

FROM WALRAS TO SRAFFA: CLAUDIO NAPOLEONI'S ACCOUNT OF GENERAL ECONOMIC EQUILIBRIUM

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ABSTRACT

The analysis of the theory of general economic equilibrium allowed Claudio Napoleoni to highlight the subordination of consumption to production and the progressive restriction of political economy's domain of enquiry as its analytical tools became more rigorous as main trends in the history of economic thought from Walras to Sraffa, to the point that, in the latter, the entire productive configuration was assumed to be already determined, leaving the system of equations describing the existence of a surplus as 'socially mute' with respect to its origin. Political economy thus ended up precluding for itself the analysis of its most essential question, and yet at the same time offered a faithful mirror of the capitalist inversion between subject and object, of the subordination of human needs to the logic of accumulation. Focusing on Napoleoni's writings in the 1960s, the paper will critically discuss this reconstruction, also taking into account Napoleoni's attempt in the 1970s to look for new premises for economic theory, as well as the reason for his return, in the 1980s, to positions already held during the 1960s.

Keywords: Claudio Napoleoni, Léon Walras, John von Neumann, Piero Sraffa, General Economic Equilibrium.

JEL Codes: B51, D50, E11, E21.

INTRODUCTION

This contribution will present Napoleoni's analysis of general equilibrium and assess its relevance for the development of his thought. The interdependence of economic variables was identified by Napoleoni as a fundamental methodological standpoint already in the entry *Liquidità*,

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written for the *Dizionario di economia politica* (1956). Here, Napoleoni pointed out the weakness of Keynesian theory in abstracting from the mutual determination of income and of the interest rate. The attempt to determine income through a sequential chain which went from the determination of the rate of interest in the financial market to the determination of investment and then to the level of effective demand and of income, ended up disregarding the influence in turn exerted by income on the rate of interest. Keynes' reasoning was therefore exposed to the same circularity that he had reproached the marginalists for when he wrote they had overlooked the influence of income in determining savings. In Napoleoni's perspective, John Hicks's (1937) controversial restatement of the *General Theory* represented an improvement which brought the Keynesian revolution to the appropriate level of rigor, a judgment Napoleoni would reaffirm also in his later writings. As he wrote in *Discorso sull'economia politica* against Pasinetti's (1977) rehabilitation of causal reasoning in economics: "Whatever way Keynes thought of his theory, it may well be that, in order to be expressed in an accomplished form, it must precisely be formulated in terms of the simultaneous determination of variables" (Napoleoni 2019 [1985]: 176-177).

Far from being confined to the interpretation of Keynes's theory, Napoleoni's lifelong adherence to this epistemic criterion constitutes a fundamental component of his approach to economic theory, leading him both to give prominence to authors who worked within a general equilibrium framework (from Walras to Sraffa) and to assess the validity of the different economic theories in light of their stability once formulated in terms of simultaneous equations. Still in 1986, Napoleoni defended this perspective in *Critica ai critici* against Graziani's (1986) and Bellofiore's (1985, 1986, 1987) attempts to rehabilitate Marx's theory of value outside the framework of simultaneous price determination. Against Graziani's attempt to justify a labor theory of value on the basis that only the exchange between capitalists and workers could be a source of value added for the economic system, and that such a value added originated in the difference between the hours of work expended by workers and the hours effectively paid to them, Napoleoni objected that assuming the value of the labor power to be given by the hours necessary to its reproduction implicitly required the price of all commodities to be determined by labor expended in their production. In determining exchange value, Napoleoni commented, "no element can be isolated from its context in order to be determined in such isolation" (Napoleoni 1992a [1986]: 202). Whereas Bellofiore had argued that a labor theory of value could keep its relevance in explaining competition as a disequilibrating force, grounded in the necessity of reducing labor time expended in production in order to achieve extra-profits,

Napoleoni reaffirmed the centrality of equilibrium as both the starting and ending point of every dynamic process: in the continuous change of actual phenomena, economics as a science needs to “carve out some fixed points, without which reality would be unintelligible from its perspective” (*ibid.*: 203-204). Therefore, “if price were not assumed to be an equilibrium price, that is, the starting and the ending point, we could not say anything about it”. The mathematical formulation of general equilibrium was not for Napoleoni “merely an expositive tool, more suitable and synthetic than ordinary language” but rather provided “an essential tool for securing the logical and formal coherence of economic reasoning” (Napoleoni 1963: 124), to the point that “some of the basic concepts of economic reasoning (among which the concept of price) cannot even be defined in a satisfying way outside the domain of general economic equilibrium” (Napoleoni 1965: 11).

If the theory of value was for Napoleoni (1976: 7) “the keystone of the whole economic science”, general equilibrium represented for him the logical framework for testing the coherence of rival claims made by classical and neoclassical economists about value and, consequently, about production (whether it should be interpreted as a linear or as a circular process) and distribution (whether it was determined according to the contributions of each factor or it revolved around the extraction and appropriation of a surplus). From a more superficial perspective, the struggle between these two theories appeared to Napoleoni to have been won by a reformulation, advanced by von Neumann, Leontief and Sraffa, of classical economics in terms of general equilibrium: the notion of surplus appeared to be vindicated, together with a circular reading of production. However, while following Garegnani (1960) in this depiction of the demise of Walras’s approach, Napoleoni did not see this movement neither as involving the confutation of two central tenets of neoclassical theory, i.e. the fundamental fact of scarcity and the need to optimize means in relation to ends, nor (contrarily to Garegnani’s expectations) as allowing for a full restatement either of the classical or Marxian analysis. According to this reading, advanced in *La posizione del consumo nella teoria economica* (Napoleoni 1992c [1962]) and *L’equilibrio economico generale* (Napoleoni 1965), three were the fundamental trends that seemed to shape the whole history of economic thought: 1) the subordination in economic theory of the sphere of consumption to that of production; 2) the progressive restriction of the domain of inquiry proper to political economy as its instruments of investigation become more rigorous; 3) the simultaneous truth, beyond the faults of their respective theories of value, both of the neoclassical’s notion of scarcity and of Marx’s concept of alienation as the subordination of the economic subjects to the social relation of production.

To the extent that Walras's general equilibrium system represented for Napoleoni the most lucid attempt to interpret economic reproduction as oriented to the satisfaction of human needs, its demise in consequence of the contradictions of Walras's theory of capitalization and its subversion in the name of formal coherence, as in von Neumann's model, constituted for Napoleoni, together with Marx's failure to develop a critique of political economy based on a labor theory of value, one of the most significant historical passages for the understanding of the nature of the economic process. The subordination of consumption to production also implied the impossibility to determine in a significant way the orientation of production: without any criterion dictated by a goal which could be imposed to economic processes, first of all the satisfaction of needs, any hypothesis concerning the development of an economic system ended up depending on arbitrary assumptions, like the constancy of the ratio between the activity levels of all industries we can find in von Neumann's model. Sraffa's scheme, where both the inputs and the outputs of production must be taken as given, represented therefore the final word which could be said on the economic object by assuming it as autonomous from all the other spheres of life, bringing it to its most rigorous and, at the same time, most abstract formulation, to the point of resulting "socially mute".

This reading of the history of economic theory would resurface, twenty years later, in the positions held by Napoleoni in the *Discorso sull'economia politica* (2019 [1985]). Whereas the theses defended in this text are usually seen either as a consequence of Napoleoni's engagement with Heidegger's philosophical thought (Amato and Lucarelli 2019) or of the acknowledgement of the defeat of the workers' struggle of the previous decade (Bellofiore 2024), I will show how his late writings represent a coherent development of the reading of the history of economic theory Napoleoni had already developed in light of general equilibrium theory: well before becoming acquainted with Heidegger, Napoleoni could coherently describe capitalist economic reproduction as alienating (i.e. subordinating human goals to the quantitative expansion of product) and efficient (i.e. being able to achieve the maximum possible output for the given available resources and technology) at the same time by scrutinizing it through the lens of von Neumann's model. No wonder that, in this perspective, no contradictions of the capitalist system could be exploited in order to emancipate labor within the domain of production, and that the only hope for liberation lay in the ever-diminishing burden economic reproduction could impose on human life in a context of rising productivity. The (at least theoretical) efficiency of capitalist production, this was the lesson Napoleoni had learned from von Neumann, left no room for its substitution with a higher form of socialized production. Starting from the

Discorso, Napoleoni would engage with Heidegger's philosophy, in whose terms he would attempt to reframe his thought, finding in it, rather than a turning point, a consonant perspective, which will reinforce and provide a broader philosophical framework for a reflection that he had previously developed within the economic domain.

In the following sections, I will reconstruct the interpretation Napoleoni developed in the 1960s of Walras, von Neumann and Sraffa as three distinct stages in the "parable of political economy". I will then address how Napoleoni sought to avoid the consequences he saw in the development of general equilibrium theory by reappraising Marx's theory of absolute value, an attempt ultimately made impossible by his methodological standpoint, which would lead him, in the following years, to restate positions he had already held in the 1960s.

1. WALRAS, OR THE AUTONOMY OF CONSUMPTION

According to Napoleoni, Walras's general equilibrium emerged as the most rigorous attempt to develop an alternative to the 'closed' scheme of the classical economists and Marx. Napoleoni stressed that, for these authors, consumption had a positive role only in its 'productive' utilization for the reproduction of the workforce, which in turn was interpreted as functional to the accumulation of capital. In this framework, consumption "has no worth on its own, to the point that it can be either positively or negatively judged according to the relationship subsisting between it and the process of formation and expansion of the surplus" (Napoleoni 1992c [1962]: 30), being seen as economically meaningful only as a necessary input for production. This condition of inversion between means and ends would be later described by Marx, who had brought classical doctrine to its most coherent development, under the name of alienation: for Marx "becoming other than oneself (i.e., alienation), consists for the 'worker' in not being 'a working human being', i.e. a subject who is capable both of needs which can indefinitely develop and of an ever more productive labor, but rather in being only a material support of labor itself, that support that Marx will later call labor-power, which, as such, imply only needs which are given, or at least variable in function of elements which are exterior to the worker, which are therefore fully controlled by the exploiter" (Napoleoni 1992c [1962]: 31-32).

However, according to Napoleoni, this account of the relation between production and consumption coexisted in these authors with the emphasis placed on market mechanisms and on competition in mediating the allocation of resources, an aspect which, by stressing the relevance of the

role played by the agents' choices, contrasted with the blind imperatives of capital accumulation. Neither Smith, with his emphasis on exchange as a peculiar feature of human nature, nor Marx, for which the capitalist mode of production was the consequence of the generalization of commodity exchange as regulator of social reproduction, could abstract from market phenomena, whose existence, however, presupposes production to be oriented according to the consumers' tastes, whose changes must act on the composition of the final product. The acknowledgment of this social mechanism clashed with a perspective centered on production for production's sake, which requires needs to be taken as naturally or historically given, in order for the surplus to be maximized as a residual over their satisfaction. Such a maximization cannot be achieved as a consequence "of processes which take place in the very same domain of needs, but can only be imposed upon consumers from the domain of production", a condition which "implies economic subjects which, in the domain of production, are in such a position of strength to be able to control and, eventually, dominate the market, which [...] for this same reason ceases to be a market in the proper sense of the word" (Napoleoni 1992c [1962]: 34).

The incompatibility between market mechanism and surplus extraction is identified by Napoleoni as being at the origin of the difficulties met by Marx in addressing the relation between values and prices of productions. Rather than two different aspects of the same reality, as Marx expected, exchange ratios determined according to labor time and those determined according to a uniform rate of profit reflect two irreconcilable ways of regulating the economic process, the first based on the surplus extraction, and the second on the equal satisfaction of all the agents participating in the exchange process. The very adoption of a theory of labor value reflected for Napoleoni the intention not to deal with surplus as such, but rather "to explain that particular form of surplus which should be realized through the market" (Napoleoni 1992c [1962]: 42): the role of labor as the substance of value could not be separated from the mechanism of socialization through exchange which, according to Marx, had exactly the purpose of redistributing social labor in absence, as it was the case in a market society, of any direct coordination of the producers.

While classical political economy and Marx remained stuck in this contradiction, without being able either to give up markets as a fundamental feature of a modern commercial society or to renounce surplus extraction as the basic requisite of capital accumulation, the marginalist revolution tried to develop in a coherent and autonomous way the interpretation of the economic process as finalized to the satisfaction of free and mutually independent agents coordinated by exchange, an attempt with received

from Walras one of “the most complex and rigorous” (Napoleoni 1963: 14), “substantially unsurpassed” (Napoleoni 1992c [1962]: 36) formulation. A new interpretation of social wealth as “the sum total of all things, material or immaterial, on which a price can be set because they are scarce (i.e. both useful and limited in quantity)” (Walras 1954 [1874]: 40) allowed to rethink the economic process as a series of exchanges on different markets, each of them involving different forms of social wealth (commodities, productive services, newly produced capital goods, circulating capital and money), whose exchange ratios had to be determined simultaneously. Equilibrium was the result of two conditions: the subjective striving for the maximum of achievable satisfaction, and the objective compatibility, secured by the equality of demand and supply on each market, of the maximum achieved by each agent.

Two were the main consequences of this “grandiose construction” (Napoleoni 1963: 18). On the one hand, the translation of each economic act in terms of an exchange between equivalent magnitudes made the notion of surplus completely meaningless: each form of revenue was here interpreted as the price of a particular productive service deriving from the employment of people, capital and land. On the other hand, production ceased to be interpreted as the expanded reproduction of a given vector of commodities: the circular flow where the output of each period is at the same time the input of the following one was here replaced with a linear process which, starting from labor and given resources one could arrive, through production, to consumption for the satisfaction of the human needs. Labor ceased to be seen as a reproducible input through the reconstitution of a given real wage and became a given magnitude which could not be increased through production.

Even if Walras’ reinterpretation of the economic process allowed for a higher degree of coherence compared to the inner contradictions of classical economics, his main tenets could not meet the standard of formal consistency set up by the adoption of the mathematical method. On the one hand, general equilibrium involved a redefinition of the concept of price which not necessarily related with exchange (Napoleoni 1963: 20-21). Goods could be compared on the basis of their marginal rates of transformation and of substitution, i.e., respectively, the additional quantity of a commodity a which could be produced by renouncing to produce a unit of the quantity b , and the additional degree of satisfaction provided by the consumption of the commodity a which could be acquired by renouncing to the consumption of a unit of the commodity b . The equilibrium position was defined by the coincidence of these two rates with the prices established through competition. However, since it was always possible to determine these ratios once preferences and endowments were

known, an allocation of resources capable of securing the psychological and technological equivalence between goods could, at least in principle, be reached also outside the mechanisms of market exchange. In this way, general equilibrium theory provided the rational foundations for “a planned economy, provided that the related calculation problems were solved”, a point which, despite not being perceived by Walras, “begins to be clear to Pareto, who is Walras’s most important heir, and becomes fully explicit in the Italian economist Enrico Barone” (Napoleoni 1963: 21). If this amounted to saying that Walras’s reframing of economic theory did not necessarily require markets in order to work, the second difficulty encountered by his version of general equilibrium, at least in Garegnani’s (1960) criticism, on which Napoleoni’s reconstruction was based, demonstrated that it was no less irreconcilable with the features of a commercial society than classical and Marxian theory.¹ In order to make consumption the end of production, Walras had to consider the consumer’s satisfaction in terms of choice among heterogeneous goods, each of them requiring a different array of heterogeneous capital goods in order to be produced. This implied that the prices of each produced capital good and the quantity of each newly produced capital good had to be determined, in the end, by consumers’ preferences. This meant that the prices of the different capital goods were determined exclusively by the equations describing their demand, in turn determined by the demand for their respective products, and their supply, given by the equality between their costs of production and their prices. Moreover, by assuming production as a linear process, Walras had also to take the initial quantities of each capital good to be given. However, there was no reason why the resulting prices would necessarily be compatible with a uniform rate of net return for all the capital goods, a necessary condition for securing equilibrium in the allocation of savings between all industries. Since in the equations stating the uniformity of the net rate of income

¹ Garegnani’s critique is indeed correct if Walras’s equilibrium is interpreted as having a long period rather than a punctual horizon. However, GRAZIANI (1965) seems to me to be correct in stressing, against Garegnani’s position, that the uniformity of the rates of net income applies only to newly produced capital goods, leaving already existing capital goods with positive or negative quasi-rents. In any case, this interpretation does not suppress Walras’s contradictions, since the rate of interest, which for Graziani is exclusively determined by the consumers’ choices between saving and consumption, cannot be determined independently from prices, which in turn are among the endogenous variables of general equilibrium. This happens because a demand of investment curve presupposes the possibility to measure the quantity of capital in order to link it with the expected return. However, as already shown by Joan ROBINSON (1953), in presence of heterogeneous capital goods, such a ‘quantity’ can only be assessed in terms of value, which cannot be known independently from prices.

$$\frac{p_k}{i + c_k} = k_t p_t + \dots + k_p p_p + \dots + k_k p_k + \dots$$

$$\frac{p_{k'}}{i + c_{k'}} = k'_t p_t + \dots + k'_p p_p + \dots + k'_k p_k + \dots$$

...

the prices of the capital goods $p_k, p_{k'}, \dots$, the coefficients representing their amortization and insurance $c_k, c_{k'}, \dots$ and the quantities $k_t, k'_t, \dots, k_p, k'_p, \dots, k_k, k'_k, \dots$ and the prices $p_t, \dots, p_p, \dots, p_k, \dots$ of capital services necessary to their productions are already determined by the demand of finished goods and by the supply of the productive services given the equivalence between prices and production costs, each of these equations will determine a different rate of interest i . Only in exceptional cases will all these equations determine the same rate of interest, an issue which Walras seems to have perceived by stating that not every productive structure will be compatible with a uniform rate of profit and, therefore, with a stable equilibrium position:

If we suppose that old fixed capital goods proper of the types (K), (K'), (K'')... are already found in the economy in quantities $Q_k, Q_{k'}, Q_{k''} \dots$ respectively and that their gross and net incomes are paid for at prices determined by the system of production equations and by the rates of depreciation and insurance, it is not at all certain that the amount of savings E will be adequate for the manufacture of new fixed capital goods proper in just such quantities as will satisfy the last equations of the above system. In an economy like the one we have imagined, which establishes its economic equilibrium *ab ovo*, it is probable that there would be no equality of rates of net income. Nor would such an equality be likely to exist in an economy which had just been disrupted by a war, a revolution or a business crisis. (Walras 1954 [1900]: 308)

As Garegnani will later summarize his argument:

We cannot expect that configuration of capital stocks to be the one most 'appropriate' to the production of the outputs required by the preferences of the consumers. If, for example, 'cloth' and 'corn' are the only consumer goods in the economy, it will be a fluke if the proportion in which 'looms' and 'tractors' happen to be available in the given capital stock are those corresponding to the relative intensity of consumer demand for the two consumptions goods (Garegnani 1990: 16).

A convergence to a single rate of interest would be possible only if
a) the marginal product of each capital good diminished as its produced quantity increases and *b)* if the cost of production of each capital good

increased as its produced quantity increases. However, both magnitudes are taken by Walras as given. The marginal product cannot decrease because new capital goods enter into service only in the period which follows their production; the cost of production cannot increase because coefficients of production are fixed, and, as we already observed, the prices of productive services are already determined.

In spite of his ambition to describe “the characteristics which are commons to every form of economy, independently from the particular institutional framework in which such an economy is located”, Walras’ theory failed because, exactly like its classical predecessors, could not do away with the aim of describing the peculiar features characterizing a market society: “the essential elements of its construction, and especially the different forms of subjects and economic behaviors which can be found within it, are directly taken from a capitalist reality” (Napoleoni 1963: 14-15).

2. VON NEUMANN, OR PRODUCTION FOR PRODUCTION’S SAKE

The autonomy of consumption could therefore not be vindicated, leading economic theory to adopt ‘closed models’ once again: if general equilibrium exposed the contradictions of a linear interpretation of production, economic interdependence could however be reconciled with the classical intuition of the subordination of consumption to production, on the condition of giving up the ambition of describing a historically determinate form of economic reproduction, i.e., of including market conditions into the description of the economic process. According to Napoleoni, this transfiguration of general equilibrium, already present in Leontief’s closed model (1941),² emerged with utmost clarity in von Neumann’s equilibrium model (1945). Here the composition of the workers’ consumption is assumed to be given and represents the cost to reproduce labor as an input. The full subordination of consumption to production, while rehabilitating the classical notion of a surplus which was continuously expanded by each cycle of capital reproduction, represented a major technical advance upon the classics’ and Marx’s theory: prices and activity levels could be determined without the contradictions of the

² Leontief’s open model (LEONTIEF 1951), where the level and composition of the final demand is assumed to be given, does not restate Walras’ autonomy of consumption since the demand is here completely independent from prices and endowment, bearing “a sufficiently severe degree of arbitrariness, which deprives the system of any theoretical relevance” (NAPOLEONI 1992c [1962]: 40n).

labor theory of value, and the system could be described as an aggregate of heterogeneous capital goods growing by constantly keeping the same proportion between its constituent parts. Such a result was for Napoleoni precisely the consequence of the renounce to describe a market-oriented economy:³ without markets, the equality of human labor validated by commodity exchange loses any meaning for the determination of the surplus, which emerges only as the rate of expansion of homogeneous inputs and outputs. In this sense, von Neumann's model should not be seen as a mere restatement of the classical theory. Nor should it be seen, however, a complete negation of the Walrasian framework. Rather than repositing an objective theory of value in antagonism with a subjective one, Napoleoni observed in *Valore* how von Neumann's overcoming of Walras' contradictions allowed to preserve, by deeply revising them, two essentials truth provided by these two paradigms. On the one hand, exploitation had to be rejected given the contradictions of the labor theory of value (put into evidence precisely by the general equilibrium's simultaneous logic), but leaving space to alienation, as the reversal of means and ends, where individuals exist only as embodiments of social functions. On the other hand, the rejection of the marginal theory did not cancel the role of maximization played by economic reasoning, together with the role of equilibrium prices as indexes of efficiency, a structural feature of von Neumann's model. Indeed, equilibrium prices reflect those proportions among the commodities employed that ensure the highest possible rate of expansion. The reproducibility of commodities does not suppress the fundamental fact that they exist in limited quantity in each production period: goods which are superabundant with respect to their requirement receive in the model a price which is equal to zero, and the introduction "of a change in the production methods which, all other circumstances remaining equal, would increase the availability of a good" would make the prices of this good "diminish with respect to the other prices" (Napoleoni 1976: 140). Scarcity, inscribed in the relationship between growth and saving rate and in the duality between quantity and prices, continued to remain at the center of economic analysis even without the framework of subjective evaluations.

This synthesis entailed two important differences with the classical and (especially) the Marxian scheme. On the one hand, capitalist reproduction

³ Von Neumann, who had developed an interest in the debate on socialist calculation, actually aimed at showing with his model that "the normal price mechanism brings about – if our assumptions are valid – the technically most efficient intensities of production" (VON NEUMANN 1945: 1), thus demonstrating the efficiency of a market economy. On this point, see MARCHIONATTI 2019 and CARVAJALINO 2021.

could exhibit efficiency as one of its features: capital accumulation, under the condition of a uniform rate of expansion among the industries, allowed to achieve the maximum possible degree of reproduction, a result which seemed to be further confirmed by the turnpike theorem, which showed that the growth path described by von Neumann represented the shortest way to achieve, regardless of the starting condition, any economic configuration. Capitalists, figuring merely, in Marx's terms, as "functionaries of capital" (and, hence, with abstraction from any form of unproductive rent), could secure that result by reinvesting all their surplus (Napoleoni 1976: 143-144). This represented a full break with Marx's attempt to depict a dynamic of the capitalist mode of production where both growing unemployment and the fading out of the incentive to accumulate in consequence of the tendency of the rate of profit to fall represented an essential feature of the unfolding of unperturbed capital accumulation. Capitalist production was no longer viewed as a limited form of rationality which could be improved, in terms of efficiency, through a socialization of production and the overcoming of value as a criterion for orienting the destination of investment. On the other hand, the reinterpretation of prices outside the market framework as conditions for securing the accumulation path implied that this level of efficiency, rather than a spontaneous result of coordination of isolated individuals through exchange, could be envisaged as the result also either of planning or of macroeconomic stabilization (Napoleoni 1992b [1962]: 70-76). State intervention and reformism could have positive effects in bringing about the conditions of optimal accumulation, also by removing parasitic forms of rents which hindered both growth and the workers' welfare. It followed from that, according to Napoleoni, Keynes, by showing the feasibility to restore economic optimality through the control of aggregate demand, did not reinstate the autonomy of consumption in economic theory, but rather showed the conditions (euthanasia of the rentier included) through which an economy of pure capital could be made viable (Napoleoni 1992c [1962]: 49-51). However, such forms of intervention and reform were not *per se* sufficient to remove the degradation of human beings as instruments of production, both the workers (as enduring the toll of producing) and of capitalists (whose behavior being determined exclusively by their social function).

While achieving, unlike the Walrasian model, full formal consistency, even von Neumann's model ultimately failed to prove fully meaningful from an economic point of view. Without consumption as an autonomous component, and without the market as dictating the agents' choices, no rule was left grounded in economic behavior for closing the system of equations it defined: without the assumption of the constancy of the ratio between all

the activity levels, and, hence of a uniform rate of growth among industries, the model would remain indeterminate, admitting infinite solutions for prices, activity levels and the interest rate. Differently from the uniformity of the rate of profit in Marx and Walras, the assumption of the invariance of the proportion between industries, which secures the maximum of expanded reproduction, represents in von Neumann a mere criterion of efficiency: “it should be seen not at the result of a market mechanism, but rather as a law giving order to production, which, despite acting as it would in a hypothetical perfect market, does not need such a market in order to be justified: it simply needs, to this aim, that a mere hypothesis of productive efficiency is assumed” (Napoleoni 1992c [1962]: 43). However, its adoption entailed “an element of indeterminacy and one of arbitrariness”. The first aspect was due to the fact that only the state of technology would define whether the rate of expansion of the system would be negative, positive, or equal to zero, whereas, according to Marx and to Walras, a positive rate of expansion was provided, respectively, by the demand for future income and by the workers’ exploitation. Arbitrariness, on the other hand, was related to the absence of an internal justification for the constancy of the ratios of activity levels, a condition which can only be assumed, but not be explained within the logic of the model, and which “has the same worth of infinite other hypotheses of the same kind, which also could just as legitimately be made” (Napoleoni 1992c [1962]: 43). It is legitimate to admit that both the adoption of the technology and the equilibrium condition are imposed from outside, like in the case of economic planning, but then one must be ready to accept that “it is inevitable to conclude that the history of economic thought, when finally reaches a coherent configuration, it is forced to quit the economic sphere, since the latter lacks any autonomy” (Napoleoni 1992c [1962]: 44-45).

3. SRAFFA, OR THE ENDPOINT OF POLITICAL ECONOMY

Still, it remains possible to preserve a space of autonomy for economic reasoning by recognizing, in a further step, that the determination of quantities produced, as is still the case in von Neumann’s model, is not within the domain of political economy. Once this task is abandoned, it becomes possible to achieve a radically coherent representation of the economic process, as in the scheme developed by Sraffa in *Production of Commodities by Means of Commodities*. Here, the only magnitudes to be determined are the relative prices and the rate of profit, once the quantities employed in each industry are given together with the quantity and composition of the product. This means that not only has consumption

been expelled from economic theory, but that also production, despite the title of Sraffa's work, has been erased from the field of analysis. The picture is even bleaker, since we discover that the latter process is precisely a consequence of the former:

The achievement of formal consistency in a satisfactory manner [...] requires not only, as in von Neumann, the effective disappearance of consumption as an autonomous category, but also the acceptance of the ultimate consequence of this disappearance, namely the impossibility of including in economic theory the problem of produced quantities [...] From Walras, to von Neumann, to Sraffa, there is thus the gradual disappearance of the problem of production: in Walras, the problem presents itself as that of determining absolute production levels by knowing the "initial" quantities of resources and the state of technology; in Von Neumann, the problem becomes that of determining relative production levels by simply knowing the state of technology; finally, in Sraffa, there is nothing unknown to be determined in the world of production (Napoleoni 1992 [1962]: 52).

In this sense, Sraffa's model represented the definitive outcome of the development of a coherent representation of the economic process, which could be achieved only through ever greater sacrifices in terms of explanatory power: no reason could be given for the existence of the available quantities of means of production, of the social product, and of their ratio as the maximum rate of profit. The quantitative increase of a heterogeneous set of given commodities, together with the functional distinction between consumption and investment, to which corresponded the social distinction between workers and capitalists, was the only fundamental characteristic of the economic reality which could receive a solid foundation. Not only consumption and production but also distribution evaporated from the domain which could be examined in economic terms: by assuming one of the distributive variables to be given from outside, Sraffa's scheme was "compatible with whatever assumptions one wants to make in this regard: that wages be set, for example, either on the basis of mechanisms that reduce them to some subsistence level, or even on the basis of union conflict or bargaining; or that the profit rate be set on the basis of, say, the 'level of money rates of interest'".⁴ Distribution was therefore confined to a "sociological sphere" (Napoleoni 1976: 178), beyond what could be asserted on the basis of economic theory. On the one hand, it was impossible to directly find in *Production of Commodities* an antagonistic picture of class relationships and certainly, since it did not address capital accumulation, it was impossible to find in it a justification for the unlimited expansion of

⁴ This is actually the only interpretation hinted by SRAFFA in his book (1960: 33).

wages given the compatibility of the net product with all possible repartitions of it between profits and wages. On the other hand, Napoleoni, opposing Garegnani⁵ (and, in their private correspondence, against Sraffa himself, see Napoleoni 1992c [1967]: 23-24), deemed impossible to make Sraffa's scheme compatible with a theory of exploitation as the one developed by Marx. The relationship between the wage and the profit rate established by Sraffa expresses only the relationship into which the net product is distributed in material terms and cannot therefore be equated with the rate of surplus value, which expresses the redistribution of the working day between necessary and surplus labor time. Since the surplus is technologically given, and not socially extracted, the part of the net product which is appropriated by the workers could more legitimately be seen not as surplus-value, but as a detraction from profit, a "minus-profit" (Napoleoni 1976: 171-172). Rather than reinstating an equivalent of the labor theory of value, the whole theory of Sraffa could be more coherently seen as entailing a "capital theory of value", where the conditions of reproduction are exclusively dictated by the given technological configuration. Lastly, Sraffa's construction, where every commodity can be employed as a numeraire, abstracted entirely from money, which was a fundamental feature of Marx's theory of socialization through exchange within the capitalist mode of production. In conclusion, "in Sraffa there's nothing left of Marx's theory of value, and of what is derived as a consequence of such theory" (Napoleoni 1976: 175).

As the inevitable endpoint, whether one starts from a subjectivist or from an objectivist theory of value, Sraffa's approach then represents, in its abstractness, the ultimate outcome of any form of economic theory, revealing the essence of the economic sphere as the realm of commodities produced by the means of commodities, thus leaving no space to think emancipation within its boundaries, neither by conceiving this system as corresponding to human needs (as in Walras' expectation), nor by defending the feasibility of a different, emancipated form of production (as in Marx's critique of political economy).

4. FROM RE-FOUNDING ECONOMIC THEORY TO GOING BEYOND IT: NAPOLEONI'S ITINERARY AFTER THE 1960S

However, this never meant, for Napoleoni, that one could stop at the content of such a scheme. The progressive loss of meaning at each formal

⁵ See, in particular, GAREGNANI 1981 and GAREGNANI and PETRI 1982, to which Napoleoni made reference in his later writings.

improvement, from Marx to Walras, from Walras to von Neumann, from von Neumann to Sraffa, despite the gains in rigor, is something Napoleoni finds inherently problematic. Representing the economic process as “lacking one of the two terms around which it normally takes place, i.e. consumption” and, therefore, representing it “outside that configuration which somehow establishes a relation between these two terms, that is, the market” should necessary entail “some severe insufficiency” (Napoleoni 1992c [1962]: 43). The contradictions in dealing with the mechanisms regulating a market society, as well as the impossibility of addressing the question of technology and even of the adoption of the productive configuration, and, finally, the impossibility of having as its objects first consumption, then production and distribution place very strong constraints on economic theory, which seem to suggest that it has, so far, always relied on false premises. In the 1960s, Napoleoni is still persuaded that different assumptions could lead to a different approach to economic theory, capable of recovering all the domains of analysis it had been forced to give up, a persuasion which leads him to a careful reconsideration of economic theory in the following decade (Guzzone and Marchionatti 2022). The lessons Napoleoni drew from Sraffa, at the time, was precisely “the untenability of the premises which until now have dominated the economic discourse”, together with the necessity to “overcome a tradition which has pure abstraction as its own endpoint” by rethinking the concepts of production and consumption in order “to redefine them in such a way that they allow for an economic discourse which is at the same time logically coherent and non-arbitrary, that is, concrete in the proper sense of the term” (Napoleoni 1992c [1962]: 54). It is precisely this ambition that led Napoleoni, in the following decade, to a more careful reading of Ricardo and Marx, which allows him to identify in them an approach to value that cannot be reduced to the role of “maximization index” (Napoleoni 1976: 177) he ascribed both to Walras’s and von Neumann’s perspectives. As pointed out by Bellofiore (2024) Napoleoni reappraised Marx’s distinction between (absolute) value and exchange value, discovering in the former an important element of originality with respect to equilibrium theory, which had identified the issue of value with the determination of equivalence ratios between commodities. As the form of appearance of the totality of labor expended by a society in a given period of time, which could be expressed in terms of money, absolute value was the prerequisite for the existence of exchange values of the different commodities, which represented shares of total social labor, allowing for its redistribution between the different necessary tasks for social reproduction:

Value certainly has an absolute character because it is the very product of the activity that takes place in a mercantile society; insofar as they are related to each other through the exchange of commodities, human beings produce value, and each produces it in an amount that is determined before the exchange takes place, so that in the market exchange values manifest relations between quantities which are determined outside the relations themselves (Napoleoni 1976: 56).

This process of redistribution produces, at the equilibrium, the congruence between the value of each commodity and the socially necessary labor value necessary for its production, in the dual sense of bringing it to reflect the average conditions of production and to coincide with the social need (expressed by the effective demand) for each particular commodity. Both these conditions are secured by the competition between producers, which would continuously move from sectors where the supply exceeds the social demand and where prices are inferior to labor expended to sectors where demand is higher than supply and where prices are higher than those which reflect the socially necessary labor time. Since this process lack coordination, being regulated a posteriori through price movements, and given continuous changes both in the average labor time needed to produce commodities and in the composition of the social demands, the equilibrium conditions are met only “with a relevant degree of causality”: disequilibrium, rather than the outcome of random shocks, stems from the “impersonal, a posteriori” character of the law of value, and equilibrium can assert itself only “as the overcoming of a disequilibrium that is as systematic in character as equilibrium itself” (Napoleoni 1976: 57-58). Quite exceptionally in the history of economic thought, Marx’s theory of value was capable of addressing equilibrium and disequilibrium as inseparable aspects of the same economic reality:

The “law of value” is therefore inherently a law of equilibrium and disequilibrium, of order and disorder; since the social relation must assert itself against the asocial character of the terms of the relation itself, this assertion is always problematic. Contrary to the approach of classical political economy (and what would be the approach of post-Marxist theoretical economics), for Marx equilibrium does not exhaust the reality of value but is only one of the terms of the contradiction of which value is the expression (Napoleoni 1976: 58).

It thus became possible to acknowledge, and to emancipate oneself from, one of the main limitations of general economic equilibrium theory, namely the assumption of technology as given, called into question by the endogeneity of technical progress intrinsic to the dynamics of competition. Noting the absence of technological innovation in von Neumann’s model, Napoleoni observes that this is a feature “of all equilibrium models”, which

should be addressed at a more general level rather than, as was often the case, in a critique of von Neumann (Napoleoni 1976: 140). The dialectics between equilibrium and disequilibrium could then be enriched, through the analysis of Marx's reproduction schemes, by taking into account "the compresence of development and crisis, of implementation of the cumulative process and of its stop and of its recurse, which characterizes the vicissitude of capital" (Napoleoni 1976: 75). However, the interest with this perspective was soon shaken by the impossibility of reconciling the role thus ascribed to absolute value with the determination of exchange value according to a uniform rate of profit. The shift in interpreting Marx's theory of value could not erase neither the transformation problem nor the relevance of determining production prices for its consistency, an issue instead underestimated by new approaches that instead gave exclusive importance to the determination of value and surplus value at the aggregate level, leaving prices to be determined according to Sraffa's equations.⁶ On the one hand, Napoleoni was right to state that, without a theory of prices, the theory of value lost its ability to explain the mechanism of impersonal regulation through competition that was also necessary to the preservation of both the category of value and the dynamics of the mode of production that Marx aimed at developing.⁷ On the other hand, Napoleoni never renounced the idea that the only possible determination of prices was the simultaneous one given by the general equilibrium equations, a perspective which, as evidenced by Pasinetti's aforementioned rehabilitation of the causal method,⁸ does not necessarily represent the only possible approach to the issue, both in the interpretation of Marxian and Keynesian theory⁹ and, more generally, in addressing the relations between economic magnitudes and concepts.

In any case, the perception of the failure of the Marxian project led Napoleoni to the persuasion that, from a strictly economic point of view, it was impossible to break out of the abstraction of the Sraffian scheme, even if it could be partly mitigated by accepting von Neumann's interpretation of capitalist reproduction model as compatible with that scheme. This led Napoleoni to a progressive return, culminating in the *Discorso*, to the economic positions he had advocated in the 1960s, whose abstractness now

⁶ For some of the most representative among these approaches, see DUMÉNIL and FOLEY 1987; GATTEI 2011; BELLOFIORE and COVERI 2021.

⁷ See NAPOLEONI 1992b [1986]: 146-148.

⁸ See also PASINETTI 1986, 2019 [1964].

⁹ For different approaches to the transformation problem which do not involve the simultaneous determination of input and output prices see CARCHEDI 1991, KLIMAN 2006 and MOSELEY 2015.

he was seeking to remedy through an openness to philosophical discourse, first looking to Marx's theory of alienation, which he deemed could survive the demise of Marx's economic views, and then to Heidegger. It was a gradual shift: still in *Valore*, even while dismissing Marx's approach to value and structural contradictions of the system, Napoleoni wondered whether the contraposition between means and ends, between labor as the realm of necessity and leisure as the reign of freedom might not represent, rather than an anthropological constant that can be addressed only by the progressive reduction of the length of the first sphere, a condition that is historically determined and, as such, surmountable (Napoleoni 1976: 179-184). Marx was praised for criticizing in the *Grundrisse* the Smithian interpretation of labor exclusively as toil and trouble, and Napoleoni kept seeing alienation not as a structural feature of labor as such, but rather as a feature of the historically contingent form of wage-labor. Rather than reflecting the nature of the production process, the subordination to the reified logic of capital accumulation was still seen as the consequence of a social relationship which could be overthrown. A different and emancipated image of labor, as the free manifestation of human creativity, an activity desirable for its own sake, therefore putting into question the juxtaposition between means and ends, could again be defended. If economics could do nothing but acknowledging, as Sraffa did, the reified nature of capitalist production, a critique of political economy, to be pursued in new ways than the labor-value followed by Marx, was for Napoleoni at that time more necessary than ever as a condition for reversing domination.

Nine years later, the progressive delimitation of the economic field, whose logic of inversion between means and ends could not be subverted, was now to be matched by the progressive delimitation of the relevance of the economic sphere, a possibility which was disclosed, thanks to technological progress, by the same technocratic rationality which kept making impossible its fruition.

Napoleoni's trajectory thus appears to have been shaped by his lifelong commitment to general equilibrium as the standard for establishing a theory of prices and, more generally, for envisaging the relations between economic variables. His will to subvert the premises of economic discourse never went as far as questioning this approach, a step that other economists of that generation, such as Graziani and Pasinetti, were instead prepared to take, both for interpreting Keynes and Marx, and to emancipate economic theory from a too great constraint, whose overcoming allows us to reach a much more complex and dynamic picture of capital than the one Napoleoni ultimately leaves us with. To the image of an abstract domination of things over people it will then perhaps be possible to oppose the one, much more fluid and unstable, of a social system that constantly reiterates its own

inadequacy in ensuring widespread and durable prosperity, and whose claim to represent the ultimate form of economic rationality could be questioned.

Despite the limits of his final positions, Napoleoni's interpretive work on general economic equilibrium, showing the elements of continuity among its different formulations, as well as the persistence, despite the differences concerning the theory of distribution, of the notion of scarcity, remains of the utmost interest, as does his perception of the heterogeneity between the framework of the classical economists and of Marx, on the one hand, and the approach that may be developed from the Sraffian scheme on the other – points on which he, with the utmost originality, has opened a path that is still worth revisiting.

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