THE OKISHIO THEOREM: AN OBITUARY

Andrew Kliman

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I. Introduction

Karl Marx (1973:748) considered the law of the tendential fall in the profit rate (LTFPR) to be "in every respect the most important law in modern political economy, and the most essential for understanding the most difficult relations." However, the Okishio theorem (Okishio 1961) is generally thought to have refuted this law on logical grounds, in a manner "so devastating that it deprives all arguments (pro and contra) ... of their relevance" (Parijs 1980:9). In other words, it is commonly accepted that Okishio's and subsequent versions of the theorem have shown it to be impossible for profit-maximizing capitalists to adopt labor-saving innovations that cause the equilibrium (uniform) rate of profit to fall.

Much of the subsequent literature has shown, not surprisingly, that by altering one of the theorem's premises, one can derive a fall in the profit rate. If the theorem were true, this would indeed be the only way to derive a falling profit rate. And because the theorem is widely accepted as true, the counter-demonstrations put forward by proponents of the "temporal single-system" interpretation of Marx's value theory (Ernst 1982; Kliman 1988, 1996; Freeman 1996) are - when they are acknowledged at all - commonly regarded as alternative "models" which, like the rest of the literature, alter some premise of the theorem in order to arrive at different results.1

The task of the present paper is to show that, on the contrary,

(a) the Okishio theorem has not been proven;

(b) the TSS counter-demonstrations are genuine refutations, negating the conclusions of the theorem without altering any of its stated premises; and

(c) when the theorem's actual results are stated in a valid manner, they do no damage to the logic of Marx's LTFPR.

My claim, it should be noted, is not that the theorem suffers from a mathematical error. The relevant matrix algebra theorem of Perron and Frobenius, upon which the Okishio theorem is based, is true. Rather, the problem is a disjunction between the actual implication of the mathematics and the economic conclusions which proponents of the Okishio theorem draw from it, namely that if a uniform rate of profit is re-established after a cost-reducing technical change, this profit rate cannot be lower than the initial one. To see this, it will help first to review the theorem briefly.

II. The Okishio Theorem

Because I have claimed that the TSS critiques negate the conclusion of the Okishio theorem without altering any of its premises, it is important to identify which features of the theorem are premises and which are conclusions.

No existing version of the theorem fully spells this out, but I believe the following is faithful to the intentions of the theorem's proponents. The theorem begins from the following premises:

(i) an n-industry capitalist economy

(ii) single-product industries only

(iii)no nonproduced means of production other than labor are used

(iv)the real wage rate is equalized and constant

and an initial state of the economy is considered, in which

(v) initial unit prices are stationary (input and output prices are equal),

and

(vi)the profit rate is equalized across industries.

The next premise, in the no-fixed-capital case,[2] is that

(vii)a new technique will be adopted if and only if it reduces cost per unit of output, when costs are evaluated at current prices,

and the final premise is that

(viii)the profit rate is re-equalized after the adoption of such a new technique.

From these eight premises, proponents of the Okishio theorem use the Perron-Frobenius theorem to draw the following conclusion: the post-innovation profit rate cannot be lower than the initial one, and must be greater than the initial one if the technical innovation occurs in a "basic" industry.

III. The Missing Proof

Let us use r to denote the initial profit rate, and r* to denote that profit rate which proponents of the theorem call the post-innovation profit rate. It is indeed true that r* cannot be lower than r, and that it must be greater than r if the technical change has occurred in a "basic" industry. This much is implied by the Perron-Frobenius theorem. Yet it is insufficient to support the conclusion above. How do we know that r* will be the economy's actual post-innovation uniform profit rate?

The typical answer to this question, and the one which presumably underlies the belief that the Okishio theorem has been proven, is that technical and real wage coefficients, together with the stipulation that the profit rate is equalized across sectors, suffice to determine a unique rate of return on capital advanced. Thus, r* is repeatedly referred to as "the general rate of profit" by Okishio (1961: 90, 93, 99, emphasis added) and as "the equilibrium" profit rate by Roemer (1978:153, 154, emphasis added), implying that if profit rates are equalized across sectors, the level of the uniform profit rate is uniquely determined by physical coefficients. And since premise (viii) stipulates that profit rates are indeed equalized after the technical innovation, then supposedly r* must be the post-innovation profit rate.

Yet, contrary to the apparent belief of the proponents of the Okishio theorem (and most readers of Dmitriev and Sraffa), it is simply not true that the magnitude of the uniform profit rate is uniquely determined by physical input/output coefficients. To demonstrate this crucial point, let us turn to the example in which Sraffa (1960:7) supposedly proves that the uniform profit rate is uniquely determined. He posits the following input/output relations:

> 280qr. wheat + 12 t. iron -> 575 qr. wheat
>
> 120qr. wheat + 8 t. iron -> 20 t. iron

and immediately concludes:

The exchange-ratio which enables the advances [on the left-hand sides] to be replaced and the profits to be distributed to both industries in proportion to their advances [so that the rate of return on capital advanced is equalized] is 15 qr. of wheat for 1 t. of iron; and the corresponding rate of profits in each industry is 25%.

To obtain 15:1 as the unique exchange ratio, Sraffa implicitly assumes that the exchange ratio between wheat and iron at the time of input is equal to the exchange ratio at the time of output. This will not necessarily be the case, but even if it is, the uniform profit rate is not uniquely determined by the data above, as we shall see presently.

Letting P_{wt} and P_{it} be the input prices, and P_{wt+1} and P_{it+1} be the output prices, of wheat and iron, respectively, Sraffa's exchange ratio implies that $P_{it} = 15 P_{wt}$ and that $P_{it+1} = 15 P_{wt+1}$. The rate of return on capital advanced in the wheat sector is therefore

$$(575 P_{wt+1})/(280 P_{wt} + 12 P_{it}) - 1 = (575 P_{wt+1})/(280 P_{wt} + 180 P_{wt}) - 1$$

$$= 1.25(P_{wt+1}/P_{wt}) - 1$$

and the rate of return on capital advanced in the iron sector is

$$(20 P_{it+1})/(120 P_{wt} + 8 P_{it}) - 1 = (300 P_{wt+1})/(120 P_{wt} + 120 P_{wt}) - 1 = 1.25(P_{wt+1}/P_{wt}) - 1.$$

The constant exchange ratio of 15:1 thus guarantees that the two rates of profit are equal. Yet the level of the equilibrium profit rate is still not determined. It depends as well on the ratio of the output to the input price of wheat, and it can vary, theoretically, from -100% to + ()()

Hence, if we imagine this to be the post-innovation profit rate, it can in principle always be lower than the pre-innovation rate, if P_{wt+1}/P_{wt} is sufficiently small. If, for instance, the pre-innovation rate was 20%, the post-innovation rate will be lower if $P_{wt+1}/P_{wt} < 0.96$.

In general, then, the magnitude of profit rates, even the magnitude of profit rates that are constrained to be equal, depend on the relationship between output and input prices. The Okishio theorem's r* is therefore simply one particular post-innovation profit rate among an infinite number of possible uniform rates, a rate that corresponds to one particular set of input and output prices. Specifically, r* is that particular uniform profit rate which corresponds to the case in which post-innovation input and output prices are equal. Not only does the establishment of r* as the profit rate require that relative input prices equal relative output prices - that was the case in the example above, and it was shown that this stipulation was insufficient to fix the level of the profit rate - but the absolute prices of commodities must be equal as inputs and as outputs. In other words, it is only by implicitly constraining the output price of wheat to equal its input price (and thereby similarly making the ratio of the output and input prices of iron equal unity) that Sraffa obtains 25% as the unique rate of return on capital advanced, and that proponents of the Okishio theorem obtain r* as the post-innovation profit rate.

Our original question -- how do we know that r* will be the economy's actual post-innovation uniform profit rate? -- can thus be restated as: how do we know that the absolute magnitudes of post-innovation input and output prices will be equal? Unless they are equal, r* will not be the actual post-innovation profit rate, even if profit rates are equalized. Authors who have attempted to prove the Okishio theorem show little recognition of this difficulty. The equality of post-innovation input and output prices is never stated explicitly as a premise of the theorem, nor is it ever proven within the theorem. But since it is absolutely necessary to the theorem's conclusion, the theorem remains unproved.

The problem appears to be that the proponents of the Okishio theorem, along with almost all the post-Sraffa literature, seem simply to have taken for granted that input and output prices must be equal if profit rates are to be equalized. In the passage quoted above, Sraffa (1960:7, emphasis added) speaks of "The exchange-ratio" which permits a uniform rate of return on capital advanced. Actually, exchange ratios of inputs and outputs can differ even with a uniform rate of return; yet, as we have seen, even if they are the same, the level of the rate of return depends on absolute prices, not only relative prices (exchange ratios).

In one of his presentations of the Okishio theorem, Roemer (1978) did evince some awareness that the validity of the theorem depends on the adjustment of post-innovation prices to a stationary state. Employing a two-sector example with the technical change having taken place in sector 1, he wrote the profit rate will immediately rise in sector 1. This will encourage more firms to enter sector 1 from sector 2; prices will be cut in competition and eventually a new equilibrium tableau will emerge [... so that] cost-reducing technical innovations give rise, eventually, to a rise in the equilibrium rate of profit in a competitive situation (Roemer 1978:154, emphases added).

This passage shows clearly that Roemer did not regard the establishment of a stationary post-innovation price vector as a premise of the theorem, but rather as a result of a dynamic adjustment process in which capital flows in search of the highest rate of return and competition leads to adjustments in prices. Instead of proving that the "equilibrium tableau," in which prices are stationary and r* is the uniform profit rate, "will emerge," however, he merely asserted it. Apparently he believed that proof was not required because he shared the common, albeit erroneous, belief that if an equalized rate of profit was to re-emerge after the technical innovation (premise (viii)), this would immediately entail that prices had adjusted to a stationary state.

For the sake of maximum clarity, let me stress again that the issue is not whether it has been shown, or can be shown, that profit rates will actually equalize after the adoption of a technical change. Though investigations into the dynamic stability of the Sraffian model have yielded ambiguous conclusions in this regard (see, e.g., Duménil and Livy, 1993), the Okishio theorem is restricted, and commonly understood to be restricted, to cases in which a uniform rate of profit is indeed re-established.[3] Rather, the issue is whether the capital mobility that tends to equalize rates of return on capital advanced also leads to the establishment of stationary absolute prices. I know of no evidence that this is the case, nor of any simulation that shows it to be generally true, nor even of any theoretical argument that supports it.[4]

IV. The TSS Interpretation

The TSS interpretation of Marx's value theory has been "discovered" numerous times by theorists working independently of one another.[5] It differs from the standard interpretation in two seemingly minor but crucial ways. According to the standard interpretation, Marx's values and prices are two separate and timelessly determined "systems." According to the TSS interpretation, they are determined within historical time, and interdependently: output prices depend on the "value" rate of profit (surplus-value divided by the value of capital advanced), while the value of the capital advanced depends on the prices, not values, of means of production and subsistence.

This re-interpretation refutes all the allegations of logical inconsistency in the "quantitative" dimension of Marx's value theory. Total price and profit equal total value and surplus-value, the aggregate "value" and "price" rates of profit are equal, values cannot be negative and profits can be positive only if surplus-value is positive, the rate of profit in luxury industries affects the general rate and, what is most relevant to the present paper, labor-saving innovation itself can lead to a lower general (uniform or nonuniform) rate of profit (see Freeman and Carchedi, eds., 1996).

The TSS refutations of the Okishio theorem make use of the fact, emphasized above, that even if a uniform rate of profit is postulated, the level of the profit rate is not determined by physical coefficients alone; it depends also on the relation between input and output prices. Only when input and output prices happen to be equal to physical coefficients suffice to determine the level of the profit rate, otherwise one or another value theory is needed. The TSS refutations of the Okishio theorem employ Marx's value theory for this purpose.

Specifically, the rate of profit is computed in the following way. Both input and output prices are measured in

labor-time per unit of output or, equivalently, in money per unit of output if the monetary expression of value is assumed to be constant over time. Input prices are taken as given (determined in the previous period or stipulated as initial conditions in the first period), and they, together with the means of production and subsistence advanced, determine the value of the constant (C) and variable (V) capital advanced. New value added equals the amount of living labor (L) extracted in production (or its monetary expression, assuming the monetary expression of value is constant). Surplus-value (S) equals L - V, and the general profit rate equals S/(C+V).

This is a temporal profit rate because the input prices used to compute C and V need not equal the subsequent output prices, and because the general rate is fully determined as a result of the production process, before outputs are sold. It is a single-system profit rate because C and V depend on the prices, not the values, of means of production and subsistence. If the profit rate is assumed to be uniform, then the aggregate output prices of each sector, in the absence of fixed capital, are determined by marking up costs in accordance with S/(C+V). By dividing the aggregate output prices by the gross outputs of the various sectors, the unit output prices are obtained, and they become the input prices of the next period.

V. Refuting the Okishio Theorem

Note that no premise of the Okishio theorem precludes the employment of Marx's value theory for the purpose of determining prices or the profit rate. Indeed, if the theorem is to be an internal critique of the logic of Marx's LTFPR, as it is meant to be, and not merely a conflicting theory of the profit rate based on an alien value theory, it cannot preclude the employment of Marx's value theory in this context. Note, moreover, that if one is to determine whether the Okishio theorem is true, i.e., determine whether post-innovation input and output prices will necessarily become equalized and therefore whether r* will necessarily become the economy's actual uniform post-innovation profit rate, the employment of some value theory is simply unavoidable. As has been stressed above, physical data and a uniform profitability condition are insufficient to determine either prices or the rate of profit unless input and output prices are postulated a priori to be equal. To invoke such a postulate here would be to assume away the very problem under investigation.

Marx's value theory, as interpreted above, does imply that post-innovation prices reach a stationary state and therefore that the actual uniform profit rate converges on r* in the special case in which the labor-saving innovation is one-time-only. Thereafter, physical coefficients remain unchanged throughout all time. As is well known, if the profit rate is always uniform and physical coefficients remain constant, prices will converge to a stationary state.

What happens, however, if the innovation is followed by subsequent innovations before prices have time to approach the stationary state? Because labor-saving innovation reduces commodities' prices (measured in labor-time or in money prices that express constant quanta of value), continuous labor-saving innovation leads to continuous reductions in prices (on average).

And if prices are continually falling, output prices are always lower than input prices. This implies that the general rate of profit will be lower than r*, and it is thus possible for labor-saving technical changes to lower the profit rate, even if uniform profitability is assumed. All of this is possible, moreover, without violating any premise of the Okishio theorem. A simple example will illustrate this. Assume a two-sector economy with the following as the initial techniques:

6 t. iron + 24 hrs. living labor -> 30 qr. wheat

44 t. iron + 11 hrs. living labor -> 55 t. iron

These assumptions satisfy premises (i)-(iii). Premise (iv) is satisfied by assuming that the real wage per unit of living labor is a constant 0.2893 qrs. of wheat. Initial input prices of 2.3026 and 0.7829 for iron and wheat, respectively, ensure that, initially, absolute prices are stationary and profit rates are equal, satisfying premises (v) and (vi).

Now imagine that the output of both wheat and iron, and the input of iron into the production of each goods, all increase by 10% per period, and that the amount of living labor extracted increases by 1.2% per period in both sectors.

Because the new techniques of each period thus use no more iron, and less living labor, per unit of output, they are cost-reducing at current prices, thus satisfying premise (vii). Finally, assume that the profit rates of the two sectors are continually equalized, which satisfies the last remaining premise, premise (viii). Results are reported in Table 1. We see that the relative price of iron-to-wheat, P_{it}/P_{wt}, does converge to a stationary level, 4.00, and that the time path of the relative price converges on the time path of the hypothetical relative price, P_i*/P_w*. The latter is the relative price which would exist were absolute input and output prices equal. Yet the actual input and output prices

do not converge to a stationary state, but continually decline, and the ratio of the output price to the input price converges to 0.920 < 1 in both cases. Because the output prices are lower than the input prices, the actual profit rate, $S/(C+V)$, is lower than the hypothetical r^* and, whereas r^* rises monotonically from 22% to 25%, the actual profit rate falls monotonically from 22% to 15%.[6] Since all of the premises of the Okishio theorem were satisfied, while the conclusion that the post-innovation profit rate cannot be lower than the initial rate was negated, the Okishio theorem has been refuted. It is easy to come up with a multiplicity of similar counter-demonstrations, by varying the assumptions concerning the precise nature of the technical changes, the number of sectors, fixed capital, the size of the real wage, and so forth, in numerous ways. To refute the Okishio theorem, in other words, no particular model of technical change and accumulation is required. What is necessary is that the technical changes be labor-saving, that prices (measured in labor-time) fall when the amount of labor needed to produce the commodities falls, and that the innovations occur in rapid enough succession that convergence of prices towards a stationary state does not occur.

Table 1

t	P_{it}/P_{wt}	P_i*/P_w*	P_{it}	P_{wt}	$P_{it}+1/P_{i\,t}$	$P_{wt+1}/P_{w\,t}$	$S/(C+V)$	r^*
0	2.94	2.94	2.3026	.7829	1.000	1.000	22.0%	22.0%
1	2.94	3.02	2.3026	.7829	.985	.964	20.3	22.3
2	3.00	3.10	2.2670	.7548	.974	.950	19.3	22.6
3	3.07	3.17	2.2082	.7175	.966	.944	18.6	22.8
4	3.15	3.24	2.1336	.6772	.960	.940	18.1	23.0
5	3.22	3.30	2.0484	.6364	.955	.937	17.6	23.2
10	3.49	3.53	1.5689	.4500	.940	.929	16.4	23.9
15	3.66	3.69	1.1305	.3087	.932	.926	15.9	24.3
20	3.78	3.80	.7884	.2087	.928	.924	15.6	24.6
30	3.90	3.91	.3642	.0933	.924	.922	15.3	24.8
40	3.96	3.96	.1626	.0411	.922	.921	15.1	24.9
60	3.99	3.99	.0312	.0078	.920	.920	15.0	25.0
80	4.00	4.00	.0059	.0015	.920	.920	15.0	25.0

Note: P_i*/P_w* is the hypothetical iron-to-wheat price ratio that would exist were input and output prices equal.

In describing techniques, the preceding demonstration deals only with sectoral aggregates. It makes no assumptions concerning the techniques employed by the individual firms within each sector. It is therefore consistent with the demonstration to assume that it deals with the case in which there is only a single firm in each sector or, equivalently, with the case in which all firms in the sector employ the same techniques. Let us now assume this. What, then, does the demonstration reveal?

Because this is an example *without* fixed capital, if all firms in a sector employ the same technique, they all employ the most up-to-date, state-of-the-art technique. They begin from scratch each new period. Hence, no firm is technologically backward, or technologically advanced, relative to the others in the industry. This is true not only of existing firms, but of new entrants. Any new entrant into either sector in any period employs the exact same techniques as the existing firms, since better techniques are not yet available.

Therefore super-profit (surplus profit) does not exist here. That is, no firm, even new entrants, can obtain a higher rate of return than the average by having produced at a lower cost per unit. They have all, including new entrants, produced at the exact same cost per unit and therefore they all, including new entrants, obtain the exact same rate of return as the others. Hence, the fall in the actual profit rate, despite a constant real wage and a continuing series of Okishio-viable technical changes, simply *cannot* be attributed to the existence of technologically backward firms. The actual rate of profit is not the rate of profit obtained by the technologically backward firms only. Nor does the existence of technologically backward firms lower the general rate of profit below the rate obtained by the technologically most advanced firms. These explanations are false for the simple reason that, in this example, *all* the firms in the industry are "most advanced." Therefore the decline in the rate of profit pertains to them all. And therefore the decline in the rate of profit is a decline in the profit rate obtained by the technologically most up-to-date producer, employing the state-of-the-art technique.

There is no reason to believe, i.e., no textual evidence of which I am aware, that Marx's LTFPR refers to the tendency of the rate of profit received by the most advanced producers only. Rather, it refers to the tendency of the

general rate of profit, the weighted average of all the profit rates throughout the economy. But even if one has the opposite interpretation, or for some reason wishes to restrict the examination of the tendency of the profit rate to the profit rate obtained by the most advanced producers only, the example above demonstrates conclusively that their rate of return on capital advanced can fall, even when they employ Okishio-viable techniques and the real wage rate is constant.

VI. A Post-Mortem

Although the Okishio theorem is false, the exercise does enable us to draw some valid conclusions concerning the impact of technical change on the profit rate. The mathematics does demonstrate that r*, the particular hypothetical uniform profit rate which would exist were prices to reach a stationary state after a viable technical innovation, cannot be lower than the initial hypothetical rate r. Moreover, were technical innovation a rare "perturbation" of an otherwise stationary state, and not an ongoing phenomenon, then the convergence property of the uniform profit rate equations implies that the actual profit rate, if continually equalized, would converge to r*.

These conclusions, though valid, suggest very little about how labor-saving technical change will affect the tendency of the general profit rate in actual capitalist economies. Nor do they challenge the logic of Marx's LTFPR in the least. Even a cursory reading of the law immediately discloses that it refers to the impact of a continuing series of technical changes), and that these technical changes are held to lead to a continuing series of reductions in commodities' prices (given a constant monetary expression of value) (Marx 1981, Ch. 13; see, especially, pp. 318-19 and 332-33).

It has recently been suggested in private correspondence that the TSS critiques have not refuted the Okishio theorem, since it was meant all along to apply only to the case of one-time-only technical change or, alternatively, that the theorem was meant all along to be restricted to the special case in which post-innovation input and output prices are equal.7 I do not find these suggestions plausible; apart from the TSS literature, discussions of the Okishio theorem do not even raise these issues. It seems doubtful, moreover, that the theorem would have gained the prominence it has, or that it would have been so widely regarded as refuting Marx's LTFPR, had it been interpreted as being so restricted in scope.

In any case, none of this has the slightest bearing on whether the theorem is true or false. All that matters is whether its conclusion follows necessarily from the explicitly stated premises of the theorem. In no existing version of the theorem is it stated explicitly that only a single new innovation is permitted, nor that the equality of input and output prices is a premise. The theorem, as stated in all existing versions, is therefore false.

This should be acknowledged, and the excessive claims that have been made concerning the import of the theorem should be retracted, in print. It may turn out that readers will then still find the theorem significant, and perhaps even still regarding it as a challenge to the logical coherence of Marx's LTFPR. That is for them to decide. They cannot make that decision, however, unless and until the record is corrected. As long as the record is not corrected, moreover, those who seek to build upon Marx's own presentation of the LTFPR and to analyze current realities on its basis, will wrongly continue to be regarded as ignorant and as dogmatic apologists.

Unfortunately, nearly fifteen years have elapsed since the publication of the first TSS refutation of the theorem (Ernst 1982), and the record has yet to be corrected.

NOTES

1. This interpretation, which will be discussed below, is also known as "sequential non-dualist." The term "temporal single-system" was first used in Skillman (1995). Recently, Ramos (1996) has also challenged the Okishio theorem from a TSS perspective, focusing on the problem of changes in the money/labor-time relation brought about by technical change.

2. Roemer (1981) generalized Okishio's theorem to include fixed capital. For simplicity, I will abstract from fixed capital below, although the ensuing discussion applies equally to the fixed capital version of the theorem. The refutations of the theorem by Kliman (1988, 1996) and Freeman (1996) apply to both the circulating capital and fixed capital cases.

3. Apparently the rationale for this restriction is a passage in Capital III, in which Marx discusses why a profit-maximizing capitalist would voluntarily adopt innovations that lower the general profit rate, i.e., precisely the argument that the Okishio theorem re-examines. Marx (1981:373-74) argues that the innovating capitalist at first reaps superprofits (and thus raises his/her own profit rate), but that "competition makes the new procedure universal and subjects it to the general law [of value]. A fall in the profit rate then ensues - firstly perhaps in this sphere of production, and subsequently equalized with the rest - a fall that is completely independent of the capitalists' will." Given that the theorem is intended as a disproof of Marx's LTFPR, and not a claim concerning actual economies, it is reasonable for its scope to be restricted to the case of uniform profitability. Marx's reference here to the equalization of the rate of profit, however, is best understood as a reference to a tendency, not a static outcome.

4. The simulation models that investigate the dynamic stability of the Sraffian model do not address this issue at all, since they work with relative prices only. To guarantee that prices will be stationary throughout all time, neoclassical intertemporal equilibrium models need to assume not only perfect mobility of capital, but also perfect knowledge of the future, perfect futures' markets for all commodities, and no time preferences. Such

postulates are of course absent from Marx's LTFPR and from all versions of the Okishio theorem.

5. In addition to the TSS works already cited, see, for instance, Giussani (1991-92), Maldonado Filho (1995), and the contributions by Carchedi, de Haan, Freeman, and McGlone and Kliman in Freeman and Carchedi, eds. (1996).

6. The importance of the systematic divergence between these two profit rates, and the concomitant failure of the actual input and output prices to converge, cannot be overemphasized. It is commonly believed that the value, price, and profit magnitudes of the TSS interpretation differ from those derived from simultaneous equation models only during a "disequilibrium" dynamic adjustment process, so that the "true" magnitudes are those of the simultaneous equation models, which act as "centers of gravity" to which the actual magnitudes converge or around which they fluctuate. Results such as those above show the utter falsity of this belief.

7. These views have been put forward on the Outline of Political Economy List (OPE-L), a closed e-mail discussion list.

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