a unique set of price ratios. This leads to a difficulty which Bortkiewicz understands, that any multiple of these prices is also a solution. He therefore supposes that one commodity, gold, functions as money. He defines it as a luxury good so that all prices are expressed as multiples of the price of goods from Department IIb. He can now reformulate the “transformation problem” as follows: We have two sets of numbers, “values” given by the equations (1), and “prices” given by the equations (2). The “problem” is then, within this system, to maintain two “fundamental equalities” which Marx specifies at various points in *Capital*:

1. The total price of all goods produced in a given period is equal to their total value.
2. The total surplus value in the same period is equal to total profit in that period.

However, Bortkiewicz finds, both equalities cannot be true. From this, three generations of Marxists have concluded that “Marx” is inconsistent. This is the famous transformation problem.

TSSI scholars have allocated three now generally-accepted terms to describe this approach. It is *simultaneist*, which refers to the simultaneous equations needed to make the theory work. It is a *two-system theory*.¹⁴ There are two sets of equations: a system of values—equations (1) and a system of prices—equations (2). The “transformation” of values into prices consists in separately producing these two sets of numbers and demonstrating some imaginary putative between them. Not all simultaneist interpretations are two-system theories as we shall see. However Bortkiewicz's “simultaneous two-system” approach is so widely accepted as Marx's own that reference to this filiation is universally omitted.

Finally, we refer to such systems, and the mental approach that accompanies them, as *physicalist*. This point requires some elaboration but its importance, we will see, becomes greater as the debate progresses. The term arises because values and prices in such systems are wholly determined by “physical” or use-value magnitudes. Given the quantities of physical goods—use-values—consumed and produced in each of the three branches of production, and given the wage, prices and values are uniquely determined.

Money therefore does not enter the determination of values or prices. As we have noted, the system determines only price ratios, not absolute prices. Bortkiewicz’s device of making one of the commodities money does not really work because the choice is arbitrary: any unit can be used for money, which is a mere unit of account or *numéraire*, as both Böhm-Bawerk and later writers called it. Critically, the *profit rate* is indifferent to the money commodity and is entirely determined by the wage and by physical quantities of goods that enter into, and leave, production.

Moreover, as we will later see in discussing the evolution of Bortkiewicz’s system into what are termed “linear production” systems, *labor itself* plays no role in the determination of prices. The value system is, as Steedman (1981) later put it, “redundant.” There are two entirely separate systems, one using labor to calculate values and the other using physical quantities to calculate prices.

This was later aptly described by Samuelson (1971) as an “eraser” solution to the transformation problem. One first writes down the value system. One then rubs it out and writes another system giving prices. One then proclaims that values have been transformed into prices. On this basis, three generations of both Marxist and orthodox writers have considered it proven that Marx’s system contains insoluble contradictions.

However Samuelson has his own eraser: he obliterates the origin of the theory he is criticizing. His criticism is posted to the wrong address: it applies to von Bortkiewicz’s system but not to anything Marx wrote. He behaved like a professor who, on being asked to grade student A, instead marks student B’s essay because it was submitted with student A’s name on it. On this basis, one may refute any scientific thesis from Darwin to Einstein with a stroke of the reviewer’s pen.

In Marx’s transformation procedure there is not a simultaneous equation in sight. It cannot even be inferred: at no point at all does he suppose or even hint that input prices must be equal to output prices and in countless places he supposes the exact opposite. Nor does his transformation procedure presume simple or even proportionate reproduction, nor indeed any kind of reproduction at all. Money is decidedly not just a *numéraire* for Marx, and the magnitude of value is not independent of labor. Bortkiewicz’s system simply does not reproduce Marx’s own theory; it is another, alien theory, proposed as a “correction” of Marx. We will now examine the problems that this has created for three generations of Marxists.

The Question of Class: Why Transformation Matters

The most famous problem arising from Bortkiewicz's treatment are the ominous and now famous "two equalities" just described.

Why do they matter? Bortkiewicz's reading is so mathematically obscure that the underlying issue has been all but buried. The problem is not simply "whether the numbers add up"—though this does matter. It is the following: unless these two equalities are exactly and precisely true, either Marx's assertion that labor is the sole source of value must be false, or his assertion that the capitalist class derives its income solely from the value produced by the working class must be false. In short, his historical materialist analysis of capitalism is without foundation.

If one abandons the first idea, then it must be concluded that there is some source of value that is independent of labor. Marx's prices of production, it must be recalled, are magnitudes of *value*.¹⁵ Therefore, if after transformation, total prices are greater than total values, then extra value has been created which cannot have arisen from labor. Since this marvelous new source of value requires no labor of superintendence, incurs no such complications as trade unions or fractious laborers, and apparently costs nothing, it is then evident that the capitalists, who are infinitely creative, will sooner or later devote their attention to it and forget the difficult material world of live human wage laborers.

Alternatively, Bortkiewicz's system allows us to assert, if we want, the inviolable identity of total value and total price. In that case we find that total profit cannot equal total surplus value. But this does equal damage to Marx. If profit is not equal to total surplus value, the capitalists have some means other than exploitation to make their profits. But in that case, the basis for the theory of exploitation is shot: it is relegated to a museum curiosity.

One current which Freeman (2010a) terms "Marxism Without Economics" regards this as matter of no consequence. The real importance of Marx's contribution, they say, lies not in his arcane economic theory but in his political analysis: his theory of class, historical materialism, culture, psychology and so on.

But if Bortkiewicz's theory is used, not only Marx's theory of exploitation is lost but his theory of class. If the income of the capitalists derives from a source other than labor, they no longer depend for their existence on the laborers. Following the thread of theoretical dependency the fabric of historical materialism, followed by all his main social, political and historical conclusions, unravels.

It helps us not to prove, as Shaikh (1998), Ochoa (1984) and others claim to have done,¹⁶ that the "difference is not very big." If even a cent on every thousand dollars can be realized as profit without exploiting the workers a whit more, it would make every sense to throw the entire effort of the capitalist class into mining this new source of profit rather than sacrifice time, effort and social stability extracting it

from wage laborers. Whatever it might be now, on the basis of Bortkiewicz's system there is no reason to suppose it cannot be made indefinitely large.

The Rate of Profit and Barriers to Capitalist Production

We now turn to the second great difficulty which Marxist theory has encountered, as a result of its adoption of the simultaneist interpretation. Bortkiewicz and, as we shall see, most who followed in his footsteps until the early 1960s, were preoccupied with the transformation from values into prices. It was not until the brilliant mathematical work of the dedicated Japanese Communist Nobuo Okishio (1961) laid the underlying problems bare, that attention began to shift, at least partially, to another aspect of Marx's theory, encapsulated in his theory of the tendency of the rate of profit to fall (TRPF).

Marx himself held that this empirical tendency, hitherto treated by economists as an outcome of forces external to capitalism, was a powerful expression of capitalism's own internal contradictions:

Thus economists like Ricardo, who take the capitalist mode of production as an absolute, feel here that this mode of production creates a barrier for itself and seek the source of this barrier not in production but rather in nature (in the theory of rent). The important thing in their horror at the falling rate of profit is the feeling that the capitalist mode of production comes up against a barrier to the development of the productive forces which has nothing to do with the production of wealth as such; but this characteristic barrier in fact testifies to the restrictiveness and the solely historical and transitory character of the capitalist mode of production; it bears witness that this is not an absolute mode of production for the production of wealth but actually comes into conflict at a certain stage with the latter's further development. (Marx 2006b: 350)

The place of this particular discovery in Marx's general thinking remains disputed even amongst those who reject a simultaneist interpretation. For an entire school of Marxists, emerging out of debates among the Russian Marxists on the future tendencies of capitalism (Day 1981), the TRPF was one of a number of "logical proofs"—others included alleged contradictions highlighted by the schemas of reproduction—that capitalism was susceptible to catastrophic collapse or *Zusammenbruch*. Marx himself presents the issue in a far more nuanced way. In Chapter 25 of *Capital* Volume I on the "general tendency of capitalist accumulation" the TRPF is a general historical tendency of capitalism, subsuming within itself further consequences and counteracting factors to which it gives rise, and so shaping its crisis-prone historical evolution. These include the reserve army of labor, the immiseration of the proletariat, centralization of capital, the voracious expansion of capital into non-capitalist sectors and the progressive commodification of all social

relations, periodic failures of realization and demand, and many other features of capitalist society that are still with us today.

The TRPF, as I read Marx, is not a proximate cause of either intermittent credit crises or the periodic industrial cycles which Marx was the first to identify as lying behind them, although several writers argue that it is. Others highlight the movement of prices and the bunching of investment in capitals of varying turnover time, yet others focus on the movement of wages in response to rising and falling employment and yet others treat the industrial cycle primarily as an outcome of failures in consumption demand.¹⁷ All such explanations are certainly compatible with Marx's theory of value. More controversially, they are also compatible with Marx's theory of the tendency of the rate of profit to fall. Therefore to *counterpose* the TRPF to such other explanations is, I think, a misreading of its place in Marx's thinking. In the contexts where such explanations are found in Marx's own writing, the ever-preset backdrop and presupposition is that capitalism cannot "grow itself out of" these problems because the TRPF sets an absolute limit on accumulation. Moreover, capitalist growth itself exacerbates all these secondary contradictions, precisely because—by steadily undermining the motive to invest productively—it deprives capital of the capacity to resolve even minor difficulties, and drives it into such fruitless outlets as speculation and financial fraud.

It is in fact only when giant political convulsions—imperialism, war, fascism—temporarily remove large sections of production from the sphere of capitalist relations, that capitalism, paradoxically, has been able to reverse this long term tendency and launch successive new booms (Freeman 2010b). Marx's central contribution, in distinction to Ricardo and his predecessors, was to locate the cause of this long term historical tendency in the process of accumulation itself. For Ricardo the problem arose from the absolute limits on growth imposed by the productivity of the land, expressed in the rising portion of profits appropriated by the landlord class. For Marx, the landlord class is irrelevant to the process since capital can raise productivity on the land just as it can anywhere else. It is *accumulation itself*—the "Moses and the Prophets" of capitalism, without which it ceases to be capitalism—that brings about the fall in the rate of profit.

Marx, on the basis of this theory, therefore stands alone in identifying long term contradictions within capitalism. These, he argues, cannot but pave the way to a different society. This view of capitalism as historically confined to a definite period, giving rise to internal contradictions generated entirely within itself that in turn prepared the way for a new phase of history, is central to Marx's unique historical method.

Unfortunately, on the basis of any general equilibrium interpretation of Marx, this thesis cannot hold. Such a claim was hinted at by Croce and Tugan-Baranowsky at the turn of the century, and articulated by Moszkowska (1925) and subsequently

Joan Robinson. However it was left to Okishio to construct a rigorous mathematical proof that in a simultaneous system, the rate of profit *must rise* indefinitely given only that the real wage does not rise, and the very reasonable assumption that capitalists invest only in new technology if it reduces their unit costs.

This, if anything, is more damaging to Marxist theory than even its difficulties with transformation, since the TRPF, as we have just indicated, is an integral element not just of his theory of crisis but his general analysis of the direction of capitalist development.

What simpler and easier way to neutralize Marx's theory, depriving it of all revolutionary significance, than to embed it in a mode of thought from which crisis has been eliminated *a priori* and can never be re-introduced?

Marxist Endorsement of Bortkiewicz

Given the above difficulties, it might have been expected that Marxists, as a body, would have clearly rejected Bortkiewicz's interpretation and insisted on a proper reading of Marx's actual theory in its place. This did not happen, and it is an essential task of the intellectual historian to understand why.

The period which followed the revolutionary upsurges of 1917 has a contradictory character in which at least two developments, unexpected by most Marxists including Marx himself, moved to the center of the stage. The first was that the revolutionary wave reached its maximum extent not in the West, where capitalism was most developed, but in what is now termed the Third World. The second, less unexpected, development was that the working class in the West itself suffered a long series of political defeats, culminating in the rise of fascism, and entered a long period of political decline.

To this we should perhaps add a third point which was the "de-internationalization" of Marxism during the war. Before 1914 and indeed as late as the 1930s there was unquestionably an international community of Marxist scholars, who regularly corresponded and whose works were known well beyond their own countries. By 1939, both the English-speaking Marxists and the German exiles in America found themselves cut off. With the post-war rise of English as a global language, Marxist Economics, to all intents and purpose, became English Marxist Economics—in reality, English Academic Marxist Economics.

Marxism retreated into two refuges: the political parties of the left, and Anglophone academia. The evolution of Marxist theory has to be understood as a consequence of the different material pressures at work in each of these two distinct areas. In both cases, a vital factor was either absent or in decline, namely mass social or class movements that provided an independent court of appeal for theory. Hilferding's famous reply to Böhm-Bawerk is remembered today not just

because of its scientific merit but because it was addressed to, and reached, a large and critical audience. Today, such a wide audience does not exist. Its place was taken either, in the leftwing parties, by reference to sources of doctrinal authority such as standard approved texts, or in academia to its funders.

A further complication is that, particularly under the influence of Bortkiewicz, debates over Marx's value theory took on a particularly obscure and needlessly mathematical form. They became less and less comprehensible within the workers' movement, which with the exhaustion of its revolutionary onslaught found it harder and harder to create the organic intellectuals capable of confronting a rising breed of "Marxist experts." The material pressure on these experts was more and more removed from any accountability to the workers' movement, and steadily reduced to the crude need to make a respectable career.¹⁸

The adaptation of "Marxist economics" to bourgeois institutions and conditions begins at this point: the bourgeoisie may not know much about theory, but when it comes to hiring experts, it knows exactly what it is doing. The new breed of Marxist experts adapted its language, and cut its cloth, accordingly. Bortkiewicz's reformulation of Marx's theory lent it academic respectability; it became both practical and indeed, convenient, for Marxist academics to present themselves to the workers' movements as their "advocates" within a captive academia, and within academia as "daringly radical" without actually posing any danger. Marxist economics became an arena, not for building on or developing Marx's ideas—but for raiding them for isolated career-enhancing "insights."¹⁹

Was Bortkiewicz a Marxist? This is a difficult question to answer. He was certainly not an opponent of Marx, although his formulation of the transformation problem has been widely used to demonstrate Marx's errors. What is important to understand, however, is the following: he opened a door to discuss Marx's ideas in the framework which mainstream general equilibrium theory was fast establishing as an institutional norm. It allowed academic supporters of Marx to "explain" him to the academy in terms which threatened neither the career of the supplicant nor the security of the host.

What then followed was a strong rise of interest in the equilibrium reconstruction of Marx, in which Paul Sweezy played a seminal role, though he was by no means solely responsible for this reconstruction. His vindication of Bortkiewicz, and presentation of Marx's theory, probably remains today one of the most influential and authoritative Marxist accounts. *The Theory of Capitalist Development* (Sweezy 1970 [1942]: 53). explains his approach:

To use a modern expression, the law of value is essentially a theory of general equilibrium developed in the first instance with reference to simple commodity production and later on adapted to capitalism.

This allows a useful insight into the way the general equilibrium paradigm functions in economics. It is a hidden signifier, not dissimilar to the mediaeval Catholic Church's articles of faith, which the profession uses to distinguish a "true" economist from a threatening outsider. The pressure to "equilibriumize" all creative economic ideas is intense and continuous. Thus no sooner had Keynes himself, a fierce critic of equilibrium thinking and an intransigent opponent of Say's Law framed his theory, when Hicks's (1937) ISLM reconstruction presented it as a variant of equilibrium, producing the Keynesianism ever since dutifully taught in college classrooms as "what Keynes really meant" and justly lambasted by Robinson as "bastard Keynesianism." In endorsing Bortkiewicz's system as the "true Marx," Sweezy opened a portal for Marxist economists leading into the enchanted world of Academia.

For Sweezy, value and prices were stages in a process of "successive approximations" to the concrete reality of capitalist life. Value was the most abstract category which could be imagined to hold in a hypothetical commodity economy where capital was insufficiently mobile for profits to equalize.²⁰ Prices of production corresponded to a stage when capital could move freely, and are portrayed by Sweezy as "more concrete" or a "better approximation" closer to actual society. Finally, actual money prices were to be observed in the world. Sweezy's account therefore conjoins two ideas:

1. Value is an "approximation" rather than a concrete, actual magnitude to be observed in the world and calculated. It is in some sense a hidden quantity, "behind" the workings of the economy but not directly visible to view.
2. Value is also an abstraction. It is a stage in the deduction of the concrete categories of the world we live in.

The resemblance between this mode of arguing and that of marginal general equilibrium is not casual. Value for Sweezy, like utility for the marginalists, is not something we see in the world directly. We perceive it, like utility, through its effects. Sweezy however adds a distinct element: the idea that this process of approximation is the expression of Marx's method of abstraction. But actually, this idea is a travesty of any conception of abstraction, let alone Marx's. There is no correspondence between approximation and abstraction. Abstractions, appear in the world. Thus, for example, a sheep is an animal. The concept of "animal" is an abstraction—there are many types of animals such as cows, horses, and so on. Nevertheless, a herd of 100 sheep contains 100 animals, not 93.

Notwithstanding, with Sweezy's blessing, Bortkiewicz's own theory became, by common consent, the "official" definition of Marx's. The non-Marxist Bronfenbrenner (1968 [1965]: 205) gives voice to this consensus:

The Marxian system is easily transformable into a balanced Walrasian general equilibrium one... it may be regarded as a system of moving equilibrium at less than full employment.

while Morishima (1973: 2) celebrates Marx as a founder of equilibrium theory:

Marx's theory of reproduction and Walras's theory of capital accumulation should be honoured together as the parents of the modern, dynamic theory of general equilibrium.

The transition is complete. The historian of thought "looks from Pig to Man, and Man to Pig," but the theory now ascribed to Marx, is longer Marx's.

Planning, Input-Output Analysis, and Piero Sraffa

The modern evolution of Marxist theories of value comprises a working out, in minute detail, of the theoretical consequences of the discussion we have just described.

The most important development was the contribution of Piero Sraffa (1960) and the ensuing controversy. To situate this, however, we need to understand a development which preceded his seminal work and is generally termed linear production theory. The idea can be traced back to Smith's idea of the division of labor. If society divides itself up neatly into compartments, each of which specializes in a single activity and produces a single good, then we can impose on this the following not unproblematic idea: the economy is made up of thousands of "branches," each producing a single type of use-value. The wood industry produces "wood products," the agricultural industry produces "agricultural products," and so on.

Marx's schemas of reproduction can then be re-interpreted in the following way: actually there are not three, but many branches of production. Each makes one product, and each engages one type of concrete labor. Iron-workers make iron, steelworkers make steel, and so on.

Winternitz (1948), May (1948) and Seton (1957), acting on this idea, reformulated Bortkiewicz's original three-department formulation into a kind of "model" of society containing hundreds, possibly thousands of commodities, each produced by correspondingly many groups of producers. This has its origin in the exigencies of wartime military production. The Russian-trained Wassily Leontieff, working first in Kiel and from 1931 in the United States, began work in 1941 on what was to become known as input-output analysis. His very readable work divided the economy of the USA into over 500 branches. He recorded, moreover, how much each branch consumed from the output of every other branch. Once this is done, the resultant model can be used to predict how much steel the economy will need to produce, in order to manufacture, say, 10 percent more aeroplanes.

But now we encounter a further example of the deadening hand of equilibrium reasoning: Leontieff and his successors made a significant simplification. They

assume the system is “closed”—that the inputs of each period are in fact the same as the outputs of that same year and not, as happens in reality, the outputs of the preceding period. And they assume that prices do not change during the procedure.

This simplification is unnecessary. It does not even make the calculation simpler. It would have been equally possible to use the same equations iteratively, to predict not only the final impact of a given change in the economy but to trace its evolution over time. Ironically, the mathematical procedure for deriving the so-called “Leontieff Inverse” matrix required for his calculations involves recasting the system as an open one without change, and iterating for all the world as if the economy were dancing around its own private maypole. Leontieff himself was well aware of this issue. Hawkins and Simon (1949) whose work plays an important role in studying the stability and viability of such closed systems, also recognize that an alternative “successivist” interpretation is possible, as did Paul Samuelson (1989) in earlier versions of his own writing on such questions.²¹

Nevertheless, the iterative or temporal use of input-output models was never pursued and these, too, were absorbed into a general equilibrium consensus under the generic name of “linear systems” or “linear production systems” (Pasinetti 1979). The practice then arose of identifying Marx’s theory not simply with the Bortkiewicz system but with general, simultaneous, linear production theory, challenges being dismissed as obscurantist:

The 20th-century Marxist (eigenvector) [linear production—AF] conception of production prices is arguably the closest thing available in all of economics to a coherent conception of price formation. It establishes the interdependent qualities of the price system, avoids the obvious contradictions of the earlier Marxist formulations (assuming these are taken as completed theoretical tools rather than as good first approximations [sic—AF]), and undercuts in a massive way the central neoclassical concept of *scarcity* as the foundation for price theory...

Most important, however, is the need to avoid dishonouring Marx by treating him as a holy prophet. The not-yet-the-Messiah attitude—which asserts that the entire 20th century is a theoretical and practical wasteland, and that Marx will yet speak to us, once we come finally to understand Him, and lead us out of the capitalist morass—is simply not helpful as we face real problems requiring creative solutions. (Laibman 2004)

Enter Piero Sraffa. An Italian economist who moved to Cambridge and was associated strongly with Keynes and the Cambridge “circus,” his work *The Production of Commodities by Means of Commodities* (Sraffa 1960) was to become canonical during what Kliman (2010a) terms the “disintegration of the Marxian School.”

Sraffa’s contribution was to turn linear production theory into an exceedingly effective counter-attack on marginalism, turning Böhm-Bawerk’s ploy on its head

by demonstrating that marginalism itself was internally incoherent in its general equilibrium form.

Essentially, if we read a linear production system as an “objective” theory of value, and neoclassical general equilibrium (NGE) as a “subjective” theory, we find that the results contradict each other. Both systems purport to explain prices on the basis of a linear system of equations. In an NGE framework, subjective utility makes its presence felt through marginal preferences, alongside marginal costs and outputs. But in a linear production system they arise from the absolute requirements of production and aggregate consumption. Far from “explaining” this objective structure, subjective preferences as deployed in the marginal general equilibrium system are superfluous to it and may very well contradict it.

This inverts Böhm-Bawerk’s own attack and brilliantly turns the tables on the marginalists, as was clearly Sraffa’s (1960: v) main intention:

The marginal approach requires attention to be focussed on change, for without change either in the scale of an industry or in the “proportions of the factors of production” there can be neither marginal product nor marginal cost. In a system in which, day after day, production continued unchanged in those respects, the marginal product of a factor (or alternatively the marginal cost of a product) would not merely be hard to find—it just would not be there to be found.

What then happened, however, was entirely different from that which Sraffa and his supporters expected or intended. The attack on marginalism failed because it mistook orthodox theory for a science. After a series of often ill-tempered, protracted, and ultimately inconclusive exchanges (Harcourt 1972), mainstream theory backhandedly conceded Sraffa’s point and promptly proceeded as if nothing had happened—a further proof of the ideological character of academic economics.

Among the Marxists, the effect was different and devastating. Academic Marxism was consumed with doubts. The lingering problems of the previous years now came back to haunt it, but an entire parcel of new problems were now added.

The first reaction was overwhelmingly positive. Writers such as Meek (1979) welcomed the Sraffa system with open arms, seeing in it a vindication of Marx against the ancient enemy, as did many other Marxists. And indeed, before long, Marxists with Meek were celebrating the Sraffa system as the *expression* of Marx’s own ideas. But this proved a poisoned chalice. Not only were the earlier problems inherited from Bortkiewicz still present—and, indeed, now expressed in a somewhat more rigorous mathematical form, making it ever harder to deny the difficulties they caused—but a whole series of new problems were added. In particular the Marxian system, so interpreted, now inherits additional contradictions. It can produce negative prices or indeterminate results under circumstances of so-called “joint production”—if a single branch of production makes more than one good, as

for example cattle farming which produces beef and leather. Bortkiewicz's artifice for inserting money into the system disappears altogether and money becomes a pure "veil" with no discernible role in the economy.

To these objections must now be added two further problems which flow from results established by TSSI and other scholars. Firstly, value can be produced without any application of labor. Secondly, capitalist systems can exist in which, although profits are positive, surplus value is negative.²²

The Marxists Divide

It is no understatement to say that the above problems have paralyzed value theory and, I contend (Freeman 2010a), Marxist economics in general. Three broad currents emerged. The dominant current renounced Marx's theory altogether; a small current returned, critically, to the assumptions which had led to the Bortkiewicz interpretation; and a third current which I term "Marxism Without Marx" (Freeman 2010a), dominant among the shrinking ranks of the Marxists, hitched their wagon to the decreasingly plausible claim that Marx's *conclusions* could be drawn without employing Marx's *theory*.

Renunciation was strongly encouraged by an ideological attack, led by Paul Samuelson's (1971) allegedly scholarly examination of Marx's value theory to which we have already referred. Dismissing Marx as a "minor Ricardian" he claimed to be judging Marx "in the way a journal referee would treat any serious contributor." As we have already indicated, he found Marx wanting. The renunciation current was greatly re-enforced by Ian Steedman's (1981 [1977]) influential book which irrefutably drew out most of the contradictions in the system he, with equal laxity, labeled "Marx's."

The "Marxists Without Marx" include Steedman himself, the Analytical Marxist movement associated with John Roemer and Robert Brenner, the Institutional approach of Geoff Hodgson, and the "long run analysis" school—the continuators of Sraffa himself, of whom Kurz and Salvadori are the most prominent representatives. Numerous citations illustrate this point (emphases all my own). I have gathered them together because I find most Marxists, until confronted with this stark evidence, find it hard to believe that what passes for Marxist economics in most writing today, rests on a foundation that so explicitly rejects Marx's own theory.

The objective of the book is to present well-established results in a coherent and (as far as possible) simple way, emphasizing that arguments entirely consistent with Marx's materialist analysis both provide answers to some of the important questions with which Marx grappled and show that *his value magnitude analysis is irrelevant to those answers*. (Steedman 1981: 27–28)

Rigorously speaking, we cannot admit Marx unless he is prepared to *abandon the labor theory of value*. (Morishima 1973: 8)

[T]he focus of this book, exploitation as defined by Marxist theory, is in fact the particular form of exploitation associated with capitalist property, with unequal ownership of assets (excluding skills and other people) that are useful as means of production. In chapter 9, *I discard entirely the classic Marxist definition of exploitation in terms of surplus labour*. (Roemer 1989)

It will be evident to the reader that many of the above ideas are either inspired by, or directly attributable to, the works of Marx and Engels... We must point out, however, that in contrast to the theory of Marx and Engels, *our theory of exploitation is not based on the labour theory of value*. (Hodgson 1980: 273)

This current still dominates Marxist academia above all in the US. Laibman's (2006) presentation is the most representative:

according to the 20th-century Marxists—perhaps Winternitz (1948), Dobb (1955a, 1955b), Sweezy (1970), Sraffa (1960), Meek (1956), Bródy (1970), Steedman (1977), Shaikh (1977), Harris (1978), Lipietz (1982), and Duménil (1983) may represent this category; see also Laibman (1973, 1992)—*the failure to transform inputs in the value tableaux is in fact a drawback, or an insufficiency, in Marx's presentation, which caused violations of either simple or expanded reproduction conditions and produced an incorrect measure of the profit rate, and was corrected by later generations of Marxists*.

We should pause to ask, since it is a pertinent question in the history of thought, why the correct conclusion—that Bortkiewicz's was a wrong interpretation—was drawn by none of these people. The decisive intellectual reason, which led to the emergence of the TSSI, is that at the time there was no alternative interpretation. Marxists had, for at least fifty years and possibly longer, simply assumed on the authority of Sweezy that Bortkiewicz's reading was correct. Among interwar Marxists, possibly the only scholar who possessed an inkling of the travesty this involved was Grossman (Kuhn 2007).

A second reason is that the movement of revolt that opened up the 1970s was, outside of the Third World, limited in its extent, its only real achievement being the final overthrow of the remaining European dictatorships. It was in full scale retreat by the mid 1970s and never recovered. A series of currents found it convenient to abandon Marx altogether—a not inconsiderable development leading, in extreme cases, to desertions such as that of Colletti, who ended his life as a parliamentary deputy for Berlusconi's far-right Forza Italia party.

A third reason is the confusing response of the second current itself, which persists not only in defining itself as Marxist but in the systematic denigration and attempted suppression of its critics within Marxism.²³ This also has material roots. The underlying problem is the theoretical dead end in which this current finds itself, leaving it almost without influence in the present crisis in great contrast to the influence of Marxism in the 1930s. Careers founded on a theoretical premise whose time is over require protection, which is afforded only by safeguarding the role of the academy's tame Marxists.

This has given rise to indescribable confusion. Discussion between orthodox and Marxist economics now resembles a duel between ghosts in an empty room. Orthodoxy is represented by the ghost of Sraffa and Marx by the ghost of Bortkiewicz. To the few spectators, that empty room is all that remains of the spirit of Marx.

A small, but intellectually significant group of writers embarked on a more serious study, returning to Marx's original ideas, to see if his theory of value could be understood in other ways.

What is Temporalism?

I begin with the early findings of the most complete alternative interpretation of Marx's value theory, the *Temporal Single System* or TSS interpretation. This arose from the independent work of a number of scholars. An early refutation of the Okishio Theorem from Murray (1973) went almost unnoticed. Following Ernst's (1982) seminal enquiry, Naples' (1985, 1989) work on temporal approaches to value, and Carchedi's (1984) enquiries into the value-price relation, Kliman and McGlone (1988) and Kliman (1988) published two defining pieces dovetailing with Giussani's (1991) and Maldonado-Filho (1994)'s independent findings. Freeman edited a collection of essays with Mandel (Freeman and Mandel 1984) and produced a computer simulation based on temporal principles in 1992, leading after collaboration with Giussani to Freeman (1995) in which the new approach was described as "temporal non-dualist." Work by Ramos and Rodriguez (1996) on the role of money added great clarification which Ramos (1996, 2004) incorporated into a temporal framework. Other writers notably Michel Husson, Robert Langston, and Brian Pinkstone contributed to the discussion without being able to publish their contributions.²⁴ Kliman and Freeman organized ten conferences of the International Working Group on Value Theory (IWGVT) whose papers are available at www.iwgv.org. Freeman and Carchedi (1996) published a collection of works nearly all within the TSSI framework and Freeman, Kliman and Wells (2004) summarized the outcome of ten years' development and discussion.

What is temporalism, and how does it differ from simultaneism? Sowell's short explanation, already cited, explains the idea quite well. It is indeed perfectly explicit in Marx's exceptionally well-known circuit of value:

M-C...P...C'-M'

Marx's own words illustrate the critical point at issue:

Every commodity which enters into another commodity as constant capital, itself emerges as the result, the product, of another production process. And so the commodity appears alternately as a pre-condition for the production of other commodities and as the result of a process in which the existence of other commodities is the pre-condition for its own production. (Marx 1972: 167)

"value," says Bailey,... "is a relation between contemporary commodities, because such only admit of being exchanged with each other."... This derives from his general misunderstanding, according to which exchange-value equals value, the form of value is value itself; thus commodity values cease to be comparable once they no longer actively function as exchange-values, and cannot actually be exchanged from one another. He does not in the least suspect, therefore, that value functions as capital only in so far as it remains identical with itself and is compared with itself in the different phases of the circuit, which are in no way "contemporary," but rather occur in succession. (Marx 2006a: 186)

The stages of the circuit are points in time. At a given time t_0 , the "M-C" stage of the circuit, the capitalist acquires constant and variable capital with which she or he begins production. Following this, the application of labor to machinery and raw materials (the C...P...C' stage of the circuit) results in new commodities at time t_1 , which are then sold (the C'-M' stage). After the next circuit we will be at t_2 , and so on.²⁵

Now consider one particular commodity, say iron, and suppose that it enters the production of another, say steel. At time t_0 suppose that iron has a value of 10 hours per ton which is expressed in money as \$10. Suppose it is sold at time t_1 to the steel producers. What will be its sale price?

For the simultaneist, the price of iron at time t_1 *must* be equal to the sale price at time t_0 . If this assumption is not made, the simultaneous equations cannot be written and prices cannot be calculated. The same applies to value. All the "errors" that Marx is supposed to have committed depend on this one single assumption.

But actually, the price of iron cannot in general be equal at two different times, unless we suppose it is equal for all eternity, *or* if we suppose the steelmakers part with a sum of money different to the sum received by the ironmakers—in short,

unless we suppose that money and value are somehow created out of nowhere, or vanish into nowhere.

There is no evidence whatsoever that Marx entertained such an absurd idea. Instead, he simply supposes that the value—and the price—of the iron are changing *in time* (hence “temporal”) and that they will be larger or smaller than when the circuit began. With this in mind, we can revisit the transformation problem with very different eyes. In Volume III, Marx famously presents five branches of production in which goods are purchased at their values and sold at their prices of production. He then illustrates how the formation of a price of production *modifies* the values of the commodities, some realizing more value than was added by the direct producer, and some realizing less. This is often presented as an error: but it is not; it is a perfectly feasible if simplified sequence of events in which iron (for example), is purchased at its value at time t_0 and sold at its price of production at time t_1 .

However, the assumption that goods were purchased at their value is used for illustrative purposes. Marx (2006b: 264) notes this and offers his famous comment that

It was originally assumed that the cost price of a commodity equalled the value of the commodities consumed in its production. But for the buyer of a commodity, it is the price of production that constitutes its cost price and can thus enter into forming the price of another commodity. As the price of production of a commodity can diverge from its value, so the cost price of a commodity, in which the price of production of other commodities is involved, can also stand above or below the portion of its total value that is formed by the value of the means of production going into it. It is necessary to bear in mind this modified significance of the cost price, and therefore to bear in mind too that if the cost price of a commodity is equated with the value of the means of production used up in producing it, it is always possible to go wrong. Our present investigation does not require us to go into further detail on this point.

Writer after writer has cited this passage as proof that Marx himself recognized an error in his work, but never corrected it. This reading is not supported by the text. It is simpler, and more coherent, to suppose Marx is concerned the *reader* may “go wrong” if the simplified presentation is taken as fact. In numerous places in *Capital* (see Kliman 2007; Giussani 1991) he explains clearly how the correction should be made: one must simply recognize that when a commodity is sold above or below its value, *it enters production with its modified value and not its produced value*.

Suppose, therefore, that our steel producer is compelled to pay the price of production for steel instead of its value, and suppose this is 12 hours, expressed as \$12. In that case, the “error” can be corrected extremely simply: the value transmitted to the steel by the iron is not 10 but 12 units, which may be measured in hours or in \$ since we have, with Marx, supposed the value of money to be constant at \$1/

hour. Likewise, if wage-goods are sold to the workers at a price above or below their value, then the value of variable capital should be stated as the price, not the value, of the wage.

But have we not now made exactly the assumption of which we accused the simultaneists? Have we not supposed that the iron and the wage-goods have the same price at two different periods of time, t_0 and t_1 ? No, because the iron and wage-goods from the next phase of the circuit are not sold at time t_1 but later, at time t_2 . They will then sell for yet a new price of production. This may *happen* to equal their price of production of time t_1 but does not have to. Crucially, we did not make this assumption when calculating the value of constant or variable capital. With this simple correction, there is no transformation problem, the procedure works, and is completely compatible with everything Marx wrote.

However, matters do not end there and it is at this point we find that TSSI, far from restricting the study of value to a dogmatic orthodoxy, opens a series of questions closed to Marxists until now. To illustrate some of them, let us enquire what actual possibilities exist for the price of iron at time t_2 . What sources of variation exist? One of these is well-known: technological change. The iron was purchased at time t_1 with a given value. But if, in the meantime, productivity has increased as a result of technical change, then we would expect that the value of iron would fall. And, in general, because values fall over time, the value in successive periods will get smaller by increments.

This, however, leads us to the second great success of the temporal method. When the price of iron falls, since it is an element of the means of production (factories, lathes, machinery and so on) the value of the elements of which *capital* is composed also fall—the “cheapening of the means of production” which Marx himself cites as an offsetting factor for the fall of the rate of profit. However, for a simultaneist, capital immediately depreciates to the value of newly-produced commodities of the same type, although these initially represent only a tiny fraction of the capital of that type in existence and although, crucially, the capitalist purchased his or her existing capital at the old value, not the new value.²⁶ If at time t_1 the capitalists have advanced \$1,000 in machinery, and if by time t_2 these same machines can be produced for 90 percent of their previous value, their capital must then depreciate fully to \$900, since the simultaneist cardinal rule is that the price at both times must be equal.

Not so, says the temporalist. The machines were purchased for \$1,000 and *this is the advanced capital*. The difference of \$100 cannot miraculously be written off. It is on the capitalists' books as *past* capital, paid for in its value of the time. What in fact happens is—as any accountant knows full well—that first the advanced capital is partly, not wholly written down, to a value equal to the average for commodities of this type rather than the cheapest currently in production and, second, the lost or written-down capital is deducted from the income of the capitalist instead of

vanishing as if depreciation cost the capitalist nothing. When these corrections are made, the rate of profit falls *exactly* as Marx proposes. Okishio's theorem is, simply, false, as has been proven by both Kliman (1988) and Freeman (1996).

Now, however, consider a further source of variation. It is perfectly possible, and Marx discusses in many places, that goods may sell above or below their value for reasons that are nothing to do with either profit equalization or technology. It can and does happen simply because the price goes up or down for any one of the numerous reasons that causes prices to fluctuate—supply and demand, monopoly, rents, and so on. In that case, what conclusions can be drawn about the value of the constant and variable capital? To answer this question, scholars have found it necessary to revisit the theory of money which, we have seen, is a further necessary absence from simultaneist theory.

Rethinking Money

Perhaps the earliest reconsiderations of the standard view arose from what is termed the “New Interpretation” of Duménil (1980, 1983), which was independently discovered by Foley (1982) who however termed it the “New Solution” to the transformation problem. A further development was the “Simultaneous Single System” (SSS) Interpretation of Wolff-Callari-Roberts (1982, 1984), Lee (1993), and Moseley (1993a).²⁷

These currents do not abandon equilibrium and indeed, in the case of commentators such as Duménil and Moseley, staunchly defend it. They do however challenge the conception of money to which this gives rise. At their core is an assertion that money matters. It cannot be reduced to a mere *numéraire* but should be understood as a carrier and representative of value.

This is easiest to grasp by studying the Foley/Duménil concept of the “value of money.” This is defined as the ratio of total value added, in money, divided by the new labor discharged, during a year. Thus in the UK in 2009, total years worked were 31,000,000, and output (GDP) was £1,400bn.²⁸ The value of money was therefore $\text{£1,400,000} / 31 = \text{£45,161}$ per year. This represents in effect the average value created during the year by each worker.

This ratio is then used to transform the wage, expressed in money terms, into a quantity of labor, by dividing the time worked by the value of money. The value of variable capital—the outlay of the capitalist required to purchase labor power—is thus redefined: it is taken to be equal not to the value of wage goods consumed by the worker but the value of the money used to purchase that worker's labor power. If, for example, a capitalist purchases the labor power of ten workers for one year, and pays each one £20,000, then the value of his variable capital is $\text{£200,000} / \text{£45,161} = 4.43$ years. His profit is then, in value terms, $10 - 4.43 = 5.57$.

Over the whole economy, wages were £770bn. Using the value of money in the same way, we can convert this into years; it comes to $770\text{bn} / 45,161 = 17,050,000$ years. Surplus value is then $31,000,000 - 17,050,000 = 13,950,000$ years. We can convert this back into money profits, multiplying by the value of money, to give £630bn. Note that if we now subtract this from GDP we arrive, tautologically, at £770bn, the wage in money terms.

Before studying this at greater length, we should note that whilst the New Interpretation guarantees the equality of surplus value and profit, it does not guarantee that total price will equal total value. This is because, as Ricardo first recognized, total value includes not merely the new value added each year but the constant capital consumed during the course of the year. In Marx's terms, total value is

$$C + V + S$$

whereas new value is

$$V + S$$

It is therefore still possible, even given the New Solution equalities, that total price may deviate from total value, if the transformed magnitude of C differs from its untransformed magnitude.

This is satisfactorily resolved by *Simultaneous Single-System* (SSS) theories which take the process one step further, recognizing that the capitalist actually pays for her or his constant capital with money. The value of money is now calculated as the ratio of the total money price of the goods produced in a given year (which is greater than GDP because it includes intermediate goods) divided by the total labor time embodied in these same goods. Correspondingly, the value of constant capital is defined as their money price, transformed into time of labor, as with the New Solution, by dividing by the value of money. It can be shown that in a simultaneous system, the value of money in the SSS system is the same as in the New Solution.

SSS solutions completely eliminate the contradiction of the two equalities: both equalities hold. Although the New Solution is arguably less theoretically coherent (since the value of money is used to modify only variable, and not constant capital), work in this tradition has remained more active, being used for example by Mohun (2003b) in his calculations of the US and other profit rates.²⁹

There are two difficulties with both these approaches. First, they do not systematically investigate the category of money, and square it with Marx's own analysis of money. Second, and crucially, Okishio's theorem still applies with full force to any simultaneous system: no such system can demonstrate the tendency of the

profit rate to fall. Third, they remain what we might term “implicitly physicalist.”³⁰ Although their accompanying narratives provide much useful reflection on the role of money and the interpretation of Marx, their actual calculations remain as much a prisoner of Bortkiewicz’s system as the original version and its other descendants.

When these insights are incorporated into a temporal framework, a different picture emerges. Space only permits a superficial introduction, beginning with the pioneering work of Ramos and Rodriguez (1996: 49–76) in their analysis of Marx’s concept of the relation between money and value:

It is usual to define erroneously value as “labour,” that is, to reduce value to its substance.³¹ Actually, value is a complex concept: value is the unity of abstract labour (its substance) and money (its form)³² and, thus, it has an immanent or intrinsic measure (socially necessary labour time) and an extrinsic measure (exchange value or price). In capitalist society, labour is realised as social labour under the form of money.

Money and abstract labor are two *measures* of the same thing: value. Money arises precisely because the (socially necessary) labor time that forms the substance of value must *appear*: money is its form of appearance. Money, and labor time, are thus measures of the same thing. Ramos and Rodriguez make the telling point that, in his discussion of the transformation problem, Marx never specifies the units of value. In fact the tables make equal sense if we write “hours” after the numbers, or “\$” before them.

However, firstly, the fact that they are two measures of the same thing does not mean they always have the same proportion. Weight and volume are both measures of the quantity of matter. However, if we heat up an iron rod, or vaporize a block of ice, its volume will change and so will the ratio between volume and weight, or density. In like manner, if all money prices double, then whereas before \$1 represented 1 hour, now it will represent 30 minutes. This ratio of money to labor, over the whole of society, has been termed the *Monetary Expression of Labor* or the *Monetary Expression of Labor Time* (MELT) by Ramos, and has also passed into common use.

A change in the MELT is not the only source of deviation between price and value. The price of an *individual commodity* may rise so that iron whose value is 1 hour now costs \$2 instead of \$1. What then happens if the steelmaker purchases this iron to make steel? Much textual evidence in Marx supports the TSSI conclusion that the value of the ironmaker’s constant capital also doubles. In effect she, or he, is forced to pay out money *representing twice as much value* to acquire the iron. This is the actual outlay and this, therefore, is the value transferred to the steel.

This insight provides a tremendous expansion of the range of phenomena that can be explained within Marx’s value framework. Marxist value theory, sitting on its Procrustean simultaneist bed, has been obliged to ignore all *real* economic

phenomena, where prices differ systematically and regularly from values: where the market reigns, these theorists of the market actually have nothing to say, since they discuss only the fictitious “underlying values” of Sweezy, the “long run” prices of Kurz and Salvadori or the “93 per cent accurate” vertically integrated labor coefficients of Anwar Shaikh. Marx—the supreme analyst of money, it is often forgotten—provides a means to *lay bare the underlying social significance of all sums of money* by expressing them as quantities of labor time. The correspondence is exact, not fuzzy. His system is a guide to a real, not a fictional capitalism.

Not least among the consequences of this insight is that it provides a simple insight into the pertinent phenomenon of liquidity preference. First consider the following question: what actually happens, in terms of values, when one price rises and another falls—if for example steel falls whilst clothing rises? It means that the sellers of clothing make a killing, and the sellers of steel take a hit. Conversely, the steel-buyers get a bargain whilst the buyers of clothing have to tighten their newly-purchased belts. This has a precise meaning in value terms. The value forked up by the clothing-buyers is *appropriated* by the sellers and that forgone by the steel-sellers is appropriated by the buyers. All falls and rises in relative prices express, therefore, the capability of the various sellers and buyers to appropriate more or less value, that is, to avail themselves of the labor of others or be deprived of the labor at their disposal.

What then happens when the value of money itself is falling—that is, if the monetary expression of labor time is rising? It means, essentially, that the same quantity of money can purchase successively less labor time. That is, value in the hands of the holders of money balances is appropriated by the holders of commodities. This is one of the reasons that holders of wealth so detest inflation which, all other things being equal, acts to the benefit of the moneyless to the detriment of the moneyed. Of course, this is offset by such means as interest rate spreads to defray these losses, so we need not shed too many tears on behalf of the deserving wealthy. Moreover, the sensible capitalists acquire holdings of so-called “real value”—resources, buildings, works of fine art or, as a rather important last resort, gold. However, what happens in a slump—such as the present? The value of money either rises, or falls at a slower rate than previously. It then becomes perfectly rational to hold money, since its *capacity to purchase value* is enhanced.

The last, deceptively simple but hugely explanatory category of Marx’s theory which is retrieved from Marx with the TSSI is that of *superprofit*—those profits above the average which in fact reign in the real world in contrast to the fictitious average rate of equilibrium theory. As Mandel’s (1974) magisterial work explains, superprofit is the real driving force of capitalist dynamics. Capitalists are never motivated by the pursuit of an average profit, which is of interest only to *rentiers*, but by the prospect of a profit higher than that of their rivals and neighbors. This is the

concrete form of competition. They can acquire a superprofit in one of three principal ways: industrial superprofit, achieved by investing in a more productive process; commercial superprofit, acquired from a temporary or, if rents are involved, semi-permanent monopoly of a particular resource or mercantile advantage; and financial or speculative superprofit, gained through control of the financial system. When the capitalist state becomes involved in the economy, it is in general vigorously to enforce some particular national advantage arising from one or other of these sources of superprofit, so that, for example, post-war Japanese and German capital specialized in industrial superprofit, whilst those of the UK and, inexorably, the US, focussed on the special commercial and financial advantages which their victory in two world wars conferred upon them. The true mechanism of unequal exchange, which has eluded so many scholars of this topic, is to be located in the temporal treatment of surplus profit as Carchedi has indefatigably signaled. So central to capitalist reality is this motor of growth that it lies behind both imperialist conquest and the launching of those periodic prolonged booms of which the *Belle Époque* and the post-war Golden Age are the most recent examples.

Yet from within the perspective of an equilibrium solution, superprofit is theoretically impossible. The simultaneist calculation simply cannot be performed once profits begin to diverge from the average. With this fiction abandoned, it becomes at last possible to progress beyond mere economics to the profound explanatory character of Marx's Political Economy, in all the richness required for the unfinished battles of the new century.

The Real World

In this overview I have argued that Marx's ideas still today threaten orthodoxy because they today remain relevant, offering the most coherent explanation of the reality we are now living in. A full elaboration of this necessary point belongs to a further article. However in closing, it is important to note that the enquiry into Marx's real ideas is not an antiquarian pursuit. It remains the case—as a growing volume of new work from TSSI scholars testifies—that Marx's original theory of value provides a framework within which today's capitalist world can be better understood than with any other account so far before us. This is intimately related to one particular aspect of his enquiry, which marks him out from almost all other economic conceptions: namely its purpose, rejecting any claim that economics could provide a universal theory of human action, was to explain *capitalism*. Alone among his contemporaries and successors he understood it as a specific stage of human history, which arises at a definite point in time, develops its contradictions, and then, impelled by these contradictions, passes over into a different form of organization.

Marx's detractors have never ceased gloating over the fact that this new form of organization has not yet arisen, and that capitalism is still with us—although since 2008 the silence on this point has been somewhat deafening. But a rather important point emerges from the very fact that capitalism still remains the dominant organizational principle of the world's economy, which is that for this very reason Marx's ideas remain the best way to understand it. It will only be when capitalism really has given way to a totally different social system, that the scientific principles Marx established will cease to apply to the world we live in. Furthermore, as I have shown in this article, the alternatives constructed by the “tribe of economists” as they have been named elsewhere, being rooted in the vain attempt to define capitalism as an eternal, contradiction-free economy, are doomed to fail.

Marx's theory explains our present stage of society best *both* because capitalism is limited by its own contradictions, *and* because it is still with us. The commodity, money, and capital, which he analyzed to exhaustion, remain the organizing principles of world society. His theories, simply speaking, provide a better guide to action and understanding than the increasingly discredited and ideologically circumscribed alternatives.

Notes

1. My thanks to Radhika Desai and Andrew Kliman for their careful reading of an initial draft of this article. All errors are my own.
2. More commonly referred to by the name of book III of Volume II of *Capital and Interest*, published in 1916 and now called *Value and Price*. It is here referenced as Böhm-Bawerk (1960).
3. Published in Sweezy (1949) along with Hilferding's response, and here referenced as Böhm-Bawerk (1896).
4. “[T]he early theory of value unnecessarily abandoned the most natural explanation. As a general rule, the *measure of the benefit depending on the good is really also the measure of the value of that good*” (Böhm-Bawerk 1960: 136, emphasis in original).
5. “In the last analysis, the value of all goods is bound up with man and his purposes. Now the position which man takes towards a given purpose determines whether or not in ordinary parlance he ascribes value to a particular good. And that position may be either of two kinds and on its kind is based the familiar distinction between value in its subjective sense and value in its objective sense. In its subjective sense value denotes the significance which a good or a quantity of goods possesses for the well-being of a certain subject... By this I mean that possession of the good satisfies some want, provides some gratification, affords some pleasure or spares me some pain... The other kind of value is objective. It signifies our estimate of the capacity of a good to bring about some definite extrinsic objective result” (Böhm-Bawerk 1960: 121–122).
6. “Objective exchange value is one of the important results which it behooves economics to explain; subjective value belongs to the means or tools by which economics is to achieve some of its explanations” (Böhm-Bawerk 1960: 123).
7. See Colander et al. (2008), or Freeman (2009) for the gyrations of orthodox theory in the face of public disbelief.
8. See Freeman (2010).
9. To be pedantically precise, it is difficult to get a meaningful answer.
10. See O'Driscoll and Rizzo (1996), Prychitko (1998).

11. An approach which prefigures Heidegger's (1993) phenomenology with its insistence on the primacy of "intentionality" in ontological enquiry. The displacement of ontology by subjectivity as the field of philosophical enquiry is a general theme of 20th-century bourgeois thought. It is in economics that this substitution encounters the most serious difficulties.
12. Marshall's work passed through several editions. Dobb's citation appears in appendix I.15 but the page number varies.
13. Reserving special immunity for economics from the physicist Wheeler's principle that "time is a device for preventing everything happening at once."
14. Ramos and Rodriguez (1996) use the term "dualist" and in early TSSI writings, TSSI itself was described as a "sequential non-dualist" approach.
15. This point is discussed at greater length later on.
16. Erroneously, as Freeman (1998) and Kliman (2004, 2005) have conclusively shown.
17. See Reuten (2004) for a reasonably exhaustive exegesis of the "trend versus cycle" literature.
18. See Kuhn (2007) for an excellent account of Grossman's isolation at the hands of the Frankfurt School following the move to New York, and Horkheimer and Adorno's growing concern that his uncompromising critique of the capitalist economy would endanger the School's relations with the funders.
19. Kliman (2010a).
20. A considerable body of Marxist literature attributes to Marx the claim that such a stage of society, dubbed "simple commodity production," really existed historically. Rosdolsky (1989: 168–174) and Arthur (2005) have convincingly refuted this attribution.
21. For a pertinent recent discussion of dynamic input-output modelling see Ryaboshlyk (2006).
22. See the exhaustive, and in my view conclusive discussion in *Capital & Class* (Kliman 2001; Mohun 2003a; Kliman and Freeman 2006; Mohun and Veneziani 2007; Kliman and Freeman 2008).
23. See www.iwgv.org/rpe/ for a recent example.
24. João Machado, in private correspondence, has pointed out that Mandel (1974), without making his stance explicit, always read and understood Marx in a temporal sense. As Mandel's co-editor (Mandel and Freeman 1984) I can corroborate this.
25. The process of circulation itself, conceived strictly as the exchange of titles, is treated as occupying zero time, so that t_i is the time at which one set of capitalists sell their product (C'-M') and another acquires them (M'-C'). Marx of course, in his critique of Say's Law, is fully aware the purchase and sale may be separated. In discussing the value and production processes, abstraction is made of this issue.
26. As Maldonado-Filho (1994) explains, Marx examines this exhaustively in his much-neglected Volume III chapter on the "Release and Tie-up of Capital," a systematic temporalist treatment of depreciation, which precedes the chapters on transformation and on the rate of profit, yet which simultaneist interpretations all ignore.
27. We will not in this article comment on the extensive literature from the Value Form School, because (for the most part) its proponents concede that they seek to construct their own distinct theory of value and do not advance the claim that this constitutes an interpretation of Marx's theory.
28. All figures are taken from UK national accounts but are rounded for simplicity of presentation.
29. Mohun himself argues that the New Solution is more theoretically coherent, because his justification for using the price of labor power in place of its value is the unique status of labor power as a non capitalistically-produced commodity.
30. Since Moseley in particular is very insistent that his calculations are derived in solely monetary terms, this point needs some elaboration. It will be recalled that in a simultaneous calculation, prices, values, and profits are all completely determined once the physical magnitudes of the commodities are specified. This applies equally to Moseley's system in which the quantities entering and leaving production are specified in units of money. What Moseley does not, however, recognize is that since all prices are held constant throughout his calculation, money simply plays the role of a unit of quantity. If I fix the price of steel at \$1 per ton and specify that \$1 of steel is needed to make a car, all I am saying is that 1 ton of steel is needed to make a car, except that I have chosen to express this in money. The critical point is that the *coefficients* in any simultaneous system, which it should

be recalled are dimensionless, uniquely determine values, prices and profits. In distinction, the values arising from a temporal system are a function of *both* the coefficients and the initial values of the inputs.

31. For example, Hunt and Glick (1987: 356): "the value of a commodity consisted of the labour embodied in the means of production...(dead labour) and the labour expended in the current production period (living labour)."
32. "although exchange value is = to the relative labour time materialized in products, money, for its part is = to the exchange value of commodities, separated from their substance" (Marx 1973: 160).

References

- Arthur, C. (2005) "The Myth of Simple Reproduction." <http://marxmyths.org/chris-arthur/article2.htm>
- Böhm-Bawerk, E. von. (1949) [1896] "Karl Marx and the Close of His System," in P. Sweezy, ed., (1984) [1949], *Karl Marx and the Close of His System: Böhm-Bawerk's Criticism of Marx*. New York: Augustus M. Kelley.
- (1960) [1914] *Value and Price*. South Holland: Libertarian Press, an extract from Book III of Volume III (*Positive Theory of Capital*) of *Capital and Interest*.
- (1984) [1907] "On the Correction of Marx's Fundamental Theoretical Construction," translated and reprinted in P. Sweezy, ed., (1984) [1949], *Karl Marx and the Close of His System*. New York: Augustus M. Kelley. German edition "Zur Berichtigung der grundlegenden theoretischen Konstruktion von Marx im dritten Band des *Kapital*," *Jahrbücher für Nationalökonomie und Statistik*, Serie 3, Band XXIV, July 1907.
- Bortkiewicz, L. von. (1952) [1906, 1907] "Value and Price in the Marxian System" (part I), in *International Economic Papers*, 1952: 2. Originally published in two parts in German as "Wertrechnung und Preisrechnung im Marxschen System" (part I), *Archiv für Sozialwissenschaft und Sozialpolitik*, Band XXIII (I), July 1906; (parts II and III) *Archiv für Sozialwissenschaft und Sozialpolitik*, Band XXV, July and September 1907.
- Bronfenbrenner, M. (1968) "Das Kapital for the Modern Man," in D. Horowitz, ed., (1968), *Marx and Modern Economics*. New York: Monthly Review Press.
- Carchedi, G. (1984) "The Logic of Prices as Values," *Economy and Society* 13, 4.
- (1996) "Non-equilibrium Market Prices," in A. Freeman and G. Carchedi, eds., *Marx and Non-equilibrium Economics*. Cheltenham, UK: Edward Elgar.
- Colander, D., H. Foellmer, A. Haas, M. Goldberg, K. Juselius, A. Kirman, et al. (2008) "The Financial Crisis and the Systemic Failure of Academic Economics." www.ifw-members.ifw-kiel.de/publications/the-financial-crisis-and-the-systemic-failure-of-academic-economics/KWP_1489_ColanderetalFinancialCrisis.pdf
- Day, R. B. (1981) *Crisis and the Crash: Soviet Studies of the West, 1917–1939*. Berlin: Schocken Books.
- Dobb, M. (1973) *Theories of Value and Distribution since Adam Smith*. Cambridge: Cambridge University Press.
- Duménil, G. (1980) *De la Valeur aux Prix de Production: Une réinterprétation de la transformation*. Paris: Economica.
- (1983) "Beyond the Transformation Riddle: A Labor Theory of Value," *Science & Society* 47, 4: 427–450.
- Ernst, J. R. (1982) "Simultaneous Valuation Extirpated: A Contribution to the Critique of the Neo-Ricardian Concept of Value," *Review of Radical Political Economics* 14, 2: 85–94.
- Foley, D. K. (1982) "The Value of Money, the Value of Labor Power and the Marxian Transformation Problem," *Review of Radical Political Economics* 14, 2: 37–47.
- (1986) *Understanding Capital: Marx's Economic Theory*. Cambridge: Harvard University Press.
- Freeman, A. (1995) "Marx Without Equilibrium," *Capital and Class* 56 (Summer): 49–81.
- (1996) "Price, Value and Profit—A Continuous, General, Treatment," in A. Freeman and G. Carchedi, eds., (1996), *Marx and Non-equilibrium Economics*. Cheltenham, UK: Edward Elgar.

- (1998) “The Indeterminacy of Price-Value Correlations: A Comment on Papers by Simon Mohun and Anwar Shaikh,” in R. Bellofiore, ed., *Conference Proceedings of Marxian Economics: A Centenary Appraisal*. London: Macmillan.
- (2007) “Heavens Above: What Equilibrium Means for Economics,” in V. Mosini, ed., *Equilibrium in Economics: Scope and Limits*. London: Routledge.
- (2009a) “What Makes the US Profit Rate Fall?” http://mpira.ub.uni-muenchen.de/14147/1/MPRA_paper_14147.pdf
- (2009b) “The Economists of Tomorrow: The Case for a Pluralist Subject Benchmark Statement for Economics,” *International Review of Economics Education* 8, 2: 23–41.
- (2010a) “Marxism Without Marx,” *Capital and Class* 34, 1 (January): 84–97.
- (2010b) “Crisis and ‘Law of Motion’ in Economics: A Critique of Positivist Marxism,” *Research in Political Economy* 26: 211–250.
- Freeman, A., and G. Carchedi (eds.) (1996) *Marx and Non-equilibrium Economics*. Cheltenham, UK: Edward Elgar.
- Freeman, A., and A. Kliman (2008) “Simultaneous Valuation vs. The Exploitation Theory of Profit: A Summing Up,” *Capital & Class* 32, 1: 107–117.
- Freeman, A., A. Kliman, and J. Wells (eds.) (2004) *The New Value Controversy and the Foundations of Economics*. Cheltenham, UK: Edward Elgar.
- Friedman, M. (1953) “The Methodology of Positive Economics,” in *Essays in Positive Economics*. Chicago, University of Chicago Press.
- Gattei, G. (1982) “Les Chaires ‘Ratées’ de Ladislaus von Bortkiewicz,” *Revue Européenne des Sciences Sociales* 20, 62.
- Giussani, P. (1991) “The Determination of Prices of Production,” *International Journal of Political Economy* 21 (Winter 1991/92): 67–87.
- Harcourt, G. C. (1972) *Some Cambridge Controversies in the Theory of Capital*. Cambridge: Cambridge University Press.
- Hawkins, D., and H. A. Simon (1949) “Note: Some Conditions of Macroeconomic Stability,” *Econometrica* 17: 245–254.
- Heidegger, M. (1993) (14th ed) *Sein und Zeit*. Berlin: Neimeyer.
- Hicks, J. R. (1937) “Mr Keynes and the Classics,” *Econometrica* (April). Reprinted in J. R. Hicks (1982) *Money, Interest and Wages: Collected Essays on Economic Theory*, vol. 2. Blackwell. pp. 100–115.
- Hodgson, G. (1980) “A Theory of Exploitation without the Labor Theory of Value,” *Science and Society* 44, 3: 257–273.
- Hollander, S. (1981) “Marxian Economics as General Equilibrium Theory,” *History of Political Economy* 13, 1.
- Hunt, E. K., and M. Glick (1987) “Transformation Problem,” in J. Eatwell et al., eds., (1990), *The New Palgrave: Marxian Economics*. London: Macmillan; New York: W. W. Norton.
- Jaffé, W. (ed.) (1965) *Correspondence of Léon Walras and Related Papers*. Amsterdam: North Holland.
- Johnston, W. M. (1983) *The Austrian Mind: An Intellectual and Social History, 1848–1938*. Berkeley, CA: University of California Press.
- Kliman, A. (1988) “The Profit Rate Under Continuous Technological Change,” *Review of Radical Political Economics* 20, 2/3.
- (2001) “Simultaneous Valuation vs. The Exploitation Theory of Profit,” *Capital & Class* 73: 97–112.
- (2004) “Spurious Value-Price Correlations: Some Additional Evidence and Arguments,” *Research in Political Economy* 21: 223–238.
- (2005) “Reply to Cockshott and Cottrell,” *Cambridge Journal of Economics* 29, 2: 317–323.
- (2007) *Reclaiming Marx’s Capital: A Refutation of the Myth of Inconsistency*. Lanham, MD: Lexington Books.
- (2010a) “The Disintegration of the Marxian School,” *Capital and Class* 34, 1 (January): 61–68.
- (2010b) *The Persistent Fall in Profitability Underlying the Crisis: New Temporalist Evidence*. New York: Marxist-Humanist Initiative.

- Kliman, A., and A. Freeman (2006) "Replicating Marx: A Reply to Mohun," *Capital & Class* 88: 117–126.
- (2008) "Simultaneous Valuation vs. The Exploitation Theory of Profit: A Summing Up," *Capital & Class* 32, 1: 107–117.
- Kliman, A., and T. McGlone (1988) "The Transformation non-Problem and the non-Transformation Problem," *Capital & Class* 35 (Summer): 56–83.
- Kuhn, R. (2007) *Henryk Grossman and the Recovery of Marxism*. Illinois: University of Illinois Press.
- Kuhn, T. (1970) [1962] *The Structure of Scientific Revolutions*. 2nd ed., enlarged. Chicago and London: University of Chicago Press.
- Kurz, H., and N. Salvadori (1995) *Theory of Production: A Long-Period Analysis*. Cambridge: Cambridge University Press.
- Laibman, D. (2004) "Rhetoric and Substance in Value Theory: An Appraisal of the New Orthodox Marxism," in A. Freeman, A. Kliman, and J. Wells, eds., (2004), *The New Value Controversy in Economics*. Aldershot: Edward Elgar.
- Lee, Chai-On (1993) "Marx's Labour Theory of Value Revisited," *Cambridge Journal of Economics* 17, 4: 463–478.
- Maldonado-Filho, E. (1994) "Release and Tying up of Productive Capital and the 'Transformation Problem,'" URPE conference at the ASSA, Fall. Available at www.iwvt.org
- Mandel, E. (1974) *Late Capitalism*. London: Verso.
- Mandel, E., and A. Freeman (eds.) (1984) *Marx, Ricardo and Sraffa*. London: Verso.
- Marshall, A. (1890) *Principles of Economics*. London: Macmillan and Co.
- Marx, K. (1972) *Theories of Surplus Value*, Vol. III. London: Lawrence and Wishart.
- (1973) *Grundrisse: Foundations of the Critique of Political Economy*. London: Penguin.
- (2004) *Capital: A Critique of Political Economy*, Vol. I. *The Process of Capitalist Production*. London: Penguin; New York: Vintage.
- (2006a) *Capital: A Critique of Political Economy*, Vol. II. *The Process of Circulation of Capital*. London: Penguin; New York: Vintage.
- (2006b) *Capital: A Critique of Political Economy*, Vol. III. *The Process of Capitalist Production as a Whole*. London: Penguin; New York: Vintage.
- May, K. (1948) "Value and Price of Production: A Note on Winternitz Solution," *Economic Journal* 58.
- Meek, R. (1979) *Studies in the Labour Theory of Value*. London: Lawrence and Wishart.
- Mohun, S. (2003a) "On the TSSI and the Exploitation Theory of Profit," *Capital & Class* 81: 85–102.
- (2003b) "The Australian Rate of Profit, 1965–2001," *Journal of Australian Political Economy* 52.
- Mohun, S., and R. Veneziani (2007) "The Incoherence of the TSSI: A Reply to Kliman and Freeman," *Capital & Class* 92: 139–145.
- Morishima, M. (1973) *Marx's Economics: A Dual Theory of Value and Growth*. Cambridge: Cambridge University Press.
- Moseley, F. (1993a) "Marx's Logical Method and the 'Transformation Problem,'" in F. Moseley, ed., (1993b), pp. 157–183.
- (ed.) (1993b) *Marx's Method in Capital: A Re-examination*. Atlantic Highlands, NJ: Humanities Press.
- Moszkowska, N. (1979) [1925] *El Sistema de Marx: Un aporte para su construcción*. México: Pasado y Presente.
- Murray, R. (1973) "Productivity, Organic Composition and the Falling Rate of Profit," *Bulletin of the Conference of Socialist Economists*, Spring: 53–56.
- Naples, M. I. (1985) "Dynamic Adjustment and Long-run Inflation in a Marxian Model," *Journal of Post-Keynesian Economics*, 8, 1.
- (1989) "A Radical Economic Revision of the Transformation Problem," *Review of Radical Political Economics* 21, 1/2: 137–158.
- (1996) "Time, Money, Equilibrium: Methodology and the Labour Theory of the Profit Rate," in A. Freeman, and G. Carchedi, eds., *Marx and Non-equilibrium Economics*. Cheltenham, UK: Edward Elgar, pp. 95–115.

- Ochoa, E. M. (1984) "Labor-Values and Prices of Production: An Interindustry Study of the United States Economy, 1947–1972." PhD dissertation, Department of Economics, New School for Social Research, New York.
- O'Driscoll, Jr., G. P., and M. J. Rizzo (1996) *The Economics of Time and Ignorance*. 2nd ed. London: Routledge.
- Okishio, N. (1961) "Technical Changes and the Rate of Profit," *Kobe University Economic Review* 7.
- Osuna, G. R. (2003) "Un Modelo Secuencial para el Cálculo de Precios. El caso Español 1986–1994." PhD dissertation, Facultad de Ciencias Económicas y Empresariales, Universidad Nacional de Educación a Distancia UNED, Spain.
- Pasinetti, L. (1979) *Lectures on the Theory of Production*. Basingstoke: Palgrave Macmillan.
- Prychitko, D. L. (1998) *Why Economists Disagree: An Introduction to the Alternative Schools of Thought*. New York: State University of New York Press.
- Ramos-Martínez, A. (1991) "Competencia y Reproducción Capitalista: Una Interpretación de la Transformación de Valores en Precios de Producción," *Ciencias Económicas* 11, 1/2: 53–79 (Costa Rica). Reprinted, with some changes, in *Realidad Económica* 105/106 (1992): 191–212 (Buenos Aires).
- (1996) "The Monetary Expression of Labor: An Interpretation of the Relation Between Value-Substance and Value-Form." Paper presented at the Eastern Economic Association conference, Boston, March.
- (1998–99) "Value and Price of Production: New Evidence on Marx's Transformation Procedure," *International Journal of Political Economy* 28, 4: 55–81.
- (2004) "Labour, Money, Labour-Saving Innovation, and the Falling Rate of Profit," in A. Freeman, A. Kliman, and J. Wells, eds., (2004), *The New Value Controversy and the Foundations of Economics*. Cheltenham, UK: Edward Elgar, pp. 67–84.
- Ramos-Martínez, A., and A. Rodríguez-Herrera (1996) "The Transformation of Values into Prices of Production: A Different Reading of Marx's Text," in A. Freeman and G. Carchedi, eds., (1996), *Marx and Non-equilibrium Economics*. Cheltenham, UK: Edward Elgar.
- Reuten, G. (2004) "'Zirkel vicieux' or Trend Fall? The Course of the Profit Rate in Marx's Capital III," *History of Political Economy* 36, 1: 163–186.
- Roemer, J. E. (1989) *Free to Lose: Introduction to Marxist Economic Philosophy*. 2nd ed. Radius.
- Rosdolsky, R. (1989) *The Making of Marx's "Capital"*. London: Pluto.
- Ryaboshlyk, V. A. (2006) "Dynamic Input–Output Model with Explicit New and Old Technologies: An Application to the UK," *Economic Systems Research* 18, 2: 183–203.
- Samuelson, P. (1971) "Understanding the Marxian Notion of Exploitation: A Summary of the So-called 'Transformation Problem' between Marxian Values and Competitive Prices," *Journal of Economic Literature* 9, 2: 399–431.
- Samuelson, P., and D. Nordhaus (1989) *Economics*. New York: McGraw-Hill.
- Seton, F. (1957) "The 'Transformation Problem,'" *Review of Economic Studies* 24: 149–160.
- Shaikh, A. (1984) "The Transformation from Marx to Sraffa," in E. Mandel and A. Freeman, eds., *Marx, Ricardo and Sraffa*. London: Verso, pp. 43–84.
- (1998) "The Empirical Strength of the Labor Theory of Value," in R. Bellofiore, ed., (1998), *Conference Proceedings of Marxian Economics: A Centenary Appraisal*. London: Macmillan.
- Sowell, T. (1974) *Classical Economics Reconsidered*. Princeton: Princeton University Press.
- Sraffa, P. (1960) *Production of Commodities by Means of Commodities: Prelude to a Critique of Economic Theory*. Cambridge and New York: Cambridge University Press.
- Steedman, I. (1981) [1977] *Marx after Sraffa*. London: New Left Books.
- Stigler, G. J. (1965) "Textual Exegesis as a Scientific Problem," *Economica* 32, 128: 447–450.
- Sweezy, P. M. (1970) [1942] *The Theory of Capitalist Development: Principles of Marxian Political Economy*. New York: Modern Reader Paperbacks.
- (ed.) (1984) [1949] *Karl Marx and the Close of his System*. Philadelphia: Orion Editions. Originally published by London: Merlin, and New York: Augustus M. Kelley.

- Todaro, M. P., and S. C. Smith (2009) *Economic Development*. 10th ed. Harlow, England: Addison-Wesley.
- Walras, L. (1984) [1876] *Elements of Pure Economics or the Theory of Social Wealth*. Philadelphia: Orion Editions. Translation by W. Jaffé, of *Éléments d'Économie politique pure*.
- Winternitz, J. (1948) "Values and Prices: A Solution of So-called Transformation Problem," *Economic Journal* 58.
- Wolff, R., A. Callari, and B. Roberts (1984) "A Marxian Alternative to the Traditional 'Transformation Problem,'" *Review of Radical Political Economics* 16, 2/3: 115–135.
- Wolff, R., B. Roberts, and A. Callari (1982) "Marx's (not Ricardo's) 'Transformation Problem': A Radical Reconceptualization," *History of Political Economy* 14, 4: 564–582.