

# The aggregate neoclassical theory of distribution and the concept of a given value of capital: a reply

Heinz D. Kurz<sup>a</sup>, Neri Salvadori<sup>b,\*</sup>

<sup>a</sup> *Department of Economics, University of Graz, Graz, Austria*

<sup>b</sup> *Department of Economics, University of Pisa, Via C. Ridolfi 10, I-56100 Pisa, Italy*

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## Abstract

In this reply to Paola Potestio, it is argued that there are cases in which both the “supply” of and the “demand” for “capital” can be conceptualised in an economically meaningful way and used in the conventional long-period neoclassical manner to determine an equilibrium or to investigate the adjustment process towards it. This conceptualisation is based on strict assumptions. If, for the sake of the argument, we concede these assumptions, the critique of the theory that tries to generalise the determination of distribution in a simple one-good model, or “corn-economy”, to multi-good models can be safely founded on the possibility of reswitching and capital reversing, contrary to Potestio’s critique. © 2001 Elsevier Science B.V. All rights reserved.

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1. We should like to thank Paola Potestio (1999) for her careful critical remarks on Chapter 14 of our book *Theory of Production* (Kurz and Salvadori, 1995) which deals with “The neoclassical theory of distribution”. In the chapter, we summarize some criticisms levelled at that theory in the various forms in which it has been put forward. The emphasis is on the long-period, or traditional, variant of that theory,

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\* Corresponding author. Tel.: +39-050-945215.

E-mail address: nerisal@ec.unipi.it (N. Salvadori).

although the more recent temporary and intertemporal equilibrium versions of it are also discussed. One of the underlying themes of our argument is that a theory that attempts to determine income distribution in terms of the demand for and the supply of the respective factors of production must not only show the existence of a factor market equilibrium, but in addition it must show that the equilibrium under consideration is *stable*. This was well understood by major neoclassical authors. Therefore, we thought it advisable to focus attention on the question whether the traditional neoclassical view, which is informed by the properties of a simple one-good or “corn economy” (corn serves both as a consumption good and, as seed, as a capital good), carries over to systems in which there are many ( $n$ ) commodities. The answer is in the negative<sup>1</sup>.

Paola Potestio does not question the correctness of the result of our argument but regards the way in which we arrive at that result as flawed. Her main criticism is directed at Fig. 1 contained in our book (Kurz and Salvadori, 1995, p. 448).

We expounded:

The negative implication of reswitching and reverse capital deepening for traditional theory can be illustrated by means of the example of Fig. [1], in which the value of capital corresponding to the full employment level of labor is plotted against the rate of profit. Obviously, *if* with traditional analysis *we conceived of* the curve  $KK'$  as the “demand curve” for capital, which, together with the corresponding “supply curve”  $K^*K'^*$ , is taken to determine the equilibrium value of  $r$ , *we would have to conclude* that this equilibrium, although unique, is

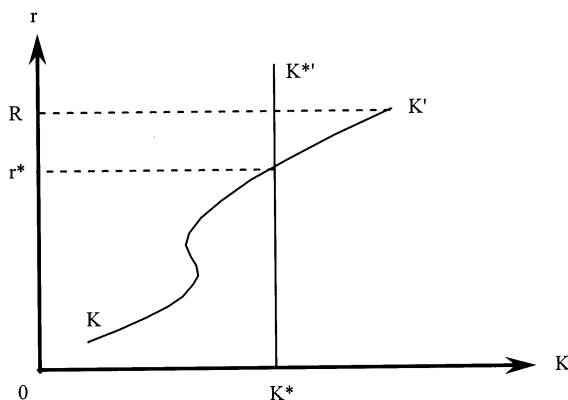


Fig. 1. Aggregate supply of and demand for capital.

<sup>1</sup> It should be pointed out that here we are not concerned with the question of the existence of an aggregate production function. As is well known, its existence is tied to a set of exceedingly bold assumptions; see the papers collected in Fisher (1993); see also Gorman (1968) and Lippi and Salvadori (1994).

unstable. With free competition, conceived of, as it is in neoclassical theory, as including the perfect flexibility of the distributive variables, a deviation of  $r$  from  $r^*$  would lead to the absurd conclusion that one of the two income categories, wages and profits, would disappear. (ibid.; emphases added)

Potestio concludes her criticism of Fig. 1 as follows:

Fig. 1 constitutes a fatal critique of neoclassical theory of distribution not because there could be instability caused by reswitching of techniques, but because it expresses an exercise which is useless, inconclusive and without any economic meaning. (Potestio, 1999, p. 389)

2. We should like to point out that, notwithstanding appearances to the contrary, Potestio and we are largely in agreement with one another. Several of the points she makes complement, and none undermines, our argument. In particular, she is right in maintaining that traditional neoclassical theory can be criticized from a purely conceptual point of view, which is independent of reswitching and capital reversing. Nevertheless, as she emphasizes, these phenomena “still represent crucial points for denying significant general analogies between the simple production theory of the corn economy and the production theory of the ... multi-good economy” (ibid., p. 392).

3. As regards Fig. 1, we should like to stress that it was used by us to illustrate the difficulty a traditional neoclassical economist would face when confronted with the problem of reverse capital deepening. Translating that phenomenon into the usual supply-and-demand framework would lead to a constellation like that depicted in the figure. We made clear, we thought, that by using the conditional (“if we conceived of...”) and inverted commas when talking about the “demand curve” and the “supply curve”, the figure would have been exclusively designed as a means to communicate with the neoclassical economists in terms familiar to them. Therefore, our argument should be read as follows: Even if there were no conceptual problems of conceiving of the two curves as demand and supply curves, the neoclassical economist would be confronted with a serious problem: the *instability* of the resulting equilibrium.

In the chapter, some evidence is provided that several neoclassical economists started from the hypothesis that the “quantity of capital” in given supply ought to be specified in terms of a single magnitude, which has a known relationship with the *value* of it. This translates into the vertical “supply curve”  $K^*K^*$  of Fig. 1.

4. Potestio questions this procedure:

How can we conceive of “a given value of capital stock”? Does this mean that the value of capital is fixed in terms of a certain good or that the value is fixed whatever good is used to express it? (1999, p. 386)

Now, it is of course not our task to defend a theory we think cannot be defended. However, we should like to point out that from the point of view of that theory, the question raised by Potestio is answered by the advocates of that theory in a clear-cut manner: the value of capital is to be specified in a way that is congenial to the concept of “capital” entertained in that theory. As is well known, this concept conceives of capital as “forgone consumption” (cf. the evidence provided in Kurz and Salvadori, 1995, ch. 14, and in Kurz and Salvadori, 1998). Hence, the “quantity of capital” in a given supply is to be expressed in terms of the consumption good (if there is only one) or, more generally, the *consumption unit* (that is, a bundle of consumption goods, if commodities are consumed in given proportions). The latter assumption is encountered in multisector steady-state capital theory, which, seen from a methodological point of view, reflects the neoclassical authors’ view that a long-period equilibrium is to be conceptualized as a *steady state*.

A prerequisite to be fulfilled in order for the long-period demand and supply approach to the theory of income distribution to be taken seriously at all is that the demand and the supply function of capital (and labour) are defined independently of one another. In Fig. 1 above, this prerequisite is met. The figure was constructed on the following assumptions:<sup>2</sup>

- (i). consumption goods are consumed in given proportions (that is, substitution in consumption is set aside), or, which amounts formally to the same thing, there is only one consumption good;
- (ii). the growth rate is uniform and given (possibly zero);
- (iii). the numeraire consists of the consumption bundle or consumption good.

In addition, it was assumed that there is a (finite or infinite) number of processes available to produce the  $n$  commodities (where each process produces only a single commodity and uses as inputs only labour and produced commodities).

If the above assumptions (i)–(iii) hold, the *supply of capital* in terms of the numeraire can be fixed independently of the equilibrium values of the rate of profit and relative prices (and thus independently of the demand function for capital). This is so because the consumption basket does not depend on relative prices and income distribution and thus on the equilibrium solution of the economic system under consideration. The *demand curve* can be built up, even though it does not need to be a function and in general will be a correspondence. A brief discussion of assumptions (i)–(iii) is appropriate. Assumptions (i) and (ii) are justified only on the ground that the construction serves a purely critical purpose: it implies special preferences (all consumers have the same utility function, and all consumption goods are perfect complements to one another). On the contrary, assumption (iii), which in itself is not a strong one, is meaningful only if assumption (i) holds.

5. When assumptions (i) and (ii) hold, then the supply and the demand function of capital are independent of one another and can be drawn in the same diagram,

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<sup>2</sup> For a more detailed discussion, see Kurz and Salvadori (1998, pp. 421–423). In Chapter 14 of our 1995 book, these assumptions were only implicit: the construction of such curves was analysed in previous chapters, particularly in Chapters 4 and 5.

and there is a numeraire such that the supply curve is a vertical line and the demand curve may be increasing or decreasing and therefore can be so at the point of intersection (if there is one). If it is increasing at the point of intersection, it is well known that the equilibrium is unstable (the supply curve being vertical).

One might nevertheless ask what happens if, starting from a system like that illustrated by Fig. 1, the numeraire is changed. Someone (but not Potestio) might conjecture that changing the numeraire could perhaps entail a change in the properties of the equilibrium under consideration. Speculations to this effect have indeed surfaced here and there in the literature, but a change in the numeraire, other things equal, cannot alter the mathematical properties of the economic system under investigation. This was also emphasized by Sraffa (1960, p. 23). With respect to the case that is of interest in this paper, the fact that a change in the numeraire cannot change the stability condition of the system has been shown by Potestio (1996) and restated in Potestio (1999, p. 388). See also Kurz and Salvadori (1998).

6. The entire analysis of Potestio (1999) is based on two “premisses”:

The first is that our focus is on the analytical aspects of the issues involved, not on the historical points of the development of neoclassical theory or the specific characteristics of the positions of earlier neoclassical writers .... The second premise concerns the fact that K–S’s critique is a reconstruction and a synthesis of positions within the neo-Ricardian field in the debate on capital theory. We will totally disregard the relation between this synthesis and the individual positions of neo-Ricardian authors that underlie that synthesis (Potestio, 1999, pp. 384–385)

These premises are the origin of some misunderstandings. In fact, when according to Potestio there is something unclear, she does not attempt to reach clarity by first scrutinizing the relevant literature. Instead, she investigates all possible alternatives that come to her mind, building up a tree of alternatives<sup>3</sup>. The result is that none of the branches of the tree she elaborated corresponds exactly to our discussion of the neoclassical theory of capital. The branch that comes closest to it assumes that the amount of capital is given in terms of an *arbitrary* bundle of commodities. In contradistinction, following the steady-state literature, we started from assumptions (i)–(iii) above, and therefore, the bundle of commodities in terms of which the amount of capital is given is *not* arbitrary, and the curves of Fig. 1 are well defined.

There is only one point, which, if correct, would undermine our story. Potestio asserts:

we cannot assume the structure of consumption before (simultaneously) determining distribution, prices and quantities. Paradoxically, therefore, reading

<sup>3</sup> In particular, when she distinguishes between two interpretations, she calls them *a* and *b* and, correspondingly, indicates the relevant curves by adding *a* or *b* to the respective characterizations.

$K^*K^*a$  raises no analytical difficulties only in a one-good context, that is in a context about which no discussion of the neoclassical approach has ever emerged. Thus, if  $K^*K^*a$  is the interpretation of the curve  $K^*K^*$  the critique of neoclassical long-run theory of distribution can immediately stop with the economic inconsistency of a value of capital fixed in something; that is, with the difficulties of curve  $K^*K^*$ . Reswitching, capital reversal and the instability of the equilibrium of Fig. 1 are unimportant for this critique in the same sense in which the lack of a pen is unimportant for an illiterate person. It would be useful for such a person to have a clear idea of the relative importance of his lack of a pen and his illiteracy. (ibid., p. 387)

$K^*K^*a$  is one of the branches of the tree built up by Potestio; she asserts that curve  $K^*K^*$  can only be built when there is a single consumption good. This specification is, of course, perfectly compatible with our discussion [see above assumption (i)]<sup>4</sup>. In this case, she asserts, the assumption is sufficient in order to eliminate both reswitching and capital reversing, and therefore the curve  $K^*K^*$  could not have a shape like that of Fig. 1. But is this correct? Obviously not. Here, Potestio is confusing a “one commodity economy” with a “one consumption commodity economy”. In the former, there is only one commodity, which acts both as a consumption and a capital good (cf. the above “corn economy”). Had this been our assumption, Potestio would in fact be correct and our construction would have been totally useless. But we actually employed the latter assumption: there is any number of capital goods (there may even be uncountably many) but only one consumption good. And this assumption, no matter how silly it is, does the job, and its silliness is irrelevant, since it is employed only for the sake of the argument, as a concession to the neoclassical construction.

7. To conclude, there are cases in which both the “supply” of, and the “demand” for, “capital” could be defined in an economically meaningful way, and consequently, they could be used to determine a long-period equilibrium or to investigate the adjustment processes towards such an equilibrium. If, for the sake of the argument, we concede these assumptions, the critique of the theory that tries to generalise the determination of distribution of the corn-economy model to multi-good models can be safely founded on the possibility of reswitching and capital reversing, contrary to Potestio’s critique.

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<sup>4</sup> Potestio appears to overlook that there is also another possibility: all consumption goods are perfect complements.

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