

NEOCLASSICAL, NEW CLASSICAL AND NEW BUSINESS CYCLE ECONOMICS:
A CRITICAL SURVEY

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Introduction

The aim of this paper is not to provide an exhaustive survey of neoclassical, new classical and new business cycle economics. We will instead present a critical evaluation of the major theoretical features shared by these three analytical frameworks, with the explicit purpose of clearing the way for a new macroeconomic approach to macroeconomics. Conceived as the first chapter of a forthcoming book on the macroeconomic foundations of macroeconomics, the paper is nothing more than an introduction to this problematic issue and has to be seen as a first step towards a more general criticism of mainstream economics.

Walras and general equilibrium analysis: the triumph of microeconomics

Let us be clear. Walras was one of the greatest economists of all times and his attempt to make a rigorous science of economics deserves our unreserved admiration. Like Jevons and Menger, the French economist believed that pure economics is a branch of mathematics and that it is thanks to algebra that the rational method may be introduced into economics. '[G]iven the *pure theory of economics*, it must precede *applied economics*; and this pure theory of economics is a science which resembles the physico-mathematical science in every respect' (Walras 1984: 71). According

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to Walras, the pure theory of economics is the theory of value, and ‘the theory of exchange and value in exchange, that is, the theory of social wealth considered in itself, is a physico-mathematical science like mechanics or hydrodynamics’ (ibid.: 71). The founding father of GEA goes as far as to claim that the value in exchange ‘partakes of the character of a natural phenomenon, natural in its origins, natural in its manifestations and natural in essence’ (ibid.: 69).

Walras’s desire to build economics on scientific and mathematical foundations was so strong that he did not hesitate to claim that the price of any given commodity (wheat in his example) is determined ‘objectively’, by scarcity or usefulness – ‘both of these conditions being natural’ (ibid.: 69). Hence, if wheat is worth 24 francs a hectolitre, ‘[t]his particular value of wheat in terms of money, that is to say, this price of wheat, does not result either from the will of the buyer or from the will of the seller or from any agreement between the two’ (ibid.: 69). Unfortunately, Walras never really attempted to explain value in exchange independently of the will of the buyer or the seller or of any agreement between the two. He endeavoured instead to show that relative prices are determined through exchange in a competitive market where supply and demand are subjected to individuals’ preferences. ‘Value in exchange, when left to itself, arises spontaneously in the market as the result of competition. As buyers, traders make their *demands* by *outbidding* each other. As sellers, traders make their *offers* by *underbidding* each other’ (ibid.: 83).

Walras’s revolution with respect to the theory supported by some great classical authors such as Smith, Ricardo and Marx consisted mainly in switching from the analysis of production and absolute values to that of exchange and relative prices. The necessary rejection of the metaphysical concept of incorporate labour led Walras to investigate the exchange between commodities, in search for a principle defining value as a mere relationship. Concentrating his attention on relative exchange, the author of *Elements of Pure Economics* reduced production to a subsidiary role, classifying it under the heading of applied economics. ‘Thus the theory of economic production of social wealth, that is, of the organization of industry under a system of the division of labour, is an applied science. For this reason we shall call it *applied economics*’ (ibid.: 76). The consequence of this choice is that pure economics is limited to the mathematical attempt to explain how supply and demand may determine relative prices and at the same time reconcile the maximisation of individuals’ well-being with that of the society as a whole. A difficult task indeed, which led Walras to transform the market into a *deus ex machina*, and which set the target for any future microeconomic analysis

based on the principles of general equilibrium.

The widespread acceptance of Walras's GEA marked the triumph of microeconomics over the classical authors' attempt to provide economists with a macroeconomic theoretical framework. Individual agents' behaviour became the key factor in an essentially subjective interpretation of the 'natural elements' of economics. Supply and demand were (and still are) considered the social forces through which individuals' preferences exert their action on the market in a continuous search for an equilibrium that, because of its very nature, can never be stable. Far from determining a set of logical rules economic agents will have to conform to, neoclassical economists expect the market to find the best possible equilibrium for the optimisation of individuals' utilities. Concerning the system taken as a whole, the state of the economy is thus seen as the result of a constant adjustment involving each individual agent in his relation with the others. No true macroeconomic criteria are envisaged and economics itself is conceived of as nothing more than a secondary branch of mathematics.

If economics were indeed of a mathematical nature and if relative prices could actually be determined by the simultaneous solution of a system of independent equations of supply and demand, Walras would be right in claiming that 'the theory of value in exchange is really a branch of mathematics which mathematicians have hitherto neglected and left undeveloped' (ibid.:70). The triumph of microeconomic analysis is therefore closely related to the possibility of interpreting economics mathematically and, in particular, to the logical possibility of determining economic magnitudes through a process of adjustment. Since Walras's publication of his *Elements*, the host of economists approaching economics from a mathematical viewpoint has never stopped swelling. Today the great majority of economists believes mathematics to be an indispensable analytical tool and makes regular use of it. This simple observation is enough to give a clear idea of how far Walras's influence reaches and how deep-rooted microeconomic foundations are. Despite important differences, the main economic schools share Walras's belief in mathematics as well as his microeconomic approach. Apart from a handful of heterodox thinkers, in fact, economists still reason in terms of adjustment, looking for a more or less perfect equilibrium in more or less flexible markets.

It is a fact that Walras's general equilibrium analysis led to a radical change in economic thinking, and that even Keynes's revolution did not succeed in overthrowing it. Indeed, Keynes's original contribution was submitted to a neoclassical interpretation which was implicitly, if not explicitly,

accepted even by a vast number of Keynes's followers. As we shall argue at length in the following two chapters, both Keynesian and new Keynesian economists share the neoclassical point of view with respect to the need of reproducing reality through mathematical modelling. Now, the use of mathematics rests on the possibility to determine a positive number of functional relationships between economic 'variables' (where the choice of the term 'variable' is itself evidence of the fact that economic magnitudes are axiomatically considered to be functionally related). Except for the particular case of identities, equations are conditional equalities, that is, equalities that are verified only for a given numerical value of the variables they relate to. Within GEA economic reality is represented by a series of models based on conditional equalities (the most famous being, of course, the equations relating supply and demand). Despite their notorious differences with the neoclassical models, Keynesian and new Keynesians models are also constructed on the same logical basis. This explains why the search for microeconomic foundations has attracted so much interest. At the same time this clearly shows how deeply Walras's conception of economic analysis has influenced the history of our science in the last hundred and thirty years.

New classical economics: the microfoundations of microeconomic modelling

New classical economics: a short introduction

The first new classical models were elaborated in order to propose a valid alternative to Keynesian econometric models and in order to explain how monetary factors could generate business cycles, without abandoning the main features of GEA. As a first approximation, it may be said that new classical models reproduce the Walrasian general equilibrium system except for the introduction of imperfect information regarding prices. For example, Lucas showed that by dropping the assumption of perfect information the Phillips curve is compatible with the general equilibrium framework, so that monetary shocks can indeed have an influence (albeit only a temporary one) on real variables.

As claimed by Laidler, although the monetarists criticism of the Keynesian analysis of inflation and unemployment jeopardised the reliability of particular functional relationships in the economy, monetarism 'constituted no radical theoretical challenge' (Laidler 1997: 335) to Keynesian orthodoxy.

In fact, Keynesian econometric models did already incorporate a demand for money function and ‘could easily enough be accommodated’ (ibid.: 335) in order to account for a more stable relationship. Likewise, ‘large-scale Keynesian econometric systems proved easily able to absorb monetarist ideas’ (ibid.: 335), so that monetarism did not really provide a theoretical alternative to Keynesianism. What monetarism failed to do was successfully carried out – so we are taught – by new classical economics, which provided an analytical framework clearly distinct from the Keynesian one. The central feature of the approach proposed by Lucas and his followers is the reintroduction of the main principles of general equilibrium analysis, in particular those of price flexibility and competitive markets clearing. The originality of new classical models with respect to traditional general equilibrium models is the assumption that economic agents ‘do not have full information about the structure of relative prices when they engage in trade’ (ibid.: 338). The rational expectations hypothesis introduced by new classical economists has thus the advantage of accounting for equilibrium while leaving room for temporary disequilibrium. Uncorrelated random errors are in fact possible when agents form their expectations, but must necessarily reduce to zero if expectations are rational. Hence, output and employment fluctuations are perceived as ‘voluntary responses to misperceived price signals’ (ibid.: 336) occurring when the economy is subjected to random exogenous shocks. Agents may mistake changes in money prices for changes in relative prices and consequently modify their supply of goods. Yet, this change in real quantities is not supposed to last. Economic agents will soon be aware of their mistake and modify their behaviour in accordance with the actual evolution of relative prices, thus re-establishing equilibrium at its proper level.

Reliance of new classical economics on price flexibility and markets clearing is a sign of how closely related it is to microeconomic principles. It is not a mystery, of course, that new classical economists claim to derive macroeconomic models of reality from individual maximising behaviour. What is particularly relevant here is the claim that new classical economics allows ‘clearly defined links to be established between individual and market experiments without recourse to empirical laws’ (ibid.: 340). It thus seems possible to avoid the traditional obstacle of aggregation facing Keynesian macroeconomic theories. Derived from a Walrasian theoretical framework, new classical economics builds its macroeconomic system directly on it. The postulates of perfect competition and rational behaviour facilitate the transition from micro to macroeconomics, the distinction between the two being a matter of size and not of substance. It is clear that, in these conditions,

macroeconomics is reduced to microeconomics, the state of the economy taken as a whole being the direct result of the decisions adopted by individual agents. The claimed superiority of new classical economics over its rivals rests precisely on the principles of GEA, of which it shares the logical coherence and rigour. In particular, new classical economists are well aware of the fact that mathematical modelling has its natural origin in the neoclassical system of general equilibrium, which is still the most rigorous setting to date, at least as far as mathematical economics is concerned. The new classical approach has been widely criticised, both outside and within mainstream economics. Akerlof, for example, in his inaugural lecture at the LSE maintained that the continuous market clearing hypothesis is generally incompatible with the principle of profit maximisation. Having claimed that profit-maximising firms tend to follow standard business practice, which ‘normally prohibit[s] firms and industries from paying the market-clearing wage at all times and in all places’ (Akerlof 1979: 231-2), Akerlof goes on to prove that ‘the firm which tries, contrary to the standard practice, to behave in the manner suggested by the market-clearing model will not in general maximise its profits’ (ibid.: 232). Violation of widely accepted norms and of standard business practices will in fact prove costly, often too costly when compared to the advantages deriving from the adoption of market-clearing wages. Now, Akerlof’s criticism is much less harmful than it might appear. Norms and business practices are historically determined and tend to evolve. Practices that are costly today may well become the norm tomorrow. We can openly disagree with the political and ethical implications of the new classical theory, of course. But this is not the point. What really matters here is whether or not the new classical macroeconomics depicts the logical workings of an ideal economic system. Lucas claims that the new classical models are the only ones which are logically self-consistent, and that the introduction of the continuous market clearing and rational expectations hypotheses is a logical requirement for a rigorous theory to be worked out at all. The free competition setting resulting from it would therefore be the unavoidable and ‘objective’ consequence of the choice of the only empirical setting truly compatible with the only theoretical model of the economy. If today’s institutions do not entirely conform to the ideal model, this is no proof that the model itself is wrong. If we are to reject it, it must be on logical grounds, and not simply because its consequences do not fit our ethical or political choices.

As a matter of fact, Akerlof’s analysis is not useless or irrelevant. A good economic theory must be capable to explain the real world. The new classical theory is no exception to this rule. The fact that

markets do not clear ‘at all times and in all circumstances’ (ibid.: 233) is apt to undermine the new classical approach, as is the fact that economic agents are far from acting rationally ‘at all times and in all circumstances’. Yet, this discrepancy between theory and empirical evidence might be simply a matter of gradual adjustment. If no logical inconsistency were to be found in the new classical approach and if it were possible to show that its foundations stand on empirical axioms derived from the working of the economic system, then new classical economists could indeed maintain that their theory has the twofold capacity to explain the present malfunctioning of the economy and to provide a model of how the economy should work in order to be consistent with its own logical laws (as determined precisely by the theory).

As we have already seen, the assumption of continuous market clearing and the postulate of price flexibility are a central tenet of new classical economics. While Keynesian macroeconomics rests on the assumption of price rigidity, new classical analysis states that a shift in demand is always matched by a change in prices allowing for the clearing of markets. If fluctuations in output and employment nevertheless occur in the real world, this is said to be due to misperceived price signals. Because of a lack of information about the meaning of money price variations, economic agents may mistake changes in money prices for changes in relative prices and react by modifying their real supply of goods and services. If this happens, output and employment fluctuate in the short-run, giving rise to a real business cycle. Now, as observed by Laidler, the continuous market clearing hypothesis is apparently in contrast with individual agents getting their expectations wrong. Errors are costly, so that agents ‘have every incentive to make their expectations as accurate as possible, and to use all available information in order to do so’ (Laidler 1997: 31). This led new classical economists to resort to the rational expectations hypothesis. It is to this assumption that we shall now turn our attention.

The rational expectations hypothesis

Expectations were already taken into account by Friedman, whose expectations-augmented Phillips curve suggested the existence of a relationship between the expected rate of change in real wages and unemployment. Yet, new classical theorists were not happy with Friedman’s assumption since it privileged adaptive rather than rational expectations. In 1961, Muth put forward the idea that forward-looking agents form their expectations on a rational basis, which can be mathematically formalised. As noted by Gerrard, one great advantage of the rational expectations hypothesis is that

it 'offers a more acceptable assumption in choice-theoretic terms since rational expectations display the twin properties of unbiasedness and orthogonality, thereby ruling out systematic expectational errors' (Gerrard 1996: 58).

According to the rational expectations hypothesis 'agents form expectations "as if" they were fully informed about the structure of the economy in which they operate, and make mistakes only to the extent that the economy is subjected to random exogenous shocks' (Laidler 1997: 34). Thus, models proposed by new classical theorists are greatly dependent on the way agents are expected to react to economic changes given their rationally determined behaviour. If they have insufficient information to distinguish relative from absolute changes in prices, monetary shocks may cause short-run fluctuations. If they behave rationally, pre-announced monetary policies will be ineffective, tax-financed and debt-financed fiscal expansions will be equivalent and time-inconsistent policies will be less effective because less credible.

The rational expectations hypothesis was introduced as the principle required 'to reconcile the price distributions implied by the market equilibrium with the distributions used by agents to form their own views of the future' (Lucas 1980: 707). This reconciliation is a necessary requirement for the contingent-claim interpretations of a competitive equilibrium model suggested by Arrow and Debreu, and considered by Lucas as 'a powerful model-building apparatus specifically designed to help us deal with problems involving choice under uncertainty' (ibid.: 708). Yet, as observed by Buiter, the rational expectations hypothesis 'appears to be in danger of being consistent with any conceivable body of empirical evidence' (Buiter 1980: 38), and thus of 'becoming irrefutable' (ibid.: 38). In other words, what is apparently introduced as a verifiable (or falsifiable) hypothesis is in fact considered as an axiom, a principle stipulated to be true for the purpose of a chain of reasoning that would otherwise be impossible to prove logical. Hence, the assumption of rational expectations becomes the necessary foundation of a formal deductive system in which real economic variables are equally affected by alternative, anticipated fiscal and monetary policies. 'The issue of how economic agents acquire their knowledge of the true structure of the economy, which they use in making their rational forecasts is not addressed by the theory' (ibid.: 38). Indeed, the rational expectations hypothesis is not introduced in order to explain how forecasts are actually formed, but as a necessary element for the very existence of new classical models.

The main shortcomings of the rational expectations hypothesis

Both in its weak form (which Lucas calls ‘vacuous’) and in its strong form (defined as ‘silly’ by Lucas), the rational expectations hypothesis is hardly acceptable. If it is simply maintained that economic agents try to get the most out of the information they can get hold of, nothing will allow us to conclude that ‘[e]xpectations [...] tend to be distributed, for the same information set, about the prediction of the theory’ (Muth 1981: 4-5). On the other hand, to claim that economic agents know the structure of the model that is supposed to describe the working of the economy and act accordingly seems too strong an assumption. Indeed, even in the softer version in which it is usually introduced by new classical economists, the rational expectations hypothesis is highly controversial. The claim that ‘[r]ational expectations implies that what they [economic agents] *do* expect is (within a serially uncorrelated error) what the true model says they *should* expect’ (Hoover 1988: 16) amounts in fact to saying that economists know perfectly well what the true model is, and that economic agent *must* work out their expectations according to this model. The first assumption is anything but a faithful representation of the present degree of agreement among economists. Even though not every economist is prepared to admit it, nobody really knows what the true model really is. As for the second general assumption, if it were true it would imply that expectations as well as decisions in general are necessarily formed according to the theoretical principles underlying the ‘true’ model, leaving no room for any form of uncertainty and free behaviour. It is not necessary to stress how far these assumptions are from reality and how little (if at all) they may help us to understand the world of economics.

Criticised by Keynesian economists and praised by new classical economists, the rational expectations hypothesis is one of the most awkward subjects of recent economic debate. Even an economist as sensible to Keynes’s arguments as Vercelli is straight in claiming for its theoretical centrality. ‘Although the prevailing interpretation and use of rational expectations is very questionable, this hypothesis has shown a remarkable heuristic value and remains the first systematic attempt at studying endogenous formation of expectations without violating economic rationality’ (Vercelli 1991: 240). Now, what should be made clear first is what is meant by economic rationality. If it is supposed to mean that economic activity is rational when decisions are taken according to the theoretical principles of maximisation under constraint, then rational expectations simply becomes a corollary of economic rationality. Moreover, if this is the case economic rationality itself is seen as an ideal state of affairs

to which economic activity must tend. Hence, rational behaviour must be in line with the principles of economic rationality, that is, with the principles that, according to a given economic theory, will make the economic system work at its best. Rational expectations are just part of this optimising behaviour, and it is not at all surprising that new classical economists have unhesitatingly taken over this assumption. The whole of GEA is based on the axiom that, through supply and demand, economic agents are able to find the best possible equilibrium maximising their utility.

The critical point of view adopted by non-neoclassical economists consists mainly in stressing the unrealistic character of the neoclassical axiom. Because of market imperfections, rigidities, discontinuities, etc., general equilibrium analysis appears rather artificial and various attempts have been made to transform it into a disequilibrium (non-Walrasian equilibrium) theory or to replace it altogether with Keynes's theoretical framework. However, if theoreticians were forced to choose between an analysis based on rigorous but totally unrealistic principles, and another that, in the attempt to replicate reality, is bound to be fundamentally unpredictable, there would be little hope for economics to ever be an objective science explaining economics events. From a purely theoretical viewpoint, neoclassical theory seems better equipped than other theories to provide a rigorous framework of analysis. Its use of a sophisticated apparatus of mathematical formalisation and its constant reference to rationality seem determinant in this respect. In fact, if another theory is to replace GEA, it must possess the same degree of scientific rigour and a higher heuristic value. This would prove rather difficult if economics were merely a social science. But, in this case it would be vain to look for a theory explaining economic reality, for its object of inquiry would unavoidably be beyond its reach. Human behaviour is highly unpredictable and no mathematical model would ever be apt to represent it. Indeed, as shown by the 2002 Nobel Prize winner, Daniel Kahneman, far from being rational, people's decisions are often idiosyncratic. Behaviour is influenced by a host of psychological factors such as individual perceptions, emotions, judgements, beliefs, which account for systematic deviations from economic rationality. In this situation the rational expectations hypothesis seems rather a heroic assumption, whose *raison d'être* is to make it possible to use new classical econometric models to represent a reality that is too complex and rich to be reproduced mathematically.

Our perception of economics changes radically once we start thinking of it in monetary terms. This has already been done by the greatest economists of the past. From Smith to Keynes, a common

thread links together all the economists who have consistently tried to prove that economics is concerned with the structural laws governing the economic system as such. This is not to deny the social character of the economic activity. Like any other human activity, economic behaviour is eminently social. Yet, the aim of economic theory is not essentially that of investigating human behaviour in the field of economics. Although created by man, the economic system has a structure that is independent of human behaviour. It is this structure that is the proper object of the economic science in its purest form. The search for logical laws, as opposed to social or behavioural laws, is part of macroeconomics proper. The final rejection of the rational expectations hypothesis is thus strictly related to the logical impossibility to derive macroeconomics from microeconomics. If economic laws are indeed of a macroeconomic nature, behaviour can no longer be a key factor and the rational expectations hypothesis immediately loses its centrality. The fundamental criticism of this assumption, therefore, does not lie in its unrealistic character, but in its uselessness in the building of a true macroeconomic theory. Hence, our critical analysis must move from the level of the new classical assumptions to that of the neoclassical theory itself, in particular it should ask whether the neoclassical general equilibrium approach may be the logical foundation of (macro)economic theory.

New classical economics: a critique

Lucas's and Sargent's criticism of Keynesian macroeconomics is essentially based on econometric considerations and on the forecasting failure of Keynesian macromodels in the 1970s. On the one hand, they reproach Keynesian economists with attempting to derive their structural models by imposing a whole series of *a priori* restrictions on a number of variables as well as on the coefficients governing the behaviour of the 'error terms' (Lucas and Sargent 1997: 274). On the other hand, they claim that a structural model must be derived from a collection of economic time series. 'The problems of identifying a structural model from a collection of economic time series is one that must be solved by anyone who claims the ability to give quantitative economic advice' (ibid.: 273). According to Lucas and Sargent, Keynesians' failure to do so must be imputed to their models lacking foundations in microeconomic and general equilibrium theory. They reach this conclusion by observing that '[m]odern probabilistic microeconomic theory almost never implies either the exclusion restrictions that were suggested by Keynes or those that are imposed by

macroeconomic models' (ibid.: 275). We thus get the flavour of Lucas and Sargent's analysis, which mainly consists in backing a microeconomic approach on the grounds that it allows to work out more articulated econometric models than Keynes's macroeconomic approach.

As we have already seen, markets clearing and agents' maximising behaviour are the two main assumptions on which new classical economics rests. Now, Lucas, Sargent, and their fellow economists too, consider these assumptions as two postulates allowing the elaboration of econometric models based on decision functions. The close connection with Debreu's claim for the axiomatic nature of economic theory is evident. Yet, economics cannot be reduced to a series of axiomatic models structured according to mathematical principles. Debreu's attempt to establish definitively the priority of a mathematical approach to economics fails because it erroneously assumes, following Walras, that the object of economics is essentially mathematical. If, as he claimed right at the outset of his 1959 book, goods were numbers, his analysis would be unquestionable and would prove once and for all the validity of Walras's general equilibrium theory. As a consequence, Lucas and Sargent's contribution would also share the same scientific status. The two authors could then legitimately claim to have shown that 'Keynes and his followers were wrong to give up on the possibility that an equilibrium theory could account for the business cycle' (ibid.: 280). In reality, however, it is logically impossible to take goods to be numbers. It is true, of course, that physical goods and services have to be associated with numbers in order to become commensurable; and it is equally true that if they were not transformed into numbers, economics would not even exist for lack of a measurable object. Yet, this does not at all mean that goods are themselves numbers. To claim the opposite is to assume, totally arbitrarily, that axioms can be chosen at will, according to the theoretical structure one wishes to apply to one's object of enquiry. The absurdity of claiming that an apple is a number or that a chair, an airplane, a juridical advice, a nuclear bomb – or whatever other real good or service – is a number should be obvious. No other proof should then be needed to establish the logical inconsistency of GEA in its traditional Walrasian version as well as in its more recent versions. Nevertheless, neoclassical thought being so deeply rooted in our minds, it is not superfluous to add a few arguments to our critical analysis of new classical macroeconomics.

By all accounts, one of the most controversial assumptions of Lucas's analysis is that of rational expectations, that is, the belief that economic agents' expectations 'accord with those that would be generated with knowledge of the "true" model of the economy' (Snowdon and Vane 1997: 267).

Enough has been said about this unrealistic hypothesis. We shall therefore limit our analysis to the new classical economists claim that ‘[t]he postulate that agents optimize means that their supply and demand decisions must be functions of real variables, including perceived relative prices’ (Lucas and Sargent 1997: 280). This claim is perfectly in line with the choice of a neoclassical framework of analysis, the rational expectations hypothesis being ‘imposed by way of adhering to the tenets of equilibrium theory’ (ibid.: 281). Hence, its validity is subordinated to that of the principles of GEA, in particular to that stating that prices are *relative*. If it were true that prices can be determined through the direct exchange of goods, then it would be legitimate to claim that GEA is well equipped to represent the best model of economic reality, and that economic agents form their expectations consistently with it. Unfortunately for the supporters of neoclassical economics, relative prices cannot logically be determined within a system of relative exchange. In other words, relative prices can only be derived from absolute or money prices, since it is impossible to introduce real goods and services in the realm of numbers through their direct exchange on the commodity market. The proof of the logical indeterminacy of relative prices having already been proposed elsewhere, (see Schmitt 1984, 1996, Schmitt and De Gottardi 2003, and Cencini 1982, 2001), let us simply remind the reader that the overdeterminacy of the neoclassical system of general equilibrium is essentially due to the fact that Walras Law is tautologically true once equilibrium has actually been reached. In the whole phase of adjustment preceding exchange, the sum of demands does not equal the sum of supplies, so that the number of independent equations is always greater than the number of unknowns (relative prices). On the contrary, if Walras’s tautology were valid before exchange, every (relative) price proposed on the market (by the auctioneer or by any other intermediary) would be an equilibrium price. In both cases relative prices are undetermined and the system of general equilibrium logically inconsistent. This being the case, it is clear that the new classical economists’ assumption of rational expectations no longer holds true, since, as we observed earlier, its rests on the postulate that agents’ supply and demand decisions are functions of relative prices.

The microeconomic nature of new classical economics is self-evident. Fluctuations in business cycles are attributed to economic agents’ behaviour and the whole analysis is carried out in terms of equilibrium. ‘The central idea of the equilibrium explanations of business cycles as sketched above is that economic fluctuations arise as agents react to *unanticipated* changes in variables which impinge on their decisions’ (Lucas and Sargent 1997: 283). Now, as already noticed, one of the new

classical economics postulates is that all markets clear, which is also one essential feature of equilibrium models. It sounds odd therefore that, in discussing criticisms raised against new classical economics, Lucas and Sargent admit that '[c]leared markets is simply a principle, not verifiable by direct observation, which may or may not be useful in constructing successful hypotheses about the behaviour of these series [time series on employment and wage rates]' (ibid.: 284). If, as recognised by our two authors, market clearing is essential to equilibrium analysis, and if this assumption is unrealistic (ibid.: 284) and not necessarily useful, how is it still possible 1) to consider the markets clearing hypothesis as a postulate, and 2) to keep relying on GEA as the basis for a new approach to macroeconomics?

The fact is that new classical economics has been developed with the intent to provide a theoretical framework in which the business cycle can be analysed using a general equilibrium approach and in which Keynesian macroeconomic models can be advantageously replaced by equilibrium econometric models. This explains why a whole series of choices has been made mainly for technical reasons, the final aim being that of working out manageable models using current mathematical techniques. The choice of linearity and the neglect of learning respond to this kind of requirements. 'There is no *theoretical* reason that most applied work has used linear models, only compelling technical reasons given today's computer technology' (ibid.: 288). Once again it appears quite clearly that microeconomic foundations are closely related to a mathematical conception of economics. Equilibrium econometric models are the most sophisticated form of this attempt at transforming economics into a branch of mathematics – an attempt that could be successful only if the object of economics (produced output) could also be conceived of as an object of mathematics. In other words, economics could be modelled mathematically only if, as claimed by Debreu, real goods were numbers. This not being the case, it is in vain that economists keep on producing sophisticated pieces of mathematical virtuosity. As mathematically elegant and consistent as they may possibly be, models, of whatever breed, have nothing to do with the real world of economics. Mathematics can be introduced into economics once goods are given their numerical form. Yet, the process leading to this integration between goods and numbers is not of a mathematical nature. As we shall see, economics is a science on its own rights that owes nothing to physics or mathematics and whose laws are not derived from agents' behaviour. It will thus become clear that GEA is a blind alley, macroeconomics being logically founded on macroeconomic principles that have nothing to do with the search for equilibrium.

New business cycle economics: back to the homogeneity postulate

In the eighties, new classical economics was put in jeopardy both theoretically and empirically, mainly because of its incapacity to give a satisfactory explanation of business cycles. ‘With sticky prices ruled out on methodological grounds new classical models were left without an acceptable explanation of the business cycle involving money to output causality’ (Snowdon and Vane 1997: 14). As a result of this crisis, a new version of new classical analysis was built based on the assumptions of perfect information relating to monetary variables, predominance of real over monetary shocks, rational expectations and continuous market clearing. Known as the ‘real business cycle’ approach, this new version of neoclassical economics reinstates the dichotomy between real and monetary variables. Hence, the economy is assumed to be subjected to random real shocks affecting the production function and resulting in relative price fluctuations. ‘According to this approach observed fluctuations in output and employment are equilibrium phenomena and are the outcome of rational economic agents responding optimally to unavoidable changes in the economic environment’ (ibid. 16).

The transition from what has been dubbed the *mark I* (traditional new classical theory) to the *mark II* (new business cycle analysis) versions of new classical macroeconomics is characterised by the reversion to a full information assumption and by the adoption of the real business cycle point of view according to which economic fluctuations originate in persistent real shocks. Lucas’s attempt ‘to improve the microfoundations of aggregate supply within a market clearing Walrasian general equilibrium framework’ (Snowdon and Vane 1996: 387) was thus replaced by the real business cycle theorists’ attempt to ‘provide an explanation of aggregate fluctuations which have their origins predominantly in shocks to the supply side of the macro equation’ (ibid.: 387). While in the *mark I* version it is maintained that changes in real output are only short-term effects caused by unanticipated monetary fluctuations (so that systematic monetary policy will be useless even in the short term), in the *mark II* version it is claimed that ‘fluctuations in output and employment are [...] Pareto optimal responses to shocks to the production function, largely resulting from fluctuations in the rate of technological progress’ (ibid.: 389). This is not surprising, of course, since new classical economics is derived from Walrasian GEA, that is, from a theoretical framework where money plays no essential role, and new business cycle economics goes back to the most rigid form of the neutrality of money.

According to the real business cycle theory, fluctuation in output and employment are due to real change, caused mainly by large random variations in the rate of technological change. In fact, so the story goes, technological changes lead to fluctuations in relative prices. Since the response of individual agents to these fluctuations in prices is rationally determined, it necessarily brings about a change in the individual agents' labour supply as well as in their consumption. The existence of a strict correlation between real business cycle and technological changes is thus easily established on the basis of a very simple model derived directly from the principles of GEA (in particular from those applied in the standard inter-temporal general equilibrium models).

As observed by Mankiw in his clear assessment of mainstream economics, the new real business cycle theory is highly controversial even from a 'conservative' viewpoint since it rests on three unrealistic assumptions.

First, real business cycle theory assumes that the economy experiences large and sudden changes in the available production technology [...]. Second, real business cycle theory assumes that fluctuations in employment reflect changes in the amount people want to work [...]. Third, real business cycle theory assumes [...] that monetary policy is irrelevant for economic fluctuations.

(Mankiw 1990: 1653)

Another criticism to the new real business cycle theory relates to the central role played in this theory by the homogeneity postulate. As is well known, the postulate of homogeneity states that a change in the quantity of money leaves relative prices unaltered. In the case monetary policy is limited to a change in the amount of monetary units, this assumption seems hardly controversial. Yet, as claimed by Fitoussi, if monetary policy is given a broader meaning it is possible to show that a change on the monetary side has 'an effect on the equilibrium level of production and employment because it influences the terms of trade between present and future' (Fitoussi 1983: 23). The French economist observes that the weakness of the homogeneity postulate results from the fact that it rests on 'the assumption of the uniqueness of the equilibrium. [While], in general, the equilibrium of an Arrow-Debreu model is not unique' (ibid.: 23). This implies that an increase in the quantity of money only exceptionally leads to a variation in nominal prices that is 'neutral' from the viewpoint

of real magnitudes. Hence, in general, ‘the real coordinates of the economy would not be invariant with respect to monetary policy’ (ibid.: 23).

Referring to the widely shared assumption that macroeconomics must have microeconomic foundations, Fitoussi rightly observes that when macroeconomics is derived from microeconomics ‘the qualitative properties of macroeconomic relations remain indeterminate’ (ibid.: 2). He then concludes that ‘[t]he practical significance of this result is that macroeconomic theory should set itself up as an autonomous discipline and seek also other foundations’ (ibid.: 2). Unfortunately, Fitoussi’s own attempt is that of developing a non-Walrasian general equilibrium theory implying ‘the existence of a multiplicity of equilibria whose real coordinates are different’ (ibid.: 7). His rejection of Walrasian general equilibrium as a meta-theory defining the framework within which macroeconomic models may be founded on microeconomic relations is based on the belief that it is possible ‘that price adjustment ceases before fully accomplishing its function of eliminating disequilibria’ (ibid.: 6). Fitoussi pleads for the adoption of a theoretical approach allowing for equilibrium to be determined through the variation of both prices and quantities. The reasons for doing that span from the need for the economic system considered as a whole to ensure its existence, to the unwillingness that, in the absence of an auctioneer, individual agents may display to go on adjusting until a Walrasian equilibrium is reached. Hence, Fitoussi still looks for the foundations of macroeconomics within the context of equilibrium analysis, even though he widens it to include ‘quasi’ or ‘non-Walrasian’ concepts of equilibrium. Now, it cannot be denied that the validity of Fitoussi’s point of view is closely related to the validity of GEA. Fixed price models, temporary competitive equilibrium models, imperfect competition models are all derived from the Walrasian model of GEA. If it were proved that relative prices are logically undetermined, all these models would have to be rejected as lacking all logical foundation.

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