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A NOTE INTRODUCING GAREGNANI'S PAPER

BY

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I. AN INFLUENTIAL UNPUBLISHED 1962 MANUSCRIPT

The 1962 paper, *On Walras's Theory of Capital*, by Pierangelo Garegnani, is published here for the first time. It was the result of rewriting, in a more developed and compact form, the argument of the two chapters on Walras in his 1958 Cambridge Ph.D. dissertation, *On a Problem in the Theory of Capital from Ricardo to Wicksell*. The rewriting occurred in Autumn 1961 and early 1962, when Garegnani was at the Massachusetts Institute of Technology (MIT) with a Rockefeller fellowship, and it was part of a revision of the dissertation in view of its English publication, a project whose completion was then repeatedly postponed to give way to other commitments. This explains why the paper has remained unpublished until now.

At the time the paper was circulated at M.I.T., and then later at Northwestern University for a seminar on the subject held by Garegnani at the invitation of Professor Jaffé. In later years, copies of it were distributed on the occasions in which Garegnani had discussions on Walras's theory of capital or more generally on the contemporary ''neo-Walrasian'' reformulations of marginal theory, which were becoming dominant after the first phase of the capital controversies. Thus the present paper (with the handwritten indication ''Provisional Draft, 1962'') was distributed at a Summer School organized by Professor Sergio Parrinello in Trieste for nearly a decade in the 1980s. There it could be read by numerous mature and younger economists with a critical inclination towards dominant theory (myself among them). A modified version of some parts of it then became paragraphs 9–18 of the paper *Quantity of Capital* (1990).

Explicit traces of its circulation are, however, less abundant than one would expect because, owing to its being an unpublished manuscript, the authors who had had access to it preferred to cite Garegnani's *Il Capitale nelle Teorie della Distribuzione* (Giuffré, Milan, 1960), or the PhD dissertation that was available to the public of scholars in the Cambridge University Library. I felt I could make explicit reference to the paper (and have done so in several of my writings since 1993) only after it was distributed at the Trieste Summer Schools. An exception is Giancarlo De Vivo, who

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in the first footnote of his 1976 article on Walras mentions that he has had access to unpublished writings by Garegnani, and that he has taken from them the procedure through which he demonstrates the logical inconsistency of Walras's theory—a clear reference to the present paper.

II. THE PAPER'S CENTRAL IDEAS

The reasons for publishing the paper now, so long after the ideas in it were conceived, are twofold: they concern, on the one hand, the central ideas themselves taken from the chapters on Walras of the 1958 dissertation, and, on the other, some developments the paper shows in both content and presentation relative to the dissertation and to the 1960 book.

Based on a reconstruction (partly inspired by Sraffa's 1951 *Introduction* to Ricardo's *Collected Works*) of two broad approaches, classical and marginalist, which—it was there contended—have dominated in succession the history of systematic economic thought, the 1958 dissertation was centrally concerned with the existence, in both approaches, of the problem of a measurement of capital independent of prices and distribution. It was argued, however, that, while in the classical theory the problem (underlying the difficulties Ricardo and Marx encountered in trying to overcome the limitations of the labor theory of value) could be solved by resorting to a measurement in terms of a *set* of quantities (a method based on the set of absolute periods of production for which labor has to remain invested to produce a commodity was developed in the dissertation), a vectorial measurement would not do in the marginalist theories, which impose the additional requirement of the measurement in terms of a single magnitude. The two chapters on Walras played a key role in the argument by demonstrating how Walras's measurement of capital in terms of the vector of quantities of the several capital goods had been inconsistent with the condition of a uniform rate of return on the supply prices—or, what is the same, equality between demand and supply prices—of capital goods that he had postulated because of his aim of determining the ‘‘normal position'' of the economy, the traditional basis of all economic theorizing, characterized by that uniform rate. (The dissertation then went on to argue that if, as in Wicksell, the need for the measurement of capital in terms ultimately of a single magnitude is accepted, the marginalist approach encounters insurmountable difficulties anyway.)

The fact made evident by Garegnani's argument, that Walras, contrary to what is generally attributed to him today, intended to determine a normal (or long-period) position like all his predecessors, contemporaries, and successors until comparatively recent decades, is in itself important. This is more true today than at the time Garegnani wrote it, when normal prices and the normal positions of the economy were still taken for granted as the necessary basis of economic analysis. Indeed, this more correct interpretation of Walras raises the question of the reasons why modern general equilibrium theorists have felt compelled to abandon that traditional method unquestioningly accepted by *all* founders of the marginalist approach, Walras included; the answer emerging from Garegnani's body of writings is briefly pointed out below, in section V of this note. It is also important to remember that at the time of Garegnani's dissertation the general belief was still that the marginalist approach *was* capable of determining normal positions, and that Walras had supplied one proof of it.

This adds to the importance of the dissertation's demonstration that Walras's system, complete with the equations of capital formation, does not generally admit solution, a point which had not been made before in the literature. The dissertation had accordingly also noticed that in the 4th edition of the *Eléments*, Walras had implicitly admitted the inconsistency of the complete system, though only in an incidental passage. The admission, it is argued in section IV of the paper, was probably the result of Walras realizing better the implications of the given vectorial capital endowment, no doubt also the reason for his introduction in that same fourth edition of the "tickets" method within a "*tâtonnement*" process originally intended to occur through actual transactions and productions (see section III of the paper.)

These points on Walras appear not yet clear to the general profession. For example, strikingly enough, in the recent variorum edition of Walras's *Eléments* (1988), the appearance of that important admission in the fourth edition is not mentioned at all by the editor; analogously unmentioned is the change undergone by Walras's justification of the uniform rate of return on supply price (section III of Garegnani's paper). The publication of the present paper will no doubt help correct these serious oversights. The Appendix on Pareto too raises questions so far little noticed in the literature, in particular his renunciation of a formalized theory of capital formation in the *Manuel*.

III. THE PAPER'S INFLUENCE ON THE CAMBRIDGE DEBATES ON CAPITAL THEORY

The central ideas in the paper are of course important for the correct interpretation of Walras's (and Pareto's) thought. But they also have general theoretical implications and, in particular, a relevance for an understanding of the evolution of the Cambridge debates on capital theory. Garegnani's argument appears to have played a role in those debates which is considerable, though not evident owing to the scanty direct reference to works that have remained unpublished. Joan Robinson, both directly (she was an examiner of the dissertation together with Lionel Robbins), and through close collaborators of hers, like Geoffrey Harcourt and above all John Eatwell, now Lord Eatwell (who had made the reading of Garegnani's dissertation in the Cambridge University Library almost compulsory for all his students), was aware of the argument[1] and used it in arguing that neo-neoWalrasian analysis (as she called the reformulation of marginal theory by then emerging to dominance) could not determine "the rate of profits"—that is, the uniform rate of return on the capitals' supply prices of Garegnani's thesis—even seeming at times to take that as synonymous for a failure to have a theory of distribution *tout court*.[2] The idea was, on the other hand, detailed in

[1] Cf. e.g. Robinson (1964), where she speaks of "a well-known difficulty" in the introduction of a uniform rate of profit in Walras, and notes that in general the Walrasian equations imply that all savings will go to purchase one capital good only—a point made in Garegnani's dissertation, and subsequently greatly stressed by Eatwell.

[2] Cf. e.g. "[Walras] does not have a theory of profits at all," in Robinson (1970, p. 315).

print and oral discussions in Cambridge by the above-mentioned younger colleagues of hers, like Eatwell and Harcourt. It accordingly provoked Frank Hahn to take it up and attempt to reverse the sign of the critique, first in a short intervention in 1975, and then more fully in the well-known article on the "neo-Ricardians" of 1982.[3] Assuming as an indisputable basis the neo-Walrasian equilibria, with their implied divergent rates of return on the capital supply prices (not to be confused with a divergence of the commodity own rates of interest, of which more presently), Hahn made of these equilibria the "General neoclassical case," arguing that it was possible to view Joan Robinson's uniform profit rate as part of a "special neoclassical case" which would hold when the proportions between the capital goods in the initial endowments happened to be the right ones. However, by arguing thus, Hahn was neglecting Garegnani's criticism of Walras's own proposed way out of inconsistency, a criticism advanced in a succinct form in the dissertation and considerably amplified in the 1962 paper, as explained below.

IV. THE ADDITIONAL CLARIFICATIONS

We have so far seen, as the reason for publishing the 1962 paper, the central ideas present already in the chapters on Walras of the 1958 dissertation. However, as mentioned above, another reason is that with respect to those chapters the paper shows developments that have been influential in their own right. The argument for the inexistence of solutions is made intuitively evident by the initial device of considering Walras's system under the hypothesis of zero gross savings; this is the device then taken up by De Vivo. Above all, more attention is devoted in the paper (see its section IV) to an assessment of the way out of the inconsistency, hinted at by Walras himself in the incidental passage of the fourth edition of the *Eléments*—in essence the same way out which by 1962 was beginning to emerge as the new basis of mainstream pure theory.

In that edition, Walras proposes that one should admit that some (non-obsolete) capital goods may not be produced in equilibrium because it is not profitable, and one should accordingly omit the equations requiring the uniform rate of return on their supply prices, that is, in effect allow for demand prices falling below supply prices for such capital goods. In the 1962 paper Walras's proposal is discussed in greater detail than in the dissertation. The inequalities required by its formalization are shown to have a radically different significance—entailing a profound alteration of the notion of equilibrium—from the inequalities indicating the non-production of consumption goods whose supply price nobody is willing to pay, or an excess supply of a productive service even at a zero price. I distinctly remember the clarification on this point that I obtained from reading the paper, after repeatedly meeting the argument that for the existence of solutions to Walras's complete system what was needed was simply the same recourse to inequalities in his "equations of capitalization," already admitted to be legitimate and necessary for the equilibrium of production and exchange without capital goods.

[3]See Hahn (1975, 1982).

In particular, the contradiction is better clarified in the paper between, on the one hand, assuming a uniform price for each kind of productive resource and therefore the time necessary for a sufficient mobility of the resource between industries and firms and, on the other hand, the impermanence of the data regarding the unadjusted physical composition of the Walrasian capital endowment (this impermanence, it is observed in a note, is particularly obvious for the stocks of circulating capital goods). For fixed capital goods, the paper stresses an additional contradiction between the implied mobility and the given endowments: independently of the time allowed for, the mobility of a fixed capital good can generally occur only by replacing the capital good in question with an identical new one in the new location when it wears out in the old location; but this replacement will not occur when the rate of return on the capital good's supply price is below the one obtainable on other kinds of physical capital, and will therefore be incompatible with the data of the equilibrium. In other words, for fixed capital a uniform price for the services of all units of each capital good is incompatible with an unadjusted composition of capital, because, being only realizable through scrapping and replacement, it can only be a result of that repeated allocation of investment to the purchase of the most profitable new capital goods, which tends to eliminate inequalities in the rates of return on supply price by altering the composition of capital. These contradictions, the paper argues, appear to exclude interpreting Walras's equations, modified according to his proposed way out of the original inconsistency, from representing a valid (observable) equilibrium. This argument significantly influenced, for example, John Eatwell, as made evident in his "Walras's theory of capital."[4]

V. THE IMPLIED CRITICISM OF HAHN AND SOME LIMITATIONS OF THE PAPER'S ARGUMENT

It should be evident how the criticism just summarized also implies a criticism of Hahn's notion of equilibrium and thus of his argument. Indeed, in his attempted reversal of the critique Hahn, undoubtedly favored by Joan Robinson's failure to specify the importance of the uniform "rate of profits," overlooked the role of assuming that uniformity for determining positions of the economy capable of providing guidance to averages and trends of observable magnitudes, the role that had historically engendered the notion of normal positions as the undisputed basis of economic theorizing since Smith's natural prices. Nor is this surprising, in view of the fact that by then reswitching and reverse capital deepening had made absolutely untenable at the level of pure theory the notion of capital as a single magnitude and had therefore rendered inevitable the abandonment by the marginalist side in the controversy, of the traditional method based on the determination of normal positions which, in the marginalist approach, requires that notion of capital in order to be determinable.

Of course one cannot find in the 1962 paper a reply to all the facets of arguments advanced twenty years later. For example, one has to turn to later writings by

[4]Eatwell (1990, especially p. 253).

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Garegnani to find a criticism of the identification—evident in Hahn's 1975 and 1982 articles[5] as well as in other contributions on capital theory of those years—between the effective uniform rate of return on the capital goods' supply prices, and the altogether different uniformity of commodity own rates, a mere result of the assumption of constant relative prices: a still widespread confusion which results in identifying normal positions with steady-growth states and in making the abandonment of the method of normal positions appear not as the consequence of the unadjusted and therefore deficient Walrasian capital endowment, but rather as the result of the seeming improvement of allowing for changes in prices when defining an equilibrium. Also, still absent in the 1962 paper are the demand-side problems of the marginalist conception of capital, whose clarification has absorbed a large portion of Garegnani's energies in subsequent years, but which remain less widely recognized to this day than the illegitimacy of a given endowment of capital, the value factor. Surely a more correct appreciation of the historical development of marginalist theory, to which the present publication should contribute, will also help the current debate on whether the traditional assumption that investment adjusts to savings, an assumption as necessary in neo-Walrasian equilibria as in the traditional ones, rests or not upon the traditional conception of capital as a single factor of production and on the connected notion—contradicted by the discovery of reverse capital deepening—of a demand for capital (and hence for savings) negatively elastic with respect to the rate of interest.[6]

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[5]Cf. Garegnani (2003, Appendix 2).

[6]Garegnani's and Schefold's different arguments about intertemporal equilibria being affected by reswitching and reverse capital deepening as much as the long-period equilibria *à la* Wicksell is what discussion is now concentrating on. See Garegnani (2000) and Schefold (2000), and the symposium with interventions by M. Mandler and S. Parrinello in *Metroeconomica*, 2005, vol. 56, no. 4.

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