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On the semantic and methodological dimensions of equilibrium in economics

Sobre as dimensões semânticas e metodológicas do equilíbrio em economia

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RESUMO: Este artigo objetiva explicitar algumas das diferentes aplicações da noção de equilíbrio nas mais diversas abordagens econômicas e estabelecer certa ordem na miríade de interpretações existentes, através de um esforço de classificação em duas dimensões: (i) semântica, que trata do significado da noção de equilíbrio nos diferentes contextos teóricos; e (ii) metodológica, em que o equilíbrio é entendido como ferramenta analítica, isto é, instrumento de abstração para apreensão de determinados aspectos do sistema econômico. Observa-se que a diversidade de usos do equilíbrio dificulta o debate entre as diferentes perspectivas teóricas, atrapalhando a avaliação sobre a proficuidade da aplicação dessa noção no entendimento dos fenômenos econômicos.
PALAVRAS-CHAVE: Equilíbrio; metodologia; semântica.

ABSTRACT: This article aims to distinguish different uses of the notion of equilibrium in various theoretical economic approaches and to establish a classification in the myriad of interpretations of equilibrium. It does so by categorizing equilibrium in two dimensions: (i) semantical, which deals with the meaning of the notion of equilibrium in different theoretical contexts; and (ii) methodological, that sees equilibrium as an analytical tool – that is, a method for apprehending certain aspects of the economic system. We argue that the diversity of equilibrium uses hampers the debate among different theoretical perspectives, making it harder to assess how fruitful this notion can be to the comprehension of economic phenomena.
KEYWORDS: Equilibrium; methodology; semantics.
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INTRODUCTION

The multiple uses and interpretations of equilibrium in economics often raise confusions and issues: what does it mean? In which form is it adopted in economic theories? Should it be a semantic definition, a methodological tool to apprehend economic phenomena, an ontological condition of the economic system? Are the different uses of this notion, in different theories, compatible? Other questions can be raised about the theme, but this article focuses on the questions above to present the debate over the prolific use of equilibrium in economics.

Considering the multifold character of the equilibrium notion in economics and the theoretical conflicts and consequences that this multiplicity implies, it is reasonable the attempt to establish an order in the myriad of interpretations of equilibrium in the economic literature. An effort to develop a broader classification of both equilibrium and the uses of equilibrium in different perspectives can help in particular[1]. This effort obviously has some degree of subjective choices regarding which are the adequate categories to encapsulates each definition of equilibrium and how each definition relates to each other. Notwithstanding being somehow arbitrary, this effort is necessary to set the meaning and different uses of this notion in each theory (or, at least, this effort is a bid to allocate the debate in a better-defined classification of equilibrium).

Thus, we establish a classification of equilibrium to set a demarcation criterion that limits the borders of this notion's uses in economic theories[2]. If the details assumed by each theoretical use of equilibrium are clarified, we can avoid the mistake of setting one definition or use of equilibrium as the unique and definitive as well as we can understand how a theory models equilibrium.

To reply to the driving questions listed above, the purpose of this article is to classify equilibrium in two dimensions. First, the semantic dimension deals with the meaning of equilibrium in the various economic theories that adopts some notion of it. The other dimension is the methodological. It refers to the analytical character of equilibrium – that is, it takes equilibrium as a method of analysis. The structure of this article follows these two dimensions. Second section discusses the semantics of equilibrium in economics whereas third section debates the methodological account of equilibrium. Last section concludes.

THE SEMANTIC DIMENSION OF EQUILIBRIUM

The semantic dimension of equilibrium first appeared in Vercelli (1991). This dimension means the conceptual sense that equilibrium assumes in different theories

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[1] Vercelli (1991), Herscovici (2005), Chick (2007), and Lawson (2005, 2007) also classified the equilibrium notion in economics.

[2] Popper (2005) created the term demarcation criterion to define the premises that differentiate scientific arguments from metaphysical or non-scientific ones.

that adopt it willing to deliver some specific meaning with the term. Equilibrium in this dimension is far from having a consensual sense, which as so is dependent on each theoretical context. Weintraub (2005, p. 446) explains "*equilibrium has become a category with no meaning independent of the exact specification of the initial conditions for any model*" and Kaldor (1972, p. 1237) "*the word equilibrium in economics is used, of course, in all kinds of contexts – in Keynesian economics, for example, or in the theory of balance of payments, and so on*".

The semantic definitions of equilibrium that per below highlight the mutable sense that the word assumes throughout the history of economics. Let us start with the most elementary definition of equilibrium, namely a balance of forces, by analogy with weights in a scale. This is a descriptive meaning of equilibrium to allude, for instance, to the confront of demand and supply forces or to the trade balance,

> When demand and supply are in stable equilibrium, if any accident should move the scale of production from its equilibrium position, there will be instantly brought into play forces tending to push it back to that position; just as, if a stone hanging by a string is displaced from its equilibrium position, the force of gravity will at once tend to bring it back to its equilibrium position. The movements of the scale of production about its position to equilibrium will be of a somewhat similar kind (Marshall, 2013 [1890], p. 57).
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> The word equilibrium, in ordinary speech, describes a relation between bodies in space. The scales of a balance are in equilibrium when the balance is at rest (Robinson, 1956, p. 57).

Equilibrium as a balance of forces is associated to another interpretation of that word that sees it as a repose position. In this sense, variances that might occur in the system are not caused by the system's endogenous variables, but by shocks from exogenous variables, implying to equilibrium a sense of stability or a somehow relative constancy of a certain set of relations or values[3]. Hence, "the word equilibrium suggests a state that, if left alone, would not move" (Malinvaud, 1982, p. 581).

Models of stationary or steady states, such as those Harrod (1939) developed to demonstrate the conditions required to a balanced growth, or the one Pasinetti (1962) constructed to present Harrod's (1939) within a multisector context, adopt equilibrium as a resting point. However, Harrod (1939) and Pasinetti (1962) did not assume a natural tendency of the model to fulfill the conditions to reach this

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[3] When differentiating parameters or constants in natural sciences vis-à-vis in economics, Nicola (2001, p. 79) argues that "except that economics fundamentals are not like universal physical constants (for example, the speed of light) that prove to be absolutely constant in time and space. Economic fundamentals are such only in a manner of speaking: they are simply variables (treated as exogenous) that characterize the process under consideration and which usually appear significantly 'less subject to variations' in time than the endogenous variables. It is therefore unlikely that an economy can repeat the same equilibrium for a long enough time interval".

equilibrium resting point (Caravale, 2001). Lisboa (1997) says that this is how the Walrasian general equilibrium takes equilibrium, for example, prices of goods and services' being markets' equilibrium point over time. In this view, only with structural presuppositions of the system is the equilibrium resting place reached.

Equilibrium meaning a resting position also emerges from the action of one specific force, limited by one special restriction – so, it is not a balance of several forces. This sense is the typical neoclassical microeconomic case where an individual maximizes his/her utility function subject to either an income or a technological restriction.

In the sense of resting place, equilibrium dismisses the notion of forces in balance, and turns itself not always associated to the hypothesis of demand and supply being equal, the so-called market clearing. Therefore, there is the possibility of systems being stable including when their forces are unbalanced. These are the cases of, for instance, equilibrium with unemployment or subutilization of production factors (Chick, 2007).

In a sense also considered a balance of forces, but going further to incorporate movement, equilibrium can mean a tendential point to which economic processes would converge. Smith and other classical economists incorporated this sense of equilibrium to represent a gravitational point around which variables such as prices and quantities would gravitate continuously (Milgate, 1987). Smith (2009 [1776]) explains the natural conditions of the economy, which are regular and persistent forces or tendency laws that exert attraction,

> There is in every society […] an ordinary or average rate both of wages and profit in every different employment of labour and stock. *This rate is naturally regulated, partly by the general circumstances of the society* […]*, and partly by the particular nature of each employment* […]. ***These ordinary or average rate may be called the natural rate of wages, profit, and rate*** […]. *When the price of any commodity is neither more nor less than what is sufficient to pay the rent, the wages and the profits* […] *according to their natural rates, the commodity is then sold for what may be called its natural price* (Smith, 2009 [1776], p. 47, emphasis included).

The assembly place of equilibrium seen as a gravity point would be the natural prices of goods – that is, prices that in the long run would account for production costs, given by the natural rates of profit, wages, and land rents[4]. Deviations from this gravity point, such as market price fluctuations, would be responses of the system to unbalances between forces of supply and demand.

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[4] The natural yield of factors is also the functional income distribution, whose share is dependent on general conditions of each economy: "their riches or poverty, their advancing, stationary, or declining condition; […] their particular nature of each employment; […] the natural or improved fertility of the land" (Smith, 2009 [1776], p. 47).

However, the regularity of the forces of attraction in play would not imply that the system attains and stays in equilibrium, but implies that the system keeps moving, pursuing equilibrium constantly, including in the presence of forces pushing to opposite tendencies than that driving to equilibrium. Smith illustrates this idea: "*different accidents may sometimes keep them* [prices] *suspended a good deal above it* [natural, tendential price], *and sometimes force them down even below it. But whatever may be the obstacles which hinder them from settling in this center of repose and continuance, they are constantly tending towards it*" (Ibid., p. 49).

Another interpretation of equilibrium considers it the necessary condition for the reproduction of the system. Marx, in his *Capital*, states the minimum conditions required for the simple reproduction of capital, pointing out the basic relationships between specific variables needed for reaching and maintaining equilibrium (HENRY, 1983). Marx's intention was not to apprehend equilibrium – that is, the simple pattern of capital reproduction –, as a natural or tendential fact toward which the capitalist system would evolve. He was actually listing the reasons why the equilibrium conditions would not be, or would hardly be replicated. In this meaning, equilibrium is a parameter of comparison to help building theoretical models that explain how the economy works.

Moreover, the semantics of equilibrium signifying a condition to the reproduction of the system also means a pattern of repetition. This was the meaning of equilibrium to Quesnay, in his *Tableau Économique*, and to Schumpeter, with his notion of circular flow in his *Theory of Economic Development* (Possas, 1983; Chick, 2007). These models consider time, however the key variables under analysis, such as wages, prices, production, income, etc, are constant in relation to the previous period. Thus, they are a static model.

Especially in Schumpeter, his notion of a circular flow that arrives at a steady state means that capitalist development is different from a simple reproduction and repetition. Possas (1983) says that Schumpeter's analysis is only a static exercise, without relation to what Possas considers the equilibrium analysis – that is, tendential levels of certain variables "resulting from some process of economic adjustment, in which time interval is a period necessary for the reciprocal balance of the forces in action" (Possas, 1983, p. 7-8).

Machlup (1958) tries to minimize the controversies among the different connotations of equilibrium. He emphasizes that equilibrium is a methodological tool to different theories, and proposes a more general definition for equilibrium, "*equilibrium, in economic analysis, is a constellation of selected interrelated variables so adjusted to one another that no inherent tendency to change prevails in the model which they constitute. The model as well as its equilibria are […] mental constructions*" (Machlup, 1958, p. 9). This meaning of equilibrium, on the one hand, resembles the idea of a repose place that has no inherent tendency to change; on the other hand, it leaves equilibrium connotating compatibility between variables, a "*peaceful co-existence between selected variables of given magnitudes*" (Machlup, 1958, p. 10). Hence, incompatibility would signify that at least one variable of the model is still in need of changing, otherwise equilibrium would not be attained.

Admitting compatibility among the variables of the model turns equilibrium into a strictly hypothetical condition, in which equilibrium is dependent on selected variables of each model and on the relationships among them. In this perspective, what is considered adjustment (equilibrium) or misfitting (disequilibrium) can only be demarked in each specific model, whose variables and their causal, institutional, and technological relationships are freely defined by the researcher when dealing with each singular phenomenon. The flexibility to compose models and the myriad of situations of equilibrium that this sort of modelling implies were highlighted by Machlup,

> The system may contain few variables or many; it may postulate inter-relationships of many different kinds; it may deliberately exclude interactions of variables which take a long time to work themselves out or, on the other hand, it may disregard regular oscillations of some variables within short intervals of time (1958, p. 6).

The inclusion both of variables or behavioral relationships previously ignored and different perspectives of time (short or long-term) can turn an equilibrium point, or a mutual rapport between magnitudes, into disequilibrium in another model. The difficulty of defining equilibrium in a historical and geographical concrete situation emerges from this relativity of meanings of what would be the conditions to accomplish the required concordance among the system's variables. Once again Machlup explains,

> Incidentally, no student who understands these conceptions will fall into the error of identifying a concrete situation, involving the prices paid and quantities produced in a certain country at a certain time, as a position of long-run equilibrium. All these equilibria are purely hypothetical. Never could anybody "know" that all adjustments to past events have been completed or will ever be completed (1958, p. 8).

Equilibrium understood as a mental allegory, a simple hypothetical analytical tool used to comprehend causal relationships among variables specially molded for an investigation sees equilibrium attached either to a solution of a math problem or to an analytical property of a mathematical model. In this sense, equilibrium signifies the existence of a set of endogenous variables that turns a system of equations logically feasible, given the values of the exogenous variables assumed as parameters.

This interpretation is dominant in economics since the 1960s[5], especially due

[5] To Weintraub (2005) there are two perspectives of the notion of equilibrium in economics. One accounts for the Marshallian tradition prior to the 1950s, back then equilibrium meant an observable feature of the real world. In the other, that prevailed from the 1960 on, equilibrium is a property of mathematical models, and keeps few or no relation to concrete processes of the economic system.

to the emergence of the neoclassical general equilibrium models. This perspective sees equilibrium as a strategy to solve problems. Being outside the equilibrium would mean that the explanation of the phenomenon under analysis is not known yet and there are still endogenous variables enfolded. Especially regarding this meaning of equilibrium, Samuelson explains that,

> By equilibrium is meant here only the values of variables determined by a set of conditions, and no normative connotation attaches to the term [...] The concept of an equilibrium system outlined above is applicable as well to the case of a single variable as to so-called general equilibrium involving thousands of variables (1965, p. 8).

In the analytical solution of dynamic models, i.e., those accounting for time, equilibrium is neither associated to a situation or a position of repose toward which the system goes, nor it represents stability. In that, equilibrium is the tendency of endogenous variables over time. Thus, the convergence to a certain tendential position relies on hypotheses specially set at each model. That explains why Lisboa (1998) argues that some dynamic general equilibrium models report divergent trajectories of equilibrium, including some with chaotic behavior[6]. With such a view of equilibrium, and also considering that the neoclassical method explains the economic phenomena based on the individual action, a particular solution for a mathematical model depends on hypotheses guiding aspects such as the individual behavior, expectation formation, time dimension, and market structure. A particular solution for a model emerges just after defined the hypotheses driving agents' behavior.

Take for instance the typical neoclassical model. The problem modelled sets hypotheses saying that individuals maximize/optimize utility and gains. Then it is hypothesized that they are subject to set of restrictions, which are given by assumptions about the available information, income, expectations. In the Walrasian model with perfect information and fully satisfied expectations, when agents reach the optime solution they have no incentive to modify their behavior. This resembles Hahn's equilibrium meaning, "*an economy is in equilibrium when it generates messages which do not cause agents to change the theories which they hold or the policies which they pursue*" (1973, p. 14).

However, there are models that recall the impossibility of perfect knowledge and convey to a non-Pareto equilibrium. For instance, Boland (2017) exemplifies that an ignorant monopolist, who cannot know the demand curve of the market, supposes some demand curve. If the supposition is wrong (and there is no way to guarantee that it is right), the price of equilibrium can be different from the monopolist's supposition. This solution would not maximize the monopolist's profits,

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[6] To see more on that, see Grandmont (1987).

yet he/she would have no incentives to adopt any other behavior. This would be a non-optimum equilibrium to both the individual (the monopolist) and the economy.

Another perspective of general equilibrium that includes non-Walrasian microfoundations[7] – Backhouse and Boianovsky (2012) name these models 'the general disequilibrium models' – develops a theoretical framework that tries to justify and confirm the existence of equilibrium without full employment, like Keynes does in his *The General Theory of Employment, Interest, and Money*. The key idea of these models is that one or more markets do not tend to the supply and demand market clear, whose cause may be a hypothesis stating that agents are restricted in their purchases, and so they exchange at false prices that hinders mutually compatible actions. Furthermore, the inclusion of presuppositions, such as the possibility of mistaken expectations, asymmetric information, and restrictive contracts, makes agents maximize utility and profit without incentives to change their behavior, even if facing unbalanced supply and demand.

When the analysis is dynamic, as in Real Business Cycles models, and incorporates agents optimizing intertemporally in a context where shocks from the monetary policy or technological changes can happen at any time, another meaning for equilibrium arises. In that, individuals optimize over time given the available information, but they mistake because of recurring and unpredictable shocks that make the economic system fluctuate. This is a stochastic type of equilibrium, whose variables are in a stable distribution of probability (Backhouse and Boianovksy, 2012).

Contrasting assumptions on how agents forge expectations are also capable of changing the solutions of models, accompanied by the change of the equilibrium connotation. In game theory, there is a solution in a game with two or more players where each player optimizes by having the correct expectation about the strategy that other players embrace, so that they accomplish the so-called Nash equilibrium (Phelps, 1991). However, this outcome changes whenever new presuppositions, like sequential decisions and other processes describing how agents' form expectations, are input into the model. These changes of presuppositions create, for example, the perfect equilibrium in subgame, Bayesian, and sequential outcomes (Lisboa, 1997).

The meanings of equilibrium treated so far are surely not the only ones in the broad range of economic theories. Moreover, depending on the parameters of classification, distinct categories become equivalent or even subcategories of other perspectives. For example, in some contexts, equilibrium as forces in balance means resting place or tendential point to which economic processes converge. In other cases, the formation of expectations is equivalent to the absence of incentives to agents change their behavior.

Semantics helps to clear the meaning of a word, equilibrium, that assumes so many senses in economics. The semantic classification done here highlights the

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[7] For authors in this category, see Patikin (1956), Clower (1965), Leijonhufvud (1968), Barro and Grossman (1971), Malinvaud (1982), and Bennasy (1962).

mobile and relative connotation that equilibrium has in different economic theories throughout the history of economic thought. There are two merits of classifying equilibrium into a semantic dimension. On the one hand, the classification highlights the impossibility of labeling equilibrium in one and only manner. On the other hand, it shows the nuances of the different connotations of equilibrium in economics, which is a necessary condition to inquiry the use of this term in each specific theory.

3. THE METHODOLOGICAL DIMENSION OF EQUILIBRIUM

Equilibrium also has a methodological dimension, in which it is a methodological tool that helps establishing causal relationships Between variables of interest, a key piece when constructing a model. This division between semantics and method is important because it shows the possibility of theories adopt a semantic dimension of equilibrium, but that do not use it as method to understand a phenomenon. What are the fundamental characteristics of equilibrium as method?

Applying equilibrium as a methodological instrument to unravel economic phenomena gained rigor and acknowledgement with Marshall's *Principles of Economics* (Düppe, 2015). Back then equilibrium first appeared in economics as what is currently called comparative statics. This method reports the logical consequences of the variance of one or more variables of a model whereas it keeps constant all other variables and elements that could affect the process under analysis. Marshall explains the comparative statics, as well the importance of the *caeteris paribus* clause to it,

> The element of time is a chief cause of those difficulties in economic investigation which make it necessary for man with his limited powers to go step by step; breaking up a complex question, studying one bit at a time, and at last combining his partial solutions into a more or less complete solution of the whole riddle. In breaking it up, he segregates those disturbing causes, whose wanderings happen to be inconvenient, for the time in a pound called Caeteris Paribus. The study of some group of tendencies is isolated by the assumption of other things being equal: the existence of other tendencies is not denied, but their disturbing effect is neglected for a time. The more the issue is thus narrowed, the more exactly can it be handled: but also the less closely does it correspond to real life (2013 [1890], p. 304).

Comparative statics is useful to deal with the inherent complexity of economic phenomena and allows for establishing causal relationships, and even theoretical generalizations. Moreover, assuming constant other variables does not exclude recognizing that they potentially influence the system. It only suspends this influence, aiming that the endogenous variables of the system reach equilibrium without depending on the elements that are under the restriction of the *caeteris paribus*

clause. Thus, a final equilibrium in a certain formulation may not be final in other conditions with other effects considered (Chick, 2007) as well as something traditionally considered a detour from the long-term equilibrium turns just another short-term equilibrium (Milgate, 1987).

The manipulation of a models' constants made Marshall define what he had meant by short and long-term equilibria. The difference resides on the temporal horizon of the economic decision: short-term is the time when the firm, *caeteris paribus*, cannot change its capital stock whereas labor unites vary. Long-term is the time when the firm can also modify its capital stock, so the firm's profit maximizing choice can combine changeable quantities of labor and capital (Boland, 2007). However, there is not a numbered time limit defining the duration of short and long-terms. The distinction relies on whether the model is still isolated from effects coming from exogenous variables or not[8].

In Machlup's (1958) view, economic events that are adjustments of the system to shocks are normally apprehended by a conceptual framework, which is a mental exercise that attempts to ground cause-effect relations between two set of variances, in that one set is distancing from the equilibrium while another is moving toward the equilibrium. The importance of this tool is associated to the fact that while changes in the system can be observable, the causal relationship of the changes cannot. The latter is only provided by theoretical construction.

Comparative statics should only appear in a model, either verbal or algebraic, with the number of variables and the behavioral, technological, and institutional functional relationships among these variables clearly stated; thus, it will be possible to undertake the analysis of how an independent variable affects the dependent ones. This process of analysis has four steps: (i) first, the modelling process starts with setting the initial equilibrium position, or the compatibility among the variables, and assuming that there is no tendency to change; (ii) second, some element needs to vary, this will be the disequilibrium factor of the model; (iii) the third step is the system's reactions to the disturbance that happened in step two. In the third step the dependent variable adjusts to the shock given by an independent variable, which was allowed to vary while everything else was in *caeteris paribus*; (iv) fourth, a new equilibrium emerges as the variables find their mutual compatibility and the adjustment ceases.

The disequilibrium and adjustments of steps 2 and 3 are unobservable. For they become elements of interpretation, to which suppositions are required to ensure feasibility and assure that the changes of step 3 result exclusively from the shocks of step 2. Step 1's supposition of an initial equilibrium makes step 2 the only likely cause of the adjustments happening through step 3. In the absence of that hypothetical initial supposition, there is no guarantee that solely the disequilibrium factors of step 2 caused the transformations of step 3. Moreover, to certify

[8] Regarding the debate about time, Friedman (1972) argues that the long-term equilibrium is only notional, it should not be taken as a perfect description of reality.

that all effects happening in step 2 are complete, and that no other change would take place, step 4 provides the new equilibrium, a situation from which no other change depart. Machlup summarizes this process,

> We have a mental experiment in which the first and last steps, the assumption of initial and final equilibria, are methodological devices to secure that Step 2 is the sole cause and Step 3 contains the complete sequence of effects. The function of the initial equilibrium is to assure us that "nothing but 2" causes the changes under Step 3; the function of the final equilibrium is to assure that "nothing but 3" is to be expected as an effect of the change under Step 2 (1958, p. 5).

To Machlup (Ibid.), the end of step 3's effects crucially relies on the set of variables. Therefore, the end of the movement depends on causes necessarily accounted for in the initial equilibrium. The variables and causal relationships that supposedly adequate to the phenomenon under research are selected depending on the question to be answered and the problem to be studied, in such a way that the compatibility among the chosen variables expresses an equilibrium in relation to the details of each model. In this sense, equilibrium has various definitions and forms in different theories.

Moreover, the logical validity of explanations the model furnishes is guaranteed if there is no change on the exogenous variables while the endogenous variables are still settling at their equilibrium values. This mental exercise resembles lab tests, where a control group is set and so the researcher can investigate the effects of one variable on other groups of variables with features that look like the control group. The initial conditions of equilibrium isolate the system from other disturbing variables, just as a control group, enabling confirmation of certain relationships.

Chick and Dow (2005, 2012) explain that a model is a closed theoretical system encapsulated to hypotheses and presuppositions that form a structure that, in turn, determines (i) the whole set of causal, (ii) the structural relations of the system, and (iii) the system's immobility[9]. Comparative statics presupposes closed systems. However, a closed model can be a subsystem of an open model liable to, for instance, variances of structural relations or an undefinition regarding which variables of the system are endogenous and exogenous[10]. In this perspective, theory has a wider meaning, being a framework that incorporates several models.

If a model taken as a closed system is component of a broader theoretical structure (an open system) and temporarily ignores key features of this broader framework by keeping constant some variables through the *caeteris paribus* clause,

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[9] Systems are a set of interrelated elements that form either a complex unit or set of principles or ideas combined in a whole. Systems can be a feature of reality or just a mental exercise.

[10] Herscovici (2005, p. 281) explains that "open or semi open models are historical models in which certain variables express the historical peculiarities of that time". For more on open and closed systems see, beyond Herscovici (2005), Chick and Dow (2005).

the model assumes the form of a comparative statics method and becomes a method of partial analysis to understand certain regularities of the open system it belongs to. Instead of both limiting the possibilities of analysis and isolating the system from modifications, this method enables flexibility and incorporates variables and structures otherwise neglected.

Chick and Dow (2005) argue that Keynes's *The General Theory* is an open system with some closed systems whose difference relies on distinct states of short and long-term expectations. The theoretical outcomes change in accordance with the variances of expectation. Kregel (1976) explains: in *The General Theory*, Keynes (1964) has three models of equilibrium, each one combining short and long-term types of expectations. (i) The static equilibrium model has constant long-term expectations whereas the short-term expectations are always satisfied. So, the system always moves directly to the effective demand point – that is, the equilibrium point. (ii) The stationary equilibrium model has unchangeable long-term expectations, but the short-term ones can be frustrated and so change. When there is frustration of expectations, entrepreneurs review their short-term expectations in a trial-and-error strategy to reach the effective demand point. (iii) The mobile equilibrium model has changeable short and long-term expectations. Both expectations can be frustrated, and they are inter-related; not realized short-term expectations disturb long-term expectations. The frustration of short-term expectations changes long-term expectations that, therefore, alters supply and demand curves, making one point within the multiple equilibria unreachable[11]. This last model is the closest to reality. Note that models (i) and (ii) respectively have both or one sort of expectation fixed. The intention is to provide for inquiring the relationships between other specific variables of the model while leaving in *caeteris paribus* both the short and long-term (model (i)) expectations or only the latter (model (ii)).

Keynes (1964) acknowledges the mutable and evolving character of social structures by fitting this characteristic into an open system capable of transforming itself over time. Nevertheless, he uses closed models to define what would be the exogenous and endogenous variables, so that he could transiently dismiss elements of the system in order to theorize its regularities[12].

Chick and Dow (2005) also argue that it is possible to identify closed models in theories that do not allow the incorporation of omitted characteristics without changing the whole system. This is the case of the economics mainstream, such as the New Classical economics, which assumes unreal hypotheses not passible of

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[11] On *The General Theory's* expectations, Herscovici (2013) points out their endogenous character because of the path-dependence process that prevails in the dynamics of the monetary production economies.

[12] On Keynes's method, Lang and Setterfield (2015, p. 196) argue that "equilibrium analysis is employed as a distinct methodology designed to "lock up without ignoring" various pertinent features of historical time in order to render analysis of a system tractable: some part of a system's dynamics is overlooked, creating constancy where there is, in fact, the propensity for change, in order to facilitate the practical analysis of other parts".

posterior changing. Different from Keynes (1964), whose system was partially closed when required for studying an object, New Classical models cannot have relationship with other structures. The justification for adopting these models is to be found in Friedman's (1953) instrumentalist approach, whose main argument is that the realism of hypotheses is unimportant if a model's predictions prove themselves right.

There are two forms of seeing and applying the comparative statics method if model and theory are taken as distinct. On the one hand, comparative statics is a transitory tool of analysis that despite being a closed system is used to suspend the effects of some elements and relationships present in the open system. This use sets permeable and flexible limits to the analysis. Herein, comparative statics is also a component of a wider theoretical effort, which admits the inclusion of aspects previously excluded. On the other hand, comparative statics is a workful method of analysis that settles clear and permanent limits to systems, but it prohibits posterior changes of presuppositions. Therefore, equilibrium can assume either a provisory or a permanent character in accordance with how each researcher perceives the powers and limits of using equilibrium as an analytical tool.

Backhouse (2004) and Machlup (1958) argue that there is no reason to consider the equilibrium method, treated like the abstraction of elements of reality, illegitimate. At least in a first glance, the comprehension of the economic system's complexity should be split into compartments, a resource furnished by the equilibrium method. Attention should not be paid to the method of equilibrium itself, but to the suppositions of each model, as in the cases where certain abstractions (such as those concerning agents' behavior or how agents form expectations) are inappropriate to understand a phenomenon. Despite of criticizing the unrestricted use of the equilibrium method, Robinson also notices that it is, although bounded, a useful method,

> The concept of equilibrium, of course, is an indispensable tool of analysis […] but to use the equilibrium concept one has to keep it in its place, and its place is strictly in the preliminary stages of an analytical argument, not in the framing of hypotheses to be tested against the facts (1962, p. 78).

Although some critics of the equilibrium method accept its convenience to transiently abstract elements of the analysis, they also point the problems of the method, especially so when it either no longer solely exerts an auxiliar function in the theory or does not permit modifying or including certain premises. Lang and Setterfield (2015) defend the criticisms of what they call the traditional equilibrium perspective, dominant in the neoclassical tradition. These authors argue that this perspective of equilibrium is characterized by results that do not account for path-dependence, whose absence neglects the importance of the dynamics of the system until the equilibrium. But the path to equilibrium has systemic properties, such as homeostasis and time reversibility. These are important to the system and should be considered, since homeostasis warrantees the system return to the initial equi-

librium after a shock, and time reversibility provides for the system the return to equilibrium position by remaking the same steps it did when moving; so, time reversibility resets the initial conditions of the system.

To Lang and Setterfield (Ibid.), there is an alternative perspective of equilibrium, where outcomes emerge from the peculiar trajectory followed by the system until equilibrium (path-dependence). In that, historical time is a key component of analysis[13]. The trail pathed by the variables of interest determines the equilibrium position, thereby various outcomes accompany each system's dynamics[14]. The crucial difference that these perspectives have regarding the equilibrium as method would lay on their distance from reality: the traditional economics is far from reality whereas the alternative perspective is close to it.

These criticisms show the necessity of a clear discussion of aspects related to dynamic systems, such as the presence of stability and convergence. Figueroa (1993) states that a stable system needs to return to the point of static equilibrium, defined at each point on time, after a shock. However, if the trajectory of the endogenous variables alters when the system faces disturbances, the system should be considered unstable.

Moreover, the theme convergence appears when the system's trajectory repetitively tends to the same final state – that is, the stationary equilibrium toward which the endogenous variables are prone to. If the system does not lean to a definite point, its trajectory is divergent and can be explosive (a continuously line of growth or degrowth), cyclical (lines alternating growth and degrowth), or chaotic (unstandardized lines).

When the system is complex, unstable, divergent, and have endogenous discontinuances, the equilibrium notion becomes unessential or even totally dispensable in the analysis of dynamic processes. There are several motives for a system to behavior as such, all of them reducing the predictability of the system, what hinders self-stabilizing or optime trajectories. For instance, systems where fundamental uncertainty abounds have a variety of complex dynamics, including outcomes compatible with stock market speculative bubbles or financial fragility. A system with chaotic features can even stop operating self-stabilizing elements. For example, when a system displays great sensitive to changes in the initial conditions and, as a consequence, raises erratic and very singular trajectories whenever those conditions change, the system disturbs agents' capacity to learn and misses the dynamic process of self-adjustment.

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[13] Historical time is the non-reversable calendar time, which prevails in the real economic system. In opposition, logical time is only an imagination of theories and is reversible. Mainstream economics largely adopts the latter.

[14] Setterfield (1999) argues that, in the case of Keynes's *The General Theory*, the effective demand equilibrium point depends on the modifications of agents' long-term expectations. This would be Kregel's (1976) mobile equilibrium, whose outcome relies on the specific path the system has gone through. To more on that, see Carvalho (1983-1984, 1984-1985).

Other factors potentially prompting complex dynamics are multiple equilibria[15] (Vercelli, 1991) and path-dependence (Robinson, 1962). In the former, the system tends to any existing equilibrium point, whereas in the latter the position of the endogenous variables over time is inescapably dependent on their past trajectory. Another key element of complex dynamics is cumulative causation (Myrdal, 1965; Kaldor, 1972), where elements causing change suffer feedback effect and are as well altered by their own impacts. These factors generate surprises that obstacle adjusts of the system to equilibrium points of any type.

Herscovici (2005) categorizes the physical and mathematical determinations of a system. He says that neoclassical general equilibrium models follow a mathematical determination – that is, this perspective pursues the solve a system of simultaneous equations to prove the conditions of existence, singularity, and stability of models. In turn, the heterodox economic tradition is concerned with determining the conditions of physical stability of models, but assuming them as partially unstable and open. Economics heterodoxy is in pursuit of both identifying areas of instability and stability of the system and analyzing the system's trajectory, given its initial conditions. Economics heterodoxy does not see equilibrium as the exclusive solution of a system of equations, but as a trajectory amongst several possible ones.

It is worthy noting that the criticisms of the traditional perspective of equilibrium do not only regard realism (Boland, 2017). Some of the criticisms regard elements not accounted for in the traditional Walrasian models, such as the latter's hypotheses of knowledge, information, expectations, uncertainty, and scale returns.

To sum up, the methodological dimension of equilibrium shows that it does not hold a unique use across different theories. Despite having a common point, namely being a method to abstract complex components of economic phenomena to make it easier to analyze objects, equilibrium as method helps the theoretical construction through different forms. Broadly speaking, the method of equilibrium helps when it is necessary to insert elements previously disregarded and check their effects on other variables of the model. On the other hand, equilibrium as a method can also be taken as a finished form of theory, but in this case, of course, there cannot be any posterior flexibilization.

FINAL REMARKS

The relevance that equilibrium has assumed in the history of economic though is undeniable. Theorists report arguments in favor or against the adoption of the equilibrium notion in economic models, and although it is almost omnipresent in

[15] Vercelli (1991) says that the existence of multiple equilibria requires the analysis of the dynamic behavior of the system in disequilibrium in order to make it possible to identify to which of these equilibria the system would converge, and which initial conditions permit such convergence.

economic theories, and even in practical economic discussions, equilibrium has neither a unique and immutable meaning nor it is a singular method in the various perspectives.

In this article, we highlighted two dimensions that equilibrium assumes in economics. The first, the semantic dimension, recalls the meaning of equilibrium adopted by schools of economic thought and emphasizes the nuances of these senses. In this dimension, equilibrium means (i) balance of forces, (ii) repose position, (iii) tendential point, (iv) conditions necessary to the reproduction of the system, (v) compatibility among variables, (vi) solution of a mathematical model, and (vii) optimization of individuals' objective functions subject to restrictions of several types. These definitions can coexist depending on the theoretical perspective. In certain contexts, they can even be equivalent, but this, in fact, feeds controversies and debates.

The methodological dimension is the second approach and it deems equilibrium as a method, an analytical tool used to simplify the object under scrutiny, useful in the apprehension of economic regularities. However, as usual when dealing with equilibrium, this procedure has not a unique form. It acquires a partial character in open theoretical systems, which accepts flexibilization of hypotheses and presuppositions, but in closed theoretical systems it takes a finished form, whose axioms cannot be modified without completely transforming the whole system.

The attempt made by this article to order this myriad of interpretations of the equilibrium notion pursued to make the debate on the theme more systematized and plainer. We sought to contribute by offering a less ambiguous assessment of the adoption of equilibrium in different economic theories, an effort that also aids to set clear borders between these perspectives.

REFERENCES

BACKHOUSE, R. and BOIANOVSKY, M. 2012. *Transforming Modern Macroeconomics*. Cambridge: Cambridge University Press.

BACKHOUSE, R. E. 2004. History and equilibrium: A partial defense of equilibrium economics, *Journal of Economic Methodology*, 11 (3), 291-305.

BARRO, R. J and GROSSMAN, H. I. 1971. A general disequilibrium model of income and employment, A*merican Economic Review*, 61, 82-93.

BÉNASSY, J. P. 1975. Neo-Keynesian disequilibrium theory in a monetary economy, *Review of Economic Studies*, 41, 503-23.

BOLAND, L. 2017. A. *Equilibrium Models in Economics: Purposes & Critical Limitations*. Oxford: Oxford University Press.

CARAVALE, G. 2001. *Equlibrium and Economic Theory*. Oxon: Routledge.

CARVALHO, F. J. C. 1983-1984. On the concept of time in Shacklean and Sraffian Economics", *Journal of Post Keynesian Economics*, 6 (2), 265-280.

CARVALHO, F. J. C. 1984-1985. Alternatives analyses of short and long run in Post Keynesian economics, *Journal of Post Keynesian Economics*, 7 (2), 214-234.

CHICK, V. 2007. Equilibrium in economics: some concepts and controversies. In MOSINI, V. Equilibrium in Economics: Scope and Limits, pp. 224-239. Oxon: Routledge.

CHICK, V. and DOW, S. 2005. The meaning of open systems. *Journal of Economic Methodology*, 12 (3), 363–381.
CHICK, V. and DOW, S. 2012. The non-neutrality of formalism. In DOW, S. C. *Foundations for New Economic Thinking: A collection of Essays*, pp. 140-161. Londres: Palgarve Macmillan.
CLOWER, R. 1965. The Keynesian counterrevolution: A theoretical appraisal. In Hahn, F. e Brechling F. The Theory of Interest Rates, 103-125. Londres: MacMillan
DÜPPE, T. 2015. Equilibrium: History of the Concept, *International Encyclopedia of the Social & Behavioral Science*s, 7, 912-917.
FIGUEROA, A. 1993. Estática y dinámica en el análisis económico, *Revista Economía*, 16 (32), 9-32.
FRIEDMAN, M. 1953. The methodology of positive economics. In FRIEDMAN, M. *Essays on positive economics*, Chicago: Chicago University Press, 145-178.
FRIEDMAN, M. 1972. Comments on the critics, *Journal of Political Economy*, 80 (5), 906-950.
GRANDMONT, J. L. 1987. *Nonlinear dynamics*. Londres: Academic Press.
HAHN, F. 1973. *On the notion of equilibrium in economics*. Cambridge: Cambrige University Press.
HARROD, R. 1939. An essay on economics dynamics, *The Economic Journal*, 49 (193), 14-33.
HENRY, J. F. 1983. On equilibrium. *Jornal of Post Keynesian Economics*, 6 (2), 214-229.
HERSCOVICI, A. 2005. Hitoricidade, entropia e não-linearidade: algumas aplicações possíveis na Ciência Econômica, *Revista de Economia Política*, 25 (3), 277-294.
HERSCOVICI, A. 2013. Keynes e o conceito de capital reflexões epistemológicas a respeito das premissas sraffianas da Teoria Geral. *Revista de Economia Política,* 33 (3), 486-504. DOI: 10.1590/S0101-31572013000300007
KALDOR, N. 1972. The irrelevance of equilibrium economics, *The Economic Journal*, 82 (328), 1237-1255.
KEYNES, J. M. 1964. The General Theory of Employment, Interest, and Money. New York: HBS.
LANG, D. and SETTERFIELD, M. 2015. History versus equilibrium? On the possibility and realist basis of a general critique of traditional equilibrium analysis, *Journal of Post Keynesian Economics*, 29 (2), 191-209.
LAWSON, T. 2005. The (confused) state of equilibrium analysis in modern economics: an explanation, *Journal of Post Keynesian Economics*, 27 (3), 423-444.
LAWSON, T. 2007. Tensions in modern economics: the case of equilibrium analysis. In MOSINI, V. *Equilibrium in Economics: Scope and Limits*, Oxfon: Routledge, 133-149.
LEIJONHUFVUD, A. 1968. On Keynesian economics and the economics of Keynes. Oxford: Oxford University Press.
LISBOA, M, 1997. A miséria da crítica heterodoxa primeira parte: sobre as críticas, *Economia Contemporânea*, 2, 4-66.
LISBOA, M. 1998. A miséria da crítica heterodoxa segunda parte: método e equilíbrio na tradição neoclássica, *Revista de Economia Contemporânea*, 3, 113-151.
MACHLUP, F. 1958. Equilibrium and disequilibrium: misplaced concreteness and disguised Politics, *The Economic Journal*, 68 (269), p. 1-24.
MALINVAUD, E. 1982. The equilibrium concept in economics, *Studies in Logic and the Foundations of Mathematics*, 104, p. 585-594.
MARSHALL, A. 2013 [1890]. *Principles of Economics*. Londres: Macmillan.
MILGATE, M. 1991. Equilibrium: development of the concept. In EATWELL, J. e
MYRDAL, G. 1965. *Teoria Econômica e Regiões Subdesenvolvidas*. Saga: Rio de Janeiro.
NICOLA, P. C. 2001. 'Catholicity' of general equilibrium. In CARAVALE, G. *Equilibrium and economic theory*, Londres: Routledge, 81-93.
PASINETTI, L. 1962. Rate of profit and income distribution in relation to the rate of economic growth, *The Review of Economic Studies*, 29 (4), 267-279.
PATINKIN, D. 1956. *Money, Interest and Prices*. Nova York: Row and Peterson.
PHELPS, E. 1991. Equlibrium: an expectational concept. In EATWELL, J; MILGATE, M; NEWMAN, P. *The World of Economics*, Londres: Palgrave MacMillan, 224-227
POPPER, K. *The Logic of Scientific Discovery*. London: Routledge, 2005.

POSSAS, M. 1983. *Dinâmica e Ciclo Econômico em Oligopólio*. Tese (Doutorado em Economia) - apresentado ao Instituto de Economia da Universidade Estadual de Campinas, Campinas, 308f.
ROBINSON, J. 1956. *The Accumulation of Capital*, Londres: Macmillan.
ROBINSON, J. 1962. *Economic Philosophy*. Londres Penguin Books, 1962.
SAMUELSON, P. 1965. *Foundations of Economic Analysis*. Nova York: Antheneum.
SETTERFIELD, M. 1999. Expectations, path dependence and effective demand: a macroeconomic model along Keynesian lines, *Journal of Post Keynesian Economics*, 21 (3) 479-501.
SMITH, A. 2009 [1776] *An Inquiry into the Nature and Causes of the Wealth of Nations*. Chicago: University of Chicago Press.
VERCELLI, A. 1991. *Methodological foundations of macroeconomics: Keynes and Lucas*. Cambridge Cambridge University Press.
WEINTRAUB, E. R. 2005. On Lawson on equilibrium, *Journal of Post Keynesian Economics*, 27 (3), 445-454.