ECONOMICS' TWO METHODS

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Paper presented at the European Association for Evolutionary Political Economy XVth Annual Conference, Maastricht, November 7-10, 2003. Revised in November 2005.

Abstract. There are two methods used by economic theory: the hypothetical-deductive method used principally by neoclassical economists, and the historical-deductive method adopted by classical and Keynesian economists. Both are legitimate, but, since economics is a substantive, not a methodological science, whose object is the economic system, the later method is more adequate. The hypothetical-deductive permits that the economist, starting from some basic assumptions – principally the maximizing agent –, deduces a consistent and mathematical theory, but at the cost of realism and relevance. Eventually the models so derived are useful tools but limited theories analyzing the economic system. In contrast, the historical-deductive method starts from the empirical observation of reality and the search for regularities and tendencies, as do the substantive sciences. As economics is a social science, such empirical reality is historical, formed of open systems, which only allow for incomplete and partially indeterminate models, but with superior explicative and predictive power.

A central theoretical problem involving economics and, more generally, all social sciences is the choice of the preferential method of inquiry. Since Stuart Mill's classical 1836 essay, and particularly after the neoclassical or marginalist school became dominant, a large part of the profession adopted a hypothetical-deductive method, although the more specific method for a substantive discipline is the empirical-deductive, and, for a substantive social science, a historical-deductive method.[1] Only with Keynes and macroeconomics revolution, the historical-deductive method, which had been used by the classical economists to understand the capitalist economic system and its growth on the long run, came out again to be fully used, now to build a general theory of the short term economic fluctuations and of the policies to achieve stability and growth. Soon, however, neoclassical economics, looking for the microfoundations of macroeconomics, began the process of returning to the hypothetical-deductive

[1] I am assuming here a basic classification of sciences, distinguishing the 'methodological sciences', like mathematics and statistics which do not have an object but are methods, and the 'substantive sciences', which have. The later are subdivided into natural sciences, like physics or biology, and social sciences, like economics and sociology.

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This paper was written based on the course of Scientific Methodology for Economists that I teach since 1989. My special thanks to my students in this course, and particularly to Ramón Garcia Fernandez and José Marcio Rego, who divide with me the responsibility for it. I am grateful for their comments, and for those of Adam Przeworski, Victoria Chick Alain Herscovici, Gilberto Tadeu Lima, Marcos Ribeiro Ferrari, Paulo Gala, Robert Nicol, Solange Marin and Yoshiaki Nakano.

method which is more compatible to mathematical treatment. Yet, as economics deals with complex social and institutional realities, which cannot be reduced to simplicity and precision of a hypothetical-deductive method, this attempt failed, and present macroeconomic theory is a pragmatic constellation of models, often destitute of relevance. In order to be reasonably consistent with its open object, economists should recognize the substantive character of economics, and primarily use the historical-deductive and only secondarily the hypothetical-deductive method. Yet, in the search of the mirage of full consistency, many of them insist in giving priority to a method which is rather suited to build methodological tools than to directly understand the economic system.[2]

The hypothetical-deductive method is specific of methodological sciences, like logics, mathematics, and statistics. These are sciences that have no object except the one that is rationally constructed; they do not make the analysis of an external reality, but are methods of reasoning. Descartes, who is widely viewed as the main founder of modern thinking, observes that mathematics is the only discipline which is endowed of evidence and certitude, and suggests that it should be applied to all sciences. Kant followed him in this matter. Although acknowledging that mathematics has no object except the one that is built formally by reason, he views it as the science *per se*, the one in which *a priori* reasoning through precise deductive demonstrations is fully achieved. Physics, although an empirical science, is partially able to reach this ideal, in so far as – with Galileo and Newton – it became able to build formal models to be verified empirically in a second moment. Thus, these two great philosophers establish a mathematical ideal for the substantive sciences – natural and social – ignoring or underestimating the fact that, differently from mathematics and logics, the substantive sciences have an object or substance, and that this object is complex and can only be effectively analyzed if it is empirically investigated, if induction and deduction are systematically combined. Kant insists in this combination, but the idealistic precedence that he gives to *a priori* reasoning is an eighteenth century truth which must be reconsidered after the growth of the natural sciences and, particularly, the social sciences.

In this paper, I will discuss this central methodological question. My claim is that social sciences and particularly economics have been victim of this arrogant Cartesian project of reducing a complex reality by means of a method which can only be dominant in the methodological or procedural sciences. Although natural scientists and economists readily admit the need of a positive or empirical method to study their respective objects, they contradictorily hope for an absolutely precise model of such reality which only a hypothetical-deductive method can provide. If such ideal is not achievable in the natural sciences, even in physics, where the elements forming the systems being studied have no freedom or choice, what to say of the social sciences, where humans not only have such freedom but learn through history, build institutions, and modify their behavior accordingly? My claim is not that economists should not use the hypothetical-deductive method, but that it should play a subordinated role in relation to the historical-deductive one. The economist needs the hypothetical-deductive method

[2] Since the hypothetic-deductive and the empirical or historical-deductive method share the word 'deductive', it could be dispensed. Yet, I keep it to emphasize the importance of deduction in any knowledge process, and also, in the case of the historical-deductive method, not to confuse it just with historical analyses which would not reach for the deduction of a theory.

to develop many of the concepts and tools or partial models that he utilizes, but, in so far as his object of analysis is the economic system as a whole, how it is coordinated and how it changes, the method that he will principally use will be an empirical or historical one – a method that I call historical-deductive. Historical because it starts from the observation of an empirical reality; deductive because, after the induction or abduction from the observation lead to some propositions, a series of deductions starting from them will be necessary to achieve a general vision of the economic system. In this way, the historical-deductive method conduces to the formulation of historical models or of ideal type in Weberian terms, in which, on one side, we have concepts classifications, on the other observed regularities and tendencies forming meaningful theories.

In the first section of this paper I will introduce the discussion of the two methods; in the second, I will situate both methods in a broader context; in the third, I will concentrate myself in the hypothetical-deductive, and in the fourth, in the historical-deductive method. In this central session, I will make a reference to my own specific form of working with the historical method: what I call the 'new historical facts method', but my main concern will be more general: to explain why the historical-deductive method is more appropriate to a substantive science such as economics, in comparison with the hypothetic-deductive method, which is rather adequate to develop methodological tools than to build an explicative model of real economic systems.

The object of economics and the two methods

It is often said that economics is a box of tools, or, a collection of models. Yet, although correct, this claim is partial. If it was to be accepted, economics would not be the science of production and distribution, but a mere collection of tools to be used in the analysis of the economic systems. Such definition fails to define the central objective of economic analysis: to provide a theory of the economic systems, to show how to achieve stability while permanently changing, how to coordinate, distribute income, and grow. An economic system is a social or historical system based on work and oriented to the production of wealth. Social systems may be seen from other perspectives than the economic one, among which the political one is the central. The more relevant social system in capitalist societies is political: it is the national-state. Yet, the economic function is important enough and self-directed enough to allow for and require a separate although not fully autonomous analysis.

The object of economics is the modern economic system. While mathematics or statistics do not have an object – are methodological sciences – economics is a substantive or ontological science dealing with an existing social reality.[3] Economic systems are based on two major economic institutions regulated by the state in each country: the market and money. Both are socially built institutions which allow for the exchange of goods and the correlate division of labor, and define the allocation of resources and the distribution of income. As it is the case of all systems, the economic has an underlying principle or logic. All living systems have survival as their basic foundation. Economic system's organizing principle is more than just survival: since work is its basic constitutive element, the logic of the system is to achieve the material

[3] Lawson, 1997, 2003.

welfare of its members. In modern capitalist economic systems, an additional step is involved: since each modern society counts with a major tool to organize collective action – the state – such underlying principle is not just wellbeing, but economic stability and sustained economic growth.

Economics aims to understand actual economic systems in several levels of abstraction: from the more general, international and national levels, to the industry and local levels. On one side, the problem is to know how these systems allocate resources and distribute income; on the other, how they keep stable and grow. Microeconomics offered a general and compelling answer to the first problem; Keynesian macroeconomics, to the second. In fact, however, neither the Walrasian general equilibrium model, nor the partial Marshallian one offers an effective view of the whole economic system. They are rather major market models, lacking money and other institutions which are essential to a minimally comprehensive picture of the whole. More generally, microeconomics contains major tools to understand the economic system. Yet, a general theory of how economic systems effectively operate in the short run was first formulated by Keynes's macroeconomics. A more loose theory of how economic systems grow through time had already been developed by the classical economists, particularly by Smith and Marx.

Smith and Marx understood that the object of economics – or of political economy, as they called the discipline at their times – was the capitalist system. They were interested in understanding the logic behind the way capitalist economies allocated resources, which both identified as the labor theory of value and prices, and in understanding how they grow, which Smith found in the division of labor and in capital accumulation, and Marx, in capital accumulation and technological progress. Keynes, again, was concerned with the understanding of the actual economic system, but on a more short term perspective, rather the perspective of stability and full employment than of growth. In between, the neoclassical or marginalist school attempted to build a microeconomic alternative to the classical and what would be the Keynesian theory, but was just able to reach an extremely abstract view of a market system, which, although having heuristic qualities, has little connection with the actual capitalist economic systems.

In fact, while classical and Keynesian economics had been able to offer an analysis of the economic system, the neoclassical economics was rather capable to offer tools to its understanding. Why that happened? Why neoclassical microeconomics remains in a level of abstraction that limits its role to the condition of a box of tools or a collection of models, instead of the analysis of the economic system? Why are neoclassical economists often constrained to adopt concepts and tools which are inconsistent with its microeconomic foundation,[4] when they want to pragmatically understand the macroeconomic system?

My answer to these questions, the central claim of this paper, is that this happens because neoclassical economics uses a hypothetical-deductive method, which is intrinsically limited to be a tool, while classical and Keynesian economics uses a historical-deductive method which is able to gauge the economic system. Economics uses two methods, which have limitations and potentials. In so far as the object of

[4] Like, for instance, the 'Taylor rules'.

economics is an existing economic system, i.e., an aspect of the social systems involving production and distribution of goods, the method which is directly applicable is an empirical one, the historical-deductive method. Yet, in so far as the production of goods and services is subject to quantification and reasonable translation in terms of prices and money, it allows for the development of tools of analysis for which a hypothetical-deductive method is useful.

In order to understand the economic systems, economists develop essentially three different economic theories: the classical political economy's long-term growth model; microeconomics' general and partial equilibrium models; and the Keynesian macroeconomic model. The second theory adopted an essentially hypothetical-deductive method, while the other two, a historical-deductive method. Although the classical economist did not know the macroeconomic expression, from now on I will refer to both theories as development macroeconomics, or just as the macroeconomics. What to say of 'neoclassical macroeconomics'? My understanding is that there is not such a thing, in so far as Lucas' attempt to reduce macro to microeconomics, i.e., to make macroeconomics hypothetical-deductive, failed. Neoclassical economists' contributions to macroeconomics, beginning with Friedman's adaptative expectations theory, were only possible in so far as they adopted an historical or empirical-deductive approach, and just looked for microfoundations *a posteriori*, not *a priori* as it is done in micro theory.

The two perspectives are legitimate. Despite the inability of the micro approach to gauge the actual economic system, it is unthinkable not to use this extraordinary tool to understand and to develop policies aiming to protect market competition. The economic system gains transparency with the use of both methods, but at a cost. In the case of the micro approach, at the cost of missing the object of economics: of not really providing a realistic and operational analysis of the economic systems. Actually, the general equilibrium model does not allow for much more than just proposing policies or reforms calling for the obvious gains involved in market competition. In the case of the macro approach, the object is reached and gauged, and from its analysis it is possible to deduce sensible macroeconomic policies, but at the cost of a certain degree of imprecision in the drawing of the model – something that is unavoidable when one deals with complex, open-ended social systems such as economic systems.

Why don't we unify the two theories? Why don't we find the microfoundations of macroeconomics – this Holy Grail searched by so many theoretical economists – in such a way as to have only one encompassing economic model? Several answers have already been given to this question. Bresser-Pereira and Lima (1995) offered the answer which I am using to define economics' two method. They are not reducible one to the other because scientific theories depend on the method they use. While microeconomics and the general equilibrium model adopt a hypothetical-deductive method, macroeconomics is based on a historical-deductive method.[5] Another way of saying that

[5] I have initially developed this idea in a paper which, however, ended up only being sketched (Bresser-Pereira e Lima, 1996). Besides widely developing the discussion of the two methods, in the present paper I change to more adequate names. I substitute historical-deductive for historical-inductive, and hypothetical-deductive for logical-deductive. I only eliminate a tautological element that impaired the previous denominations; I also make it clear that the historical method to which I refer is deductive, as every theory-building process is.

would be that general equilibrium model adopts a radical methodological individualism while macroeconomics adopts a holist historical-institutional approach, but I will argue that this distinction does not correspond to the one that I am proposing, and is less useful. The central argument of this paper is that the essential methodological distinction that is necessary to understand economics is the hypothetical X historical distinction. Since scientific theories depend on the methods they use, in so far as a science uses more than one method, two consequences derive: first, it is essential to have a broad view of the discipline; second, any attempt to reach its full unification finds an intrinsic impediment. A reasonable unification, however, is possible provided that we understand that the basic method to be used is the historical-deductive, which is appropriate to a social science as it is economics, reserving for the hypothetical-deductive method a secondary but important role of building some tools that will be useful in the analysis of the economic systems. Why cannot or should not the hypothetical deductive method be used preferentially, but can be adopted as a supporting device to the historical or empirical method? To answer this question, we first have to define more precisely the two methods.

The hypothetical-deductive and the empirical or historical deductive methods are analytical methods. While the empirical-deductive method is the specific general method adopted by natural scientists, the historical-deductive one is used by social scientists. Yet, in order to distinguish the later two methods, a distinction between the analytical and the dialectical methods is required. While the analytical method is applicable to the methodological and the natural sciences, particularly to physics,[6] in the case of the social sciences is practically inevitable to think also in dialectical terms. In the social realm, causes and consequences are blurred, the consequence often reflecting on the assumed cause. The social reality is intrinsically historical because it is permanently changing, and is intrinsically contradictory because social systems are constituted by individual actors who, although socially conditioned or determined, are free and responsible to make choices which are often conflicting; because they are learning actors, who change with experience; because, in doing so, they permanently change the social structures and principally create culture and institutions that, on their turn, change individual preferences.[7] Economic systems are, essentially, open systems, requiring open models.[8] Their complexity is much bigger than the general equilibrium model presumes. Their variables are so numerous that many, although relevant, cannot be formally included in the model. Thus, the macroeconomic models are partially undetermined. The economist who uses macroeconomic models is supposed to know that her or his model is incomplete, and that, in studying the actual system and in proposing policies, he is supposed to be modest, and take decisions which involve uncertainty. There is no reason for an economist to be confined to one or the other

[6] It is less or not so fully applicable to biology where the causal relations are often replaced by functional ones.

[7] I limit myself to this justification of the fact why the method suitable for understanding social sciences should be dialectical. This is complex concept, which is not the specific subject of this paper, but that couldn't not be mentioned.

[8] This view, in discussing economics' methodology, was particularly developed by Sheila Dow (1996) and Victoria Chick (2004). The former defines an open system as a system in which "not all the constituent variables and structural relationships are known or knowable, and thus the boundaries of the system are not known or knowable" (1996: 14).

method. We have great economists who dedicated themselves mainly to one method or the other, and they are great because they did it well. Sometimes, they realized that the use of both models leads to contradictions,[9] but they were great enough – and this was typically the case of Marx, Schumpeter and Keynes – to live their contradictions instead of attempting to impose comprehensive and absolutely consistent theories.

The two methods in historical perspective

The key assumption of economic theory is the rationality of the agents. Even though economists know that economic agents do not always act rationally, maximizing their interests, I will not discuss here the validity of the *homo economicus* assumption that economic agents are rational. This is a 'reasonable' assumption for the economic theory as a whole, independent of the schools of thought – a more reasonable assumption for economics than for other social sciences.[10] In much the same way as economists begin with the assumption of perfect competition, and the tendency of the profit rate to be equal in all industries, they also begin with the assumption of rationality, in order to later be able to relax both assumptions. There is, however, a fundamental difference in how the different schools relax such and other assumptions. Since the general equilibrium model essentially uses the hypothetical-deductive unhistorical method for thinking, the assumptions of rationality and perfect competition are at the *a priori* basis for it: thus, when the neoclassical macroeconomist needs to lower the level of abstraction, he will find a theoretical and practical difficulty in relaxing such assumptions. In contrast, in classical development economics and in Keynesian macroeconomics, where the economists work not with armchair models, but with open models built from the historical observation of reality, most of those assumptions have been already duly abandoned when they begin their analysis. Thus, not being committed to a hypothetically general and comprehensive rationality and consistency of the whole economic system, the economists are able to formulate more sensible and pragmatic explanations of reality.

The coexistence of two methods is not particular to economic theory. It also exists in philosophy and in political science. While the philosophers who use primarily a hypothetical-deductive method tend to be idealists, recognizing reality just as they are represented in ideas, philosophers adopting primarily a historical-deductive method are realists. Plato and Descartes are in the first group, while Aristotle, Marx and the American pragmatists, in the second. Kant is rather in the first than in the second group, although he was able to formulate the great synthesis between both philosophies. But he formulated an analytical synthesis, which clearly privileged the methodological sciences, specifically mathematics, and the natural sciences, particularly the one closer to mathematics: physics. Yet, with Hegel, still an idealist, the central concern changes from physical nature to society and history, and from analytical to dialectical reasoning.

[9] Consider, for example, Schumpeter, who loved to say that the general equilibrium model was the highest achievement of economic theory, but based his own theory of innovation and the entrepreneur on the critique of the circular flow – a simplification of that model.

[10] Yet, as Herbert Simon (1957) showed, it is far from being fully reasonable. Rationality is also in economics 'bounded', and economic agents are rather able to achieve 'satisficing' outcomes than maximum ones.

Marx, the American pragmatists, and the phenomenologists after Husserl completed the change from the certainty of mathematics and physics, to the open questions relative to human life and society – questions subject to contradiction and change, and often more suitable to interpretation than to the definition of a unique truth.

Yet, the temptation of founding social sciences on more 'solid',[11] hypothetical-deductive basis, was always present. First, in the political theory of the state. Following the historical tradition founded by Aristotle, the state was seen as the result of a historical evolution, as the outcome of a process of increasing division of labor, of the passage from the tribe to the clan, the village, the city, the nation, the city-state, and the empire. With Hobbes, however, and the contractual theory of state, a radically new approach arises. The state is logically deduced from the theoretical assumption of the existence of a state of nature, where war between all men was the sole reality, and from the decision of men, at a certain point, of establishing a contract through which they renounced their original freedom in favour of a legal order imposed by the state. It doesn't matter whether the state of nature had an example in history, nor whether it was possible to find the moment when free men and women decided to exchange their freedom for the protection of a sovereign. By adopting this theoretical strategy, contractualists were able to logically deduce the state from society; the monarch's legitimacy rooted in tradition was replaced by a new politics arising from the social contract. Even if Hobbes, with his theory, intended to strengthen the power of the absolute monarch, what he and his great enlightened successors did was to open the way to the modern concept of citizenship. By legitimating the king by the citizens' agreement, he established a rational legitimacy basis for political power which opened room for the rule of law and democracy. Contractualism, albeit unrealistic, set up powerful normative bases for the future political development of the nation-states, and was a tool for the affirmation of civil and political rights. Whereas the historical-deductive thinker could only arrive at the concept of the state from the analysis of political and social events and struggles, and from the 'logic' to which those events somehow obey, the hypothetical-deductive theorists were able to infer it from a theoretical assumption. While, however, the later could not explain how the state changed from absolute to liberal, and from liberal to democratic, since the original assumption remained constant, the former was more successful in such endeavor.[12]

Historically, economics adopted the hypothetic-deductive method after contractualist political theory had done that, but did it in a more radical way. Economic theory began as a historical-deductive science, with the great mercantilist and classical economists, but, after the 1870s neoclassical or marginalist revolution, it experienced a major turn. Microeconomic theory, crowned by the general equilibrium model, soon became the more radical hypothetical-deductive of all substantive sciences. It also became strongly ideological since its main concern was to demonstrate the superiority of market economies. The Keynesian revolution pointed out in the opposite direction, since it was essentially a historical-deductive theory, but soon mainstream economics

[11] Discussing this paper with me, Ramon Garcia noted how strange was that something so abstract could, nevertheless, be viewed as 'solid'.

[12] Note, however, that the analysts who used primarily the hypothetical-deductive method, and parted from the same assumption of the state of nature, arrived at quite different conclusions, as Hobbes and Locke demonstrate. This fact gives an idea of the limitations that such method confronts.

was again attracted by the consistency and precision allowed by the use of a hypothetic-deductive method.

On the other social sciences, particularly in sociology and anthropology, the historical-deductive method remained dominant after Marx, Durkheim and Weber. The later opened room for *a posteriori* search for rational explanations, with his theory of action, but remained an essentially historical analyst.[13] The same happened to the modernization and functionalist school of sociology that had in Talcott Parsons its main representative. Yet, in the second half of the twentieth century, rational choice theory appears in political science, having as its basis neoclassical microeconomics. As in the previous cases, it allowed for several interesting developments in discussing political institutions. Yet, I am a critic of such theory in so far as it radically presumes that political agents behave like economic agents trying to maximize their personal interests, and establishes a perfect analogy between market and politics.[14] When, however, it is just concerned in finding *a posteriori* rational explanations for social and political phenomena which it is analyzed historically, as often does Adam Przeworski, this approach may be fruitful particularly in giving precision and internal consistency to reasoning.[15] After using the historical method, one can complement it with a concept of methodological individualism. Yet, in doing that, the political scientists (more than the economists) should take into account, as suggested by Jon Elster, that this concept of rationality should be broader, including public interest issues, since the laws ruling the market are not the same as those governing the forum.[16] And they should take into consideration the social or historical constraints imposed on agents by the structural, cultural and institutional instances of society, which are eminently historical. It is also important not to fall in a typical mistake associated with the hypothetic-deductive method: determinism. The assumption that it is enough to have the initial conditions defined to know which will be the consequences is as attractive as false in social sciences. According to Prigogine, methodological determinism is timeless, implying perfect or logical causality.[17]. Thus, economic variables are determined by the initial conditions. Non-predicted irregularities arising from the actual historical processes are ignored, or, using the terminology of economists who rediscovered history, there is not path dependence.[18] There is nothing further from this than the kind of reasoning that the one I am trying to develop here.

Economic science works, therefore, with two methods. Only in the case of more general and abstract theories, such as the general equilibrium, or Sraffa's theory of the production of commodities by means of commodities, the precedence and the dominance belong to the aprioristic method. These theories, however, are already developed, are self-containing. In contrast, in the case of macroeconomics and development economics, the fundamental research tool is the historical-deductive method, or, more specifically, a variety of it that I call the 'new historical fact method'. It also uses induction and deduction, but, in so far as it begins the analysis of reality, it

[13] Weber, 1922: chapter 1.
[14] Downs, 1957.
[15] Przeworski's classical analysis of social-democracy (1986) is the perfect example of this approach.
[16] Elster, 1997.
[17] Prigogine, 1997.
[18] See Prigogine's ideas applied to economics in Ferrari, 2003.

searches for the new historical facts that changed the picture. The economist who analyzes a real social system must be constantly looking for the new historical facts that change reality and require new explanatory models. His search for microfoundations, using primarily a hypothetical-deductive instrumental, should happen at a subsequent time, so that the social mechanisms behind the observed macroeconomic relations can be established.

The hypothetical-deductive method

The hypothetical-deductive method used by neoclassical theory is essentially aprioristic. In order to build its major theory – that of general equilibrium – the microeconomist, sitting in his armchair, assumes that the economic agents maximize their economic interests, and from this simple assumption, combined with some other as stable preferences, decreasing returns, perfect information, etc., he deduces logically and mathematically his whole model. Since his basic assumption is a reasonable approach of the reality of economic behavior, and since he works at a high level of abstraction, the results attained are interesting: they succeed in developing a highly abstract theory that is able to predict an also abstract economic behavior. Yet, the theory is so abstract and so general that it represents a danger when it comes to predicting complex actual behaviors such as the ones involved in macroeconomic policy and development policy.[19]

There is a vast economic literature that questions the *homo economicus* assumption. Although this assumption doesn't apply to political and social behavior,[20] because in these areas human beings take into consideration other goals besides those related to the maximization of personal interests, it reasonably applies to economic behavior, which is relatively less complex. Therefore, from the point of view of this paper, it is not the *homo economicus* assumption that sets the limits to the neoclassical economics, but the form that this assumption is used, specifically the ambitions that are involved. Neoclassical economics hopes to derive the full bulk of economic theory from it, what is absurd. General equilibrium theory, which is its more general offspring, is the most radically hypothetical-deductive theory among the substantive theories that try to describe reality. It was built from an analogy with physics, but it is clearly more hypothetical-deductive than that already so mathematical science. Even though a good portion of the physicist's research program is employed in deducing theories, this work is committed to the observation of reality, and it is always building more and more powerful and exact equipments to assist in its empirical research. In the general equilibrium model there is no commitment to reality. It is the reality that should be adapted to the model. The numerous and insistent contradictions or anomalies do not lead to the model's rejection. The protective belt that envelops the core theory is absolute. All anomalies, such as monopoly power, externalities, path dependency, information asymmetry, moral hazard, are elegantly defined and viewed just as disturbing factors of a model which is internally consistent. Institutions, even money, for a long time were just excluded, as irrelevant or 'neutral'. When institutions were finally acknowledged, they were also 'deduced' from the concept of transaction costs,

[19] The danger involved in what Schumpeter called the 'Ricardian vice' is present here.

[20] The rational choice school, which borrowed its tools from neoclassical economics, naturally rejects this assumption.

instead of being understood as historical realities permanently evolving through time as societies must regulate social behavior.

Although it intends to be general as long as it is extraordinarily abstract, neoclassical microeconomics is a partial achievement. It views economic system only from one angle, as an un-fleshed, un-spatial and un-historical market economy. Yet, minds that have an internal demand for consistency, and feel particularly attracted by mathematics, become often fascinated when introduced to this theory. As it is true to all sciences, the simpler the better. And, mathematical formalization may be a good tool to achieve such simplification. However, formalization cannot be confused with scientific work. In economics, as in any other science, the most important is to observe the new economic facts, connect them with the other social and political facts, develop new ideas, new explanations; in a second moment, to develop models as simple as possible; and finally to look for empirical justification for them. Formalization is a mere expedient to facilitate – never to complicate – the communication of the model.[21]

Mainstream or conventional orthodox economics is presently neoclassical and, so, essentially hypothetical- deductive. Yet, discussing the concept of orthodox economics, Tony Lawson defines it not as neoclassical, but as adopting abusively mathematical tools. To deny its neoclassical character, Lawson accepts Colander et al.'s claim that orthodox economics is not anymore neoclassical in so far as it is keeping increasingly distant from the main tenets of such economic doctrine: rationality, egoism, and equilibrium.[22] Despite acknowledging that orthodox economics is under permanent change, and that its more bright and pragmatic adherents strive for adapting it to reality, it is wrong to infer from that fact that it does not define itself by the use of the assumptions of rationality, egoism and equilibrium. Such inference would be correct if we assumed that mainstream economics is coherent, but obviously it is not. Their more competent practitioners are realist enough to use models that lack the microfoundation that would make them so. In macroeconomics, for example, the rule of Taylor, which today is widely used, is just a smart rule of thumb, which emerged from the observation of the effective behavior of central banks. Nothing farther from a true neoclassical hypothetic-deductive method based on microfoundations. Another example is the introduction of game theory in microeconomics textbooks. This was a major improvement in such books, but game theory has no relation to neoclassical economics. It is a strategic theory of decision under uncertainty, while, in pure neoclassical theory, there is no space for decision: the agents always maximize, always choose the optimal alternative. Yet, the fact that presently mainstream economics is incoherent does not authorize us to say that it is not neoclassical. The abusive use of mathematics and the reduction of economics to an infinite number of mathematical models can only be explained by the fact that economists use a hypothetical-deductive method which derives from the neoclassical assumptions. It is only when one adopts a radical methodological individualism, and derives all models from one basic microfoundation –

[21] The assumption that formalization is an indispensable condition to economic thought is adopted even by neoclassical economists who do not limit themselves to do normal science. This is the case of Krugman (1999), for instance, who did not hesitate in stating that the true scientific work of inserting externalities in the theory of economic development through the *big-push* model – one of the central models of the theory of economic development – was not performed by Rosenstein-Rodan (1943), who created it, but by Murphy, Shleifer and Vishny (1989), who formalized it.

[22] Lawson, 2005; Colander et al. (2004).

the agents' rationality – that it is possible to fully reduce economics to mathematics. Debreu's claim, that "deductive reasoning about social phenomena invited the use of mathematics… for two of its central concepts, commodities and prices, are quantified in a unique manner as soon as the units of measurement are chosen…", explains only partially the use of mathematics in economics. Mirowski, who quoted Debreu, rejects the abusive use of mathematics in economics by correctly criticizing the implicit "notion that commodities exhibit a natural isomorphism to a real Euclidean vector space", and underlines that the mathematicization of economics should be limited because "symmetries and invariances existing in market activities" should be explained "through the instrumentality of social institutions".[23] Yet, Debreu and his critic fail to realize that central reason for the mathematicization of economics does not rest on the nature of commodities, but in the nature of the chosen method: the hypothetical-deductive one. Once the economist decides to derive logically the whole economic analysis from the assumption of the *homo economicus*, coupled with a few others, like the law of diminishing returns, the analysis can be fully reduced to mathematics.

In fact, the decision to adopt this method happened before the neoclassical revolution. It was made by the last great classical economist, Stuart Mill, who aspired that economics was as precise as mathematics. He knew that this was impossible, but, in his 1836 methodological essay, he realized that it was possible to get near to this objective with the assumption of the maximizing individual, the *homo economicus*.[24] After developing pure theory according to this method, he believed that it would be possible to check it with the complex reality. This belief continues to haunt economics, and, today, is a main reason for its growing irrelevance, in so far as it allowed for the development of economic models which have little relation with reality. Or to partial and incompetent analysis of real economic systems, in so far as the economists are supposed to start from perfect competition, and then, step by step, relax the corresponding assumptions, but eventually will not be able to follow such procedure, not only because it is tiresome and unpredictable, but also because they risk to see themselves without any model, helpless.

Before closing this section on the hypothetical-deductive method, a last remark is appropriate. With the generalized adoption of game theory by microeconomics, general equilibrium theory loses its status of a general system for understanding a substantive market economic system, to constitute just a chapter of a decision theory. Its founding acts would no longer be the works of great economists, such as Walras, Jevons and Menger, but rather of Von Neumann and Morgenstern.[25] Instead of being a theory about reality, economics transforms itself into just a tool for taking economic decisions under uncertainty. According to Habermas, in this circumstance, "it would be possible to understand economic theory as a specific theory of decision, concerning situations of economic choice".[26] Yet, economics definitely is not just a method. It effectively searches to analyze real economic systems. But it is necessary to acknowledge that, when it uses as its primary method a method that is appropriate to methodological sciences, it cannot be more than that.

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[23] Mirowski, 1991: 145 (Debreu's quotation), 153, 155.
[24] Stuart Mill, 1830.
[25] Walras, 1874-90; Jevons, 1871-79; Menger, 1872; Von Neumann and Morgenstern, 1947.
[26] Habermas, 1967: 71.

The historical-deductive method and new historical fact approach

In the analysis of complex economic realities, the alternative to the neoclassical hypothetical-deductive method is to start from more realistic assumptions by situating the problem within a historical context. It is to use what I am calling the historical-deductive method. It is historical because it is based on the observation of the historical economic reality, in which each event is unique, but has enough relations with other economic events that it is possible to look for regularities, or, at least, tendencies. Yet, regularities will not necessarily be found. Actually, not all scientific explanation calls for them. There are no 'regularities' for the Big Bang, or for the Industrial Revolution; in economics, some objects of study are frequent, others not so, and other take place only once.[27] When regularities materialize, they appear as historical events related to the conventions and institutions which will give meaning to them.[28] Thus, in building the explanatory models, the researcher will have to include such conventions, routines, or institutions, as Nelson and Winter so well argued.[29]

In the process of developing a theory or a model based on the observation of the economic processes, the economist will, in a given moment, have a vision – a vision he will have to transform into a falsifiable hypothesis. First, he will submit his original intuition to the knowledge he already possess of the economic process, using the tools and models that he disposes. But, if his vision involves real novelty, he will soon realize that he will have to develop new concepts, additional tools. Starting from the observation of reality, he will begin with induction, or, more modestly, from abduction, but he soon will have to recur to deductive reasoning. He will have to make inferences, and relate inferences one with another in a reasonably consistent way. His objective will be to understand a real economic system, to have an understanding of this system as a whole. This economic system may be the Brazilian macroeconomic system, the European monetary system, the Chinese development system. The essential is to understand the logic or the underlining principle that organizes this system, to understand how its several elements are interconnected and vary one with another and it is to be able to predict its tendencies, and how the system will change if certain policies or some more permanent institutions are introduced.

Once the researcher is able to understand the regularities and develop a model of the economic system he is studying, he will be supposed to check the predictions of the model against the data empirically observed, for which econometric methods will be particularly relevant. In this process starting with the empirical observation of social facts or history, inductive, abductive and deductive reasoning will be intrinsically complementary methods: one is impossible without the other. Yet, while hypothetical-deductive method corresponds to logical time, the historical-deductive deals with the historical time.[30] The economic facts or the economic relations take place in a historical

[27] I owe this observation about regularities to Ramón Garcia Fernández.

[28] We know the relevance that Keynes gave to conventions. Since the 1980s, institutions became a must in social sciences. Economists and other social scientists realized that it is impossible to understand society and the economy without considering formal and informal laws.

[29] Nelson and Winter, 1982.

[30] I owe this observation to Alain Herscovici.

time, and generalizations, that must be done to develop a theory, are supposed to acknowledge this truth.

Once the economist developed a model using the historical-deductive method, he may try to reduce the degree of uncertainty of such model through the search for rational microfoundations. This search gives consistency to the model. This heuristic strategy is somewhat similar to the methodological distinction made by Max Weber between understanding and explanation. The social scientist should first try to understand the social and economic phenomena, find their regularities, their distinctive features, adopting an essentially historical analysis that leads him to the proposal of some stylized facts and their logical connections. Afterwards, however, or even at the same time, he should formulate explanatory theories for which there should be rational motivations.[31] Finally, *a posteriori* and not *a priori*, as a consequence of the generalization of historical regularities, and of their rational explanations found, he concludes the drawing of his model, which doesn't aim to give an answer to all questions, but to be abstract enough to constitute a scientific theory and a guide to action.

This is a historical method, but it is necessary not to mistake this kind of approach with the one of the German historicist school of Gustav Schmoller and Max Weber, or for the American institutionalist school of Thorstein Veblen. It is true that the historicists didn't reject theory, but they saw narrow limits for the development of theoretical models of the type produced today by a historical-deductive method.[32] However, there are significant similarities between the historical-deductive method here advanced and the historical method adopted by Weber. In studying economic laws, Weber didn't define 'laws' in the narrow sense used by natural sciences, but as "*adequate* causal relationships". The aim of political economy is "the knowledge of the historical phenomena in their concreteness … the most general laws, because they are most devoid of content, are also the least valuable".[33]

It is also necessary not to mistake the historical-deductive method for the search for a theory of economic change as proposed by Nelson and Winter.[34] The critique that the two distinguished economists make to neoclassical economics is to point at the fact

[31] Weber, 1922: Chapter 1. Habermas (1967: 19) studies this methodological approach proposed by Weber and remembers that Weber begins his 1922 book stating that: "sociology is a science which attempts the interpretive understanding of social action in order thereby to arrive at a causal explanation of its course and effects". And Habermas (1967: 19) summarizes Weber's methodological vision stating that: "Weber analyzed particularly the articulation between explanation and understanding... The general theories make it possible to deduce hypotheses related to the empirical regularities. Those hypothetical laws have an explanatory function. Unlike natural processes, however, the regularities of social action have the characteristic of being understandable. Social actions belong to the class of intentional actions, which we grasp by reconstructing their meaning".

[32] I don't believe that Schumpeter (1959, vol.3: 80) had been unfair towards Schmoller when he states that he used a conceptual apparatus, but "theorized weakly". According to Schefold's observation (1987: 257), "Schmoller's main work, the *Gundrisse*, remained rather traditional in its theoretical part – the treatment of value and price was not too far away from mainstream neoclassical economics".

[33] Weber, 1906: 72.

[34] Nelson and Winter, 1982.

that it doesn't account for the processes of economic change. Therefore they propose to replace it by an evolutionary theory. My main criticism to the neoclassical economic theory is that they use as preferential method a scientific method that is rather appropriate to methodological sciences than to substantive ones. It is for that reason that it fails to achieve the objective of a social science: to build theories which explain not only the present but the continuously changing process. In order to fulfill this objective, the social scientist will be powerfully helped by the method of new historical fact. He will start from the assumption that there are relatively necessary relations between three major instances existing in any social system – the structural, the cultural and the institutional one –, and he will search for the new historical facts which change this reality.[35] In this way, he will be able to understand how the economic system under analysis moves from one historical moment to another, and to identify the peculiar characteristics of the new historical phase, for which an explanatory model is adequate. Yet, given that economic systems are open systems, he will have to limit his ambitions about the precision of the economic theories, particularly when they involve change.

The starting point in the historical-deductive method is the assumption of imperfect markets. When markets are perfect, there is nothing new to analyze, and no policy needs to be proposed. Secondly, the identification of the new historical facts that are changing the picture is invariably necessary. The problem may have existed for a long time and not been solved, but, even in this case, it will be a new fact, since a new historical fact is defined as the one that modified reality, created new constraints or new liberties for social action, and thus required new theories to account for reality. The new fact may be 'old' in so far as it was noted when it emerged, but it is having consequences, introducing change, and must be acknowledge and analyzed. In the realm of the social sciences, the new fact gives birth to the problem to be solved in the scientific and practical level. In most cases the solution of the problem will not only be the product of a brilliant mind, but of a group of people thinking and debating that problem. Continued, open, and respectful debate is fundamental in order to define the problem, find reasonable alternative explanatory models for it, choose one, and, finally, scientifically validate it through the quasi-consensus of the peers.

Validation will depend on research – usually econometric research. Yet, econometric tools are usually limited to the verification of some specific characteristics of a much broader problem. On the other hand, the results of such research are often disappointing, as causes and consequences are not clearly distinguished, or in so far as relevant variables were not considered. For each economic problem, econometric evidence is usually found to justify opposite theories. Yet, none of these limitations should prevent us from using the econometric tools. On the contrary, if the historical-deductive method is supposed to start from the observation of reality, such observation can be powered by econometrics. However, when historical series of data are involved, the researcher often uses all the data available, not distinguishing historical phases or stages, not taking into consideration historical discontinuity, and ignoring crucial moments that change the economic problem being studied. According to the historical-deductive method, econometric research must either start from assumptions about such historical discontinuities in order to make sense, or to identify the occurrence of such

[35] By the 'structural' instance of a society I mean its founding characteristics, like the level technology and labor division, the property system, the class system. I do not assign a more important role to one or another instance: it will depend on a case by case analysis.

discontinuities with the use of econometric methods.[36] In any circumstance, once identified both the new historical fact and the discontinuity, the subsequent econometric analysis will have to take them into close consideration.

Besides econometric tests, it is important to check the model in terms of its practical use in predicting outcomes and in formulating economic policy. In theoretical terms, there is no better validation for an economic theory than the possibility of deriving reliable predictions from it. In pragmatic terms, a theory is validated when it is possible to deduce economic policies which prove to be effective. In Brazil, for instance, the Plano Real, which in 1994 ended with the high and chronic inflation, was based on the inertial theory of inflation which some Brazilian economists had previously developed. The success of the Real Plan in neutralizing inflation was a validation for the theory.[37]

The method used by the classical economists to analyze the capitalist revolution or the emergence of market-coordinated economies, as well as the method that Keynes originally employed to explain the cyclical fluctuations and establish the foundations for macroeconomics, started from the observation of the new historical facts, which involved ruptures or discontinuities requiring the acknowledgment of new regularities, and implied the definition of new concepts and the analysis of the logical connections between the relevant economic variables. Adam Smith acknowledged the beginning of the industrial revolution, and changed the focus of economic analysis from trade to production; for Marx, the new historical fact was the tectonic change that the capitalist revolution, at his time completed in England and France, represented; Keynes built the first full economic theory based on the historical-deductive method writing the *General Theory* after World War I, the Versailles Treaty, the hyperinflation in Germany and Central Europe, and the Great Depression had changed the world economy. The *homo economicus* assumption was still present, but in the background. It was only after observing the new regularities, developing the new concepts, and linking them in a meaningful way that those great economists were able to develop their open models. And only then they or their followers looked for the rational explanations. Only then they asked, on a case-by-case basis, what are the relevant social mechanisms behind, assigning greater consistency to the theories developed. But this *a posteriori* search cannot be confused with the *a priori* presumption that 'the microfoundations' of macroeconomics are already known. Differently from the general equilibrium model, there are microfoundations for macroeconomic and development economics' models but they are *a posteriori*, not *a priori*, because, differently from the hypothetical-deductive, the historical-deductive method uses an essentially *a posteriori* form of reasoning. In general equilibrium, there is only one microfoundation – the maximizing agent –, the one that serves for the hypothetical-deductive analysis; in macroeconomics there are many, because they will be found after the observation of the economic phenomenon, and the development of the new model or the new theory.

[36] Not ignoring that in some cases a continuous change may eventually imply also a discontinuity.

[37] On the theory of inertial inflation see Bresser-Pereira and Nakano, 1983, 1987; Resende and Arida, 1984; Lopes, 1984. For a survey of inertial inflation theory, see Bresser-Pereira, 1996.

The historical-deductive method is realistic because it believes that it assumes that objective knowledge of social reality is possible provided that the researcher is modest, and because it requires the use of realistic assumptions. By being realistic, wouldn't the method also be 'positivist', in the sense given by Friedman to the word? Friedman tried to justify the neoclassical microeconomic model (he hadn't yet developed his own macroeconomic model) with the argument that, despite the unrealistic assumptions this model was based on, the predictions were realistic, and their confirmation made the model 'positively' true. This argumentation is rather rhetoric than positivist. It is supposed to be originated in Popper's classical claim on the impossibility of proving the veracity of a certain scientific hypothesis: a scientific hypothesis will be valid if, being falsifiable, it had not been falsified yet.[38] From that Friedman concluded that Popper was not concerned with realism or the veracity of the assumptions, but only with the falseability of the hypotheses, which he identified with the models' predictive ability. Since general equilibrium and partial equilibrium models enable, at a very general level, predictions about the agents' behavior, he concluded that neoclassical economic theory was positively validated. Thus, he adopted a pragmatic approach, following the lesson of the founder of pragmatism, Charles Peirce, for whom the truth of an idea resided in its predictive ability and in its ability of orienting action.[39] Yet, Friedman's analysis was rather rhetoric than scientific, and, eventually it did not make justice to Peirce. He ignored that the alleged predictive capacity of neoclassical economics is too general, so that it has limited utility in guiding economic policy. It is useful for letting us understand, in very general terms, how does a hypothetical market coordinate a hypothetical economic system, but it tells us little about how to act when we confront actual economic problems involving the analysis of real economic systems. Eventually, it becomes a dangerous model when it intends to become the general framework from which the macroeconomic models and development economics models should be built. Horkheimer, in criticizing subjective and instrumental reason, which became dominant from the industrial age on, and from the widespread identification of reason with personal interest, remarks that there is a significant proximity between positivism and pragmatism. By losing its particular autonomy while presuming the existence of an objective reason, reason became instrumental and formal. Whereas the formalism of reason usually expressed through the abuse of mathematics was stressed by positivism, its instrumental aspect was underlined by pragmatism.[40]

Conclusion

In conclusion, my claim in this paper is that economics uses two methods: a historical-deductive and a hypothetic-deductive method. Neoclassical economics uses mainly the first, classical and Keynesian economics, principally the second. The more appropriate method to a substantive or ontological science is originally empirical, based on the observation of reality; in the case of most the natural sciences, the method is just empirical, in the case of social sciences, historical. Only a historical method is able to

[38] Popper, 1959. Popper is often defined as a positivist, for sure he is not a relativist, but it would be fairer to view him as a realist. See, particularly, Popper, 1982.

[39] Peirce, 1958 (date of publication of his selected papers). Although founder of pragmatism, Peirce cannot be considered a relativist unless we have a broader understanding of relativism. See Wiener, 1958, and Hoover, 1994.

[40] Horkheimer, 1947: 30.

analyze the social system as a whole, and to understand how it changes through time. In contrast, the hypothetical-deductive method is proper of the methodological sciences, like mathematics and statistics, i.e., to sciences that lack object, except the one that they build rationally. In so far as neoclassical microeconomics primarily uses this method, it sets limits to its capacity of analyzing analysis of economic systems as a whole, while classical development economics and Keynesian macroeconomics are able to draw broader and more realistic theories explaining how social systems work.

Neoclassical economics risks becoming increasingly irrelevant in so far as it is based on unrealistic assumptions, and adopts a hypothetical-deductive method, which favors the use and abuse of mathematics at the cost of realism and pragmatism. When orthodox models, particularly macroeconomic models, become more realistic, it is sure a signal that they are giving up the internal consistency that is made possible by the hypothetical-deductive method, and acknowledging the open character of economic systems. On the other hand, when microeconomics ads game theory to its text-books, it is admitting that it is rather a tool for reasoning than a theory of how economic systems work.

The truth related to economic relations and the working of economic systems is a complex one, and may be seen from different angles. Thus, to complement the historical-deductive method with a hypothetic-deductive one is legitimate, provided that the later is assigned an auxiliary, not the main role. The validation of the models or economic theories depends on the empirical test to which they are submitted, on their ability to make practical prediction, on the effectiveness of the economic policies that are based upon them, and on the degree of consensus that is formed around them. The hypothetical-deductive method was effective in developing microeconomics and for devising economic decision tools, but it is unable to provide a whole picture of the economic system, and is dangerous when extended to other areas, while the historical-deductive method provides such picture and has been successfully applied in the solution of macroeconomic problems and of development economics. The first method is based on a radical view of methodological individualism, the second one, on the assumption that economics, being a social science, is an essentially historical science. It is also based on a holistic perspective according to which the whole is not the mere sum of its parts. Third, it is deliberately eclectic, pragmatic, and humble. It is eclectic because it asserts that it is possible to combine the historical comprehensive perspective of economic reality with the search for rational explanatory social mechanisms, and attributes to microeconomics a relevant role in providing tools for social analysis. It is pragmatic because it concerns with the practical quality of the predictions provided by the economic models, and, particularly, with the guide-lines that they offer to successful economic policy. It is humble, because it acknowledges the open character of economic systems, and, so, knows well how limited is, any way, economic theory. The economist, confronting an actual economic system, cannot just apply ready-made models. He is supposed to think in depth, analyze conflicting data, and finally take decisions which involve uncertainty and risk.

In this setting, the search for microfoundations for macroeconomics and development economics is legitimate, but it will be a search *a posteriori* for the rational motives behind the aggregate behaviors that are being studied. It is legitimate, as long as it gives a rational explanation for the observed phenomenon. But this elucidates why neoclassical economists have failed in the search for a unique microfoundation macroeconomics. It is impossible to reach it. Or, when it is reached, the macroeconomic

models will have become so abstract and general, that they will have lost explanatory power.

In order to think about the economy, to formulate the hypotheses that explain its functioning, and to propose the economic policies necessary to the socially accepted objectives (stability, growth, distribution), the economist, whose problems are today essentially macroeconomic and of economic development, should observe the reality, verify how the phenomena occur and get repeated or show tendencies, and from this analytical process, which is initially abductive, but actually inductive-deductive, he will infer his model or his explanation. The skeptical objection that every inductive inference is not justified – Hume's well known 'induction problem' – although interesting, cannot be accepted. Not only because it is against common sense, against the evidence that knowledge results mostly from inductive inferences, but also because, as Foster argues, inductive inference is justifiable whenever it represents the "best explanation" for the problem under examination.[41] Therefore, the economist, in these two great areas, adopts natural sciences' classic form of scientific research: he examines reality, and searches for regularities. But he does it much more modestly. He mainly uses induction, but naturally also deduction. The researcher's job is essentially to generalize from the study of reality, which, for social sciences, is always a historical reality. The market and money – the two main elements in economic systems – are themselves institutions, thus, historical realities.

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[41] Foster, 1982: 334.

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