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Axiomatical examination of the neoclassical economic model. Logical assessment of the assumptions of neoclassical economic model

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Abstract. *We analyze in this paper the main assumptions of the neoclassical theory, considered as axioms, like the rationality of the economic actor, equilibrium of the markets, perfect information or methodological instrumentalism. Attempts to apply to formalism in economy are related to expressing human behaviors in mathematical models and to identifying strict causalities or necessities in the structure of economic behavior. Rationality is a model which supposes that all actors act always by following the pattern of maximization and makes behavior predictable. We consider that the basic principle on which this theory is build is actually human rationality. The individual action which strictly conforms to the principles of optimizing rationality is the most primitive level from which we can deduce the whole structure of neoclassical economic theory. The neoclassical deductive system is based on the axiom of individual universal rationality. If we analyze logically this theoretical construction, we reach the conclusion that rational behavior, which means choosing based on a function of optimum, has the potential to explain all economic phenomenon, at least in an abstract and theoretical manner. It explains the behavior of an ideal agent and of an ideal economy, and its extreme generality makes it a universal principle. Correspondence with reality matters less in this strictly abstract approach compared to the possibility to build a coherent and convincing system. The proposal and axiomatic derivation of formal models was equivalent to discovering a simplified structure, obviously reductive, of the reality, but which offered through its universality the possibility of unitary interpretation of economic phenomenon. Thus the need to offer sure, stable and general foundations characterizes the neoclassical approach.*

Keywords: neoclassical economics, axiomatics, rationality, homo oeconomicus, formalism.

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In this paper we will try to identify the main axiomatic assumptions of neoclassical economic theory related to the relevance of applying a formalization method in economy. Neoclassical economic theory has revendicated a scientific statute only by importing the methods of exact sciences. Economic actor as an atomized individual, characterized by perfect rationality, and who acts always based on the principle of utility maximization, and economic systems acting in an equilibrium state represent the axiomatic foundation for the neoclassical economic model. Methodological individualism applied as a rule supposes that the macroeconomic level can be explained through the aggregated action of rational individuals. Markets systems are represented as closed systems, which have the capacity to self-correct and self-sustain, returning to the equilibrium state.

These assumptions are related to the possibility of building a mathematical formal model for the structure of empirical reality. The axioms of neoclassical economic theory have been necessary in order to build a formal representation of reality, and in their absence neoclassic theoreticians would not have been able to build a coherent system to describe economic behavior. These initial presumptions are imposed axiomatically, and they serve to postulate the economic system characterized by optimal functioning. The need to find some primitive principles that act as universal economic laws is related to the necessity to build a formal system, which explains market mechanisms in analogy with natural laws that govern the behavior of physical phenomenon.

If we don't start from abstract, universal and general premises, we cannot derive axiomatically theorems which can prove that economy is a perfectly coherent system. These axiomatic suppositions thus represent a sine qua non condition in order to build a unique model for individual behavior and for market behavior. In the contrary case, we would be faced with a multitude of representations of economic behaviors, which destabilize the coherence of the model or even make impossible its construction. Just as equilibrium was conceived by neoclassical theorists as being characterized by unity and stability, we need to discover some fundamental repetitive structures of economic reality, with the some traits of unity and stability, which can explain both individual and market behaviors.

Thus we can identity a general behavioral pattern which can explain all economic phenomenons, which represents an assumption prior to any theory, and mathematical formulas have played an important part in imposing these models. With the help of a mathematical formalism, becoming more and more complex, neoclassical economic theories imposed and succeeded to provide explanations apparently valid for any type of economic phenomenon.

Correspondence with reality matters less in this strictly abstract approach compared to the possibility to build a coherent and convincing system. The proposal and axiomatic derivation of formal models was equivalent to discovering a simplified structure, obviously reductive, of the reality, but which offered through its universality the possibility of unitary interpretation of economic phenomenon. Thus the need to offer sure, stable and general foundations characterizes the neoclassical approach.

Of course this approach is from the beginning questionable. Methodological choices have been influenced by the need to build on scientific bases a social science, where causality which rules economic actions is different from the strict causality in the natural field. The need to resort to behavioral axioms and the necessity to discover fix laws which should characterize economic behavior at the individual and social level made neoclassical theoreticians to adopt abstract, general and universal principles, which can be applied not only to economic behavior, but also to any human behavior. The results were perfect theoretical constructions, but in obvious contrast to empirical reality.

Otherwise, any attempt to axiomatize human behavior, economic or non-economic, is from the start problematic. We cannot identify necessary regularities or causalities in the structure of economic phenomenon, and homo oeconomicus, who acts in any situation rational-maximizing, is at most a heuristically fiction, whose role is to ground theories of maximal generality. Within these theories, it is not the truth which matters, but the identification of a structural formal model, which can serve as hypothesis for explaining how economy works.

These abstractions and idealizations represent the necessary ground that ensures the possibility to provide a unitary explanation of the phenomenon. If we do not suppose a representative agent, acting based on a rationality optimizing model, we cannot explain unitary economic phenomenon. The result is the appearance of a rigorous science, deeply grounded on the existence of universal laws and which can produce conclusions universally valid and based theoretically on laws (of consumer, producer, free market). The ideal rational behavior is thus the methodological premise, which ensures stability and coherence to a system build outside the relation with empirical reality.

If we analyze neoclassical economic theory from the point of view of primary assumptions which are necessary to explain all economic phenomenon, its explicative capacity is extremely big, because it succeeds through the postulate of rational behavior to explain all possible economic phenomenon, at microeconomic and macroeconomic level. Friedman claims that a scientific theory is as valuable as it succeeds to offer explanations using as few as possible primitive principles. Scientific understanding is growing as the number of independent assumptions which are used to explain all the cases of a theory as fewer. Science increases our understanding of the world by reducing the total number of independent phenomenon, which we accept as final or given. A world with fewer independent phenomenons is more intelligible than a world with more phenomena (Milton Friedman, 1970).

We consider that this unitary explanative capacity is an essential trait of neoclassical economic approach. Through the unificative capacity of the explanations offered, that is by reducing the number of axioms, which can explain all economic phenomenons, the theory succeeds to unify all economic phenomenons in a single explicative pattern, through the universality and reduced number of primitive axioms used.

State of the art

We consider that the axioms of the neoclassical economic model can be reduce to the rationality of homo oeconomicus and to the state of balance, which characterizes the economic system in general. We will review other attempts to define some fundamental assumptions of the neoclassical economic model. We remark in general the abstract nature of these assumptions, considered axioms or meta-axioms, which are at the foundation of the neoclassical economic theory.

In the literature there have been identified several axioms considered representative for the neoclassical economic model. For instance, Weintrub realized an attempt to systematize neoclassical economic theory. Neoclassical theory can be equivalent with a meta theory, that is it represents a set of implicit rules in order to build satisfactory economic theories. Any theory, which is consistent with these meta-theoretical assumptions, is considered neoclassical. The fundamental axioms of the meta-theory are the following: 1. Individuals have rational preferences regarding purposes; 2. Individuals maximize utility and firms maximize profits; 3. Individuals act independently based on complete and relevant information (Roy Weintraub, 2002). Economic theories can be thus analyzed from the prospect of the presence or not of these meta-axioms and thus included in the category of neoclassical economic theories.

Christian Arnsperger and Yanis Varoufakis reduce neoclassical theory to three meta-axioms, like methodological individualism, methodological instrumentalism and methodological equilibrium (Christian Arnsperger & Yanis Varoufakis, 2006). The explanative model used by neoclassical economists is analytical, which means that socio-economic phenomena are divided and analyzed in the terms of the individuals, which compose the system. Authors claims that homo oeconomicus is no longer defined by unlimited rationality, there are models that refer to behaviors with limited rationality and irrational behavior has been also accepted. The fundamental part that remains is the analytical decomposing by understanding the individual level and extrapolation of principles from individual to macroeconomic level. Explanation goes from the agent and generalizes for the case of the social structure. Methodological instrumentalism can be shortly characterized by the fact that any behavior is determined by preferences. All individual economic actions are instrumented through preferences` satisfaction. Equilibrium is axiomatically imposed to explain economic behaviors and the state of an economic system.

Another attempt to define neoclassical economic model was made by Geoffrey Hodgson based on the following principles: rational, maximizing behavior of economic agents which have fix and stable preferences; states of equilibrium or movements towards equilibrium; absence of the problems of chronically information (Geoffrey Hodgson, 1999).

Colander identifies six main attributes of the neoclassical school: the allocation of resources at a certain moment in time, a certain variation of utilitarism, which plays an

important part, marginal trade-offs, extended rationality, methodological individualism, and the structure of the general equilibrium of the economy (David Colander, 2000).

Tony Lawson considers that the neoclassical project is in fact a form of mathematical deductivism applied to economic science. Deductivism implies that all explanations be expressed as „laws" or „uniformities" or interpreted as actual or hypothetical correlations or regularities of the events (Tony Lawson, 2013). Mathematical methods used by economists (functions, calculus) suppose the existence of some regularities at the level of events. No matter if these regularities are considered as a priori hypothesis or they are afterwards detected, mathematical methods cannot be applied in the absence of these regularities. The existence of regularities also implies that the systems are closed. Deductivism is the doctrine that explains events in terms of regularities, and mainstream economics is just a form of mathematical deductivism.

In a formal way, economics is the logic of rational action and of taking economic decisions, which represent rational choices between alternate uses of limited resources. Neoclassical economic model is universally valid, and its principles could be applied in any society. These formalist models, because they propose an abstract approach, are able to explain human behavior in any circumstances. Individuals make rational decisions in any situation, based on full information, and the final purpose is preference maximizing. Individual decisions are determined by individual preferences. Generally, these suppositions have a tautological value, and they cannot be contradicted empirically. Neoclassical economic theory starts from some universalities and proposes an extremely abstract model, which can be considered universally valid.

We identify in the literature several principles, which ground the neoclassic economic model, which can be finally reduced to assuming the principle of instrumental rationality which leads the action of economic agents and the equilibrium state to which economic systems arrive as a result of individual optimizations. The individual economic agent is the fundamental unit of analysis, which determines through aggregation the behavior of efficient markets characterized by competition and perfect information. Neoclassical explicative models are characterized by linearity and formalism. The individual action, which strictly conforms to the principles of optimizing rationality, is the most primitive level from which we can deduce the whole structure of neoclassical economic theory. The neoclassical deductive system is based on the axiom of individual universal rationality.

Possibility to axiomatize the neoclassical economic theory

We consider that neoclassical economic theory can be constructed as an axiomatic system only if we accept the idea that axioms are merely methodological hyphosesis. Under these circumstances, the recent changes in the axiomatic science, in the senses of renouncing to the idea that axioms must be verified by reality, is replaced by the idea that axioms are chosen arbitrarily, in order to justify a certain conceptual system. If we introduce the

liberty to choose our axioms, then we can accept any deductive system, which is built correctly from the logical point of view. Axiomatic as a mathematical method in its modern form starts even from these premises. We are not interested in the truth of the primitive concepts; we are only interested to produce a consistent formal system.

Axiomatic theories in modern mathematics introduce the liberty to choose our axioms. In the Aristotelian structure of science, axioms represented indemonstrable truths from which we can deduce true theorems, a priori truths about empirical reality, which we accept without any demonstration, being intuitively true. In exchange, modem science admits that axioms can be only hypothesis, which are accepted only if they play an explanatory role in the construction of a deductive theory. In this context, there is absolute liberty in choosing axioms, which have only a methodological role; they become mere elements, which justify a theoretical construction. We no longer search for the truth of primitive propositions, but the study of consistency relations between the propositions of a theory.

If the value of truth of axioms does not present importance, this means that we can build many axiomatically systems, with the condition that these satisfy certain proprieties – axioms must be non-contradictory, independent and complete, so that all the theorems can be deduced from these axioms.

Axioms become thus only conventions, as Poincare said. The axioms of geometry are mere conventions, and our choice between all possible conventions is guided only by experiments, but this choice is free and it is limited only by the necessity to avoid any contradiction (Henri Poincare, 1905).

Hilbert has introduced the axiomatic method as a method which helps us to see the essence of scientific thinking. Science represents the identification of primitive concepts and of deductive and definition rules based on which we can derive all the other parts of a theory from these primitive concepts. We can build any science through the axiomatic method (David Hilbert, 1950).

If we give up to the criterion of truth as an exterior criterion which justifies both primitive concepts and primitive phrases of a theory, then we will be only preoccupied by logical relations which form between the concepts of a theory and to abide by logical principles. Thus conceived, the general formal schema of a deductive theory appears: the axiomatic part includes non-defined terms, primitive phrases (axioms) and derivation rules for terms (definitions) and for phrases (deduction rules). The derived part includes defined terms and proven sentences (theorems).

The meaning and the value of truth of this axiomatic system are replaced with the preoccupation for applying syntactic rules – the construction of a system is the construction of a coherent syntactic language, where the meaning of the concepts used is not important.

The application of the axiomatic method in economics starts from the observation of modern axiomatics that mathematical systems are not anything else but logical systems, where theories are built on deductive bases. This model can be applied in the case of social sciences as well, which can be seen as deductive logical systems, the main difference being that within economic systems theoretical conceptualizations refer to real phenomenon, unlike mathematical systems which are only abstractizations without correspondence in reality.

We will analyze further this possibility to apply some formal models for the interpretation of economic phenomenon. Any mathematical formalization supposes the identification of patterns in the structure of a system which offers it defining characteristics and the possibility to explain any behavior based on these characteristics identified. Because formalization entails inevitably simplification, it is difficult to resort to generally valid laws while explaining economic behavior. If we simplify reality too much, this will result in falsification and then our model will not reflect adequately the characteristics of the system. The complexity of the social subjective behavior cannot be reduced to a strict number of parameters and rules which can condition economic behavior. In reality, economic agents are motivated by purposes and act in interaction with other participants to the economic process.

Economic system is different from physical systems, where there are a small number of parameters, and laws are fixed and established through repeatedly experimental verifications. Economic phenomenon have their own dynamic, which make them difficult to be measured mathematically, and laws are not precise, economic behaviors being often impredictible. Thus, any axiomatic theory of economic behavior must express behaviors which have various motivations and are characterized by complexity (David Colander, 2008). The attempt to reduce this complexity to a formal model is achieved by finding an equation or set of equations which corresponds to these data. Models are afterwards tested by comparing their predictions with empirical reality, using statistical instruments. These models are generally linear and static, because they are the only ones with unique, determinist solutions (Robert Nadeau, 2013).

To reduce a social behavior to a set of equations is not the same thing with expressing mathematically physical laws. Social determinism is fundamentally different from natural determinism. Formalism in economy is based in principle on the possibility of measuring and interpreting in a deterministic manner economic behaviors. While the laws of physics can be confirmed empirically, economic laws have only a subjective existence, they are only theoretical inventions in order to introduce order into reality and thus explain the evolution of economic processes as a type of rational deterministic evolution.

We have here an ideal model which supposes that economic behaviors are linear determinist, which helps to identity constants. Economic agents are considered homogenous, and the principles of behavior are universal. But economic behavior is

changing under the action of time and external influences, and all these influences are difficult to be taken into consideration and especially to be expressed mathematically.

Equations from physical theories contain variables, which have a correspondence in physical reality, and their predictions are tested experimentally. In economic equations variables are self-referential functions, which do not have any correspondence in empirical reality. Not being principially possible to infirm or to confirm them, these functions cannot produce really scientific theories, because there is no objective basis for their verification. The obvious conclusion is that we do not have any modality to prove that the theory is valid or invalid in scientific terms (Daniel M. Hausman).

Axiomatization in economy supposes therefore the identification of those regularities of economic behavior, which can be considered universal and general, and through transposing these behavioral models in equations formalism is equivalent to causal determinism. Postulation of these fundamental principles contributes to the construction of an axiomatic system rather normative than descriptive, because social behavior is not objective and constantly deterministic.

Homo oeconomicus is governed by constant laws and acts always in a rational maximizing manner, and does not bear any influences of temporal or social nature. It is simply an entity, which calculates irrespective of the context which is the action which satisfies better the preferences and he cannot commit errors in his choices. The knowledge of all variables is supposed to be complete, because economic actors have perfect information. Economic actors are conceived in an abstract manner, acting independently of external circumstances and independently of time dimension.

Main hypothesis of the neoclassical economic model

We will analyze further the main assumptions on which the neoclassical economic model is based. We consider that the primitive axiom in this axiomatic deductive system is individual rationality, from which all the other theoretical assumptions are derived. As individual behavior is rational, the conclusion is that the choices are efficient, they suppose the optimization of a function-objective, under the conditions of existence of external restrictions or constraints, and the cumulate effects of these individual behaviors produces at macroeconomic level the equilibrium functioning of the markets.

Methodological individualism is used as a methodological principle, which allows to derive in a deductive manner the neoclassical economic theorems from the axiom of rationality, by considering the individual as irreducible analysis unit. Economic phenomenon are explained through the action of the individuals, which seek to maximize utility. From the individual behavior considered rational are deduced universally valid laws. In all the economic analyses the starting point is universal sooner than particular, and this universality is ensured by postulating the existence of an individual who has tastes and preferences which determine his choices, and which appears as an abstract,

temporal construct. If the leaving point is universal, the analysis based on these universal considerations will produce general and ahistorical conclusions and truths.

The departure point is the abstract, ahistorical individual. Axioms about individual behavior have been obtained by applying some optimizing rational principles, and institutions and social relations have been excluded from these analyses or have been interpreted in terms of general universals. This individual is represented atomized, far away from relations and from social environment.

Starting from these premises of extreme generality and abstractness, neoclassical theoreticians do not refer to any economic system in particular, but to economy in the most abstract manner, because their analyzes want to identify common elements of economic behavior.

Homo oeconomicus is defined as an agent who acts rationally (in the sense of behavior consistent with self-preferences), his decisions are based on maximizing personal utility through sophisticated analyzes cost-benefit, which always materialize in the best decisions, and pursuing self-interest, that is selfishness, is his trait of behavior. Homo oeconomicus acts in order to obtain the greatest well-being for himself, in a situation defined by constraints, and this type of optimizing behavior was formalized in neoclassical economic models. Economic agents are homogenous, which represents of course a methodological simplification, and their aggregate behaviors explain the action at macroeconomic level.

Actors are mechanical automates, not distinct individuals. These abstract presuppositions lead to the incapacity to recognize and analyze different behaviors and modalities of action or different economic systems. Everything is reduced to the rational individual who acts on the market.

To this sense it is obvious that it is manifested a certain imperialism of the economic science, through the fact that the main assumptions of the theory – rational behavior based on pursuing self-interest, competition and rarity, apply to all sciences. The hypothesis of homo oeconomicus as a rational actor is applicable to all social sciences, being in this sense a universal behavior model.

Rationality

The theory of rational choice is a formal or logical-mathematic theory. Rational action is defined axiomatically. An action is considered rational only if it respects certain axioms. These assumptions are a apriori, they do not depend and they cannot be infirmed by empirical experience. If the observed behavior does not comply with these axioms, this means it is irrational behavior, but not that the model is false. The theory of rational choice is interpreted normatively and proposes an ideal behavioral pattern.

Axioms are considered in neoclassical economic theory propositions obviously true, which express our preanalitical intuitions about rationality. Rational behavior is behavior based on axioms which satisfy the criteria of consistency, being a behavior organized logically-deductively. Axioms work like the rules of formal logic which describe conditions of consistent thinking.

The standard version of the theory of rationality starts from the following assumptions regarding human behavior: there is a set of possible actions which each individual can do and which lead to certain consequences. Individuals have a mental order of preferences which determine their choice and they also know all possible consequences of their actions. They evaluate all these consequences and choose the optimal alternative, taking into account existent constraints.

There is a coherence between choices, preferences and constraints, and economic decisions are based on perfect information and on the knowledge of the situation defined depending on restrictions and preferences. The choice is the result of a complex computing activity by applying an optimum function – the alternative which maximizes utility and personal welfare.

"Calculus" is totally independent from individual mental activities. The role of rationality is normative. Rational choice is not a psychological activity of pleasure maximization, but an optimal calculus irrespective of psychological processes, which chooses optimal alternative in any given situation.

Rationality means to choose depending on an order of preferences which are axiomatically defined, through the criteria of completeness, transitivity and independence.

Rational choice is defined within neoclassical economic theories as a choice based on a set of predefined preferences, which are considered to be stable in time. A consistent choice means to choose depending on the hierarchy of preferences. The choice will maximize personal utility, by choosing the preferred alternative. The interpretation of preferences which best suits the axioms and economic practice considers preferences as being totally subjective comparative evaluations (Dinga, 2014).

The individual acts in this model strictly deterministic. His choice is obligatory defined in terms of preferences and beliefs, and the function of preference obliges us to choose the maximizing alternative. Rationality is equivalent to automat behavior. We cannot choose but in conformity with our own preferences and we cannot choose but the maximizing alternative.

Economic decisions are always the result of an optimal calculus. Homo oeconomicus becomes thus a man who acts axiomatically.

Preferences seem to represent the key to economic choice, condition our decisions and seem to be considered stable, at least in some neoclassical models. On the way the interpretation given to these preferences changed, both exogenous and endogenous

preferences have been introduced, and the role of social environment and of interactions was included in the definition and outlining of the set of preferences.

In this model the attribute of rationality which is supposed to characterize human choice will determine the choice of that alternative which is optimal, that is the best compared with the actionable interests of the subject. Rationality offers us the possibility to establish some laws of the type of natural laws when we explain human action. Resorting to rationality and postulating it as initial methodological principle makes the subjects act predictable.

If we admit the rational behavior of human subject, then its decisions and choices will take place within a model of rationality and they will follow with the same logical necessity with which we deduce events determined by physical laws. Rational behavior becomes thus a causal behavior, within a certain model of rationality. If we choose a specific model of rationality, the result which follows is necessary and more exactly, it is about a logical necessity (Lansana, 1992).

The postulate of rationality describes only the behavior of homo oeconomicus, a theoretical construction better described as an ideal type. And the utilization of an ideal construction, which does not have empirical content, as the core of an empirical theory, can be justified only on normative bases (Blaug, 2003).

We can remark that economic laws are based on simplifying and therefore false assumptions about human nature. Economic laws are based on the axioms of the theory of rational choice. According to this theory, individuals will act under any circumstances in a rational manner, rationality being instrumental, by making cost-benefit analyses which result in the maximization of personal utility. These assumptions postulate that under any circumstances individuals will act in this rational – optimal manner, although exceptions from this behavior have been observed through various experiments which prove the deviations from the axiom of rationality.

Economic behavior is not instrumental, and is not strictly individualist, oriented only through pursuing self-interest, but it is determined and influenced by social norms, customs or traditions. As a consequence we can remark that the so-called economic laws are sooner theoretical postulates which prove that economy is ruled by laws, although experimental proofs indicate that there are no laws acting in economic behavior – like for instance rationality.

So both the generalizations and the discovery of laws which govern human behavior are problematic within social sciences. Of course, if we accept a model of rationality which characterizes individual behavior, than we can hope to identify regularities in human behavior only starting from a priori assumptions. Yet this is not easy to achieve. The postulate of a representative economic agent which acts in any situation in a rational manner, in the sense of taking the best decision by comparing advantages and by maximizing the function objective, is at most an explicative ideal, but it does not propose

but an image which cannot be applied in empirical reality and which does not help to discover regularities, but starts from the premise that these regularities are accepted previously to any research.

Economic equilibrium

Neoclassical economic theory reduces everything to market mechanism and conceives social relations as if they take place through exchange and market contracts. Market and exchange determine all relations between individuals. All human relations are treated as if they were market transactions. The hypostasis of homo oeconomicus is that of participant in economic processes, as consumer or producer, and its action oriented to the fulfillment of self-interest is producing equilibrium on the markets where he acts. The realization of the optimum function means to make rational choices and to have as result individual welfare.

Neoclassical economists consider that economy functions in state of equilibrium, the law of demand and supply act in order to reach equilibrium on the market via the mechanism of prices. If individual economic agents act rationally and efficiently, their cumulated actions produce at macroeconomic scale the effect of a perfectly coordinated activity. Neoclassical economic theories consist in theorizations of equilibrium as final static states with little attention to the stability of equilibrium or to the process through which we reach a state of equilibrium (Arrow and Debreu, 1954).

The transition mechanism from one state of equilibrium to another is not analyzed, and equilibrium is considered more a given state of the systems, towards which these tend automatically.

Because markets are self-regulating, the system will return in an automatic manner to the state of equilibrium, without being necessary policies or special measures of intervention from the state. The maximizing behavior of the economic agent will result in the final place not only in self-well-being, but also in general well-being, through the mechanism of the invisible hand.

Economic markets act based on economic efficiency, having the capacity to produce maximal utility effects with minimal costs, by introducing rationality as a principle of action. The approach is quantitative and mercantilist.

Economic well-being is related to Pareto efficiency. Pareto efficiency means that all resources are maximally utilized, that is there are no resources which are not engaged in the economic cycle. Pareto proposed a mathematical formula to define the equilibrium of a social system by establishing the points where there is maximum of ophelimity for each individual. Ophelimity comes from the satisfaction given to an individual by the consumption of a quantity from an economy good. Free markets have thus the most efficient mechanism for resources distribution.

According to the neoclassical theory, the economic system reaches equilibrium in an automatic manner. Any external shock is incorporated by the system, which reaches again equilibrium. Neoclassical authors analyzed less the mechanism through which we can reach the equilibrium. Walras offers an explanation for this process of transition between distinct phases of equilibrium by introducing the concept of exploration, where demand, supply and prices are balancing reciprocally. This phenomenon takes place as if there is a fictional agent which collects information about quantities of goods and services which consumers want to buy and producers to offer on the market and would establish the prices depending on the rarity of these goods offered though the market. Equilibrium prices are established via repeated trials and explorations, until we reach that price which reflects the value of the good and corresponds to the position of equilibrium between supply and demand. The representative agent generated through his rational action a unique equilibrium, which is characterized by the existence of a fixed structure of prices.

This situation of economic equilibrum is identified as an optimum of individual and social welfare. K. Arrow and G. Debreau presented the two theorems of the welfare economy. These theorems start from certain hypothesis regarding the functioning of the economy – perfect competition, homogeneity and the continuity of the production and demand functions and analyze the possibility of the existence of an optimal state for resources allocation. The equivalence theorem postulates that any state of general equilibrium under conditions of pure competition is optimal in the sense of Pareto. The second theorem states that any state of optimal in the sense of Pareto can be obtained as a state of Walrus equilibrium through the reallocation of dotations with initial conditions. Thus, the equilibrium state is characterized through the efficient allocation of resources and economy tends to return to this state, even if it goes out provisory from the state of balance (Alex Rosenberg, 1992).

Markets are not characterized through perfect competition. The atomicity of the market supposes that economic agents are sufficiently many in number so that none of them can influence significantly the situation of the market. It is supposed that there is the same freedom of access on the market, products transacted are homogenous and there is access to information for all participants at the market. In fact, information is considered perfect, and information about prices is included in price.

The action of free market leads to an efficient reglementation, that is one will reach a stable equilibrium, characterized by optimal allocation of resources. If consumers and producers act rationally-optimally, then the markets where they act will act efficiently, distributing resources optimally. If we conceive thus rational action at individual level and at the level of the markets, the equilibrium can be deduced from this model of rationality. The equilibrium is important for economic theory not in the last instance due to its predictive power. An economic system in equilibrium or which is under the way to equilibrium is a system whose future states are completely predictable (Ackerman, 2002).

The aggregation of individual behaviors produces at macroeconomic level the effect of a coordinated action which will result in market equilibrium. Yet, as has been remarked, the aggregation presents several problems. The difficulties of a theory of equilibrium characterized by unicity and stability come from the difficulties of aggregation and the individualistic model of consumer behavior. The modification of economic theory in order to overcome these problems will need a new model of consumer choice, non-linear analyses of social interactions and the recognition of the central role of institutional and social constraints (Vernant, 2010).

Logical evaluation of the axioms of neoclassical economic model

We will try further to evaluate from the logical point of view the main axioms of the neoclassical model identified in the literature. Any axiomatic system must respect a few rules or metalogical proprieties. If we analyze any axiomatic system from the prospect of these metalogical requirements, we can establish if deductive systems are or not correctly build from the point of view of respecting formal rules.

The first propriety of any axiomatic system is consistency – an axiomatic construction should not contain any contradictions. A sentence and its negation cannot co-exist inside a consistent system. The law of non-contradiction stipulates clearly that we cannot accept in the same time a formula and its contradiction.

A system which contains negation cannot give birth at the same time to a sentence and its negation. Generally, a system is consistent if it does not allow the demonstration of any formula well formed. Para consistent logics weaken this exigency.

The second propriety of an axiomatic system is completeness. Completeness refers to the fact that any proposition belonging to the system can be either accepted or rejected, that is if we have two non-contradictory propositions; one of them should be valid inside the axiomatic system. This propriety ensures the correspondence between syntactic demonstration and semantic validity.

The third characteristic which an axiomatic system should respect is independency. No axiom should derive from the other axioms. Axioms must be thus introduced so that an axiom cannot be deduced from the rest of the axioms. This exigency is only heuristical. A possible method to verify if the condition of independence of the axioms is satisfied consists in testing, for instance by reducing to absurd, if an axiom is demonstrable, starting from the others.

If these proprieties are respected, then the logical coherence of the system is ensured and this is correctly built from the formal point of view.

If we analyze from the perspective of metalogical requirements above mentioned the axiomatic system proposed for the neoclassical economic theory, then we consider that especially the principle of axioms` independence is not respected. Our opinion if that the

axiom of rational behavior is the most primitive, out of which all the other axioms can be deduced.

We will analyze in turn each axiomatic proposal of the neoclassical economic model. Weintrub speaks about a meta-theory whose axioms are the following: 1. Individuals have rational preferences regarding purposes; 2. Individuals maximize utility and firms maximize profits; 3. Individuals act independently based on complete and relevant information. Rationality is the fundamental level from which we can deduce axiom 2, maximization of utility, because any rational behavior in the economic sense will pursue the satisfaction of preferences by maximizing the function objective and also axiom 3, because perfect rationality supposes access to all relevant information and processing capacities. The last two axioms are not independent, but they can be logically derivable from the axiom of omniscient individual rationality.

Christian Arnsperger and Yanis Varoufakis reduce neoclassical economic theory to three meta-axioms, precisely methodological individualism, methodological instrumentalism and methodological equilibrium. We say that methodological instrumentalism as individual principle is the most primitive level of the analysis. The equilibrium as a general state of economy is a result of the actions of optimization realized at individual level, and methodological individualism is not an axiom, but a methodological principle according to which all collective actions can be reduced to individual actions, that is the analytical unit of analysis is rational individual.

We analyze further the proposal of Geoffrey Hodgson to axiomatize neoclassical economic theory: rational, maximizing behavior of economic agents who have fixed and stable preferences; states of equilibrium or movements towards equilibrium; absence of the problems of chronical information. Economic agents are those who explain both equilibrium states at macroeconomic level, and perfect rationality could not be conceived outside access to all relevant information for the decisional situation. In conclusion, preferences of individual agent explain all economic phenomena through rational action.

Another author who treats the problematic of axiomatization of neoclassical economic theory is Colander, who identifies six main attributes of the neoclassical school: allocation of resources at a certain moment in time, a certain variation of utilitarim which plays a central role, marginal tradeoffs, extended rationality, methodological individualism, the structure of the general equilibrum of the economy. We claim that individual rationality in the sense of consistent satisfaction of preferences based on full information is the fundamental axiom from which all the other assumptions derive. The efficient allocation of limited resources implies rational behavior which takes optimal decisions in any situation, utilitarism supposes to follow personal satisfaction through principles of rational action – any choice of some alternatives will maximize personal utility and is based on the principle of following the self-interest, any calculus is based on marginal variations of utility – a perfect rational calculus of advantages compared with the costs implied by a certain choice. Methodological individualism supposes to treat

individual as the final unit of analysis. Individual behavior can explain macroeconomic behavior through aggregation.

A complete system can prove all valid formula. Although this is not a condition absolutely necessary, it is obvious that this is an advance. Inside a contradictory system one can prove a thesis and its negation. This thing is unacceptable, because, in the ordinary meaning of negation, a sentence and its negation cannot be both of them true concomitantly. To fulfill the condition of non-contradiction is thus necessary in any axiomatic system. In an independent system, at least one axiom can be proved based on the others. This means that this axiom can be proven, and it is not necessary to consider it as an axiom. Thus, if an axiom derives from other axioms, we can no longer consider it an axiom. Thus, the axioms of the neoclassical economic theory are reductible to one single axiom, the axiom of individual rational behaviour, which explains all economic phenomena.

Conclusions

Neoclassical economic theory is characterized by ontological and epistemological universalism. Abstractions or simplifications on which this theory is based, especially the axiom of rationality of individual agent, are valid in all contexts, for any economic system. Formalization, linearity and equilibrium are fundamental characteristics of this model.

If we start from the assumption of homogeneity of economic agents which are characterized by perfect rationality, then the model proposed can explain all economic phenomenon. This model is rather ideal, axioms and theorems are prescriptive, they propose a model of behavior that cannot be verified in empirical reality, but it is only a desiderate, a normative model.

The axioms of the neoclassical model do not have descriptive content, but rather prescriptive. The role of theoretical pressuposions on which neoclassical economic model is based is not to offer realistic descriptions of the facts. The assumptions are merely instruments which we use in order to develop testable hypothesis and to make predictions based on them. Really important and significant hyphotesis have assumptions which are descriptive incomplete representations of reality and the more significant a theory is, the more unrealistic are its assumptions (Milton Friedman, 1966).

The lack of realism of the axioms of neoclassical economic theory is thus related to the importance of the theory. The lack of descriptive accuracy is proportional with the explanatory power of a theory. The more phenomenon the theory explains through abstract hypothesis which subsume a large class of events, the greater is its explanatory power. The more abstract and general a theory is, there are more chances that it is all inclusive and explains more phenomena. The risk implied in this kind of approach is to lose contact with reality. In this case, the tradeoff is between theory and the reality the

theory refers to, between generality and the incapacity to refer to a complex and historical reality.

Neoclassical economic theory cannot satisfy the requirements regarding verification and falsification. If a theory is not constructed so that to allow falsification, that is if we cannot build descriptive propositions based on prescriptive propositions of the theory, then the explanations offered by the respective theory are problematic. The criterion for testing the truth of a theory is no longer correspondence with reality, but becomes coherence or internal consistence of a theory. From this point of view, axioms of neoclassical economic theory are actually theoretical constructions, without correspondence in reality. The axiom of rational behavior is only a postulate which explains economic behavior under ideal conditions, but does not explain real actions and phenomenon which take place within economic processes.

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