

## **The Truthiness of Veneziani's Critique of Marx and the TSSI**

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### **Abstract**

A 2004 paper by Roberto Veneziani criticized the temporal single-system interpretation (TSSI) of Karl Marx's value theory as well as Marx's own value theory and law of the tendential fall in the rate of profit. This paper responds to Veneziani's critique, showing that it is teeming with falsehoods and logical problems. When assessed in terms of logical rigor, precision, and truthfulness (as distinct from truthiness—"truth that comes from the gut"), none of his criticisms hold water. The topics discussed herein include: the methodology of the TSSI's refutation of the allegations of internal inconsistency leveled against Marx, the difference between prices and values, the origin of profit, the monetary expression of labor-time, and the law of the tendential fall in the rate of profit and Okshio's theorem.

## The Truthiness of Veneziani's Critique of Marx and the TSSI <sup>1</sup>

### truthiness (noun)

1: "truth that comes from the gut, not books" (Stephen Colbert, Comedy Central's

"The Colbert Report," October 2005)

2: "the quality of preferring concepts or facts one wishes to be true, rather than

concepts or facts known to be true" (American Dialect Society, January 2006)<sup>2</sup>

### 1. Using Truthiness to Put the TSSI in its Place

Roberto Veneziani's critique of Marx and the temporal single-system interpretation (TSSI) of Marx's value theory has been hailed, by no less an authority than Ian Steedman, for having put the TSSI in its place. In a paper prepared for a 25<sup>th</sup> anniversary commemoration of his *Marx after Sraffa*, Steedman (2003: 6) wrote, "Then there are the Temporalist-Single-System [sic] arguments much noised about these days. It seems to me that Veneziani (2002) has adequately put them in their place."<sup>3</sup>

Like Sraffians generally, Steedman has long been portrayed as a champion of truth, precision, and logical rigor. The paper in which he hails Veneziani's critique opens on this note as well:

In the 1970s there was a great flurry of writings on 'Marxist economics' but much of it (not all) was, unfortunately, of a careless and uncritical kind, showing more signs of ideological fervour than of any determination to ensure that what was said was at least internally coherent and logical. In complete contrast, the 1960s/early 1970s 'capital theory' literature ... had by-and-large been a model of precision, à la Sraffa.

... The purpose of *Marx after Sraffa* was to show ... beyond any reasonable dispute, the fallacious nature of many traditional Marxist arguments and claims. [Steedman 2003: 2–3]

Readers are thus led to infer that when Steedman praises Veneziani for having put the TSSI in its place, this judgement is based on considerations of logical rigor, precision, and truthfulness. And since this judgement comes from no less an authority than Ian Steedman, must it not be true? Surely he checked Veneziani's math, verified the accuracy of his citations and attributions, and scrutinized the cogency of his arguments?

Actually, as we document below, Veneziani (2004) is teeming with falsehoods and logical problems. When assessed in terms of logical rigor, precision, and truthfulness, none of his criticisms hold water.

The most striking feature of the collection of erroneous allegations which Veneziani offers, and on which Steedman confers the accolade of his authority, is that—apart from the fact that they are all intended to “put the TSSI in its place”—in other respects they have nothing in common. No single misunderstanding or mistake lies at their root. Veneziani's allegations are just a wide-ranging assortment of mathematical errors, unsubstantiated claims that misrepresent TSSI writings and arguments that do not make sense

But how can one paper be filled with so many unrelated mistakes? And how can so many errors have escaped the attention of the referees and editors of *Metroeconomica*, and of such a champion of truthfulness, precision, and logical rigor as Ian Steedman? We find it extremely improbable that so many unrelated errors could have survived if Veneziani *et al's* primary concerns were truthfulness, precision, and logical rigor rather than putting the TSSI in

its place. On the other hand, we are unwilling to believe that Veneziani set out to do a hatchet job on Marx and the TSSI, or that *Metroeconomica* or Steedman intended to promote one.

Our conjecture is instead that they all employed *truthiness*, rather than *truthfulness*, as their standard of evaluation. In other words, we suspect that for many critics of the TSSI, the notion that “something is wrong” with this interpretation is a “truth that comes from the gut.” They wish it to be true; therefore it is true. The TSSI seems to eliminate the internal inconsistencies in Marx’s value theory, but they “know” that Marx was internally inconsistent, and thus they “know” that the contrary findings of the TSSI simply *must* be the result of trickery and/or error. Thus, every new critique is looked to expectantly as finally having provided the proof of what has been intuitively “known” all along to be true. And, in order to decide whether the new critique really is the long-awaited proof, they appeal to their guts.<sup>4</sup>

We believe that the employment of truthiness as a standard of evaluation, especially in order to put theoretical opponents in their place, is what actually deserves to be put in its place. This paper is a contribution to that effort. More broadly, we view this paper as a contribution to the movement for pluralism in economics, as we will discuss in a brief concluding remark.

Before turning to the details of Veneziani’s paper, it is important to point out that, although its title suggests that it is only a critique of the TSSI, the ultimate object of the critique is Marx. Veneziani claims that his results “confirm[ ] that the adoption of a coherent methodology and a clear distinction between values and prices would imply that not *all* [of] Marx’s results hold, as is well known in the literature on Marxian economics. ... [T]his leads one to question the TSS literal interpretation of Marx’s theory” (Veneziani 2004: 98, emphasis in original). Thus, Veneziani claims that not all of Marx’s theoretical results hold true. Some cannot be taken literally, but must either be reinterpreted as mere metaphors or rejected outright.

Thus, although the TSSI is the immediate target of Veneziani's critique, the ultimate target is Marx. By claiming to refute TSSI findings that vindicate the internal consistency of Marx's theory, Veneziani claims to confirm the charges that Marx himself is internally inconsistent.

## 2. The TSSI's "Unsurprising" Vindication of Marx's Conclusions

Veneziani (2004: 98) grudgingly concedes that the TSSI undoes the appearance of internal inconsistency in Marx's theory: "the TSS approach ... 'corresponds to the original [theory of Marx's] in a way that others do not.'"<sup>5</sup> We have purposely quoted Veneziani out of context in order to highlight the fact that he acknowledges this point here. If one does not read his paper with extreme care, it is easy to overlook this very brief acknowledgement.

Commented [ajk1]:

The remainder of his paper diverts attention from the question of internal inconsistency by making the controversy seem to be about whether Marx's value theory is *true*. But as Veneziani surely knows, the controversy is about whether Marx's theory is internally *inconsistent*. As we will shortly demonstrate, we have made this distinction so clear that an author of Veneziani's competence cannot fail to be aware of it. We thus have to conclude that his diversion from the issue of inconsistency is a deliberate rhetorical device, or that "truth from the gut" imposes such a relaxation of standards that the pursuit of "putting TSSI in its place" has wholly driven out rigor.

Although he admits that the TSSI succeeds in deducing Marx's conclusions, Veneziani (2004: 98, emphasis in original) says that this is "unsurprising[ ]"; the conclusions are deduced only because "all [of] Marx's propositions [i.e. premises] are *assumed* to be correct" in TSSI works.

If proponents of the TSSI claimed to prove that Marx's conclusions are true, as Veneziani asserts, his complaint would be legitimate. One cannot prove that conclusions are true simply by showing that they follow from the premises. Yet we have continually stressed that our demonstrations are not efforts to prove that Marx's theory is true, but efforts to prove that the theory can be interpreted in a manner that renders it logically consistent. For instance, *in a paper that Veneziani cites in his text and references*, we stated: "We have never said that Marx's contested insights are necessarily true .... We simply say the claims that his value theory is *necessarily wrong*, because it is logically invalid, are false" (Freeman and Kliman 2000: 260, emphasis in original).

Now, the way in which one proves that Marx's theory can be understood to be logically valid is *precisely* by showing that his conclusions follow from his premises (as we interpret them). Once this is understood, Veneziani's revelation that the TSSI arrives at Marx's conclusions by deducing them from (our interpretation of) his premises no longer reads like an exposé of trickery or failure. His statement now seems to be what it actually is—an admission that the TSSI demonstrations have succeeded in refuting the century-old "proofs" of Marx's logical inconsistency.

### **3. Veneziani's False Claim that TSSI Values = Prices**

According to Veneziani (2004: 102, emphasis in original), the TSSI assumes that

*in a steady state equilibrium, values are equal to observed market prices, and goods exchange at embodied labour values.* In other words, the TSS approach solves the transformation problem by constructing a 'money costs theory of value', where *by*

*assumption*  $\lambda = \mathbf{p}$  [i.e., the vector of unit values equal the vector of unit prices], apart possibly from short-run deviations.

This assertion is completely false.

By “steady state equilibrium,” Veneziani means that the temporalist monetary expression of labor-time (MELT),<sup>6</sup> all values, and all *market* prices—whether equal to production prices or not—are stationary. Marx’s theory as understood by the TSSI holds that, in the hypothetical steady state equilibrium that Veneziani assumes, unit values and unit prices (in terms of labor-time) would be

$$\lambda = \mathbf{p}\mathbf{A} + \mathbf{l} = \frac{\mathbf{p}^{\$}\mathbf{A}}{\varepsilon} + \mathbf{l} \quad (1)$$

$$\mathbf{p} = \frac{\mathbf{p}^{\$}}{\varepsilon} = \frac{\mathbf{p}^{\$}\mathbf{A}}{\varepsilon} + \mathbf{l} + \mathbf{g} \quad (2)$$

where  $\lambda$  is a vector of unit values in terms of labor-time,  $\mathbf{p}$  is a vector of unit prices in terms of labor-time;  $\mathbf{A}$  is the input-output matrix;  $\mathbf{l}$  is a vector of living labor requirements per unit of output;  $\mathbf{p}^{\$}$  is a vector of unit money prices;  $\varepsilon$ , the temporalist MELT, is a scalar; and  $\mathbf{g}$  is a vector of per-unit deviations of prices from values.

Now *if*  $\mathbf{p}$  were determined ahistorically, within equation system (2), the system would be underdetermined. Even if one stipulates that  $\varepsilon = 1$ , as Veneziani does, (2) contains  $2n$  unknowns ( $n$  money prices plus  $n$  elements of  $\mathbf{g}$ ) but only  $n$  independent equations.

To avoid this indeterminacy, Veneziani claims, it is necessary to impose the “equilibrium condition”  $\lambda = \mathbf{p}$ . Therefore, he immediately concludes, the TSSI’s proponents “construct[ ] a ‘money costs theory of value,’ where *by assumption*  $\lambda = \mathbf{p}$ .” This inference makes no sense at

all. Even if it were true (which it is not) that Veneziani’s equilibrium condition is needed for a determinate solution, this would imply only that TSSI authors leave equations (1) and (2) underdetermined. Yet Veneziani does not make this claim. Instead, he attributes to us a premise which we do not hold and do not need to hold. *We do not* construct any “money costs theory of value.” There is no basis for Veneziani’s claim that we do. The  $\lambda = \mathbf{p}$  condition is his invention, not ours.

This objection is not a mere linguistic quibble. By falsely alleging that proponents of the TSSI construct and assume something that is both ridiculous and at variance with Marx’s value theory, Veneziani creates the impression that we either know nothing about Marx’s theory or purposely misinterpret it. Each time he claims that we fail to distinguish between values and prices, this impression is reinforced, and the claim is one of his paper’s dominant themes. Featured in both his abstract and conclusion, it also appears on pages 98, 102, and 103-04 of his paper.

Veneziani (2004: 102) claims that his  $\lambda = \mathbf{p}$  condition is needed, not only in order to obtain a determinate solution, but also “as a matter of logical ... consistency.” This is simply not true. *Overdetermined* systems are inconsistent. *Underdetermined* systems of linearly independent equations never are.

In any case, system (2) is neither inconsistent nor underdetermined. It is exactly determined—historically. By assuming that prices are stationary, *Veneziani is tacitly assuming that the input prices that existed at the start of the steady state have prevailed since that time:*

$$\mathbf{p}_0^{\$} = \dots = \mathbf{p}_t^{\$} = \mathbf{p}_{t+1}^{\$} = \mathbf{p}^{\$} . \quad (3)$$

The key point in this is taken as nearly incontrovertible in calculus and in the theory of differential or difference equations, and must be fully understood by Veneziani: in a temporal formulation, the initial conditions—the elements of  $\mathbf{p}_0^{\$}$ —are *data*, not unknowns.<sup>7</sup> They are the input prices of Period 0, i.e. the output prices of Period –1, the period immediately prior to the steady state. These prices are *already determined*, through the socioeconomic processes that occurred before and during Period –1.

Since  $\mathbf{p}$  is known, the only *unknown* variables are the  $n$  elements of  $\mathbf{g}$ , as well as  $\mathcal{E}$ . System (2) thus contains  $n$  equations in  $n + 1$  unknowns. A further equation is provided by fact that, in Marx's theory as interpreted by the TSSI, total price equals total value. Thus the economy-wide sum of price-value deviations is

$$\mathbf{g}\mathbf{x} = 0 \quad (4)$$

where  $\mathbf{x}$  denotes the vector of gross outputs (see Kliman and McGlone 1999: 38).

Using (1), (2), (3), and (4), we can now solve for all the unknowns by means of the following substitutions. Multiplying (2) through by  $\mathcal{E}$ , we obtain

$$\mathbf{p}^{\$} = \mathbf{p}^{\$}\mathbf{A} + \mathcal{E}\mathbf{l} + \mathcal{E}\mathbf{g} \quad (5)$$

Post-multiplying by  $\mathbf{x}$ , and employing (3) and (4), this becomes

$$\mathbf{p}_0^{\$}\mathbf{x} = \mathbf{p}_0^{\$}\mathbf{A}\mathbf{x} + \mathcal{E}\mathbf{l}\mathbf{x} \quad (6)$$

or

$$\mathbf{p}_0^{\$}(\mathbf{I} - \mathbf{A})\mathbf{x} = \mathcal{E}\mathbf{l}\mathbf{x} \quad (7)$$

so that

$$\varepsilon = \frac{\mathbf{p}_0^{\$}(\mathbf{I} - \mathbf{A})\mathbf{x}}{\mathbf{l}\mathbf{x}} \quad (8)$$

Substituting (3) and (8) into (2), and rearranging terms, we then find that

$$\mathbf{g} = \left( \frac{\mathbf{l}\mathbf{x}}{\mathbf{p}_0^{\$}(\mathbf{I} - \mathbf{A})\mathbf{x}} \right) \mathbf{p}_0^{\$}(\mathbf{I} - \mathbf{A}) - \mathbf{l} \quad (9)$$

while substitution of (3) into (1) and (2) yields

$$\lambda = \frac{\mathbf{p}_0^{\$}\mathbf{A}}{\varepsilon} + \mathbf{l} \quad (10)$$

$$\mathbf{p} = \frac{\mathbf{p}_0^{\$}\mathbf{A}}{\varepsilon} + \mathbf{l} + \mathbf{g} \quad (11)$$

where the numerical values of  $\varepsilon$  and  $\mathbf{g}$  are those given in (8) and (9).

These solutions demonstrate that, contrary to what Veneziani asserts, the TSSI neither assumes nor requires the assumption that values equal prices in a steady state. It is clear from Equations (10) and (11) that values equal prices if and only if  $\mathbf{g} = 0$ , but (9) shows that this is not true in general. Veneziani is also wrong when he states, as he repeatedly does, that the value of  $\varepsilon$  is fixed in an arbitrary, *ad hoc* way. Equation (8) makes clear that its value is determined by the *data*. It also makes clear that Veneziani (2004: 102) is wrong when he suggests that proponents of the TSSI would have to “assume that the steady state is never reached” in order to avoid indeterminacy without assuming that  $\lambda = \mathbf{p}$ .

To explain why the money price vector is  $\mathbf{p}_0^{\$}$ , rather than something else, the above solution appeals to the historical circumstances that gave rise to  $\mathbf{p}_0^{\$}$ . Veneziani (2004: 102)

seems to dislike this kind of explanation, preferring appeals to optimizing behavior and physical data. But we challenge him and anyone else who dislikes this solution to produce a different one, using only the information that he has provided—the input-output data and the stationarity assumption. They will not succeed.<sup>8</sup>

Veneziani also tries to prove that the TSSI requires the  $\lambda = \mathbf{p}$  condition when profit rates are equal, i.e. when commodities sell at their production prices. “[T]he transformation between [sic] values and production prices is also trivially solved in the TSS framework by *assuming* that they are ... equal, apart from short-run deviations” (Veneziani 2004: 103-04, emphasis in original). His attempted proof is, if anything, even more feeble than the one above. Veneziani (2004: 103) makes use of the TSSI value, price, and profit-rate equations (his equations (1)-(7)), as well as the following equality:

$$\mathbf{s}_t^* = r_t \mathbf{p}_t (\mathbf{A} + \mathbf{b}_w \mathbf{I}) \quad (12)$$

which states that, when production prices prevail, the vector of surplus-values equals the vector of profits (both per unit of output).<sup>9</sup>

Now if it were true that surplus-value equaled profit in every industry, then *of course* every commodity’s production price would equal its value. Yet no proponent of the TSSI has ever invoked (12). It is a ludicrous condition, and entirely Veneziani’s own invention. He simply pulls it out of thin air.

It would be simple to prove that values and production prices as understood by the TSSI are generally unequal, but a proof is not worth the effort. Instead, we refer readers to the numerical examples contained in Kliman and McGlone (1988: 72–76)—*which Veneziani cites*—and McGlone and Kliman (1996: 40–44). The examples show how production prices are

determined under a variety of assumptions regarding the constancy or variability of prices and the MELT. Individual industries' values and production prices are unequal in all cases.

#### 4. The Origin of Profit under Simultaneism

Overturing three decades of conventional wisdom, Kliman (2001) proved that all simultaneist interpretations of Marx's value theory (in which outputs' and inputs are priced or valued simultaneously) are incompatible with Marx's theory of the origin of profit. They all contradict his claim that surplus labor is necessary and sufficient for the existence of profit. Veneziani takes issue with this proof, making it seem incorrect. Yet his objections are all diversionary. None of them address whether surplus labor is necessary and sufficient for profit under simultaneism.

Moreover, if one reads Veneziani's critique very carefully, cutting through the disparaging rhetoric, one sees that he *tacitly* concedes that surplus labor is neither necessary nor sufficient for profit under simultaneism. "Kliman's critiques," he writes, "reduce to the trivially true, and rather uninteresting, algebraic statement that there are arbitrary combinations of the variables such that  $\Pi_t > 0$  while  $S_t < 0$ , and vice[-]versa" (Veneziani 2004: 105-06). But this means precisely that it is possible that profit is positive ( $\Pi_t > 0$ ) while surplus labor is negative ( $S_t < 0$ ), and vice-versa. Thus, surplus labor is neither necessary nor sufficient for profit under simultaneism. Why does Veneziani fail to acknowledge this in a forthright way, and without obfuscating phrases like "trivially true," "uninteresting," and "arbitrary"? Indeed, these are, precisely, rhetorical rather than logically rigorous assertions. Their function is to distract attention from the substance of the proof under consideration. They have no place in an impartial inquiry after truth and knowledge. What exactly is "uninteresting" about the fact that

simultaneist solutions necessarily give rise to circumstances in which profit is positive, whilst physical surplus is negative? Any mathematically rigorous examination could not but conclude that this “arbitrary” and “uninteresting” result establishes the result that Kliman set out to prove. Why, then, at this *precise* point, abandon logic for rhetoric? The goal of “putting the TSSI in its place” has here, as throughout, driven out the normal criteria of rigor.

Although he tacitly admits that Kliman proved what he claimed to prove, Veneziani (2004: 105) nonetheless holds that Kliman’s critique of the Fundamental Marxian Theorem (FMT) “seem[s] rather unconvincing” because, in order to show that surplus labor is neither necessary nor sufficient for profit under simultaneism, Kliman relaxed the restrictions that had heretofore been imposed on the problem by simultaneists—restrictions that cleverly made it *seem* that their interpretations imply that surplus labor is necessary and sufficient for profit. According to Veneziani (2004: 105n7), “all [of] Kliman’s (2001) ‘results’ are unwarranted” because he did not assume that profit rates are equal. His examples were “arbitrary” (Veneziani 2004: 105). His economies were not in a “reproducible solution” (Veneziani 2004: 105).

These objections seem compelling—unless one knows that Kliman’s (2001: 97, Abstract) critique of the FMT was precisely that it “rel[ies] crucially on restrictive and implausible conditions.” Then Veneziani’s objections make no sense at all. He is complaining that Kliman had to relax the FMT’s restrictions in order to prove that it relies crucially upon those restrictions! How else could Kliman prove this? Will Veneziani please tell us?

If Kliman had claimed that the FMT was *false*, then Veneziani’s complaints would make sense. One cannot disprove a theorem if one violates its premises. But what Kliman claimed, correctly, was something different: the FMT fails to demonstrate that surplus labor is necessary and sufficient for profit. Veneziani is well aware of the difference. He writes, “Although this

[demonstration that surplus labor and profit can have opposite signs under simultaneism] does not refute the FMT, according to Kliman, it shows that the FMT is theoretically unsatisfactory because it holds only under Roemer's restrictive and unrealistic definition of reproducibility" (Veneziani 2004: 104-05). Since he understands what Kliman did and did not claim, and tacitly concedes that what he did claim is correct, why has Veneziani responded with "objections" that fail to address the issue?

### 5. The Negative MELT issue

Although Veneziani tacitly concedes that all simultaneist interpretations are incompatible with Marx's theory that surplus labor is the exclusive source of profit, he contends that the TSSI is in no better shape. "[T]he TSS approach does not offer a 'superior' interpretation of Marx's theory of exploitation" (Veneziani 2004: 107) because it, too, fails to imply that surplus labor is necessary and sufficient for positive profit. "[T]he desired result can only be obtained by arbitrarily assuming" that the monetary expression of labor-time (MELT) is never negative (Veneziani 2004: 106).

It is true that *if* the temporalist MELT could be negative, *then* surplus labor would not be necessary or sufficient for positive profit under the TSSI. Given a negative MELT, profit would be negative when surplus labor is positive, and vice versa.

Yet, although Veneziani *alleges* that it is arbitrary to assume that the MELT is non-negative, he gives us absolutely no reason to believe that a negative temporalist MELT is logically possible. A negative MELT would imply that a quantum of labor-time is represented by a negative amount of money. In the absence of any reason why we should believe in such an absurd situation, it is hardly arbitrary to assume that the MELT is positive.

In fact, we do *not* assume that the MELT is positive: we prove it. The proof that the temporalist MELT must always be positive was presented in Kliman (2001) and in Kliman and Freeman (2006). Veneziani's charge that it is "arbitrary" to assume a positive temporalist MELT is false, and had he considered the mathematical implications of his claim in any but the most superficial manner, he himself should have recognised this. And since this false charge is the sole basis for his rejection of the claim that the TSSI succeeds in deducing the conclusions of Marx's exploitation theory of profit, Veneziani's rejection of the claim is unwarranted. Given the importance of this issue, it will be useful to re-state the proof of the positivity of the temporalist MELT here.

- (a) Kliman (2001: 106-08) proved the following theorem: if  $P$  (the total price of output, in money terms),  $C$  (total expenditures on used-up means of production, in money terms),  $L$  (the total amount of living labor expended in production, in labor-time terms), and  $\tau(0)$  (the temporalist MELT of time (0)) are all positive and finite, then  $\tau$  *must always* be positive.<sup>10</sup> (Veneziani (2004: 106) accepts that this result is "algebraically correct.") It follows that surplus labor and real profit, as understood by the TSSI, *must always* have the same sign.
- (b) The temporalist MELT is the ratio of total price,  $P$ , to total value in labor-time terms. Thus the MELT exists only when value is produced, i.e., only under commodity production. The subsequent steps of the proof thus presuppose the existence of commodity production.
- (c)  $L$  is always positive under commodity production (as the latter is defined by Marx).
- (d) *Proof that  $P > 0$ ,  $C > 0$  under commodity production.* Free goods are not commodities. Hence, if commodities are produced, it is not the case that all goods actually produced are

free. Hence,  $P \neq 0$  under commodity production. Moreover, negative prices “exist” in economic theory only by virtue of a definitional quirk. The statement that trash has a negative price, for example, really means that its “buyer” is the seller of a positively priced trash collection service. Thus any price that has wrongly been designated “negative” can be made positive by reinstating the buyer and seller in their correct positions. Since all prices are therefore non-negative, as are all gross outputs,  $P$  is non-negative as well. And since  $P \neq 0$  under commodity production, it follows that  $P > 0$ . Moreover, physical inputs cannot be negative, and this, together with the non-negativity of all prices, implies that  $C > 0$ .

(e) *Proof that the temporalist MELT is initially positive and finite.* By definition, the price of any item—commodity or other asset—equals  $\tau$  times the amount of labor the item commands in exchange:

$$\text{price} = \tau \times (\text{labor commanded}) \quad (13)$$

Also by definition, the “price” of a unit of money equals 1. Thus, on any date arbitrarily selected as “time 0,”

$$1 = \tau(0) \times (\text{labor commanded by a unit of money at time 0}) \quad (14)$$

And since a unit of money commanded a positive and finite amount of labor on any such date—since, i.e., one could buy a positive and finite amount of products of labor with it—it follows that  $\tau$  was initially positive and finite as well.

It might be argued that money did not initially command any labor that *counted as value*, since the products in existence at the start of commodity production were not produced as commodities. Under this interpretation of Marx’s theory, the inputs employed at the start of commodity production did not transfer value to the products

produced. Hence the total value of commodities (in terms of labor-time) was at first just the living labor extracted, a positive quantity. As demonstrated above, total price was also positive. Hence the initial MELT, the ratio of total price to total value, was positive as well.<sup>11</sup>

(f) It follows from paragraphs (c), (d), and (e) that the conditions given in paragraph (a) for the temporalist MELT to always be positive, are satisfied. Hence the temporalist MELT has always been and will always be positive. Hence surplus labor is necessary and sufficient for positive real profit, according to the TSSI. This conclusion replicates Marx's.<sup>12</sup>

#### **6. TSSI Disproofs of the Okishio Theorem**

The Okishio (1961) theorem was long thought to have disproved Marx's law of the tendential fall in the rate of profit, by showing that labor-saving technological changes adopted by profit-maximizing capitalists cannot cause the equilibrium rate of profit to fall. But numerous TSSI works have refuted the theorem (see Kliman 2007, chap. 7).<sup>13</sup>

From a logical point of view, Veneziani's critique of these refutations is an advance over earlier ones. Laibman (1999a, 1999b, 2000), Foley (1999), and others (in unpublished works) had put forward examples which showed, on the basis of the theorem's premises, that labor-saving technological changes *need not always* cause the rate of profit to fall. Yet since the theorem states that such technological changes *cannot ever* cause the rate of profit to fall, the exhibition of even a single falling-rate-of-profit example is sufficient to refute it. Subsequent rising-rate-of-profit examples are irrelevant, as Veneziani (2004: 109) recognizes.<sup>14</sup> Thus, instead of offering such an example, he tries to demonstrate that the temporalist refutations of the

Okishio theorem are not “robust[ ]”: that they depend crucially upon scenarios that are impossible, or almost impossible.

### 6.1 The Constant-MELT Critique

Two of Veneziani’s objections (Veneziani 2004: 110–11, numbers 3 and 4) are criticisms of the assumption in Kliman (1996) that the MELT remains constant. Veneziani suggests that this assumption plays a critical role in the temporalist refutation of the Okishio theorem. Once the constant-MELT assumption is relaxed, the TSSI supposedly produces results that support, rather than contradict, the theorem.

In an attempt to demonstrate this, Veneziani (2004: 110) shows that if the MELT and labor productivity both grow at the same constant percentage rate, then in the long run the temporally determined rate of profit will converge upon Okishio’s physicalist rate of profit. So what? Veneziani does not bother to tell us, but his point is evidently that, since Okishio’s rate of profit cannot fall as a result of “viable” technical change, the convergence of the temporally determined rate of profit upon Okishio’s rate implies that the former also cannot fall if the MELT and labor productivity both grow at the same constant percentage rate.

In fact, however, the convergence result implies the very opposite. Veneziani assumes that the labor-time value of the commodity is initially constant. Thus, if the MELT increases at a constant rate, the money price of the commodity is initially *increasing*. But this implies that the monetary rate of profit is initially *higher* than Okishio’s physicalist rate of profit (since the latter is the rate of profit that would exist if the commodity’s price were constant). So the fact that the monetary rate of profit converges upon Okishio’s rate actually implies that the monetary rate *falls* over time in relation to Okishio’s rate. If this fall more than offsets the rise in Okishio’s rate

that results from technical progress, then the monetary rate of profit will fall over time even though his rate of profit rises.

Anyone can make a mistake, but once again, the question is: why did Veneziani not bother to check his results, and why did *Metroeconomica* and Steedman not catch his error before hurrying to publish and endorse a faulty argument that “put the TSSI in its place”?

Owing to the importance of the issue under discussion here—the possibility of a decline in the monetary rate of profit despite a continuously increasing MELT, under conditions in which the Okishio theorem claims that “the” rate of profit must rise—we shall now consider a simple numerical example in order to check a result that was not checked before publication. Let us examine the simplest case possible: a one-sector (“corn”) economy, without fixed capital, in which all of the year’s output is invested, planted as seed corn at the start of the next year. (See Table 1.) Since all output becomes seed, the farmworkers and farm owners consume none of it.

**Table 1. Physical Quantities**

Year	<i>SC</i>	<i>NP</i> = <i>PS</i>	<i>CO</i> = <i>SC</i> + <i>NP</i>	<b><i>ROP</i> =</b> <b><i>PS/SC</i></b>	<i>LL</i>
1	64	16	80	<b>25.0%</b>	80
2	80	20	100	<b>25.0%</b>	100
3	100	30	130	<b>30.0%</b>	100
4	130	45	175	<b>34.6%</b>	100

Because fixed capital and wages are assumed away in this example, the seed corn (*SC*) is the whole of the capital advanced in physical terms, and the physical surplus (*PS*) equals the net product (*NP*)—corn output (*CO*) minus seed corn. Thus Okishio’s physical rate of profit (*ROP*) equals the net product divided by the seed corn.

Let us also assume that, between Years 1 and 2, the seed corn, the output, and the amount of living labor ( $LL$ ) performed by the farmworkers all increase by 25%. The economy is growing, but there is no productivity growth. Output per unit of living labor and output per unit of corn input both remain unchanged. Given the physical quantities of Year 1 presented in Table 1, the figures for Year 2 follow from the assumption of 25% growth.

In Years 3 and 4, technological progress commences. The net product now increases by 50% per year, while employment no longer increases—100 hours of living labor are performed each year. Output per unit of living labor (“labor productivity”), output per unit of seed corn (“capital productivity”), and the ratio of seed corn to workers (the technical composition of capital) all rise in Years 3 and 4. (The seed corn figures for Years 3 and 4 are based on our assumption that all output is invested as seed; for instance,  $CO = 100$  in Year 2, so  $SC = 100$  in Year 3.)

Of course, this is an extremely unrealistic set of assumptions. We do not pretend to be modeling the process of accumulation in any actual economy here, but employ these assumptions to establish the logical point at issue: that our disproof of Okishio does not depend on the assumption of a constant MELT.<sup>15</sup>

Let us begin with the constant-MELT case. If we assume that the MELT is \$1/hr, the new value added by living labor ( $NV$ ) is always equal to the living labor ( $LL$ ) figures of Table 1, and the nominal price of corn,  $p$ , equals its value,  $v$ . The resulting flow of value is given in Table 2.

The value/price rate of profit is initially equal to the physical rate, and the two rates remain equal as long as productivity is not growing. Once technological progress occurs, however, the value/price rate of profit falls, even though Okishio’s physical rate rises.

**Table 2. Temporalist Value/Price Rate of Profit,  
Given the Law of Value & Constant MELT**

Year	$p_{in}$ = $v_{in}$ *	$C = c$ = $VT$ = $p_{in} \times SC$	$NV =$ $LL = s$	$TV =$ $VT + NV$	<b>ROP</b> = $s/C$	$p_{out} = v_{out}$ = $TV/CO$
1	5.000	320	80	400	<b>25.0%</b>	5.000
2	5.000	400	100	500	<b>25.0%</b>	5.000
3	5.000	500	100	600	<b>20.0%</b>	4.615
4	4.615	600	100	700	<b>16.7%</b>	4.000

\* The input price equals the prior year's output price. Year 1's input price is given.

It is tempting to assume that the nominal (i.e., monetary) rate of profit has declined here only because the MELT is constant, so that the nominal price of corn falls together with its value. Yet this is not the case. Imagine that the price of corn rises by 10% year after year. This year's output sells for 10% more than it would have sold for last year, but the seed corn advanced at the start of the year also costs 10% more than it would have cost last year. The rate of profit—the ratio of sales to costs, minus 1—is consequently the same whether we use this year's or last year's prices to value the seed corn and output. In other words, a constant rate of inflation leaves the rate of profit unchanged.

What affects the nominal rate of profit is therefore not inflation per se, but *changes* in the rate of inflation. A rising rate of inflation causes sales revenue to increase by a greater percentage than costs increase, and thus the nominal rate of profit rises. Conversely, when the rate of inflation is falling, sales revenue increases by a smaller percentage than costs, causing the nominal rate of profit to fall. *What matters is not whether prices are rising or falling—i.e., whether the rate of inflation is positive or negative—but whether the rate of inflation is rising or falling.*

Hence, productivity growth need not lead to deflation, falling prices, in order to cause the nominal rate of profit to fall. It needs to lead to disinflation, a falling rate of inflation. If this occurs, then the nominal rate of profit, just like the real value rate, must fall in relationship to the physical rate of profit, regardless of whether prices are rising or falling. Unless the physical rate rises by an amount sufficient to offset this effect, both the nominal and the real value rates of profit will decline in absolute terms as well.

The point can also be expressed in the following way. A rising MELT does not cancel out the tendency of the rate of profit to fall. The rate of inflation is approximately equal to the growth rate of the MELT plus the growth rate of values.<sup>16</sup> Thus if the MELT grows at a constant rate, but values fall at an increasing rate as a result of a rising rate of productivity growth, the rate of inflation must decline, and the nominal rate of profit will tend to fall.

It is of course possible, in principle, that that the growth rate of the MELT will accelerate, canceling out or more than canceling out this effect. However, there is no inherent reason that it should do so.<sup>17</sup> A rising MELT reflects built-in or exogenous inflation, inflation that arises because of factors other than productivity growth.

To see this more clearly, let us imagine along with Veneziani that the MELT increases at the same rate as labor productivity (net product per unit of living labor) increases beginning in Year 3, which is 50% per year. Since the MELT equals 1 at the start of Year 1, for instance, it equals 1.5 at the end. Instead of the constant-MELT prices of Table 2, now have the new prices of Table 3 that reflect this 50% growth. (The nominal prices equal the values of Table 2 times the MELT. To obtain the total value figures, we multiply the corn output figures of Table 1 by the output price and, to obtain the nominal value added, we subtract the sum of value transferred from the total value.)

**Table 3. Temporalist Value/Price Rate of Profit, Given the Law of Value & 50% Annual Growth of MELT**

Year	$p_{in}^*$	$C = c$ $= VT =$ $p_{in} \times SC$	$NV =$ $s =$ $TV - VT$	$TV =$ $p_{out}$ $\times CO$	<b>ROP</b> $= s/C$	$MELT_{out}$	$p_{out} =$ $MELT_{out}$ $\times v_{out}$	Rate of Inflation $(p_{out} - p_{in})/$ $p_{in}$
1	5.000	320	280	600	<b>87.5%</b>	1.500	7.500	50.0%
2	7.500	600	525	1125	<b>87.5%</b>	2.250	11.250	50.0%
3	11.250	1125	900	2025	<b>80.0%</b>	3.375	15.577	38.5%
4	15.577	2025	1519	3544	<b>75.0%</b>	5.063	20.250	30.0%

\* The input price equals the prior year's output price. Year 1's input price is given.

Through Year 2, there is no productivity growth, so the value of corn remains constant. Thus the nominal price of corn increases at the same rate as the MELT, 50%. This is exogenous inflation, unrelated to productivity growth. Once productivity growth commences in Year 3, the exogenous 50% inflation persists, but the falling value of corn partially offsets this effect, causing the overall rate of inflation to decline. However, the MELT rises more rapidly than the value of corn falls, so the nominal price of corn rises continually; the overall rate of inflation remains positive.

Although the *level* of the nominal rate of profit is significantly greater than the level of the real value rate of profit given in Table 2, its *trend* is essentially the same. Both rates are constant through Year 2, and both fall once productivity growth begins. The reason why both rates of profit fall is that, as we stressed above, the rate of inflation falls both when the MELT is constant and when it increases at a constant percentage rate. That the price of corn falls in one case and rises in the other is irrelevant.

The exact relationship between the nominal and real rates is

$$1 + r_{nom} = (1 + g_m)(1 + r_{real}) \quad (15)$$

where  $r_{nom}$  and  $r_{real}$  are the nominal and real rates of profit and  $g_m$  is the growth rate of the MELT. In Year 1, for instance, we have  $1.875 = (1.5)(1.25)$ , while in Year 4 we have  $1.75 = (1.5)(1.167)$ .<sup>18</sup> Thus, if the MELT increases at a more or less constant rate, the nominal price rate of profit will closely track the real value rate. Whether the *level* of the MELT is constant or not makes no difference.

Finally, let us consider what would happen if the above scenario were to persist throughout time, so that the MELT and labor productivity both continue to grow by 50% per year, and all corn output continues to be re-invested as seed corn. The answer is that Okishio's physical rate of profit, which started at 25%, would converge upon 50% by continuing to *rise*, while the nominal rate of profit, which started at 87.5%, would converge upon 50% by continuing to *fall*. So although Veneziani is correct that the monetary rate of profit eventually converges on Okishio's rate when the MELT rises at the same rate as labor productivity, we see that this result definitely does not mean what he suggests it means. It does not prevent the nominal rate of profit from falling under conditions in which Okishio's rate rises, and thus it does not undermine, but further confirms, the temporalist refutation of Okishio's theorem.

## 6.2 An Implausible, Singular Case?

Veneziani (2004: 109, emphasis in original) also contends that "Kliman's (1996) conclusions may have some analytical support *only* in the implausible, singular case" that Kliman assumed, the case in which the amount of living labor needed to produce a unit of output approaches zero over time. Actually, any other assumption is implausible, since *any other assumption implies that labor productivity cannot increase beyond a certain point*. The amount of living labor

required to produce a unit of output is no more than the inverse of labor productivity. If 1 unit of labor produces  $y$  units of some output, then the “amount of living labor required to produce a unit of output” is  $1/y$ . To assert that this magnitude,  $1/y$ , approaches indefinitely close to zero, is simply to assert that  $y$  rises without limit. This is a nearly trivial mathematical result and it is astonishing that it has escaped Veneziani’s attention. If he wishes to deny this assumption or brand it as “arbitrary,” he must in fact assert that there is an absolute upper limit to the productivity of labor, an assertion without theoretical foundation and for which there is no empirical evidence.

Suppose that Veneziani were right, and that, for example, the amount of labor needed to produce a unit of output continually falls over time from 1000 hours to 1 hour, but cannot decline any further. In that case, an hour of labor can never yield more than 1 unit of output—not now, and not at any time in the future.

This is precisely what Veneziani (2004: 110) assumes in an attempt to prove that the temporally determined rate of profit approaches the physical “rate of profit” of the Okishio theorem. This *assumption* is what produces his “proof.”

In his example, labor productivity is initially equal to  $1/(l_1 + l_2)$ , and it asymptotically rises to  $1/(l_1)$  over time. But it is never, ever allowed to exceed  $1/(l_1)$ . Putting the same point differently, *the rate of growth* of labor productivity in Veneziani’s example declines continually over time and asymptotically approaches zero. It is *this case that is implausible and singular*. There is certainly no evidence that the level of aggregate productivity has ever run up against such an insurmountable barrier.

### 6.3 Capitalist Investment Criteria

Veneziani's (2004: 109) remaining objection (number 1) is that Kliman (1996) assumed that capitalists are "compelled to invest according to a fixed rule, regardless of what happens to the price of output and to the profitability of investment." He does not elaborate further, and his point is unclear. If he is claiming that Kliman assumed that capitalists introduce new technologies regardless of profitability considerations, he is incorrect. Kliman (1995: 219) employed the Okishio theorem's own decision rule: they introduce those new technologies that will boost their rates of profit if prices and the real wage rate remain constant.

Yet Veneziani may be suggesting that if the rate of profit falls, capital accumulation will slow down, which in turn will cause the rate of profit to rise. This is quite possible, but it is difficult to see how it affects "the robustness of TSS results" (Veneziani 2004: 109). Slower accumulation causes a slowdown in productivity growth, and the latter slowdown is what leads to the subsequent rise in the rate of profit. There is nothing here to support the notion that the rate of profit is physically determined; once again, the rate of productivity growth and the rate of profit tend to move in *opposite* directions, contrary to what the physicalist critics of Marx claim to have proved. Moreover, the cyclical behavior of the rate of profit accords with Marx's (1991, Ch. 15, esp. pp. 362-64) law of the tendential fall in the rate of profit.

### 7. Conclusion

This paper has been written as a contribution to the movement for pluralism in economics. By means of a particular case study, we have sought among other things to illustrate the extent to which scholarly standards in economics can break down when the effort of a more entrenched and powerful school to put a less entrenched and powerful one in its place is allowed to go

unchecked. We believe this problem is a general one that the movement for pluralism in economics needs to address.

We also believe that this case study indicates the need for greater clarity about what is meant by pluralism. An analogy between “equal rights” and “pluralism” may be helpful here. Some would argue that, if the law treats rich and poor alike, it affords them equal rights. However, we think Anatole France was correct when he suggested that the “majestic equality” of laws which “forbid the rich as well as the poor to sleep under bridges, to beg in the streets, and to steal bread” is actual a parody of equality. By the same token, some would argue that, since Veneziani has had his say, and we have had our say, the present debate has been pluralistic. However, we think that a “pluralism” which allows a more dominant school of thought to level a host of egregiously incorrect criticisms against a less dominant one, and “allows” the latter school to devote much, if not most, of its limited time and resources to defensively replying to this host of unfounded criticisms, is actually a parody of pluralism. For genuine pluralism to exist, its proponents must attend to the need for, and attempt to enforce the use of, proper intellectual standards. This is particularly important in cross-paradigm discourse, especially where the disparities between the contending schools’ power and resources are significant. Unless proponents of pluralism are there to actively defend proper intellectual standards, what the members of the more powerful school “know in their guts”—i.e., truthiness—is likely to prevail.

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## Notes

<sup>1</sup> We wish to thank two anonymous referees for their helpful comments on a prior draft of this paper. Any remaining errors are our responsibility.

<sup>2</sup> Merriam-Webster Online, [www.m-w.com/info/06words.htm](http://www.m-w.com/info/06words.htm). (July 8, 2007). “Truthiness,” a term that Colbert takes credit for coining, was voted “Merriam-Webster's #1 Word of the Year for 2006.”

<sup>3</sup> Steedman is referring to an unpublished draft of Veneziani’s work. Veneziani (2004) is a revised version of part of that paper, and Veneziani (2005), which deals with a single paper by Freeman (1996), is a revised version of most of the rest. Owing to space limitations, we shall deal only with Veneziani (2004) here.

<sup>4</sup> Other critiques of the TSSI, most of which also suffer from this problem, we believe, are discussed throughout Kliman (2007).

<sup>5</sup> The interior quote is from Kliman and McGlone (1999: 43).

<sup>6</sup> The MELT is the amount of value, expressed in money terms, that is equivalent to a unit of labor. Thus if an hour of labor creates \$100 of new value, the MELT is \$100/hr.

<sup>7</sup> “No unique time path can be determined ... unless the value of the constant [of integration]  $c$  can somehow be made definite. To accomplish this, additional information must be built into the model, usually in the form of what is known as an *initial condition* or *boundary condition*” (Chiang 1974: 429, emphases in original). “Solving a differential equation gives rise to a *family*

of functions. Specifying an initial condition is a natural way to specialize down to a particular solution” (Krantz 2005: 34, emphasis in original).

<sup>8</sup> Recall that  $\mathbf{p}^S$  is a vector of *market prices*, not prices of production. Hence uniform profitability cannot be assumed. It is indeed peculiar to assume that a steady state exists even though profit rates may be unequal, but it is Veneziani’s assumption, not ours.

<sup>9</sup> Since the profit rate,  $r$ , is the ratio of profit to capital advanced and  $\mathbf{p}_t(\mathbf{A} + \mathbf{b}_w\mathbf{I})$  is the vector of capital advances per unit of output, the right-hand-side of (3) is the vector of profits per unit of output.

<sup>10</sup> The proof also goes through when  $C = 0$ . Note also that any time can be chosen as time 0. Thus if the MELT is positive at *any* time, it must be positive forever after.

<sup>11</sup> Thus the temporalist MELT differs from the simultaneist MELT, which is the total price of the net product divided by the living labor performed, where the net product of any commodity is the gross output of the commodity minus the amount of it that is used up as an input into production. The “total price of the net product” is therefore a simultaneist notion, since it values inputs and outputs at the *same* set of prices, and since it does not recognize that the MELT applicable to the inputs differs from the MELT applicable to the outputs that emerge later. See Kliman (2001) for further discussion of this issue.

<sup>12</sup> After this paper was written, Mohun and Veneziani (2007) published a critique of the above proof. See Kliman and Freeman (2008) for our reply.

<sup>13</sup> Much of this section of the paper was published, in slightly different form, in Kliman (2007, chap. 7).

<sup>14</sup> In contrast, Rieu (2009) seems not to understand the elementary logical point that any counter-example is sufficient to disprove a theorem. In the Abstract of his paper, he writes, “The TSSI’s refutation of the Okishio theorem requires not only changes in the definition of the rate of profit but also an arbitrary assumption about the time paths of labour productivity and prices. An ad hoc assumption about price changes used to disprove the Okishio theorem is meaningless because the aim of Marx’s economics was to explain capitalist exploitation and accumulation without resorting to exogenously given changes on the market.” Since we have not yet had the opportunity to read the full text of Rieu’s critique, which appeared after we completed the present paper, we shall not say more about it here, but we hope to respond to it in the future.

<sup>15</sup> For a counter-example that disproves Okishio’s theorem in a case in which wages are positive and two different products are produced, see Kliman and McGlone (1999). However, even though the present example assumes a zero real wage rate, it too serves to disprove the theorem, since the latter only assumes that the real wage rate remains constant, not that it is positive. Okishio (1961) did acknowledge that viable technical changes can result in a fall in the maximum rate of profit, but only in order to stress that the *actual* rate must nevertheless rise or remain constant. When the real wage rate is zero, the maximum rate of profit equals the actual rate, and the theorem therefore implies that neither can fall. That claim is disproved below.

<sup>16</sup> If  $A = B \times C$ , the growth rate of A is approximately equal to the growth rate of B plus the growth rate of C. Since the level of prices equals the MELT times the level of real values, it

follows that the growth rate of prices, i.e. the inflation rate, is approximately equal to the growth rate of the MELT plus the growth rate of real values.

<sup>17</sup> Even if the growth rate of the MELT does increase enough to cancel out the tendency of the nominal rate of profit to fall, it does not follow that the law of the tendential fall in the rate of profit has been negated. If the accelerating growth of the MELT is caused by rising government debt burdens and overextension of credit, it may well be that the crisis tendencies resulting from productivity growth are displaced, but not negated.

<sup>18</sup> It can be shown that this relationship holds true in all cases in which there is no fixed capital, and that a similar relationship obtains when fixed capital is present.