The Marginal Revolution and uncertain knowledge in economics

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Abstract: Whether "the marginalist revolution" represented a discontinuity in the history of economics remains a matter of debate, particularly in what concerns theoretical foundations and/or methodological devices. This essay, inspired by Michel Foucault's belief in the possibility of discerning the underlying configuration of thought through an investigation of ontological and epistemological conditions, offers a new approach to the controversy. Foucault did not consider "the marginal revolution" as representing a change of epistemes. However, that "revolution" may be seen as promoting two thresholds in economics: a new positivity and an epistemological shift, which resulted from a new conception of language and the emergence of a fundamental uncertainty regarding knowledge. According to this perspective, the first neoclassicals incorporated the mathematics into the formulation of theory as a means to overcome this uncertainty. This perspective offers a completely new way of conceiving that event and defies, for instance, the usual understanding of Cartesian and Newtonian influences on it.

Keywords: the marginal revolution; Michel Foucault; thresholds of knowledge; language; formalization

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1. Introduction

Economists, historians, methodologists and philosophers of science have been debating over whether the marginalist revolution, which led to the emergence of 'neoclassical' economics and mathematical economics, could really be depicted as a 'revolution', in the sense of a discontinuity in the history of economic thought.

The so-called "marginal revolution" was promoted by a group of thinkers who had formulated the theory of marginal utility at nearly the same time, even though they were working independently, at the end of the 19th century. The main cofounders were W. Stanley Jevons in England, Leon Walras in Switzerland, and Carl Menger in Austria. One main issue in the debate has been whether and how their historical context had influenced their theoretical and methodological principles, leading to their specific formulation of a theory. We say "whether" because some authors, such as Hutchison (1972) for instance, argued that there were different forces, operating in different places, and that the simultaneous discovery of marginalist economics may have been just a coincidence. Birken (1988, 25), for example, disagrees with Hutchison and argues that the British was similar to Continental marginalism.

The controversy has focused on the issue regarding a "revolution" in Kuhnian paradigmatic sense and has approached it in what concerns theoretical foundations, methodological devices and social context of its protagonists (e.g., Hutchison 1972; Blaug 1972; Schumpeter 1954; Winch 1972; Mirowski 1984 e 1989).

This paper would like to pursue Foucault's provocative and ambitious suggestion about the possibility of revealing an underlying configuration of thought, which would also define the "paradigms" in a Kuhnian sense (see more about the comparison between Kuhn and Foucault in Lima, 2010). Foucault named "episteme" the underlying arrangement of some conditions that determine knowledge. According to him, every age has its way of producing "the truth", which can be uncovered as we consider history. Beyond an internal and/or external history, Foucault tried to disclose the conditions that made knowledge possible and within a specific way. He wondered about the possibility of knowledge having historically followed a kind of "well-defined regularity" and believed that it was possible to unveil it through the investigation of a set of relations. Actually, when following this line of investigation, Foucault was searching for the consequences for economic theory of the existence of a certain historical "interdiscursive practice", as he defined it, which may also help us to understand why those thinkers, though working independently, obtained the same approach. As Blaug (1972) wrote: "it is too much to believe that three men working at nearly the same time in such vastly different intellectual climates as those of Manchester, Vienna, and Lausanne could have hit by accident on the same idea; it must be due to some common cause".

In this expression, "practice" means "a way of doing things" and "discursive practice" comprises a set of regularities regarding the form by which certain fields of objects are demarcated and norms about how to elaborate concepts and theories are established (Foucault 2000b, 74). Hence, each historical "discursive practice" presupposes a play of prescriptions that govern exclusions and selections (Foucault 2000a, 11). For Foucault, it is through the analysis of "discursive practices" that we can unravel "a type of systematicity" that characterizes different "systems of thought".

In 1990, the *History of Political Economy* journal published a debate between Lawrence Birken and Jack Amariglio over Foucault's treatment of "The Marginalist Revolution" in his archaeology of political economy in *The Order of Things*. The debate was over Foucault's ignoring of marginalism as promoting an epistemic break in the history of economic thought. Foucault actually placed the first neoclassicals together with other economists from Ricardo onwards, including Marx, in the modern episteme in his *The Order of Things*.

Birken (1990) refers to Amariglio's paper *The body, economic discourse, and power: an economist's introduction to Foucault* (Amariglio, 1988), also published in *The History of Political Economy* journal. Birken criticises Amariglio for having agreed with Foucault's argument that the marginalist revolution was not an epistemic shift, because, as Amariglio (1988, 596-7) asserts: "The critique of political economy at the hands of the marginalists will not reverse this order of things [modern episteme]. As Foucault suggests all too briefly, the marginalists do not overturn the reign of Man in their rejection of Ricardian and Marxian value theory".

Birken (1990) argues that Foucault failed to see the break promoted by marginalism. He argued that marginalism, and so the emergence of neoclassical theory, has marked a sharp shift in relation to classical economics, particularly because marginalists repudiated the "classical" search for an essence of human behaviour. Birken writes:

> But it is precisely this essentialism that marginalism overthrew by repudiating the search for an exchange as opposed to a use value. There is no longer essence, either in the form of social labor or social need, but only a radically situational, relativistic, and idiosyncratic desire attached to particular goods at a particular moment of exchange (Birken 1990, 559).

Birken concludes that the marginalism should be considered as part of a new ("post-modern") epistemic configuration of thought. According to him, marginalists' emphasis on utility pointed to a Nietzschean relativisation of the body, which does not have the collective character that it used to have for classical economists. The neoclassical body had already acquired a "decentered", "postmodern" character by the end of the 19th century, marking a first moment of "postmodernism" in economics. He argues that there was a shift from production to consumption, in which desire

could no longer be depicted by humanist basic principles. For Birken, Foucault failed to see the break, precisely because of his methodology: archaeology. For Birken, the problem with the archaeology was exactly that it did not offer elements for understanding when and where exactly the epistemic shifts had happened.

Amariglio (1990) responds to Birken"s criticism and argues that Birken's views resulted from an unsustainable concept of neoclassical economics, which was problematic on four basic accounts: the economic man in the neoclassical theory is not a "decentred" subject as supposed by Birken; the neoclassical conception keeps the stable rational connection between desire and preference; the neoclassical notion of equilibrium requires the assumption that there is a universal statute of desire; and, *homo economicus* has an essential identity in neoclassical theory. Contrary to what Birken believes, Amariglio agrees with Foucault in that neoclassical economics does not differ from classical economics, in the sense that it maintained the same humanist concern, which was to find the essential principles of the economic man. According to Foucault, in the modern episteme, man began to perform two functions in knowledge. Firstly, man was to be the object of the empirical sciences - life, labour, and language. Second, man is converted into the philosophical foundation for the possibility of knowledge. It is this "historical *a priori*" that explains the arising of the human sciences. Foucault uses the term "anthropology" not to refer to the specific science of man, but literally as "a logic of man": "anthropologism" became the philosophical foundation of all human sciences.

In addition to Birken's unusual and problematic argument that neoclassical theory has a "postmodern" conception of the economic subject, which was addressed by Amariglio (1990), it is here believed that there are other important elements in Foucault's archaeology that can help us to understand why Foucault considered "the marginal revolution" as fitting in the modern episteme. Furthermore, Foucault referred to it in his *The Archaeology of Knowledge*, which was a methodological exposition, of his previous works, including *The Order of Things*, and described it as promoting a threshold in economic knowledge (Foucault [1969] 2002, 127). He did not elaborate on that in *The Archaeology of Knowledge*, but a more careful reading of *The Order of Things* allows us to explore his statement. A more detailed account of Foucault's considerations regarding the context of the marginal revolution provides crucial elements to understand some ontological and epistemological conditions that were underlying economic thought and highlights the conception of language that may explain the fundamental change promoted by the cofounders of that methodological revolution in economics. Also, Foucault introduced an interesting theory about thresholds of knowledge, which is approached in the next section and is certainly one more example of his reflections that could deserve a more careful consideration of economists interested in methodology and historiography of economics.

2. Foucault's archaeology and the Marginal Revolution: a threshold of a new positivity and epistemologisation

2.1 The thresholds of the marginal revolution

Foucault believed in the possibility of discerning the underlying configuration of thought in different ages through some conditions. He denominated the arrangement of some conditions as "epistemes". When accomplishing an archaeology of political economy, he did not refer to the marginalists of the end of the nineteenth century as representing a change of epistemes. It would therefore appear that Foucault had neglected the importance of that moment in the history of economic thought. He had located it in the same epistemic context as Ricardo, for instance - the modern episteme. This was a matter of debate between Amariglio (1990) and Birken (1990) as mentioned above.

Nevertheless, Foucault referred to the marginal revolution in *The Archaeology of Knowledge,* which he wrote as methodological treatise to his previous *The Order of Things*.

In *The Archaeology of Knowledge*, Foucault writes that one of the consequences, of considering continuities in the history of knowledge or to believe in the "progress" of reason ("accumulation of truths" or "the orthogenesis of reason"), is that of analysing knowledge only in terms of what is, or is not, "science". These examinations fail to recognize that "a discursive practice (…) has its own levels, its own thresholds, its own various ruptures" (Foucault [1969] 2002, 207). He then distinguishes four thresholds in knowledge, which characterise the distinctive emergences and changes that occur within a discursive formation. Although he was very vague when defining these thresholds, as in so many parts of his *The Archaeology of Knowledge*, which he admitted was the most difficult of his books (Foucault 2001, 850), it is possible to infer that:

a) Positivity: when a group of statements about certain phenomena achieves individuality and autonomy, constituting a "system" in terms of "science", "literature", "philosophy", "history", "theory", "discipline", and so on. As Smart (1985, 40) defines it: the "positivity" "reveals that within a discourse, reference is being made to the same thing within the same conceptual field, at the same level".
b) Epistemologisation: when norms of verification and coherence are established (even if they are not successfully followed, adds Foucault) and the discourse becomes a model, a critique or verification of that knowledge. This threshold occurs when discursive practices "give rise to a corpus of knowledge, in so far as they assume the status and role of science". (Foucault [1969] 2002, 210)

c) Scientificity: when a knowledge (that has already crossed the threshold of epistemologisation) obey some criteria regarding what is considered to be scientific;
d) Formalization: when a scientific discourse deploys a formal structure. For example, when it adopts a mathematical structure following axioms, variables and the relations between/among variables.

Foucault stresses that these thresholds are neither successive nor evolutive and that there are cases when they may occur simultaneously: "the establishment of positivity evolves at the same time the emergence of an epistemological figure" (Foucault [1969] 2002, 207). The threshold of scientificity may occur during a transition from one "positivity" to another, as for example during the transition from natural history to biology, which Foucault explored in *The Order of Things*, as they had different formal criteria (classification of beings in natural history and specific correlations of different organisms in biology). Some regions of knowledge may never achieve some of these thresholds but that does not mean that they are not "sciences".

Foucault identifies mathematics as being "the only discursive practice to have crossed at one and the same time" all those thresholds (Foucault [1969] 2002, 208). That is why it has been taken as a prototype for the emergence and development of all other sciences. However, Foucault refuses to take it as his model, since this would reproduce a "historico-transcendental analysis". According to Foucault, the historian of science who follows this kind of analysis would fail to notice that mathematics might well serve as a model for the discursive practices that seek formal rigour, while it cannot be a model for other "sciences", such as the ones he analysed in *The Order of Things*, including political economy.

Foucault then mentions the case of economics:

> In the case of economics the disconnexions are particularly numerous. In the seventeenth century, one can recognize a threshold of positivity: it almost coincides with the practice and theory of mercantilism; but its epistemologisation did not occur until later, at the very end of the century, or the beginning of the next century, with Locke and Cantillon. However, the nineteenth century, with Ricardo, marks both a new type of positivity, a new form of epistemologisation, which were later to be modified in turn by Cournot and Jevons, at the very time that Marx was to reveal an entirely new discursive practice on the basis of political economy. (Foucault [1969] 2002, 207- emphasis added)

In this quotation, it seems that Foucault would be admitting that the first neoclassicals would have promoted a change that he had not recognised in *The Order of Things*. He remarks that Jevons (as well as Cournot, it should be noted) modified both the "positivity" and "epistemologisation" in economics.

But in order to understand Foucault's allusion to the marginal revolution in *The Archaeology of Knowledge*, it is necessary to go back to *The Order of Things*. Therefore, in the next section, we examine his archaeological project more carefully and emphasise that he was looking for some ontological and epistemological conditions that, according to him, led to an important change in the relationship between language and representation and can explain the shift promoted by the cofounders of "the marginal revolution".

2.2 The marginal revolution as a new "positivity" and "epistemologisation" of discourse in economics: language and formalization in the modernity

Language was the foundational of Foucault's system in *The Order of Things*. In particular, the relationship between language and representation[1] in different moments in history was critical in his archaeology. He introduced the notion of "episteme" as the underlying arrangement of some conditions and related them to the fundamental connection between language and representation.

When the title of the book was translated from *Les Mots et Les Choses* into English as *The Order of Things*, this essential characteristic seems to have been lost. The book is an inquiry into the ontological and epistemological conditions of possibility of the human sciences (psychology, sociology, and linguistics) and certain discourses in political economy, biology and philology at the end of the 18th century, but it is also, and perhaps mainly, about an epistemology of narrative. *Les Mots et les Choses* is about the relationship between words and things. In an interview to the Magazine Littéraire in 1969, Foucault explained that the title *Les Mots et les Choses* was actually ironic:

> The title *Les Mots et les Choses* was completely ironic. […]There is a problem: how is it possible that real things, and perceived ones, can be articulated by words within a discourse? Is it words which impose our definition of things or is it things themselves that, for some interference of a subject, transcribe themselves on the surface of words? It was absolutely not this old problem that I wanted to deal with in *Les Mots et les Choses*. I tried to invert it: to analyse the discourses themselves, that is, the discursive practices that are in between words and things. […]I try to do another thing and to show that there were […] rules for the formation of objects (*which are the rules of use of words*), rules for the formation of concepts (*which are the rules of syntax*), rules for the formation of theories (*which are neither rules of deduction nor*

[1] Usually, 'representation' has the meaning of 'correspond to'. In the philosophical meaning, as Lalande (1999, 953) defines it, 'representation' is 'what is present to the spirit: what someone 'represents to him / herself'; what makes the concrete content of an act of thinking'. It could have originated from Leibniz's writings, to the extent that he used the term to designate 'correspondence'.

rhetorical rules). *It is these rules, which are put in action by a discursive practice at a given moment, that explain that things are seen (or omitted), that they are focused on according to some aspect and analysed at a certain level; that a certain word is employed, with a certain signification, and in a certain kind of sentence*. (Foucault 2001, 804 – emphasis added)

As the quotation attests, Foucault believed that it was possible to apprehend the rules that were determining the choice of objects, concepts and theories in some fields of knowledge through a scrutiny of language. Actually, he proposed a new epistemological model through an analogy between the study on grammar and economic thought (as well as natural history) during the 17th and 18th century in *The Order of Things* (see more on this in Lima 2010, 91-100).

In *The Order of Things*, he turned to the investigation of the conditions of possibility in what concerned to the emergence of the human sciences and further to this, developed an archaeology of political economy, biology and philology, which he called "empiricities"/"positivities", also because he wanted to avoid the term "science".

His epistemological novelty, the *episteme*, is then defined by a set of relations, operating as an unconscious referential guide for thought at a given period. It lies beneath distinctive discursive practices ("interdiscursive practice"), establishing epistemological figures, rhetorical schemes, methods of investigation, and linguistic devices. He used the following set of relations: the comprehension of the experience of language and representation that each period holds (language-representation relations); the relationship of same-other in knowledge; the place that time and space occupy in the structure of knowledge; the distinct techniques of isolation within the subject matter of knowledge (resemblances, equalities and differences, leading to analogy or analysis): the ontological conception that man historically held, regarding his power or limitations to knowledge and the solution to problems concerning his life, economic production and language (which were the main object in biology, political economy and philology). This concept is investigated through the thought-unthought relationship.

Foucault argued that, from the beginning of the 17th century until the last quarter of the 18th century, language was representation. He called it "the age of representation", because, according to him, it was possible to know through a representation of the object by analysing it, ordering it, and mainly building the correct language to describe it. Knowledge was synonymous with a "well-constructed language" and that is what led to many thinkers of that age, such as Adam Smith, Rousseau, Condillac, and others, to study language. That is why "language" could and should be studied, and, according to Foucault, a theory of language emerged (the study on grammar). Language was a physical representation of thoughts. It was believed that there was a language that could be better than others to represent, the Latin.

In the last quarter of the 18th century, language became an object of study and philology emerged. This occurred following the collapse of representation, which happened when man became conscious that he was who sought knowledge (Kant"s work was the expression of this), making him the transcendental foundation of all knowledge. Foucault called this the problematic of the transcendental-empirical doublet, in which man is inevitably subject and object of knowledge. As Amariglio declares, "Man" and his body became "a ground for the representation of "words and things" (such as value) in the many organised and dispersed discourses that constitute our formal and informal knowledge" (Amariglio, 1988, 586).

Man found his finitude. Naturally, this does not mean that man discovered his mortality only in the modernity. Finitude is related here to his power of knowing and his practicality and capacity for solving basic questions concerning life, labour and language. For Foucault, the finitude of Man was connected to the finitude of knowledge. For biology, political economy and philology, man was a finite being since he was limited by the environment, by the forces of production and by the linguistic heritage that had formed him. He is subject to the laws of biology, of production and language.

According to Foucault, knowledge in the modern age became an endless task in transgressing finitude. In between words and things, there was man and the unthought. The human sciences emerged to think about the unthought, although this would prove to be unsustainable for Foucault, since there would always be the unthought. The unthought, he clarified, is not restricted to the unconscious that can be thought when the right procedures are employed, such as the Freudian unconscious. It includes that which that either cannot be thought or will never be thought. Man is surrounded by things that he cannot express and by a language that he cannot master, argues Foucault. Referring to Descartes, he says that the unthought may never be absorbed in the *cogito*. The Cartesian statement "I think, therefore I am" was no longer attached to certainty, since the one who knows (thinks) is the same as the one who lives under the "laws" of language, whose elements are not totally conscious. Here, it is worth mentioning that, if we accept Foucault's suggestion, the neoclassical theory in economics has no direct connection with Descartes's project as it has sometimes been supposed by historians and methodologists of economics. The Cartesian *mathesis universalis* was part of the previous epistemic context, when complete knowledge was still possible if the right method was employed. Also, Newton was a character of the classical episteme, since knowledge could be possible for him, insofar as the right method was used. The marginal utility theory emerged in the context of the modern episteme as a means to try to surpass finitude and uncertainty. Foucault's distinction of these two moments in history can shed light on the debate over the influence of the Cartesian project and Newtonian physics on "the marginal revolution". And again, this allows us to conclude that Mirowski's investigation is in accordance with

Foucault's suggestion. The neoclassical marginalist theory emerged in the modern episteme and was a response to the collapse of representation.

Being one of Foucault's most striking conclusions that: until the end of the 18th Century, man did not exist as an object or subject of knowledge. For Foucault, there was no epistemological consciousness of man as such. Until then, life, labour and language did not exist as objects of study.

In the modern episteme language "does not cease to have a meaning and to be able to 'represent' something in the mind that employs or understands it" (Foucault 1970, 280). But it does not have a representative function "by right of birth" (*ibid*.), and words now have to obey some rules in order to represent. Language has "unconscious" - the unthought - elements. Philology emerged, in order to analyse "what is said in the depths of discourse" (*ibid*.).

Foucault also writes:

> now it is not a matter of rediscovering some primary word that has been buried in it, but of disturbing the words we speak, of denouncing the grammatical habits of our thinking, of dissipating the myths that animate our words, of rendering once more noisy and audible the element of silence that all discourse carries with it as it is spoken. (Foucault [1966] 1970, 298).

This meant a collapse of "representation", according to Foucault. While representation became a problem, language lost its power to communicate things and its transparency, becoming then an issue. According to Foucault, modern knowledge became actually an "analytic of finitude", which is man's reflection on his own conditions of possibility as a subject of knowledge and object of those disciplines, including economics. In Foucault's project, this was the moment in which man became "the functional subject" (and object) of knowledge. However, it is noteworthy to assert here that has to be asserted here that Foucault never considered political economy as a human science. Actually, Foucault writes that:

> even though man is, if not the only species in the world that works, at least the one in whom the production, distribution, and consumption of goods have taken on so great an importance and acquired so many and such differentiated forms, economics is still not a human science. (Foucault [1966] 1970, 352)

In some respects, it is understood that the limitations in the modern episteme are produced by man, so he has to fight to surpass them. There is a paradox here: due to his limitations, man began searching for complete knowledge. For instance, man became aware that he is responsible for representation and that he must construct the language, a formal language, which will then provide him with the tools to surpass his limitations in order for him to be able to act as the subject of knowledge. Language became an object of knowledge and some domains emerged or developed as a result of it, such as analytic philosophy, formal logic and hermeneutics. Logic positivism could

now surface as a possible solution. Before that, but in the same epistemic context, neoclassical economics emerged as a project to transgress the finitude of economic knowledge.

More important for our study, the modern era tries to control the lost of the power to represent through formalization and critical interpretation, wrote Foucault. Through formalization, man aims to polish, purify language, releasing it from its "accidents and alien elements" (Foucault [1966]1970, 296). That was also the dream of positivists. Critical interpretation of language aims to understand the hidden meanings through an exegesis. In this case, Foucault even mentions *Das Kapital* as being an exegesis of "value" (Foucault [1966]1970, 298). Perhaps *The Order of Things* could also be included as an exegesis of the conceptions of language.

In that context and due to those conditions, we can then understand that the marginal revolution became possible. That is what Foucault meant by saying that the marginal revolution represented a threshold, a new form of "positivity" and "epistemologization" in economic theory. It happened in the same epistemic context as Ricardo's theories, which was marked by the fundamental finitude engendered by the collapse of representation. But, the marginalism responded to the same conditions differently, leading to the emergence of a new theory and new epistemologization.

There seems to be a wide agreement, including among debaters over the actual "revolution" of the marginal utility theory, that it at least represented a change in the history of economics in what concerns to the emergence of a new theory (what has been called "neoclassical theory") and a new methodological approach (what has been called "mathematical economics"). There may be controversy about what neoclassical economics really means, but the disagreements are mostly over the details. When the big picture is focused, all economists seem to agree that the marginal revolution was the first moment of a new theory, which Veblen would first call "neo-classical theory":

> No attempt will here be made even to pass a verdict on the relative claims of the recognized two or three main "schools" of theory, beyond the somewhat obvious finding that, for the purpose in hand, the so-called Austrian school is scarcely distinguishable from the neo-classical, unless it be in the different distribution of emphasis. The divergence between the modernized classical views, on the one hand, and the historical and Marxist schools, on the other hand, is wider, so much so, indeed, as to bar out a consideration of the postulates of the latter under the same head of inquiry with the former.(Veblen 1900, 261)

Another example is Winch (1972, 325), who writes:

We speak of the marginal revolution as having altered the agenda and methods of economics, of new problems being made central while old ones were either revamped, subsumed, or set aside. In short, we speak of a transition from classical political economy to neoclassical economics.

In the fall of 1972, the *History of Political Economy* journal published a series of papers written by prominent historians of economics, which had been discussed at a meeting at the Villa Serbelloni, Bellagio, Italy, from August 22 to 28, 1971, to celebrate the centenary of the "marginal revolution". When summarising the debate, Coats (1972) acknowledged that there was an agreement among the debaters about some common fundamental changes promoted by the cofounders of that revolution:

Their emphasis on demand ("subjective") as against supply influence on price; the tendency to turn away from macro theory to micro theory; the narrowing of the scope of economics, by concentrating on analysis *per se* rather than its applications to practical problems; the impulse given to efforts to coordinate the theories of value and distribution; and the enhanced precision of language and techniques, especially (apart from the Austrians) by the use of mathematics. (Coats 1972, 604)

Hutchison (1972, 459) writes:

The founders of the neoclassical school, Carl Menger, W. S. Jevons, and Léon Walras, and their precursors, A. A.Cournot and H. H. Gossen, understood the glaring omission of demand from the classical model. They took as an expository point of departure a model which was the polar opposite of the classical, the model of pure exchange. Arrow and Starrett conclude that what "led to the downfall of the classical theory'' was "the failure to explain either absolute or relative wages.'' We could add that this failure rapidly came to a head in the late sixties and early seventies. The suggestion by Arrow and Starrett regarding changing "environmental" conditions may be noted, though we would suggest that the theory of "structure" which met its downfall might be described as the "Ricardo-Mill" rather than classical theory.

Hutchison affirms that the neoclassicals changed Ricardo-Mill's theory, rather than "classical theory". It is in this sense that Foucault remarked that Jevons would have changed the "positivity" that had started with Ricardo.

This happened when the protagonists of that revolution incorporated the mathematical language into the formulation of pure theory. Taking Foucault's archaeology into consideration, that event could be understood as a means to try to overcome the limitations of knowledge that marked the essence of the modern episteme, which Foucault called "analytic of finitude". Formalism, which

led to a mathematisation of economics and was promoted by the main protagonists of the marginal revolution was the first step, became a means to try to surpass the collapse of representation. In this sense, marginalism was indeed an epistemological transformation, although it happened due to the same conditions of thought that marked the emergence and existence of the classical economics from Ricardo onwards. Indeed, Ricardo"s way of thinking, which has been said to have already changed the method of economics ("Ricardian Vice" according to Schumpeter 1954), could also be seen as possible due to the same conditions. Therefore, the formalization/mathematisation seems to be what Foucault meant by "epistemologisation" in his reference to Jevons.

It is well-known that the central characters of "the marginalist revolution" were committed to clarifying why they thought that mathematical language could and/or should be employed in economic enquiry. For example, Jevons wrote in the Introduction to his *The Theory of Political Economy*, a book that has been considered pivotal in the formation of neoclassical economics:

> It seems perfectly clear that Economy, if it is to be a science at all, must be a mathematical science. There exists much prejudice against the attempts to introduce the methods and language of mathematics into any branch of the moral sciences. Most persons appear to hold that the physical sciences form the proper sphere of mathematical method, and that the moral sciences demand some other method,—I know not what. My theory of Economy, however, is purely mathematical in character. (Jevons 1871, 3-4)

Jevons considered that economic science should be a rational, logical, deductive, and ultimately mathematical.

Therefore, this consideration of "the marginal revolution" seems to be in agreement with studies that have suggested that it represented at least a methodological shift in economics. For example, Mirowski (1984 and 1989) argues that it did represent a "methodological" revolution, whilst employing a metaphor imported from physics and adopting the mathematical language in the construction of pure theory. The point being, that while mathematics had previously been employed, it was mainly used as an instrument for the purpose of quantification and became a language in the formulation of theories at the end of the 19th century.

Mirowski (1984) argues that the cofounders of the marginalist revolution promoted a "methodological revolution" in economics, employing a metaphor imported from physics, more precisely from energetics, as it was being developed in the middle of the 19th century. It is particularly interesting to notice here, that Mirowski presents the process as discontinuous and investigates what, in Foucault"s approach, is a "region of interpositivities" or an "interdiscursive domain". For Mirowski, there was a discontinuity in the history of economic thought in the years 1870-1880, which led to the genesis of neoclassical theory, and it was a process that also followed a discontinuity in physics. Instead of what is usually believed to be the case, that neoclassical theory

was inspired by Newtonian physics, Mirowski shows that it was indeed built upon an analogy to energetics. All the main protagonists of the marginalist revolution (Jevons, Walras, Edgeworth, Fisher, and Pareto) were familiar with the developments in energetics, which provided them with a metaphor (utility = energy), the mathematical techniques and the new attitudes in theoretical construction (Mirowski, 1984, 366). This allowed them to apply mathematical language to the construction of theories and promote the first great point of inflection of mathematical economics, argues Mirowski.

From a Foucauldian perspective, we can see that Mirowski"s investigation of that event was touching on an inquiry into the historical interdiscursive practice that gave rise to it, which may also help us to understand why those thinkers, though working independently, obtained the same approach. Mirowski"s study is an example of different domains of knowledge being determined by the same epistemic context. Therefore, the conscious possibility of such underlying configurations of thought may also shed light on the historiography of economic thought.

Mirowski was actually investigating the consequences for economic theory of the existence of a certain historical "discursive practice", as Foucault would define it. For Foucault, this "systematicity" could not be found out only through a logical or linguistic analysis.

3. Closing remarks

The issue concerning the actual role played by the marginal "revolution" in the history of economic thought has certainly several perspectives of analysis. One can think of the marginal revolution in theoretical and methodological terms.

Beyond the instigation of some revolutionary ideas, on the interpretation of the history of economic thought, Foucault added a novel perspective, together with a range of inspiring notions and a consideration of the ontological and epistemological conceptions underlying knowledge since the 16th century, which can be inspiring in this debate.

Foucault was really eager to answer a question that has long troubled thinkers: is there an underlying configuration that determines our way of thinking, theorising, speaking, writing, and so on? Is there something that can explain why same paradigms, metaphors, exemplars, etc. spread through different areas of theory and practice? This is a central issue in the discussion about the "marginal revolution". One aspect of that intellectual movement which has troubled philosophers and historians of economics is the simultaneous development of similar theories, while using the same techniques, by a group of thinkers in different countries and without knowledge of each other. This is the essence of Foucault's archaeology.

Ironically, Foucault employed the expression 'order of things' to refer to the different forms that some relations had combined historically (language-representation, time-space, same-other,

interpretation-analogy-analysis, thought-unthought, perceptions of mode of beings and order-modes of *savoir*, though not exclusively) to establish the way man ordered things in discourse. He built his own method and terminology to investigate these processes, which he articulated in his *The Archaeology of Knowledge*. Beyond an internal and/or external history, he believed in the possibility of discerning the thought of different ages through the set of relations just described, as well as proposing new and fascinating questions and suggestions, as a means to answering them.

He was dedicated to clarify that he had picked some conditions of possibility, or as he said, "a set of relations". He remarked that these relationships might not even be the only ones and that the boundaries were open. He knew that as an "author" he was inserted in a given space and time and his own context had determined his options. Perhaps what remains of his taunts and suggestions is that at least now we have more clarity of what issues can/should be raised.

His archaeology was really ambitious, but it certainly added a new perspective and important sublevels in the analysis. Now perhaps we can say that the methodological approach has at least two more levels of analysis: "positivity" and "epistemologization". This analysis allows us to conclude that a certain "episteme" can lead to different "positivities", "epistemologizations", "scientificities" and ways to "formalize" discourses. It may be possible then to associate "mathematical economics' to a new form of epistemologisation, while describing "neoclassical economics" as a new positivity.

The primary objective of this paper was to establish that, although Foucault had not considered the marginal revolution as promoting a shift of epistemes in *The Order of Things*, he referred to it in his *The Archaeology of Knowledge* and depicted it as an epistemological threshold in the history of economic thought. The explanation about why he considered that is found in *The Order of Things* and offers a novel perspective, together with a range of inspiring notions and a consideration of the ontological and epistemological conceptions underlying knowledge, which deserve more attention by anyone intending to study methodology and historiography of economics.

Finally, one more important conclusion of this study must be emphasised. The marginal revolution was an epistemological and methodological transformation in economic thought that was a result of a loss of certainty in knowledge, which was definitely not the case in Descartes's and Newton's intellectual projects, for instance. That uncertainty was not present in Descartes's and Newton's work. They are mentioned here because they are recurrently mentioned as the greatest influences on the process of formalisation of economics. The Cartesian and Newtonian conception of knowledge had already collapsed.

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