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## The Marginal Revolution in the light of Foucault's typology of epistemes

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Abstract :

**Objective:** We seek here to draw on the methods and tools put forward by Michel Foucault in *The Order of the Things* (1966) to shed light on history of welfare economics. More specifically we consider that the rejection of interpersonal comparisons that foreshadowed the marginalist revolution and the transition to ordinal measures of utility during the 19th century can be explained by the shift from the classical *episteme* to a modern *episteme* which is described by Foucault.

**Method:** To explore this hypothesis, we draw on the method of archaeological knowledge, proposed by Foucault (1966, 1969). We started by building a corpus using an incremental research strategy (the “snowball” method), starting from first bibliographic reference on history of welfare economics Baujard (2013, 2014). Then, we study the various statements within a corpus, in order to identify regularities and turning points both in semantics and concepts, so as to compare discourse “styles”. Unlike other approaches in social sciences, the method of knowledge archaeology consists in analysing scientific discourses in themselves, outside the social, economic and political context that led them to emerge.

**Results:** Using this methodology, we first examine to what extent the early utilitarianism is typical of the classical *episteme* as described by Foucault, which entails (i) the use of a mechanistic framework, (ii) the use of mathematics and more generally (iii) an effort to classify different entities.

Second we examined how the rejection of interpersonal comparisons in the marginalist literature and the transition to ordinal utilities could be typical of the modern *episteme*, through the development of positivist stand and transcendental function of the notion of utility.

Keywords: Welfare economics, Health economic evaluation, Epistemology, Foucault

# 1. Introduction

## 1.1. Context

Foucault, in *The Order of the Things* (1966), considers that scientific disciplines, in particular empirical sciences such as biology, economics, and linguistics, are based on a common fundamental structure, which he calls *episteme*, and which explains why we can find correspondences between them, as well as between their histories. These correspondences are not explained by the influence of specific disciplines on others but by the influence of this *episteme* and its evolution on each of them. Foucault distinguishes three distinct models: the epistemic model of the Renaissance, the epistemic model of the classical age (17th-18th century) and the modern epistemic model (from the 19th century). These epistemic models unconsciously determine how the scientific disciplines conceive how they can produce knowledge. Foucault defines the *episteme* as the historical *a priori* that determines the emergence and evolution of the different sciences and how they conceive their positivity. Canguilhem compares them to humus, on which the different scientific discourses would grow.

*"Quite obviously, such an analysis does not belong to the history of science: it is rather an inquiry whose aim is to rediscover on what basis knowledge and theory became possible."* (Foucault, 1966, p. 13)

*"The concept of episteme is that of a humus on which only certain forms of organisation of discourse can grow"* (Canguilhem, 1976, p. 612, unofficial translation)

- i. In the *episteme* of the Renaissance, the world is conceived as a vast network of hidden correspondences between realities of different orders (the plant, the animal, geography and cosmology, the spirit of man and that of the gods, etc.). Access to the truth (knowledge), therefore, requires the identification of similarities (similarity by proximity, by emulation, by analogy or based on the sympathy/antipathy pair).
- ii. In the *episteme* of the classical age, the world is conceived as a set of ordered elements that exist in limited quantity. It is, therefore, possible:
  - to carry out a comprehensive survey of all the elements;
  - to identify the relationships between all the elements of the whole through mathematics for quantifiable elements or through classifications for non-quantifiable and complex elements (identification of identities and differences) (e.g. classification of living beings in natural sciences or Quesnay's economic table).

In this classical *episteme*, it is considered that the truth is visible and, to reach it, it is necessary to enumerate, describe, measure and classify what is observed.

- iii. In modern *episteme* it is considered that the organising principle of the realities studied by the different disciplines, such as exchanges in political economy, species in biology, and language in linguistics, is not directly observable, although its effects can be measured. The scientific work then involves studying these empirical manifestations to approach the organising principle that determines them. Foucault compares these organising principles to Kantian 'transcendentals' (see below, section 3).

*"No composition, no decomposition, no analysis into identities and differences can now justify the connection of representations one to another; order, the table in which it is spatialized, the adjacencies it defines, the successions it authorizes as so many possible routes between the points on its surface – none of these is any longer in a position to link representations or the elements of a particular representation together. The condition of these links resides henceforth outside representation, beyond its immediate visibility, in sort of behind-the-scenes world even deeper and more dense than representation itself. (...) In order to find a way back to the point where the visible forms of beings are*

*joined – the structure of living beings, the value of wealth, the syntax of words – we must direct our search towards that peak, that necessary but always inaccessible point, which drives down, beyond our gaze, towards the very heart of things. (...) it is from the starting-point of the architecture they conceal, of the cohesion that maintains its sovereign and secret sway over each one of their parts, it is from the depths of the force that brought them into being and that remains in them, as though motionless yet still quivering, that things – in fragments, outlives pieces, shards – offer themselves, though very partially, to representation. (Foucault, 1966, p. 239).*

According to Foucault, the transition from a classical to a modern *episteme* is prefigured by Kantian critical philosophy, which describes the impossibility of knowing objects in themselves and limits the capacity of knowledge to observing phenomena perceived through the filter of the transcendental subject<sup>1</sup>. This Kantian critical philosophy would be at the origin of two distinct lines of research, which are two possible responses to this statement of failure:

- positivism, which proposes to limit oneself to "*recording the empirical regularity of observable phenomena, renouncing to reach the unknowable depth of things*" (Foucault, 1967, p. 258);
- phenomenology, which explores this enigmatic reality (e.g. Schopenhauer's Will, Bergson's Life, etc.) through the subject's perception of it<sup>2</sup>.

While it is customary to distinguish these two lines of research as mutually exclusive, Foucault proposes to consider that they are two sides of the same epistemic model (modern *episteme*) and cross different scientific disciplines.

## 1.2. Objectif

In this paper, we question to what extent Foucault's typology of epistemes sheds light on the history of welfare economics. This discipline aims to assess the impact of public policies and on social well-being.

More precisely, we consider that the rejection of interpersonal comparisons, which prefigures the marginalist revolution and the transition to an ordinal measure of utilities, could be explained by the transition from a classical to a modern episteme. Foucault indicates that the marginalist revolution is representative of the modern episteme. However, he didn't analyse it in detail (Foucault, 1966, p.14 and pp. 269-270).

## 1.3. Existing literature

- *Existing literature on Foucault's analysis of the history of economic thought*

The main discussions on Foucault's analysis of the history of economics focus on Foucault's description of the links between neoclassical theories and practices of power in his lecture *Birth of Biopolitics* (1978-79) at the Collège de France (Vallois, 2015).

Discussions on Foucault's analysis of the history of economic in his earlier works are more limited. They focus on:

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<sup>1</sup> "*The new positiveness of the sciences of life, language and economics is in correspondence with the establishment of transcendental philosophy. (Foucault, 1966, p. 257) "One of the difficult points of Foucault's demonstration is the highlighting of the unpremeditated connivance of Kantianism and the work of Cuvier, Ricardo and Bopp in the manifestation of the episteme of the 19th century."* (Canguilhem, 1967, p. 614).

<sup>2</sup> "Everything happens as if phenomenology represented what, from that thought formed at the threshold of the modern age (Kantianism), still comes to us, invests us, and serves as a continuous ground for our discourse." (Sabot, 2006, p. 72, *unofficial translation*)

- on the status of Adam Smith's theory of value in the light of the typology of *epistemes*: the question is whether it is part of a classical or modern *episteme* (Lima, 2010);
- on the status of the marginalist revolution: the question is whether it is part of a modern or post-modern *episteme* and whether the marginalist revolution is a 'revolution' in itself or whether it is an extension of Ricardo's analysis (Amariglio, 1990; Birken, 1990). A recent article by Lima (2019) presents these discussions in detail. Lima also shows that Foucault's analysis helps explain the marginalists' integration of mathematics into economics to overcome the limits of the capacity to know that characterises the modern *episteme*. Our work naturally fits into the framework of this literature, although we are interested here in different dimensions than those discussed by these authors. To our knowledge, neither Foucault nor those who have commented on his analyses have specifically studied the rejection of interpersonal comparisons and the transition to an ordinal measure of utilities through the prism of the typology of *epistemes*.

#### 1.4. Method

The method is based on analysing a corpus of classical texts in the history of economics using the typology of *episteme* mentioned above. These texts were identified using an incremental literature research strategy ("snowball" method) from initial references identified in the literature, in particular Baujard (2013, 2014).

#### Box 1 Corpus of texts analysed in this work

Turgot, Values and Coins, 1769  
 Bentham, Introduction to the Principles of Morals and Legislation, 1789  
 Destutt de Tracy, Traité d'économie politique, 1823  
 Say, Cours complet économie politique pratique, 1828-29  
 Mill, Principles of Political Economy, 1848  
 Dupuit, De l'influence des péages sur l'utilité des voies de communication, 1849  
 Jennings, Elements of Political Economy, 1855  
 Jevons, The Theory of Political Economy, 1871  
 Walras, Elements of Pure Political Economy, 1873  
 Marshall, Principles of Economics, 1890  
 Pareto, Handbook of Political Economy, 1906

The literature review is carried out using the method proposed by Foucault in the *Archeology of Knowledge* (1969). The aim is to study the various statements to identify regularities and shifts, both in the semantic and in the definition of concept, and thus compare the 'styles' of discourses.

*"It is a question of grasping the statement in the narrowness and singularity of its event; of determining the conditions of its existence, of fixing its limits as accurately as possible, of establishing its correlations with other statements that may be linked to it, of showing what other forms of enunciation it excludes"* (Foucault, 1969, p. 40)

Unlike other social science approaches, the method of Archaeology of knowledge consists of analysing scientific discourses for themselves outside the social, economic and political context in which they arise.

## 1.5. Plan

It is common to describe the precursors of contemporary welfare economics by distinguishing two distinct streams (Gamel, 1992; Baujard, 2013, 2014):

- Utilitarianism at the end of the 18th century, which proposes to base public choices on the objective of maximising the sum of individual utilities, measured in a cardinal manner;
- the new welfare economics, which abandons interpersonal comparisons of utilities and focuses on an objective of ethical neutrality. The aim is to identify situations that will maximise the individual well-being of some people without worsening that of others to achieve unanimity. Utilities are measured in ordinal terms.

We are interested in the period between these two currents, which precedes and prefigures the new welfare economics, most often referred to as the marginalist revolution. This specific part of the history of economics would illustrate the transition from a classical to a modern *episteme*. We will therefore start by considering the extent to which the classical utilitarianism is typical of the classical *episteme* (section 2) and then present the reasons why the rejection of interpersonal comparisons in the marginalist literature and the transition to ordinal utilities seem to be typical of the modern *episteme* (section 3).

## 2. The classical utilitarianism, typical of the classical episteme

Classical utilitarianism, especially Bentham's utilitarianism, seems to be typical of the classical *episteme*, which implies (i) the use of mechanistic models to study physical and social phenomena, (ii) the increasing use of mathematics and more generally, (iii) an effort to classify different realities.

*"We must, in fact, distinguish between three things. On the hand, there was the mechanism that, for what was really a fairly short period (not quite the last fifty years of the seventeenth century), offered a theoretical model to certain fields of knowledge such as medicine or physiology. There was also an attempt, rather diverse in the forms it took, to mathematicise empirical knowledge (...) But neither this endeavour nor the attempts of mechanism should be confused with the relation that all Classical knowledge, in its most general form, maintains with the mathesis, understood as a universal science of measurement and order. (...) For the fundamental element of the Classical episteme is neither the success or failure of mechanism, nor the right to mathematicise or the impossibility of mathematicising nature, but rather a link with the mathesis which, until the end of the eighteenth century, remains constant and unaltered. (...) So that relation of all knowledge to the mathesis is posited as the possibility of establishing an ordered succession between things, even non-measurable ones."* (Foucault, 1966, p.56-57)

On the one hand, classical utilitarianism results from the goal to identify quasi-mechanical laws of social phenomena, e.g. the pursuit of self-interest and pleasure<sup>3</sup>. These laws, once identified, make it possible to establish a 'moral science'. *"What will be called utilitarianism, philosophical radicalism may be defined entirely as Newtonianism, or, if you like, an attempt at Newtonianism applied to the things of politics and morality."* (Halevy, 1901, chap. 1, *unofficial translation*) Bentham, for example, presents utilitarianism as a "moral arithmetic."<sup>4</sup>. This project was already formed by Spinoza when he proposed to establish a

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<sup>3</sup> *"Just as motion, that is, the force inherent in matter, constitutes the principle of the physical world, so for Helvetius there is, in the moral and human world, a dynamic principle that imposes its strict laws: this principle is interest. Beccaria translates this idea by speaking of a 'force similar to gravitation that pushes us towards our well-being'"* (Francioni, in Audegean et al. 2017, §19 *unofficial translation*)

<sup>4</sup> *"In laying down the rules of his moral arithmetic, he is working to constitute, as it were, a mathematical morality analogous to mathematical physics. How can we apply the calculation to moral matters? The ends that*

“science of the affects” by treating “*human actions and appetites as if they were lines, planes, or bodies*” (Spinoza, Ethics III, quoted by Hirschman, 1980) by Condorcet (Condorcet, in Hacking, 1990) and of course by Helvétius. “*I thought that morality should be treated like all the other sciences and that morality should be made like experimental physics*”. (Helvetius, 1759, Preface, p. 1, *unofficial translation*).

On the other hand, Bentham's classical utilitarianism assumes that it is possible to classify, order and compare utility that individuals derive from different goods, depending on the circumstances. The pleasure or pain that individuals feel varies according to their intensity, their duration, the certainty or not of their occurrence, or whether they take place immediately or at a distance in time.

*"Pleasures then, and the avoidance of pains, are the ends which the legislator has in view: it behoves him therefore to understand their value. Pleasure and pains are the instruments he has to work with : it behoves him therefore to understand their force, which is again in other words, their value. To a person considered by himself, the value of pleasure or pain considered by itself, will be greater or less, according to the four following circumstances : 1/ its intensity ; 2/ its duration ; 3/ its certainty or uncertainty ; 4/ its proximity or remoteness. To take an exact account then of the general tendency of any act, by which the interest of a community are affected, proceed as follows. Begin with any person of those whose interest seem most immediately affected by it: and take account : 1/ of the value of each distinguishable pleasure which appear to be produced by it in first instance. 2/ of the value of each pain which appear to be produced by it in first instance (...) 5/ sum up all the values of all the pleasures on one side, and those of all the pains on the other.(...) 6/ Take an account of the number of persons whose interests appear to be concerned ; and repeat the above process with respect to each. Sum up the numbers." (Bentham, 1789, chap. 4, §1-2)*

Bentham does not describe in the *Introduction to the Principles of Morals and Legislation* how to estimate these quantities of pleasures and pains in concrete terms. He implicitly considers that this can be done without any particular difficulty. This conception of utility as directly measurable contrasts with the conception of utility of later economists, as discussed in the next section.

### **3. Marginalist literature, typical of the modern episteme**

To some extent, with Dupuit, and especially with Jevons, Walras, Marshall and Pareto, we can observe an evolution in the discourse on economics in general and on the notion of utility in particular, which seems to illustrate the transition between the classical and the modern *episteme* that Foucault describes in *The Order of the Things*.

- *A positivist approach, characteristic of the modern episteme*

Firstly, these authors are part of a positivist approach that is typical of the modern *episteme*. This positivist approach is not manifested by the use of mathematics (which is common to both classical and modern *epistemes*) - but by renouncing to explain the phenomena studied with the use of theoretical models identified *a priori* and sticking to the observation of facts. All these authors compare their methods to those used by the physical sciences. Jevons and Pareto, for example, both state that in economics, as in the other sciences, it is only possible

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*the legislator has in view are pleasure and the absence of punishment: he must therefore know their value. Therefore, the science of legislation supposes, as a first condition, that a quantitative comparison of pleasures is possible. All the English moralists, from Hobbes to Bentham, have contributed, each in his own way, to the development of the rules of this calculation: Bentham completes the collective work" (Halevy, 1901, chap. 1, unofficial translation)*

to identify regularities in the observed facts, to pose hypotheses to explain these regularities and, from there, to establish laws. These laws are only valid insofar as they allow events to be predicted. Their validity is always transitory.

*“Possessing certain facts of observation, we frame an hypothesis as to the laws governing those facts ; we reason from the hypothesis deductively to the results to be expected; and we then examine these results in connection with the facts in question” (Jevons, 1871, p. 17)*

- *The transcendental function of the notion of utility*

Secondly, it seems to us that tastes, desires or preferences (the terminology varies between authors) occupy the same place, in these authors, as that which Foucault attributes to the livings, to language, and to labor in the modern human sciences (biology, linguistics and political economy), which he qualifies as "transcendental". For Foucault, the notion of 'transcendental' designates, in reference to Kant, a condition of possibility of empirical knowledge of objects, which is not derived from experience (*“no object that corresponds to it can be given by the senses”*(Kant, 1787, AK, III , 254)). This condition of possibility of knowledge belongs to the thinking subject and not to the object it allows to know. The transcendentals designate, as it were, what the subject "puts of itself" into the object it represents. Kant distinguishes three types of transcendentals:

- the fundamental forms of our sensibility that allow the subject to receive the sensory impression of the object (space and time),
- the concepts of understanding allow us to synthesise these impressions and to think about the object (quantity, quality, relation and modality),
- the pure ideas of reason finally make it possible to gather all the knowledge established by the understanding by seeking a single principle of organisation (unity of the thinking subject, unity of the world, unity of the conditions of thought through theology).

Foucault thus compares the concepts of life, language and labor to these pure ideas of reason because they would allow us to understand the organisation of the phenomena studied by each of these sciences; they would be the unifying principle<sup>5</sup>.

*“Labour, life, and language appear as so many ‘transcendentals’ which make possible the objective knowledge of living beings, of the laws of production, and of the forms of language. In their being, they are outside knowledge, but by that very fact they are conditions of knowledge ; they correspond to Kant’s discovery of a transcendental Dialectic, and yet they differ from it In two essential points ; they are situated with the object, and, in a way, beyond it; like the idea in the transcendental dialectic, they totalize phenomena and express the a priori coherence of empirical multiplicities.” (Foucault, 1966, p. 244)*

Foucault also points out that these transcendentals do not designate fixed concepts but rather processes that organise different empirical realities in a historical mode<sup>6</sup>. For example, with Ricardo, the value of goods is no longer the result of the circulation of wealth but the product of labor, which is the expression of a struggle for survival in a situation of scarcity of natural resources. The organisation of living beings is the result of efforts made by organisms

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<sup>5</sup> Foucault specifies that these transcendentals have a specificity compared to the transcendentals defined by Kant; they *“they are situated with the object,”* and not in the subject. Unlike the Kantian transcendentals, they are external to the subject and inaccessible to it. For this reason, according to Foucault, the human sciences from the 19th century onwards do not derive directly from Kantian philosophy. However, they have *“the same archeological subsoil as Criticism itself”*.

<sup>6</sup> The notion of history here does not mean a linear succession of facts. It can be understood in the quasi-Hegelian sense of dialectic, i.e. the discovery of truth in the confrontation of a subject with alterity, with its limits and with the negative.

to keep themselves alive, given the external constraints using major distinct functions (feeding, reproduction). Finally, words no longer represent things; they are a set of sounds that take on meaning within the framework of a grammatical organisation that is the result of people's history.

In the same way, tastes, desires and preferences determine the phenomena studied by economics: the formation of prices and exchanges between economic actors, the value of intangible goods (e.g. health, time, environmental goods, etc.). However, it is not possible to observe and measure these tastes, desires and preferences directly. Indeed, Dupuit, Jevons, Walras, Marshall and Pareto all consider that it is impossible to directly measure the utility that individuals derive from consuming these goods because the sensation of pleasure is unobservable.

- *Genealogy of the theme of the unobservability of pleasures*

Jevons develops the theme of the unobservability of pleasures, and is later taken up by Pareto and Walras. However, the latter only mention it briefly as if taking it for granted. Jevons, for example, points out that there is an "gulf" between the minds of each individual, which does not allow for a comparison of 'motives for action'. Similarly, Pareto points out that it is impossible to establish a 'bridge' between the pleasures experienced by different individuals.

*"Every mind is thus inscrutable to every other mind, and no common denominator of feeling seems to be possible. (...) Each person is to other persons a portion of the outward world-the non-ego as the meta-physicians call it. Thus motives in the mind of A may give rise to phenomena which may be represented by motives in the mind of B ; but between A and B there is a gulf. Hence the weighing of motives must always be confined to the bosom of the individual."* (Jevons, 1871, p. 15)

*"The ophelimity, or its index, for one individual, and the ophelimity, or its index, for another individual, are heterogeneous quantities, We can neither add them together nor compare them. No bridge, as the English say. A sum of ophelimity enjoyed by different individuals does not exist; it is an expression which has no meaning (Pareto 1971 (1906) p. 172)*

Before Jevons, this topic appeared in the works of Destutt de Tracy and Dupuit<sup>7</sup>. None of these authors describes when and for what reason it is now considered that it is not possible to measure utilities directly, contrary to what the classical utilitarians envisaged. We thus identify a silence which is typical of the shift from one *episteme* to another, which the archaeological method seeks to identify<sup>8</sup>.

The emergence of the theme of the unobservability of pleasures is ultimately associated with an evolution of the notion of utility itself. In the 18th century, economists conceived utility as an intrinsic quality of economic goods. In contrast, the early marginalists and their precursors (e.g. Dupuit) conceived utility as the result of a relationship between the good and the person. Mongin and d'Aspremont (1998, pp. 380-381) highlight this evolution of the notion of utility.

Say's speech seems pivotal in that he describes utility as a quality of the good, while indicating that this utility is constantly changing because it varies according to circumstances and changing needs (e.g. according to the cultural environment, living conditions or

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<sup>7</sup> *"The measure of the real or supposed utility of a thing is the vivacity with which it is generally desired. Now, how can we fix the degrees of something as inappreciable as the vivacity of our desires?"* (Destutt de Tracy, quote taken up by Dupuit, *unofficial translation*)

<sup>8</sup> *"Against traditional history, the "archaeological" method intends to draw attention to the phenomena of ruptures, the "cuts, faults, gaps, entirely new form of positivities and sudden redistributions"* (Braunstein, 2017, p. 8).

production conditions). This theme of the variability of utilities according to needs was already present in Turgot. For both authors, however, the various factors influencing the utility of goods are external and observable and are not linked to the obscure nature of desires.

- *Rejection of interpersonal utility comparisons and shift to ordinal measurement*

The rejection of interpersonal comparisons of utility and the shift towards an ordinal measure of utility stems from the impossibility of measuring utility directly. The marginalists and their successors then proposed to limit themselves to indirectly evaluating these tastes, desires or preferences based on the effects they have on observable dimensions: consumption, willingness to pay, and indifference between different baskets of goods<sup>9</sup>. For example, Jevons compares the effects of pleasures and pains on the behaviour of consumers and producers to the effects of gravity on physical bodies. It is not possible to measure gravity in itself, but it is possible to measure it through its effects. Similarly, it is not possible to measure feelings directly, but it is possible to measure them through their effects on markets.

*"I hesitate to say that men will ever have the means of measuring directly the feelings of the human heart. A unit of pleasure or of pain is difficult even to conceive; but it is the amount of these feelings which is continually prompting us to buying and selling, borrowing and lending, labouring and resting, producing and consuming ; and it is from the quantitative effects of the feelings that we must estimate their comparative amounts. We can no more know nor measure gravity in its own nature than we can measure a feeling; but, just as we measure gravity by its effects in the motion of a pendulum, so we may estimate the equality or in- equality of feelings by the decisions of the human mind. The will is our pendulum, and its oscillations are minutely registered in the price lists of the markets." ."* (Jevons, 1871, p. 12-13).

Marshall similarly points out that it is not possible to measure feelings, but they can be measured indirectly through the effect they have on the actions of individuals. He further states that they can be measured by the willingness of individuals to pay to satisfy their desires. *"It is essential to note that the economist does not claim to measure any affection of the mind in itself, or directly; but only indirectly through its effect."* (Marshall, 1890, Volume I, Book 1, Chap 5, §3) Pareto, finally, indicates that it is possible to establish a complete representation of an individual's tastes from the comparison he makes between combinations of goods. These comparisons make it possible to establish indifference curves and to associate each of them with indices of ophelimity (Pareto, 1906, p. 169)

- *The historical dimension of the concept of utility*

The concept of utility, for the marginalists, finally has a historical dimension as described by Foucault<sup>10</sup>. What determines the utility of goods and services is that they result, like labor,

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<sup>9</sup> The vocabulary of these economists is similar to the terms used by Comte in his Discourse on the whole of positivism: *"In a word, the fundamental revolution which characterises the virility of our intelligence consists essentially in substituting everywhere, for the inaccessible determination of causes properly so called, the simple search for laws, that is to say, for the constant relations which exist between the observed phenomena. Whether it is a question of the least or the most sublime effects of shock and gravity as well as of thought and morality, we can only really know the mutual connections proper to their accomplishment without ever penetrating the mystery of their production. It is in the laws of phenomena that science really consists, to which the facts properly so-called, however exact and numerous they may be, never provide more than indispensable materials."* (Comte, 1848, unofficial translation)

<sup>10</sup> See footnote 9.

from the individual's confrontation with the scarcity of natural resources. Foucault alludes to the link between resource scarcity and the marginalist conception of utility. Homo oeconomicus, he points out, is an individual permanently confronted with his own finitude (death) and that of the natural resources necessary for his survival.

*"Homo oeconomicus is not the human being who represents his own needs to himself, and the objects capable of satisfying them ; he is the human being who spends, wears out, and wastes his life in evading the imminence of death. (...) Since Ricardo, economics has rested, in a more or less explicit fashion, upon an anthropology that attempts to assign concrete forms to finitude. Eighteenth-century economics has stood in relation to a mathes's as to a general science of all possible orders ; nineteenth-century economics will be referred to an anthropology as to a discourse on man's natural finitude."* (Foucault, 1966, p. 257).

Foucault then establishes a direct link with the modern notion of utility without detailing his analysis further.

*"By this very fact, need and desire withdraw towards the subjective sphere – that sphere which, in the same period, is becoming an objectif of psychology. It is precisely here that in th second hald of the nineteenth century the marginalistes will seek the notion of utility."* (Ibid).

We find this link in the texts of the marginalists. For Walras, scarcity determines the economic value of goods and services. It is because they are scarce that these goods and services are subject to appropriation and exchange (Walras, 1873, p. 21 and p. 24). Jevons also mentions the impact of scarcity on the value of goods, although in less detail. Finally, Pareto indicates that preferences are revealed by their confrontation with external obstacles (scarcity of resources, production costs, the tastes of other men):

*"(...) Obstacles do not absolutely determine all movements; they simply establish certain limits, they impose certain restrictions, but they allow the individual to move according to his own tastes over a more or less restricted domain."* (Pareto, 1906, p. 155)

This typology of *epistemes* highlights the break that these late 19th-century economists made with traditional utilitarianism by considering that pleasures are unobservable and unmeasurable. This break can be explained by the fact that they reasoned within a different epistemic framework, that of the modern *episteme*, which made possible the emergence of contemporary welfare economics during the 20th century. This analysis must, of course, be put into perspective with the body of work on the history of utility theory, in particular Cooter and Rappoport (1984), Mongin and d'Aspremont (1998), Baujard (2014) and Moscati (2018).

## 5. Conclusion and perspectives

The typology of episteme proposed by Foucault in *The Order of the Things* seems relevant in shedding light on the history of welfare economics, such as the rejection of interpersonal comparisons of utility and the shift from cardinal to ordinal utility measures. This typology also has the advantage of shedding light on the history of other scientific disciplines, such as clinical epidemiology. In a second article, we consider that the emergence of clinical epidemiology in the nineteenth century, which underpins contemporary Evidence-Based Medicine, can similarly be explained by the transition from one episteme to another. What distinguishes authors belonging to the modern episteme, particularly from their predecessors, is their prudence regarding their ability to identify the direct cause of disease, its evolution and the effectiveness of treatments. Physiopathological mechanisms are not directly observable and can only be approximated by analyses carried out at a population

level. These two disciplines would therefore have followed the same epistemic evolution. In particular, they share the same positivist stance and renouncement to observe the object under study directly. We can therefore speak of an "isomorphism between the different fields of knowledge" (Sabot, 2006).

Comparing the history of these two disciplines allows us firstly to understand that the meeting of both disciplines in health economic evaluation has been facilitated by the proximity of the methods and concepts (e.g. cost/benefit calculation and calculation based on the principle of the benefit/risk balance). Secondly, comparing the history of these two disciplines could facilitate mutual understanding between evaluators from both sciences and limit some disagreements. Health economic evaluations are criticised by academic communities, as are the cost-benefit evaluation methods to which they are related (Adler and Posner, 1999). It is common to explain this criticism by the multidisciplinary nature of these methods. The hypothesis we wish to explore through these various studies is that it is not the multidisciplinary nature of these methods that explains the gap with the theoretical framework of welfare economics since the two disciplines share a common epistemic history. Instead, these differences can be explained by measurement practices stemming from a third discipline, operational research.

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