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PIONEERS OF ECONOMIC METHODOLOGY

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INTRODUCTION

Methodological epistemology and the conscious application of specific methods of inquiry had already been adequately analysed and employed in the natural and social sciences in the 17th century by such luminaries as Bacon, Descartes, and Newton. The most common methods employed in economics in the 17th and 18th centuries were deduction and induction, while the collection of statistical and historical data for the establishment of arguments and the verification of propositions, were new techniques predominantly developed, respectively, by Petty and Montesquieu.

It is acknowledged that Aristotle [Nicomachean Ethics, 1139b, 27-31; Analytica Priora, I.1.24b, 18-20; Analytica Posteriora, 71a, 1-41] was the first scholar who clarified the exact meaning of deduction and induction as methodological tools and procedures in a scientific inquiry and explanation. These two scientific methods lived on through the centuries: deduction, in the hands of Schoolmen of the "Middle Ages" and induction, in the hands of the Arab scientists. These two procedures were triumphantly applied during the 17th century in the works of Bacon (1620), Descartes (1637) and Newton (1687). These works, as will become clear in the coming pages, greatly influenced the methodological procedure employed by the social scientists of the 18th century.

In the present article primary imprortance will be attached to the methods explicitly used by the leading economic figures in the late pre-classical period. More specifically, the purpose of this article is twofold. First, the methodological tools fruitfully employed by those economists (Smith included) are explored.

Second, the various arguments advanced concerning the proper method of scientific investigation applied for the explanation of economic phenomena and the derivation of economic conclusions, as explicitly discussed by some of those scientists, are analysed. Thus, the conclusions drawn at the end of this article, include an appreciation of their contribution to economic methodology.

Though methodology is in varying degress interwoven with philosophical, psychological and ideological subjects[1], we shall try to refrain from such an approach by concentrating our analysis only upon the investigation of pure methodology.

This article has been ordered along local and chronological lines which facilitates comparisons and throw light upon the various influences the economists of the period in question were receptive to.

I. At the close of the 17th century

The methods applied by two of the leading figures among the mercantilists, Petty and North, are analysed here in order to elucidate Katouzian's [1980, p. 18] comment: "The Mercantilists generally tackled their problems with piecemeal and partial discussions based on casual observations, though this does not mean that they generalised from "directly observed" facts".

Sir William Petty, in his *Political Arithmetick,* [1690, pp. 244-5]: comments upon methodology:

> "The Method I take to do this, is not yet very usual; for instead of using only comparative and superlative Words, and intellectual Arguments, I have taken the course (as a Specimen of the Political Arithmetic I have aimed at) to express my self in Terms of Number, Weight or Measure; to use only Arguments of Sense, and to consider only such Causes, as have visible Foundations in Nature; leaving those that depend upon the mutable Minds, Opinions, Appetites and Passions, of particular Men, to the Consideration of others: ... Now the Observations or Positions expressed by Number, Weight, and Measure, upon which I bottom the ensuing Discourses, are either true, or not

1. Concerning such approach see L. Th. Houmanidis [1989].

> apparently false, and which if they are not already true, certain, and evident, yet may be made so by the Sovereign Power,... and if they are false, not so false as to destroy the Argument they are brought for; but at worst are sufficient as Suppositions to shew the way to that Knowledge I am at".

Three things can be drawn from the above often quoted statement: first, that Petty's basic idea —as Roncaglia points out [1985, p. 19]— was that "the introduction of quantitative methods would produce a more rigorous analysis of social phenomena"; second, Petty did not deny that the use of quantitative data is an imperfect method for analysing and presenting social phenomena, however he conceived that it is the best that we have; third, Petty followed Bacon's middle way[2] between empricism and rationalism [see also Petty, 1691, p. 129 Aspromourgos, 1986, pp. 40-3] and enriched it with quantitative measurement. Therefore, Schumpeter [1954, p. 211] rightly comments that "Petty was no victim of the slogan: let facts speak for themselves. Petty was first

2. Francis Bacon turned against the sole use of either deduction or induction [1620, p. 49]. He considered [ibid, p. 97] that empiricism through induction does not yield verifiable truths, as Popper recently argued [Mattessich, 1979, p. 146]. Moreover, Bacon, in his *Advancement of Learning,* also comments on the weaknesses of pure induction, or "experienta literata" viz: "the induction which the Logicians speak of, ... is utterly vicious and incompetent ... For to conclude upon an enumeration of particulars, without instance contradictory, is no conclusion, but a conjecturê" [1605, pp. 124-5]. This problem of induction, as Russell [1946, p. 529] comments, "by simple enumeration remains unsolved to this day". Thus, the only useful scientific procedure, according to Bacon, is by the use of both methods, so "then, and then only, may we hope well of the sciences, when in a just scale of ascent, and by successive steps not interrupted or broken, we rise from particulars to lesser axioms; and then to middle axioms, one above the other; and last of all to the most general" [1620, p. 97]. This approach is achieved through a proper employment both of induction and deduction: "from closer and purer league between these two faculties, the experimental and the rational, (such as has never yet been made) much may be hoped" [ibid, p. 93]. Bacon's own method of analysis, as he declares, is: "not to extract works from works or experiments from experiments (as an empiric), but from works and experiments to extract causes abd axioms, and again from those causes and axioms new works and experiments, as a legitimate interpreter of nature" [ibid, p. 104].

and last a theorist"[3]. Moreover, the quantitative and empirical method which was widely used by Petty was also employed by Charles Davenant [Endres, 1985] and to a lesser extent by Cantillon, Steuart and Vauban who "adorned his economic arguments with statistics" [Hebert, 1987, p. 192].

Sir Durdley North (or his brother Roger [See Vickers, 1959, p. 94]) in the preface of the Discourses upon Trade (1691) gave a clear description of the deductive method which must be applied in matters of trade, i.e., in economics; viz:

> "I find Trade here Treated at another rate, than usually hath been; I mean Philosophically:... he begins at the quick, from Principles indisputably true; and so proceeding with like care, comes to a Judgement of the nicest Disputes and Questions concerning Trade... upon the appearance of Des Carter's excellent dissertation de Methodo,... Knowledge in great measure is become Mechanical,... built upon clear and evident Truths" [1691, Preface].

According to North, only this method, assist the scientist to speak "impartially of Trade in general, without warping to the Favour of any particular Interest" [ibid]. Thus, the impartiality of the scientists is guaranteed through the use of the abstract method[4].

II. France: phase I

In mid-eighteenth century France, two famous scientists, Montesquieu and Cantillon, fruitfully employed a combination of methods and techniques in social analysis.

In regard to *Montesquieu's* methodology, Devletoglou [1969, p. 535] comments that his economic observations

3. Petty, according to Sidgwick [1885, p. 82], was " a pioneer in each of the two lines of investigation of which we here maintain the union, since he wes the first in England to combine a serious effort to establish the general relations of economic quantities by abstract reasoning and analysis with patient endeavours to ascertain particular economic facts by statistical inquiries".

4. Letwin [1963, p. 137] mentions that "Petty's arithmetical manipulations of the numbers are precisely parallel to North's chain of deductive reasoning, for both represent an open and impersonal method of moving from premises to conclusions".

remained "painstakingly relevant to the current problems of the world". Also, his conclusions on non-religious human behaviour were drawn from "exhaustive studies of particular (local) physical and moral causes" [ibid, p. 538], showing a sceptical attitude in regard to general laws and principles of the social phenomena. Montesquieu, made extensive use of a new method of historical research, the "conjectural history", which is, "the systematic study of the effect of the legal, institutional and general environmental conditions upon human progress" [West, 1964, p. 26]. However, as Devletoglou observes concerning Montesquieu: "where facts must play a lesser role... where one observes less than one discovers and processes ideas, (he) leans toward Cartesianism" [Devletoglou, 1969, pp. 538-9, brackets added].

Hume, Steuart, Smith and most members of the Scottish Historical School were influenced by the methodological approach and inquiry of Montesquieu, and followed him "in seeking reasons for existing differences, but went beyond him in seeking the causes of change" [Skinner, 1965a, p. 3][5]. For this reason J. Millar wrote (1803) that: "The great Montesqieu pointed out the road. He was the Lord Bacon in this branch of Philosophy. Dr Smith is the Newton" [Lehmann, 1960, p. 363, ft].

Richard Cantillon, did not explicitly comment on methodology. However, he did consciously use the abstract Cartesian methodology without ignoring experience and statistics for the verification of his conclusions [Spengler, 1954, p. 285; Murphy, 1986, pp. 250-1; Hutchison, 1988, pp. 54, 165-6; Aspromourgos, 1989, pp. 358 ft. 5, 372-3]. He applied the cause —effect relationship "some thirty times" in his work [Spengler, 1954, p.

5. Johnson [1937, p. 211] mentions that Steuart had read Montesquieu's work and had been influenced by it, while the influence of Montesquieu on Smith's scientific method is pointed out by Thomson [1965, p. 125]. Furthermore, Skinner [1963, p. 438] has shown the influence of Montesquieu's comparative static approach to the study of society, an approach which had encouraged "in Scotland the development of a theory of social dynamics which rested on a foundation of economic determinism", one of the most sovereign characteristics of Scottish Historical School.

6. As Higgs [1931, pp. 382-3] mentions, Cantillon used a (now lost) "Supplement whose statistics throw a physical light on [some economic] principles" (brackets added).

286], made extensive use of the "ceteris paribus" device and proceeded from the simple to the most complex analysis. And as Cantillon stated:

> "I confine myself always to the simple views of commerce lest I should complicate my subject, which is too much encumbered by the multiplicity of the facts which relate to it" [1755, p. 265].

His cautious use of empirical verification of his conlusions and theories, is one of the main characteristics of his methodology, viz:

> "There is no branch of knowledge in which one is more subject to error than Statistics when they are left to imagination, and none more demonstrable when they are based upon detailed facts" [1755, p. 133].

Another, is the care he takes to separate his value judgements from his pure theory [Higgs, 1931, p. 388; Hollander, 1973, pp. 39, 42; Hutchison, 1988, p. 166].

III. France: phase II

Some years later the "first" school of economics originated in the same country. The physiocrates were a group of writers who considered themselves to be disciples of François Quesnay, forming a distinctive school of theorists on political and economic matters.

Their methodological procedure was based on Cartesian[7] rationalization and was far removed from any empiricism or empirical verification. This path was followed by most of the members of the Physiocratic School of Economics. The physiocrates as, Neil mentions [1949, p. 541], "... sought to begin with incontestable first priciples and to deduce from them, in typically rationalist, deductive fashion, their whole body of economic doctrine. Done in this method, they believed, their science would be foolproof". The above method of reasoning was not followed by

7. Descartes under his dictum "Cogito ergo sum" (ie. I think, therefore I am) and his four famous rules of method — ie. the operation of intuition, the rule of analysis, the rule of syntesis, and the significance of memory [1637, p. 41], developed and tried to apply pure deductive reasoning in sciences.

Quesnay, nor in its entirety by Mirabeau[8]. Quesnay, probably influenced by Nicolas de Malebranche and his medical studies, and employed both induction and deduction in his economic inquiry [see Pribram, 1983, p. 103; Fox-Genovese, 1976, p. 79]. Furthermore, his awareness of both Cartesian and Newtonian methods led him, in the opening of his "Preface" to the "Memoires de l'Academie royale de chirurgie" (1743), to maintain that "in scientific research, experience and theory should move hand in hand, serving rather than combating each other" [Fox-Genovese, 1976, p. 81]. Moreover, Quesnay, in his early economic work 'Evidence' (1756), "specifically and rigorously attacks the Cartesian theory of innate ideas subscribed to by the younger Physiocrats" [Neil, 1949, p. 546]. Consequently, Quesnay's methodological procedure was closer to Bacon's and Montesquieu's than to his "disciples" and particularly Du Pont de Nemours who followed, more or less, the Cartesian methodology.

Du Pont de Nemours explicitly justified on the following grounds the employment of mathematics in economics: 1) the use of mathematics will "do much to improve the reputation of the correct principles of political economy" [1174, p. 1]; 2) as the economic relations "among different classes of citizens and different nations" [ibid. p. 2] are characterized by regularity, or "all are mutually interrelated" [ibid. p. 4], "To produce a properly rigorous assessment, a method and a habit of calculation are required which... (is possessed by) the scientists, whose special study is the art of mathematically calculating relationships" [ibid, p. 2, brackets added]; and 3) "The objection that higher mathematics is not applicable to poplitical economy is an absurd proposition, as absurd as if a person were to have insisted that one could not apply higher mathematics to mechanics or hydraulics" [ibid]. Thus, Du Pont de Nemours used geometry to illustrate "curves which will represent the effects of various measures of

8. See also Klein [1985, p. 52. ft. 2]. On the methodological reasoning of the other physiocrats, Neil [1949, p. 543] comments: "La Mercier is probably the purest Cartesian rationalist of the school. Dupont and Baudeau rank close behind him. Le Trnonse is undoubtedly a rationalist, but he uses historical exampes and factual material to back up his arguments from time to time".

policy, the "curves of policy'" [Theocharis, 1961, p. 59], with the support, as the states, "of my intuition" [1774, p. 15].

A. R. Turgot, explicitly elaborated upon methodology in his *A Philosophical Review of the Successive Advances of the Human Mind* (1750) by stressing the importance of the inductive method and of the causation analysis [1750, p. 45]. However, according to Turgot, different sciences employ different methodologies, although "All sciences, no doubt, have their origin in senses" [1750-1, p. 96]. The mathematical method, according to Turgot, is purely deductive (Cartesian) and verifiable only by its consistency [1750, p. 44; 1750-1, p. 96]. On the other hand, in the physical sciences, a different methodology is employed [1750-1, p. 98]. It consists of the following line of reasoning:

> "The natural philosopher erects hypotheses, follows them through to their consequences, and brings them to bear upon the enigma of nature. He tries them out, so to speak, on the facts, just as one verifies a seal by applying it to its impression. Suppositions which are arrived at on the basis of a small number of poorly understood facts yield to suppositions which are less absurd, although no more true. Time, research, and chance result in the accumulation of observations, together" [1750, p. 45].

Thus, he advocated that observation and experiment not only initiate the hypotheses but also test them. In economic science, as is known, experimentation is seldom feasible. This is why in recent times falsification, rather the verification, has been the rule.

Turgot, distinguishing between the mathematical or deductive method in both physical and political science, declares that the latter science uses a very peculiar method. As he writes:

> "What I have said in a general way about the differences between sciences of combination [i.e. mathematics] and sciences of observation [i.e. physics] may be applied to them [i.e. correspondigly, to moral and political sciences]. In the latter [i.e. political], we cannot confine his attention [i.e. of scientist] to a small number of principles. He is assailed simultaneously by a whole mass of ideas, and is forced to gather them together in large numbers, because all things which exist are bound up with one

another by their mutual interaction; and he is obliged at the same time to analyse these ideas carefully until he arrives at their most simple elements" [1750-1, p. 98, brackets added].

By linking economics to political science, according to the spirit of the times, we understand that Turgot was in favour of a mixture of the inductive and deductive methods for the advance of economics —and perhaps he was influenced by Hume[9]. However, he made little use of history for the collection of observations and for the verification of his conclusions in his work *Reflections on the Formation and the Distribution of Wealth* (1766). Conversely, in his "Paper on Lending by Interest" (1770) he made grater use of historicism, while in his "Value and Money" (1769) he employed a mixture of deduction and induction.

Abbe de Condillac was a sophisticated deductivist in economics [Klein, 1985, p. 51]. His approach had a philosophical origin trying "to establish primary principles which come from the most simple ideas... which in turn come directly from our sensations" [Klein, 1985, pp. 53-4]. However, in regard to economic matters, Condillac reasoned that experience is the starting point of the scientific analysis. Thus, he "did not use hypotheses to arrive at his first principle (by which the rest of the system can be deduced)... Instead it is established by deductions from empirical facts" [Klein, 1985, pp. 58, brackets added].

IV. Italy

The mixture of deduction and induction was also employed by Cesare Beccaria. On methodology, Beccaria comments:

> "By tracing things up to their original sources, where they are less entangled among a variety of relations and modifications I hope to establish, as far as is possible, exact and precise definitions. For by thus acquiring a knowledge of their elements we are enabled to unravel complex and intricate combinations; or, in other words, a deduction of the most simple propositions is the best means of bestowing evidence on the more general and

9. See Taylor [1565, p. 7].

> complicated truths. A continual application of the maxims of economy *to our own circumstances* will prevent the tediousness of abstract speculation" [1769, p. 45, emphasis added].

Beccaria held that in regard to the intended scope of the deduced principles, and the range of "falsificationary" tests, a scientist must establish exact and precise principles from "our own (he means Italian) circumstances".

However, Beccaria was also a pioneer in the application of the abstract mathematical method in economics, a method also followed by other Italian scientists [see Theocharis, 1961, ch. 4; Hutchison, 1988, pp. 178-9]. He justified the use of this methodological instrument in the same way as Jevons did [1871, pp. vii, xxi, xxiiii, xxiv] more than a century later, namely, on the basis that as economics deals with quantities, mathematics is a useful method to employ, viz:

> "Algebra is simply a precise and straightforward technique for reasoning about quantities, and it can therefore be employed not only in geometry and in other mathematical sciences, but also in the analysis of anything that is capable of increasing or decreasing, and to all things which exhibit mutually comparable relationships. Even political sciences can therefore make use of algebra, up to some points. Debts and assets of a nation, taxes, etc. are all items which can be treated as quantities and can therefore be subjected to calculation. I said, **"up to some point" because political phenomena are highly dependent on many isolated decisions and human passions which cannot be specified precisely"** [1764, p. 149, emphasis added].

Despite the above weakness of the extreme mathematization of economics which in our century has been emphasized by many scholars [see Karayiannis, 1989, pp. 104-5], Beccaria's intention in his short paper, as he wrote, was "to give an example of the manner in which economic sciences can be approached analytically" [1764, p. 149].

V. Scotland

The nescessity of using the scientific method in the explanation not only of philosophical but also of more "pragmatical" (including economic) subjects, received explicit recognition in the hands of David Hume. Hume stresses the necessity of establishing a proper scientific method, as we have "to distinguish exactly what is owing to "chance", and what proceeds from "causes"" [1748a, p. 64]. Moreover, he proposes that "it requires some thought and reflection to discover the principles, by which we can reconcile reason to experience" [ed. 1970, of Money, p. 41].

Hume was critical in regard to the sole application of any scientific method. Particularly, in his introduction to *A Treatise of Human Nature* [1748, p. 25], he criticized the rationalistic systems of philosophy and the non applicability of abstract reasoning to matters of fact. On the other hand, he was sceptical about the sole use of induction and experiences, while he found empirical evidence (statistics) in regard to economics, very questionable and insufficient [Endres, 1985, p. 245, ft 6]. As we know, the inductive method is one wherein by observing a number of individual cases, a sample of the data, or a particular variable, we reach a general conclusion. But by using this method alone, we may simply arrive at a truism, without any power of prediction. This trap of truism is known as "the problem of induction". This problem of induction arises from our inability to provide an inductive proof for a common belief, such as the propostion: "the sun will rise tomorrow"[10]. Hume explicitly recognised this problem of pure induction, stating: "That the sun will nor rise tomorrow is no less intelligible a proposition, and implies no more contradiction, than the affirmation, that it will rise" [1748a, p. 26; see also 1740, pp. 15-7]. Therefore, "it is impossible,... that any arguments from experience can prove this resemblance of the past to the future; since all these arguments are founded on the

10. L. A. Bolland [1982, p. 14] says that: "The problem of induction is that of finding a general method of providing an inductive proof for anyone's claim to embirical knowledge". Concerning the same problem see also: J. Robinson [1962, pp. 21-2]; L. A. Bolland [1979, pp. 506-7]; M. Blaug [1980, p. 12]; Gemtos [1987, pp. 57-60].

supposition of that resemblance" [1748a, p. 38]. Thus, "Whatever is may not be. No negation of a fact can involve a contradiction" [ibid, p. 164]. That is why Hume with his empirical method also used deduction to arrive at verifiable conclusions.

Hume, after criticizing the use of pure deduction [see also Hutchison, 1988, p. 201] and emphasizing the problem of pure induction, proceeds under the dictum "Effects will always correspond to Causes" [1748a, p. 30] in his causation analysis [1739, p. 69; 1740, pp. 14-5] the significance of which was previously emphasized by Misselden under the dictum "Non causa Pro Causa" [1622, pp. 79, 102], and by Hobbes [1651, p. 85] who maintained that: "Science is the knowledge of consequences, and dependance of one fact upon another". The relationship between cause and effect (causation analysis) —which was also accepted and employed by Sir James Steuart [1771, p. 15]— according to Hume, was not self-evident but was derived wholly from experience and historical observations [1739, pp. 73-5]. He then applies Occam's Razor: "we must endeavour to render all our principles as universal as possible, by tracing up our experiments to the utmost, and explaining all effects from the simplest and fewest causes, 'tis still certain we cannot go beyond experience" [1739, p. xxi]. Particularly, as "The idea of cause and effect is deriv'd from "experience", which informs us, that such particular objects, in all past instances, have been constantly conjoin'd with each other" [ibid. pp. 89-0; see also 1740, p. 24]. The experience of the past comes to us through history, thus, "there is... an advantage in that knowledge which is acquired by history, above what is learned by the practice of the word [i.e. modern experience], that it brings us acquainted with human affairs" [1748b, p. 57, bracket added].

Therefore, according to Hume, by the knowledge acquired from history [see also Hutchison, 1988, p. 202] and repeated experience[11] the mind (particularly of philosophers and men of genius) derives general principles for the course of events "through a non-rational associative mechanism", namely through causation analysis [Rotwein, 1970, p. xxvii]. This formation of

11. The philosophical empirisism founded by John Locke "is the doctrine that all our knowledge... is derives from experience" [Russell, 1946, p. 589].

general principles, for Hume, "if just and sound, must prevail in the general course of things though they fail in particular cases; and it is the chief business of philosophers to regard the general course of things" [Of Commerce, ed. 1970, p. 4].

Very briefly, Hume tried to use both inductive and deductive methods in a balanced way to reach scientific conclusions, without leaving aside the historical evidence [see also, Veblen, 1899-1900, pp. 55-6; Hutchison, 1988, pp. 201-2].

Sir James Steuart presentes his inquiry "to the public as nothing more than an essay which may serve as a canvass for better hands" [1.6][12] declaring both his modesty and his scienctific moderation. Nowhere in his economic analysis does he claim absolute authority-indeed, he repeatedly apologizes for his lack of a proper scientific preparation for such an inquiry [1.7, 12], and also for his literary inabilities [1.75].

In general, Steuart was a "deist", but his approach to explanations of reality may be termed as "agnostic", or, at least, antidogmatical [1771, p. 13]. Though he believed that everything in nature originated from the "Supreme Being", or "the first cause", an explanation of phenomena is still called for, and common sense is our guide to the truth. However, empiricism should not stand alone "without any progressive argumentation" [1771, p. 20] on reasoning. Thus, he avoided methodological extremes, as we shall soon see in more detail, when deriving economic principles which are contingent upon specific assumptions.

Steuart's opening remarks in his **Principles** ... treated with the problem of economic methodology. In his "Introduction", he declares his inquiry to be a "deduction of principles, not a collection of institutions" [1.7]. The principles of political economy are derived from "the painful deduction which forms the whole chain of my reasoning"[13] [1.7]. What Steuart means here by "principles" are "guides" rather than "dogmas".

12. All reference cited to 1805 edition of Steuart's "Works" are as follows: volume, book, page, [e.g. 1.I.x], For Skinner's edition of "Principles" we cite volume and page only [e.g. 1.310].

13. Deduction was painful for Steuart because as Skinner points out [1966, p. lix] "it cost ... a great effort; it is painful because this lack of mastery on setting out led to an arrangement which is often unsatisfactory". However, Steuart used the deductive method, as himself declares, [1.38] in order to "lay down principles consistent with the nature of man, with agriculture, and with multiplication".

However, though Steuart deliberately employed deduction to arrive at principles, the principles in turn should be tested frequently and at each stage so as "to avoid abstraction as much as possible" [1.19]. He explicitly recognized that the extensive use of pure deduction as a means of obtaining knowledge collapses when doubt is thrown upon the premises, or when the content of the premises changes. Steuart seems to base his opposition to the extensive use of abstract reasoning on the following points [1.8; 1770, p. 45-6]: 1) The premises may be wrong; 2) The premises may be initially correct, but become incorrect later; 3) The principles derived from deduction may be based on so narrow (even though true) set of premises that applications of them to complex reality are absurd. Furthermore, recognizing that the deductive method must based upon clear and scientific language, Steuart attempted to give clear scientific definitions to the terms used in his analysis.

On the other hand, Steuart's principal puprose is "to discover truth" [1.19], and because "every true proposition, when understood, must be assented to universally" [1.8], so "[I] frequently make use of examples for illustrating every principle" [1.19]. This is the framework on which "An induction is formed, from whence a conclusion, called a principle, is drawn and defined; but this is no sooner done, than the author extends its influence far beyond the limits of the ideas present to his understanding, when he made his definition" [1.8].

Steuart uses "inductions and suppositions" [1.44.ft.2] when starting "from fact, and from experience" [1.II. 322] to draw conclusions which at least do not contradict reality. Also, he clearly understands that there is little hope of formulating principles that can then be usefully applied using only direct induction, thus he used deductive conclusions which were constantly tested against historical data.

Steuart recognized the Humen problem of pure induction, saying that: "In speculations of this kind, *one ought not,* I think,

Specifically, he used this method in adopting five premises to describe a model of a "perfect economy" without foreign trade [1.123] and in his analysis of the market process leading to equilibrium [see, Karayiannis, 1990].

to conclude, that experience must of necessity prove what we imagine our reasoning has pointed out" [1.124, emphassis added]. Thus, in the same manner as Hume did, Steuart synthesized inductive and deductive methodology in his analytical reasoning. More specifically, though Steuart did indeed use deduction to derive his "principles", he constantly verified —or sought to verify— each stage of the argument by an appeal to observation and experience [1.17; 1.II.218][14].

In building up his body of economic knowledge Steuart begins with the simple cases and gradually moves to more complex ones [1.28-9; 1.II.346; see also Skinner, 1966, p. lxxii]. By this procedure, he does not collect and use historical or statistical data [1.51-3] only for the sake of making observations upon which to start his analysis but also for the purpose of verifying "relative conclusions" or "relative principles". He stressed —and in this respect may be regarded as a predecessor of the German Historical School of the 19th century— the relativity of conclusions regarding the principles of economic phenomena, which is ultimately related to the differences in facts between different times, countries and institutions [1.4-5; 1.16; 2.339]. However, he employed a particular generalization in his analysis, which takes him away from "pure relativism", when he used the "universal spirit of men" — without explicitly analysing the meaning of the term— as the ruling principle of the economic behaviour of individuals. Thus, he emphasized that "we must suppose the spirit universal and then point out the principles which influence the success of it" [1.II. 348]. These principles, however, are derived in connection with historical empiricism, the base and the instrument of his verification procedure.

Steuart by using a mixture of deduction and induction, both verified by historical data, follows more or less the methodology established by Bacon. However, any scientific "thought and reflection" presupposes adequate knowledge. Steuart confirms

14. In the words of Skinner, "Steuart ... recognized that the use of induction ... is not of itself enough; that the scientist can only advance by concerning himself with cause and consequence, that is by thinking deductively" [1966, p. lxi].

that he derived his knowledge through experience and study [1.5-6].

The supplementation of inductive and deductive methods with historical data and the employment of the latter for the purpose of verification, is so pervasive in Steuart's work as not to need any specific quotations[15]. It is undoubtedly necessary to employ some empirical generalization for the establishment of economic principles, albeit in their relative forms, and Steuart took a great step in this direction by bringing together induction, deduction and historical empiricism.

Steuart, was perhaps influenced by Humean historicism in regard to his scientific method, but more generally, his approach was at one with the spirit which formed the "Scottish Historical School"[16]. His approach to social analysis was not only a priori analytical but also a posteriori empirical. This approach fitted well with the spirit of the Scottish philosophers of his day. As Skinner explains [1965a, p. 3], this "was analytical as well as historical; they sought principles and causes so that... it is necessary to start from the facts of history". Thus, Steuart was "master of the highly abstract natural history of society in general, as developed by his fellow-literary of Scotland, [and] ... was equally at home in the concrete study of the histories of particular societies" [Davie, 1967, p. 292].

However, we must make clear that Steuart was not directly influenced by the members of the Scottish Historical School[17], the writings of which appeared after, or concurrently with the publication of Steuart's work, nor by the environment of Scotland. On the contrary, Montesquieu's influence was more important, as also was Steuart's first hand knowledge of European conditions.

In addition to his general opposition to over-reliance on abstract reasoning and pure induction Steuart pointed out some weaknesses which accompany the methodological procedure of

15. For example see Steuart [1.35]; for more examples of Steuart's historicism, see Skinner [1986, p. 5].

16. For an account of the attainments of the Scottish Historical School and its members (Robertson, Millar, Smith, Ferguson, etc.) see Skinner [1965b].

17. Concerning the characteristic attitude and method of the Scottish scholars see Macfie [1955, pp. 81-1].

social science. The arguments utilizing this point by an "economist qua economist" as was Steuart, have a truly original sound. At first, he objected to the use and the unquestionable acceptance of any "general maxim" or "general proposition" in the "science of political economy" [2.339; 2.358][18]. In addition to this, in a subject like "Political Economy" "combinations are infinite, and the smallest change of circumstances throws the decision of a question on a different principle" [2. 581]. And as there are some differences "between theory and practice" [1.259], Steuart prefers "to apply principles only, and shew how consequences may follow one another: to foretell what must follow is exceedingly difficult, if not impossible" [2. 365]. In other words he emphasizes the low "predictive" power of economics.

Second, he warned of the psychological inclination of the scientist to accept "authority", or the propositions of other scientists, in the formation of his views[19]. It is all too easy to accept a false argument of some eminent authority, and so to "adopt an opinion, without being able to give a sufficient reason for it; and yet we cannot persuade ourselves to give it up, though we find it combated by the strongest arguments" [1.9]. For this reason, "*it is better for people to judge from experience and reason, than from authority;* to explain their terms, than to dispute about words; and to extend the combinations of their own ideas, than to follow conceits, however decorated with the name of systems" [1.10, emphasis added], although, "the difference ... of opinion between men is frequently more apparent than real" [1.9].

Third, Steuart was well aware that one of the weaknesses of the social sciences is the subjectivity of the "scientist" who is himself a part of the process by which the facts, or the human actions, are taking place. The subjectivity of the observer of social phenomena accrues from his surrounding "natural, social, and spiritual environment". As Steuart himself admits, "The modes of thinking, also, peculiar to the several countries where I

18. However, Steuart recognized that "Nothing is so systematical, nothing so pretty in a treatise as general maxims; they facilitate the distribution of our ideas, and I have never been able to dash them out with a certain regret" [1. 67-8].

19. Hobbes [1651, pp. 77, 87], severly criticizes the procedurs of following the propositions and the statements of "authority".

have lived, have, no doubt, had an influence on what I have written concerning their customs" [1.4]. Steuart attempts to guard himself against these pitfalls, particularly the last two, by being as far as possible an "impartial" author [1.3; 1.7; 1.10].

Steuart's methodological reasoning stems at one and the same time from: first, the universality of his approach-universal in the sense of the application of principles to different societies, and second, from the pronounced historicist and relativist stance taken by Steuart as regards the Baconian method. When to this is added Steuart's employment of induction, deduction [see also, Sjinner, 1965b, pp. 273-4, 279; Skinner, 1966, p. lxi; Davie, 1967, p. 293; Hollander, 1973, p. 42] and empirical verification, we arrive at an overall picture of the "core" of his methodology.

As we mentioned above, Steuart not only followed the empirical method but also used the causation analysis put forward by Hume. However, he differs from the latter, in regard to the general validity of derived principles. Steuart believed that the production of general principles or "maxims" in relation to human affairs (particularly economic) is unattainable, while Hume considered these principles to be generally applicable, but not in particular circumstances. This difference in methodological approach perhaps explains why Steuart took the Humean quantitative theory of money partly out of context in his critique of it[20].

In conclusion, we can first say that Steuart was the first pure economist who successfully integrated different methodological instruments, namely, the inductive, deductive, and historical method. His purpose, as we can recognize from his *Principles*, was both to explain changes of economic phenomena and exist-

20. Steuart criticized Hume's quantitive theory of money, primarily the proportionality of changes between the quantity of money and the level of prices [2.342-356]. Steuart developed his critique without taking into account the "ceteris paribus" conditions and the short and long run analysis used by Hume [Of Money, ed. 1970, pp. 39-44; Of Interest, ed. 1970, pp. 40, 51-2] in regard to the changes between the quantity of money and the level of prices. However, Steuart's critique was consistent with the "correct" Humean theory, on the possibility of hoarding [2.350] and the differences in income elasticities of various commodities [2. 342-3]. For an analysis of Steuart's Critique on Hume's theory of money see Karayiannis [1988, pp. 542-4].

ent economic states. Also, he was well aware of the problems which arise from an asolutist use of either the inductive or the deductive methods, and noticed the danger in the use of "authority". In addition, Steuart recognized the relativity of economic phenomena, and avoided laying down absolute or general economic principles; rather, he always attempted to verify his conclusions with historical data. Though he was himself so meticulous with respect to methodological procedure, he still cautions his readers, first, that "to lay down a scheme, you must suppose a particular state to be perfecty known" [1.80] and second "there is no man whatever, let his knowledge of facts and accuracy of judjement be ever so great, who can pretend, with any degree of certainty, to foretell what will or must happen, in cases so complicated and combined with future contingencies" [1769, p. 285].

Adam Smith, was deeply aware of the evolution of ancient (Aristotlean) and "modern" (Cartesian, Newtonian) methodology [1762-3, pp. 139-40]. Despite his profound understanding of the new methodological horizons opened by Descartes and Newton, he "had surprisingly little to say on the subject of method (in the sense of considering the techniques of analysis and synthesis)" [Skinner, 1974, p. 164; see also Bitterman, 1940, p. 497]. Only in his *Lectures on Rhetoric...* does he comments on "abstract and speculative reasoning, which perhaps tend very little to the bettering of our practice" [1762-3, p. 37].

However, he explicitly elaborated in his Essays on *Philosophical Subjects* (ed. 1795) on the method "employed in establishing ... a system" of thought [Raphael, Skinner, 1980, p. 1]. According to him, philosophical research begins "when law has established order and security, and subsistence ceases to be precarious" [1975, p. 50]. On the other hand, "Wonder,... is the first principle which prompts mankind to the study of Philosophy ... and they pursue this study for its own sake, as an original pleasure or good in itself, without regarding its tendency to procure them the means of many other pleasures" [ibid. p. 51][21]. Any

21. "Philosophy", Smith writes elsewhere, "is the science of the connecting principles of nature... [and]... by representing the invisible chains which bind together all these disjointed objects, endeavours to introduce order into this chaos of jarring and discordant appearances, to allay this tumult of the imagination, and to restore it, when it surveys the great revolutions of the universe, to

scientific theory, is derived from "the ... intense application of thought" [ibid. p. 43], "the most attentive observation" [ibid. p. 57], the "tranquillity of the imagination"[22] and the subjectivity of the scientist [ibid. p. 61, 105].

Thus, by the stimulus of "wonder" and through the work of the "attentive observation" and "imagination" of the scientist, the chain of cause-effect "explanation" inherent in any natural phenomena could be reformed to establish a new, simpler and more widely accepted theory explaining the course of events [ibid, pp. 41-2]. As Smith points out, a "theory" could be replaced by another (as happened with the astronomical systems) if the first was "intricate and complex ... [and] ... The imagination, therefore, found itself but little relieved from that embarrassment, into which those appearances [i.e. the multiplicity of Celestial Spheres] had thrown it, by so perplexed an account of things" [ibid, p. 59, brackets added][23]. Thus, "It may well be said of the Cartesian philosophy, now when it is almost universally exploded, that, in the simplicity, precision and perspicuity of its principles and conclusions, it had the same superiority over the Peripatetic system, which the Newtonian philosophy has over it" [1756, p. 243][24].

Smith, however, in expounding an economic system[25] in his

that tone of tranquillity and composure, which is both most agreeable in itself, and most suitable to its nature" [1795, pp. 45-6].

22. Hume had already put forward "the imagination ... [as]... being the ultimate judge of all systems of philosophy" [1739, p. 225]. see also A. Skinner [1974]; D. D. Raphael [1977, p. 28]; D. D. Raphael, A. Skinner [1980, p. 19].

23. As Raphael and Skinner, notice [1980, p. 21]: Smith accepts that "the replacement of one theory by another is not always in order to accommodate new empirical facts. The new facts could often be accommodated within a revised, but more complicated, version of the old theory. The new theory may be preferred because it is simpler or because it can be connected more directly with the theory of a related branch of science. If so, the criteria for prefrence are quasi-logical and aesthetic".

24. Skinner [1974, p. 180] points out that Smith "in showing that the pattern of [scientific] development involved the modification of an existing system and that at some stages this process of modification could lead to results which made that system unacceptable", anticipates "at least on the surface,... the basic theses contained in Thomas Kuhn's "Structure of Scientific Revolutions" (1962)".

25. Smith considers intellectual systems as machines. As he writes: "Sys-

Wealth of Nations adopted the Nrewtonian method[26], supplemented, for the purpose of verification, with historical observations, without leaving the Cartesian method outside his analysis [Skinner, 1974, pp. 181-2]. He was dubious about the efficiency of statistics, viz: "I have no great faith in political arithmetic" [1776, p. 534], though he used it in some cases [mainly on price statistics, 1776, pp. 267-275] in his descriptive investigations [see also, Spiegel, 1979, pp. 109-110]. He also used "conjectural history" in depicting the various phases of economic life [Veblen, 1899-1900, p. 84-5; Perelman, 1984, p. 132].

Because of the multiplicity of methods employed by Smith —though he consciously avoided the extensive use of "pure abstraction" [Bittermann, 1940, p. 357][27]— Sowell [1974, p. 112] and Katouzian [1980, p. 22] called Smith's methodology "eclectic"[28].

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tems in many respects resemble machines. A machine is a little system, created to perform, as well as to connect together, in reality, those different movements and effects which the artist has occasion for. A system is an imaginary machine invented to connect together in the fancy those different movements and effects which are already in reality performed" [1795, p. 66].

26. In reality, Smith employed Newtonian mechanics both in his *Moral Sentiments* and *Wealth of Nations.* See, Bittermann [1940, p. 502], J. Lindgren [1969, p. 898]; Skinner [1974, pp. 180-1]; Blaug [1980, p. 57].

27. As Skinner [1956b, p. 271] observes: "Francis Hutcheson had already helped in persuading Smith to avoid, as he had done "all researche into abstract relations" and to direct his enquiries 'into what is the most obviously and immediately known from observation and experience'". Hollander [1979, p. 72] mentions that Smith used the "hypothetical - deductive theorizing" in his model of economic development and in his theorise of value and distribution.

28. According to Veblen [1899-1900, p. 56] Smith "is said to have combined deduction with induction. The relatively great prominence given the latter marks the line of divergence of British from French economics, not the line of coincidence;". Concerning Smith's method, Thomson [1965, p. 219] says: "The empiricism of Bacon, Hobbes, and Locke appeared unsatisfactory to Smith... [although] ... he speaks of himself occasionally as an empiricist, yet his reluctance to align himself with the purely inductive school of scientific methodology was due to the excesses to which this method had been carried by previous generations of scholars". While, Blaug [1980, p. 56] more specifically writes: "Adam Smith is a particularly striking case because he in fact employed radically different modes of reasoning in different parts of his work. Books I and II of "The Wealth of Nations" make liberal use of the method of comparative statics latter

Before concluding this section of the paper, we will offer a brief comparison between Steuart's and Smith's methodology. First of all we must say that there is a great difference in their attitude, at least explicitly, toward the "discovery of truth". Steuart, discussed the methods which must be employed by a scientist for the discovery and analysis of economic principles, whereas Smith was engaged more in analysing the way in which a "scientist's imagination" could establish a "system of thought" with proper characteristics. In addition, they treated differently to the issue of subjectivity in science. Steuart held that there was a problem of "bias" in social science derived by the influence of (general) "environment" on a scientist's thought, while Smith believed that the subjectivity of the scientist was a necessary precondition for the advancement of knowledge.

However, the methodology employed by Steuart and Smith in analysing economic phenomena has more similarities than differences. It is known that Smith followed Newton's method - particularly in his equilibrium analysis- and the same analytic path was followed by Steuart[29], though to different conclusions. As Skinner [1965, pp. 278-9] comments, in the cases of Steuart and Smith "an interest in the dynamics of change can be seen; in both cases a careful empiricism is evident thus echoing views as to sound scientific method which were typical of contemporary Scottish thought. The only difference between Steuart and Smith is that the former addressed himself explicitly to the question of method". Of course, there can be no objection to the view that, "Smith was a better strategist and a better stylist than Steuart" [Meek, 1967, p. 7]. However, this is no reason to place Smith's methodology at a higher level than Steuart's, as did J. N. Keynes and Thomson. J. N. Keynes [1890, p. 10], regarded Adam Smith

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associated with the work of Ricardo, whereas Books III, IV and V of "The Wealth of Nations", and most of "The Moral Sentiments", exemplify the very different methods of the so-called Scottish historical school". Recently, Hutchison [1988, p. 356] commented on Smith's method: "the comprehensiveness and balance of methods deployed in *The Wealth of Nations* has hardly ever been regained in a general work on the subject of major stature".

29. Steuart was well aware of Newton's writings. Specifically, he wrote a book vindicating Newton's *Chronology* in reply to M. de Vibnolles' Dissertation upon Sir Issac Newton's Chronology", (1757).

as the ideal economist because "It has been said of him that he first raised political economy to the dignity of a deductive science. But he also been regarded as the founder of the historical method in political economy". Thomson [1965, pp. 226-7] following the same line says: "Adam Smith was one of the few economists who experienced some success in integrating a systematic analysis of economic phenomena with an additional perspective of historical development". We do not disagree with this respect for Smith's achievements, but we must not forget Steuart's pioneering integration and exploration of the various methodological instruments. And, as Sen rightly mentions: "Whatever we may think of [Steuart's] performances in other respects, we cannot but admit that is one of the most conscientious writers and disciplined logicians among the early economists, the conscious care with which he sets down his assumptions, traces the relation between his premises and conclusions and avoids ambiguity of expression, and the pains that he takes to define accurately every technical term that he uses" [1957, p. 28].

CONCLUSIONS

The principal conclusions drawn by the previous analysis are that most of the writers whose methodological arguments have hitherto been analysed followed a multiplicity of methods or a "methodological eclecticism" in their scientific inquiries. In the course of their inquiries they fruitfully combined the various methods in order to elucidate economic phenomena and to draw some useful inferences on economic policy. On the other hand, they emphasized the problems and the limitations of economic analysis caused by the sole use of one particular method. Generally speaking, one could deduce that most of the British are more inclined to use the Baconian method-- as Veblen says [1899-1900, p. 59], "there is more of "induction" in the British" -- while their colleagues in France the Cartesian one [see also Russell, 1946, pp. 618-9].

Though, each of these scholars significantly contributed to the progress of economic methodology[30], we think that Hume (as

30. R. Mattessich [1979, p. 233] considers that "Sir William Petty (1623-1687), Richard Cantillon (1680-1734) and above all Francois Quesnay (1694-1774) and Sir James Steuart (1712-1780) may have to be addressed as the first methodologists of economics".

a philosopher-economist) and Steuart (as a pure economist) has contributed the most. Therefore, they must be highly esteemed and regarded as the main figures of the 18th century on the subject in question.

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