

THE INDETERMINATION OF SENIOR

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SYNOPSIS

The commitments and working requirements of abstract, applied, and art of, economics are assessed within an analogy with the fields of inert matter and life. Abstract economics is the pure logic of the phenomenon. Applied positive economics presupposes many distinct abstract sciences. Art presupposes applied economics and direct knowledge of the specificities which characterize the time-space individuality of the phenomenon. This is an *indetermination* clearly formulated by Senior and Mill; its connection with institutionalism is discussed. The Ricardian Vice is the habit of ignoring the Indetermination; its prevalence in mainstream economics is exemplified, and its causes analyzed.

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Abstract science, applied science and art of science are three distinct spheres of knowledge, whether the field of inert matter, or life, or society is in question. An analogy among the three fields focuses the attention on the complementarity among the three spheres of abstraction, allows a comprehensive and less conflicting view of economics, and invites a better characterization of the nature of, and method or language appropriate to, each sphere of abstraction, as well as of the abilities, commitments and limitations of its practitioners. The evolving nature of boundary-lines between these branches of learning is, however, always acknowledged.

The abstract economic theories, the pure logic of economics, do not tell what ought to be done in reality. It is generally acknowledged, even if not always followed, that value judgments are involved in normative conclusions. More fundamentally, reality involves so many non-economic elements, elements which are omitted from abstract theories, that an indetermination is also involved in normative conclusions, and this was clearly stated by Senior and Mill. I suggest calling it the **Indetermination of Senior**.

Art of science presupposes applied science, an intermediate positive level which collects rays of light from the relevant and distinct abstract sciences. Art of science also presupposes knowledge from direct experience, namely the specificities which account for the time-space individuality of the phenomenon. On the whole, mainstream economists forgot Senior and Mill, and are thus addicted to the Ricardian Vice. On the whole, institutionalists did not forget, but failed to account of the value of abstract sciences on one side, and perhaps of the danger of the Empiricist Vice on the other.

These questions are covered in four sections. The first concentrates on the division of labor in the field of inert matter, and indicates the ability and commitment of the specialist in each level of abstraction; an underlying attention to economics is maintained through appropriate quotations from great economists. The second section complements the first and deals with the limitations of the analogy, namely the effects of the non-experimental nature of economics and of the ascendant complexity of the phenomenon as one moves from inert matter to society -- this exposition results primarily from direct acquaintance, from 1964 to 1974, with an integrated school in the field of inert matter -- six years as faculty member (Mechanical and Electrical Engineering) of the Aeronautical Institute of Technology (ITA), Brazil -- and also an integrated school of management and economics -- five years as graduate student of industrial administration (MS) and economics (Ph.D.) of the Carnegie-Mellon University (GSIA), U.S.A.

The second section proceeds by incorporating the views of Senior and Mill, which are updated in order to account for the growth of knowledge and the new constellation of sciences which came to light in the past one and a half centuries. This is used in section three for a re-statement of Schumpeter's work on the Ricardian Vice. Section four exemplifies the latter by indicating factors which cannot be ignored in constitutional rule proposals, for instance the multiplicity of economic theories and the perverse effects of rules on behavior; in the specific case of the monetary rule proposal, the shortcomings are further exemplified from within the monetarist perspective in which it was founded. There follows a discussion of the causes of the Vice¹.

There is a substantial division of labor between physicists and engineering scientists. The former is forced into a process of increasing abstraction in the search for ascendant generality, while the latter is restrained within the realism imposed by the required applicability. Both are theorists, as opposed to professional engineers. But the constructs of physics -- vacuum, perfect gas, frictionless motion etc. -- become increasingly distanced from reality as theory progresses. That is not, and cannot be, the case for the engineering sciences, since the theoretical entities must be tied more closely to their real counterparts, and all kinds of safety coefficients have to be developed to allow their implementation. The phenomenon under analysis is the same, but it is treated in a different light.

The discreteness of the division of labor among the many sub-fields of specialization varies with the accumulation of knowledge, and the degree of integration between basic and applied theories. A nebulous and vague evolving frontier is evident. Let me first emphasize the lack of one all-embracing science in the field of inert matter -- physics here conveniently stands for all of them. Obviously, the most important basic field for the chemical engineer is chemistry, as distinct from physics, notwithstanding physical-chemistry. Second, since the end of the last century there has been no one all-embracing theory in physics either.

Third, the paradigmatic dissent found in the case of the distinct abstract and applied views is quite similar to, and perhaps stronger than, that found in the case of competing abstract theories (Kuhn 1971, pp. 111-59), particularly in the mutual vituperations -- physicists talk about technologists or applied physicists, avoiding references to engineers, physicists talk about models, rather than applied theories, or about empiricism, rather than science etc. In the other camp, one hears of irrelevance, unrealism, one-track-mindedness and so on. Buchanan (1985, p. 14) may represent below the engineering scientist, if economics is replaced by physics:

As it is practiced in the 1980s, economics is a 'science' without ultimate purpose or meaning... In a very real sense, the economists of the 1980s are illiterate in the basic principles of their own discipline... Their interest lies in the pure intellectual properties of the models with which they work, and they seem to get their kicks from the discovery of proofs of propositions relevant only for their own fantasy lands... I do deplore the waste that such investment of human capital reflects.

Buchanan is here attacking the mathematical economists, who are still indirectly called frauds, conscious parasites on the community etc., and also ideological eunuchs, because their motivation is not normative. But the distinction between abstract and applied sciences cannot be made in terms of the extent to which mathematics is used. As Hicks (1980, p. 214) put it, "the first catallactists were poor mathematicians, but were thinking mathematically" -- Hicks is referring to the first marginalists, but the dictum holds good here. Buchanan's contribution ranks in the highest level of abstraction.

One has to add that the mathematics required in some applied fields may be still more sophisticated than that in the abstract ones, as witness the stochastic models in management sciences -- see, for instance, Clarkson (1968). And I am stressing the term "models" because they are mutually disconnected and may even be mutually contradictory, a spurious contradiction derived from their partiality. As one moves from abstract to applied sciences, the theories or models lose generality as they gain applicability, i.e. they

are closer to reality or, in more formal language, they hold more closely to the protocol experiences (Margenau 1966, pp. 26-31).

Know-how is the task of the professional engineer. He is interested in the know-why to the extent that it helps in the development of products and processes, no more than that. The commitments are to products and processes not to theories. Friedman (1952, p. 456) speaks for the professional engineer: "And the only relevant test of an hypothesis [or theory] is comparison of its prediction with what occurs". This really sounds like the talk of a professional economist who works, for instance, in the strategic unit of a large corporation, and who may consistently put aside the macrotheories when, as it happens, mechanical forecasting procedures work as well as, or as poorly as, economically founded ones².

The physicist is the exact opposite of the professional engineer. The physicist's interest in the know-how goes only to the extent of its help in the development of the know-why, no further. The physicist's commitment is to theory, not products and processes. His commitment is to the improvement and reconstruction of theories, and he follows Ockham's Razor, Ockham's requirements for structure and form of theories: logical consistency, logical fertility, multiple connection, simplicity, elegance, etc. The physicist's language is logic, and the ability the esprit geometrique. It is knowledge for knowledge's sake. Debreu (1984, p. 46) speaks for the physicists:

Yet a scientist knows that his motivations are often weakly related to the distant consequences of his work. The logic rigor, the generality, and the simplicity of his theories satisfy deep personal intellectual needs, and he frequently seeks them for their own sake.

The importance of the physicist's problem -- what aspects of reality to look at -- is dictated by the development of theory, not by social relevance (Kuhn 1971, pp. 36, 164). What needs emphasis here is the fact that the engineer scientist, the applied physicist, chooses in accordance with the social importance of the problem. He may be viewed as the middleman who translates know-why into know-how, and vice versa. His community is divided in its commitment. The more theoretically oriented work from the know-why downwards, while their more pragmatic colleagues work from the know-how upwards -- I doubt that anything can be said objectively about which is more important, and much of the conflict here may be assigned to internal paradigmatic dissent, or to disguised self-interest, politicking, etc.

Simon's option for satisficing reflects his position on the indispensability of the know-how, one case of the engineering or applied scientist (Simon 1979, p. 289):

But the important thing about the search and satisficing theory is that it showed how choice could actually be made with reasonable amounts of calculation, and using very incomplete information, without the need of performing the impossible -- of carrying out this optimizing procedure.

Kuznets was a genuine applied scientist in his commitment to the realism which allows applicability -- Ohlin on Kuznets (1972, p. 299):

Kuznets, of course, makes use of models which demonstrate the connections between strategic elements in the economic system, but he shows a very limited sympathy for abstract and generalizing models... He chooses and defines concepts which correspond as closely as possible to what can be observed... Within the framework of these models, regard is also paid to institutional and non-economic factors -- for example changes in

population growth, in technology, in industrial structure and in market forms.

Paying attention to the structural, sociological, and psychological dimensions of the phenomenon is an institutionalist approach, another case of the applied scientist. And this may be well understood by the abstract scientist (Knight 1960, p. 111):

Now to say a little more about the unrealism of pure economic theory... All the sciences of man and society are involved if one presses the question [of social action, public choice, policy decision] further and further back -- particularly history, and possibly even more specially, ethics.

The applied scientist's ability is the *esprit de finesse*. The language cannot be restricted to logic, because "all the sciences of man and society are involved if one" is restrained within the realism imposed by the required applicability. If within each science, even in physics, the theories are mutually inconsistent, despite the internal consistencies, no one can expect or prescribe interdisciplinary logical consistency.

The language cannot be restricted to logic, because the theoretical entities must be tied closely to their real counterparts, and because "the world has an uncomfortable way of not permitting itself to be fitted into clean classifications" (March and Simon 1959, p. 1). Logic requires clean classifications, *tertium non datur*, the is or is not of the principle of contradiction. The applied scientist's language is dialectic, dialectic in the limited sense of reasoning without disregard to the vagueness with which reality presents itself, dialectic in the limited sense which was established in economics by Georgescu-Roegen (1967, pp. 17-30) -- one may perhaps be surprised by the fact that Quantum Physics also demands a "quantum logic", which would ideally contain classic logic as limiting case (Heisenberg 1963, pp. 145-60).

Intellectually unsatisfactory as it may be judged, dialectic is the way of "assembling" distinct constructs, or mutually inconsistent but internally consistent theories. Engineers practice it all the time, the professionals using disconnected applied theories as they are available, applied theories developed by engineering scientists who may keep half an eye, if that, on the aspiration for scientific unity, but are prepared to use all sorts of "safety coefficients" and "approximations" in the maintenance of their first commitment to applicability. Professional engineers differ still in their due regard for the specificities of the reality or case in question, the product or process they are working with. The specificities account for the individuality of the case and, as such, they are obviously omitted from applied theories, not to say of the abstract ones. The applied scientist aims at, say, "ordered and tested knowledge", and all the better when it can be cast into the Ockhamian mold (Kuznets 1961, p. 119):

In the social sciences field, in particular, the foremost aim of ordered [and tested] knowledge is to enrich the direct experience of current generations with those of the past, and to widen the horizon of experience of a given nation by the experience of others.

If one takes the simple example of the design of a plane or its engine, the division of labor in the field of inert matter is clear. For the physicist, whether theoretical or experimental, it is an unthinkable task: he would lack a scientific sense and charlatanism would be suspected because he does not understand the task -- furthermore he has no way of pretending knowledge

either. Obviously, he would need the know-how, and that is not to be found in the know-why. The professors of aerodynamics, heat engines etc., do participate, but as consultants and in more sophisticated projects. No one would question that this is the job of the professional engineer.

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For physics and engineering, for biology and medicine, for economics and management: to a large extent the analogy holds good, but two major limitations should be discussed. A first one lies in the increasing complexity or dialectic nature of these large fields of knowledge. The division of labor gets correspondingly smaller and less clear, as one moves from inert matter to life, from life to society. In relative terms, there are more economists than physicists in the professional as opposed to the academic world; and there are more economic sub-fields and schools in the applied level, such as economic development, monetary economics, some of the neo-Austrian works, most of institutionalism etc. Thus one must say that the analogy holds good in terms of abstract economics versus management as well as applied economics.

The second limitation of the analogy resides on the non-experimental nature of economics and other social sciences. Positive is said to refer to **what is**, normative to **what ought to be** (Neville Keynes 1904, pp. 31-6) or, more appropriately, **what ought not to be** -- to maintain ought is to fall into pure technocracy, technocracy as the modern version of theocracy when science replaces religion in undemocratic governments. It is possible to talk about **positive** and **normative** physics, but positive and normative engineering sciences make more sense, because normative clearly connotes directions for dealing with reality, not with laboratory, a molded stylized reality.

Physicists feel free to move away from reality because the experimental physicist can, and to a significant extent does, construct **idealized realities** in laboratory experiments: vacuum, perfect gas and so on. Abstract theoretical economists do not feel the same freedom because experimental economists, econometricians and the like, but also economic historians, cannot, to the same extent, do the equivalent: create economic man, perfect competition and so on. To play down the difference with the "exceptions" in physics will not do. It is a childish but very frequent play: it just takes advantage of the fact that "classifications are not clean". It is like saying that five or forty is the limit of the voting age, based on the premise that no-one can go over to the dialectic interval of, say, fifteen/twenty-one and prove the correctness of eighteen.

Ethical barriers stand in the way of constructing **idealized economic realities**, but other impossibilities are also obvious. Economists have no alternative but to look at society as it is, or as it was, and take into account its changing nature, including the change derived from the accumulation of knowledge itself -- which, ironically, reduces its value and that of history. A thorough look may require knowledge of all the other social sciences. This is one attraction of applied economics, where more elements of the phenomenon (reality) are represented, thus permitting a less distorted view. But abstract theoretical economists also work with the opposite motivation, that of improving their theories -- "improving" in Ockham's sense --, whatever their school of thought. This leads to the reduction in the number of axioms -- basic constructs carrying fewer and fewer elements of reality --, and a parallel increase in deductive chains, or sequences of theorems (Margenau 1966, p. 36).

Normative economics, if it is understood as normative abstract economics and includes the connotation that its practitioners are apt to tell what ought not

be done in reality, has a flavor of charlatanism and of a lack of scientific sense. And I really mean "flavor" because of the limitations of the analogy already discussed -- in general, abstract economists know more about reality than physicists. If they also have the "intuition and the wide knowledge of facts" (Keynes 1951, p. 158), they are constantly aware of many reserves and qualifications: if relevant and similarly interpreted normative propositions of sociology and other partial social sciences do not conflict with an economic proposition -- not to say with conflicting economic propositions; if efficiency can be taken as the decisive factor in the matter; if omitting the irreversibility of time here but not there is an acceptable simplification -- see Hicks (1976, p. 140) on Keynes --; and so on.

Normative economics, if it is understood as normative applied economics, conveys the usual meaning of the expression, and it is safer to practise because many of those reserves and qualifications form integral part of the theories, they are already dialectically in-built. Let me take a testimony by Hicks (1976, pp. 139, 143, 145-6):

The two progenitors of the Austrian school were Menger and Bohm-Bawerk... What was it in Bohm that so annoyed Menger? I believe it is simply that in Menger time is uni-directional. Menger's theory [the beginnings of a theory] is an economics in time... the [Wicksell's version of Bohm's] theory became no more than a theory of stationary state... out of time... I also mean that it [Stationary State economics] has encouraged economists to waste their time upon constructions that are often of great intellectual complexity but which are so much out of time, and out of history, as to be practically futile and indeed misleading... It is clear that his [L. Lachman] view of me is like Menger's view of Bohm-Bawerk... His ideal economics is not so far away from my own ideal economics; but I regard it as a target set up in heaven. We cannot hope to reach it, we must just get as near to it as we can...

A hint at the "ideal economics" may be found elsewhere, "by generalization, by constructing 'more general' theories, theories which put more things into their places, even if we can do less with them when we put them there" (Hicks 1980, p. 209). It is "in heaven", certainly, Hicks should have been ultimately hinting at the dream of science, "to explain all phenomena, those of economics as well as those of physics and chemistry, in terms of an all-embracing theory in which all constructs are logically related" (Margenau 1966, p. 32) -- this dream is a subtle motivation, however, and it plays its role even for those scholars who call it "illusion" (Heer 1969, p. 211) or "creed of unified science" (Georgescu-Roegen 1967, p. 61). "In earth", here and now, are the applied sciences and dialectic.

Now, whatever the current gulf which separates dynamic from evolutionary theories (the irreversibility of time is one element here), the hope is that it may be bridged in the future, and the history of science does not authorize mere opinions like "the waste of their time..."; more forcefully, the history of science does not authorize unfounded generalizations like Buchanan's condemnation of mathematical economists, as quoted above. It is up to the applied economic scientists, as it is up to the engineering scientists, to derive applied models and the consequent normative implications. Adam Smith was confirmed on the progressive division of labor after all. Abstract and applied economics are complementary; imbalances may occur here or there, a real difficult problem whose "out of time" and out of space solution would be unequally "misleading".

"Practically futile and indeed misleading...": in the terms here developed, it is so because, as it happens, normative propositions have been erroneously or

unduly derived from abstract constructions, which in this particular case omit the irreversibility of time. Senior (1938, p. 3) has been forgotten:

But his [Political Economist] conclusions, whatever be their generality and their truth, do not authorize him in adding a single syllable of advice... The business of a Political Economist is... to state general principles, which is fatal to neglect, but neither advisable, nor perhaps practicable, to use as the sole, or even the principle, guides in the actual conduct of affairs... To decide in each case how far those conclusions are to be acted upon, belongs to the art of government, an art to which Political Economy is only one of many subservient Sciences.

It is something to say for economics, and abstract economics in particular, that its first master of the theoretical-deductive model (Schumpeter 1986, p. 484) starts his work by stating its principle limitation. And this limitation is nothing short of an indetermination, one worth calling **The Indetermination of Senior**. Senior's "Political Economist" is here updated, "abstract economist" is the idea. "Single piece of advice" is also updated, and in "normative conclusions" there is an added generalization. Senior's dichotomy is equally changed into the trichotomy of abstract economics, applied economics and art of economics. The latter conveniently stands for the art of social sciences, but the term additionally characterizes the phenomenological domain.

Applied economics also conveniently stands for applied social sciences. The idea is better expressed by Mill (1877, pp. 152) in a footnote, "each art presupposes, not one science, but science in general; or, at least, many distinct sciences". To the extent that applied economics models each economic problem under rays of light from the relevant distinct and mutually contradictory abstract social theories, not to say of the distinct economic theories, applied economics does not exhibit the Indetermination of Senior. But then applied economics is first and foremost positive economics, a positive intermediate science; and its normative conclusions should be qualified not only, and not obviously, because of value judgments, but because of the nature of scientific knowledge: the most important and dominant features of the reality may happen to lie in its time-space individuality, in the specificities. Mill (1877, p. 155) again:

No one who attempts to lay down propositions for the guidance of mankind, however perfect his scientific acquirements, can dispense with a practical knowledge of the actual modes in which the affairs of the world are carried on, and an extensive personal experience of the actual ideas, feelings, and intellectual and moral tendencies of his own country and of his own age.

An alternative understanding is to view normative propositions more in the realm of specialization of professional economists, those directly involved with the "practical knowledge", those who know from direct experience -- this knowledge can be transmitted, but time, costs and noises of transmission are very high in comparison with the case of applied sciences, and particularly with abstract sciences. The analogy with medical doctors, general practitioners in particular, says it well: "there are no diseases, there are patients", i.e. the specificities of the patient (the case) may be more important in the determination of the treatment (normative conclusions from medicine or applied biology) than the general features of the disease³. As one moves from inert matter to life, from life to society, the increasing complexity of the phenomenon means ascendant individuality. So, the indetermination of Senior, which by all reasons but precedence should be called the Indetermination of Mill, is here updated in the following terms:

The propositions of abstract economics, whatever be their generality and their truth, do not authorize normative conclusions. The latter, namely what ought not to be done, is derivable from applied economics. The derivation is to be qualified by the specificities of the case.

3 - THE RICARDIAN VICE

The Ricardian Vice is the habit of extracting normative conclusions from abstract economics. Analyses which do not take into account crucial elements of the phenomenon, are conducted and applied as if they did. The Vice was described and named by Schumpeter (1986, pp. 540, 1171):

They [Senior, Mill and others] merely meant that questions of economic policies always involve so many noneconomic elements that they should not be dealt with on the basis of purely economic considerations... one could only wish that the economists of that (or any) period had never forgotten this piece of wisdom -- had never been guilty of the Ricardian Vice. The Ricardian Vice, namely, the habit of piling a heavy load of practical conclusions upon a tenuous groundwork, which was unequal to it yet seemed in its simplicity not only attractive but also convincing.

On the whole, this piece of wisdom was forgotten by mainstream economists. The Friedmanian trichotomy is positive economics, normative economics and art of economics. Friedman (1953, pp. 3-7) omits the existence of other sciences! Mill is wrong, the art of economics presupposes just economics (this seems to be Friedman's way of updating Mill's principle, **each art presupposes, not one science, but many distinct sciences**): "The conclusions of positive economics seem to be, and are, immediately relevant to important normative problems, to questions of what ought to be done and how any given goal can be attained" (emphasis added; *ibid.*, p. 4). The art of physics presupposes just physics: professional engineers may ignore the chemical properties of the elements; iron, aluminum, hydrogen, oxygen, plutonium and gold, all elements are everywhere perfect substitutes... It is the legitimization of the Vice.

Vice is virtue: the F-Twist. Friedman (1953, p. 14): "the more significant the theory, the more unrealistic the assumptions (in the sense of inaccurate descriptive representation of reality)". Samuelson (1963, p. 233) did not entirely forget: "the basic F-twist, which is fundamentally wrong in thinking that unrealism in the sense of factual inaccuracy even to a tolerate degree of approximation is anything but a demerit for a theory". Virtue is vice: "Edward Mason, Fritz Machlup, and Milton Friedman have placed it [Behavioral Theory of the Firm] outside the Pale..." (Simon 1979, pp. 276-7). Most mainstream economists talk about actual unemployment problems based on conclusions of the work-leisure scheme, of the abstract labor supply function; it takes just the reading of an applied classic, *Organizations* (March and Simon 1959), to avoid this Ricardian Vice, and to see how economics and other social sciences are "subservient Sciences" (Senior), i.e. to see how they inform the construction of March' and Simon's inducements-contribution scheme. (To say that the work-leisure scheme is a dialectical limiting case of the latter is to convey, unconventionally but appropriately, the general pattern of the relation between abstract and applied models.)

Institutionalists did not forget the substance of the piece of wisdom, of the Indetermination of Senior. Quite the contrary, it is perhaps the sole shared basic view: institutionalists "[at best] share a conviction that economic theory must be reformulated to take account of the social and legal structures amidst which market transactions are carried out" (Simon 1979, p. 283). On the whole, however, they question the validity and usefulness of abstract theories, they fail to accept the complementarity of abstract and applied

economics. And it seems that, on the whole, institutionalists even refuse to see themselves as applied economists, and this happens as much as mainstream economists refuse the abstract "indictment"! I am in no condition to assert, however, how far institutionalists are addicted to the reverse of the Ricardian Vice, say, the Empiricist Vice. As it happens, Schumpeter (1986, p. 804) does not forget to register both vices:

On the whole, however, the economists responsible for the reports that fill those volumes of the *Sriften*, cared little for analytic refinement. They took no end of trouble with their facts, but most of them went straight from their impressions of the factual pattern to recommendations, just as would have any nonprofessional worker. They neither use nor contributed to theoretical or statistical technique, in spite of their obvious opportunities for doing so. And the analytical apparatus of economics did not improve but even deteriorated in their hands.

Schumpeter's monumental *History of Economic Analysis*, a classic in its kind, is also a classic in the applied economics kind, applied economics in the sense here developed, say, *a la* Mill. Schumpeter does not forget the Ricardian Vice in his own work. I repeatedly and randomly opened the classic, but it did not take many trials to find my mark in a remarkable passage (*ibid.*, pp. 988-9):

The essential result of Barone's or any similar investigation is that there exists for any centrally controlled socialism a system of equations that posses a uniquely determined set of solutions... this means that so far as its pure logic is concerned the socialist plan makes sense and cannot... (emphasis added.) We must not forget that, just like the pure theory of competitive economy, the pure theory of socialism moves on a very high level of abstraction and proves much less for the 'workability' of the system than laymen (and sometimes theorists also) think.

Schumpeter's language is dialectic, say, dialectic *a la* Georgescu-Roegen. Repeating my "experiment", I succeeded again, and found a succinct justification of his periodization of history, and of his 1870-1914 period (*ibid.*, p. 753). It is dialectic at its best. Using logic, the abstract economist would be at a loss with the number of "exceptions", the number of authors or works which do no conform with any criterion of periodization; commitment to logic would thus mean to declare the intractability of the periodization problem, or "to omit" the exceptions... Finally, a touch on the Schumpeterian elegance. As a scientific body matures, its theoretical skeleton grows and undergoes qualitative moves to higher layers of abstraction (Georgescu-Roegen 1967, pp. 3-8). It is interesting to note that as Schumpeter moves along the historical development of economic analysis, and from its origins reaches general equilibrium, his methodological reserves and qualifications consistently increase as the abstraction ascends.

4 - EXEMPLIFICATION

The works of the chief protagonists of the Public Choice "Sedition" display, nowadays, the most extreme addiction to the Ricardian Vice. This was shown elsewhere (Silveira 1990); but here let me take the popular political campaigns for constitutional reforms in the U.S.A., the rule proposals that they take as immediate normative conclusions of the abstract theory of Public Choice; for instance, the monetary base should increase by a fixed annual rate (note that the rule also presupposes monetary economics). March (1978, p. 603) deals with the rigidity of measures of performance where ambiguity is inherent in objectives, values or tastes. My first applied economic comment on

constitutional rule proposals requires very few adaptations and paraphrasings of his problem, and it was originally directed against the disruptive role of the International Monetary Fund in the current international debt crisis.

The complexity of the economic phenomenon ought to be emphasized -- Hayek's (1975, pp. 251-2) elaboration on its **essential organized complexity** provides a good context here. Given the inherent complexity, the more rules of performance there are, (a) the greater is the tendency to concentrate efforts on irrelevant ways of abiding by them, and (b) the greater also is the number of perverse ways, when the rulers do not care for the relevant aspects of the phenomenon which were not contemplated by the rules. So, (c) there exist a tradeoff between these negative effects, and the positive enlargement of controls over the rulers. This **optimal clarity problem**, as March calls it, suggests caution on rule proposals.

My second comment is closely related to this. The more complex the phenomenon is, the greater is the possibility of alternative and equally plausible ways of its being explained (Morgenstern 1963, p. 25). So, a correlation exists between the increasing number of theories, or schools of thought, and the growing complexity of the phenomenon, from physics (Heisenberg 1963) to psychology (Loevinger 1987), passing midway through economics. A mature approach to the differences among current schools in the macrofield was recently taken by Dow (1985); the reverse seems to predominate in all disciplines, and not least among physicists. Given this situation, from what school should rules be taken? Again, this suggests caution on rule proposals, particularly if a Constitution is involved.

Let me, however, for the sake of exemplification, assume that the other social sciences are not relevant in the monetary facet of the monetary rule (after all, it is an 'applied economic field'), and that monetarists are correct: the monetary base is exogenous, the money supply is determined by the standard money multiplier (Silveira 1974b); the demand for money is stable, but for reasonably predictable shifts in response to changes in financial institutions (Silveira 1973). There follows a positive conclusion: a fixed five percent annual increase of the base would in fact mean a progressive relaxation, or a rising effective rate, if the diversity of financial products and institutions expands, as it has happened in the last two decades. Even in this idealized reality, the monetary rule cannot be so simple.

Let me reduce the degree of idealization. Take the money multiplier; it is difficult to think about a simple applied economic model closer to reality (and more widespread used). Despite that, it ignores the bankers' requirement for compensating balances. One may account for the latter by introducing a bankers' behavioral equation, and by defining the extra balances which the public must hold; the extra balances distinguish the effective money supply from the observed or measured balance. Let the base increase by the fixed "constitutional" rate; increasing the requirement, bankers contract the effective money supply, while the measured balance expands, and *vice versa* (Silveira 1974). In other words, bankers are able to "fine-tune" the constitution! Let me now consider a positive conclusion of applied economics (Kuznets 1972, p. 319):

Economic growth perforce brings about a decline in the relative position of one group after another... a change not easily accepted, and, in fact, as history teaches us, often resisted. The continuous disturbance of pre-existing relative position of the several economic groups is pregnant with conflict -- despite the rises in absolute income or product common to all groups. In some cases, these conflicts did break out into overt civil war, the Civil War in the United States being a conspicuous

example... The modern national state plays a crucial role in peacefully resolving such growth-induced conflicts... [which] may be described as a process of controlled revolution.

I connected this to the behavioral theory of the firm, in particular to Simon's administrative man, and I also discussed the different intensities of pressure over the Monetary Authorities which result from different rapidities of structural transformation of the economy (Silveira 1984; 1987). The rule proposals ignore this applied conclusion. The fixed "constitutional" rate is pro-cyclical: it is more restrictive when the structural transformation speeds up and the consequent redistributive conflict rises, and vice versa. The importance of the matter is such that further comments are unnecessary. The rule proposals are usually out of time, because out of time are the positive constructions which inform them.

A Knightian touch is in order: should more laws be enacted with the aim of regulating the behavior of "the law-breaker of the universe" (Knight 1960, p. 53)? If reasonably substantiated observations of the erosion of moral codes exist and are evoked to justify replacement by constitutional rules, it is necessary to look still further into the degree of substitutability between them. Joan Robinson (1983, p. 11) maintains the survival of the species as the ultimate reason for moral codes, but denies efficiency in the replacement, "honesty is much cheaper". These are examples of immediate questions which may occur to any economist who is not addicted to the Ricardian Vice. Certainly, similar applied questions are raised by many who favor rules. A serious question of fact is raised by Meltzer (1987, p. 1), "The thesis I will present is that forecasts of main economic aggregates are so inaccurate -- so wide of the mark on average -- that discretionary policies based on forecasts are unlikely to stabilize the economy". Incidentally, Meltzer neither presupposes Public Choice nor suggests the constitutional layer for his more elaborated version of the monetary rule.

The causes of the addiction are not specifically addressed to by Schumpeter, who just indicates lack of knowledge -- historical sense, philosophy and sociology --, and suggests that the attention of economists was deviated, since Cairnes, Sidgwick and Weber, from the piece of wisdom to the avoidance of value judgments (Schumpeter 1986, pp. 471-3, 540-1). Hayek (1973; 1975; 1978; 1981) does not discuss the Vice, but my reading of his work leads me to interpret him as disavowing any normative conclusions whatsoever, they all involve no more than "Pretence of Knowledge"; this is going too far, as is evidenced by the normative conclusions that Hayek himself derives from his evolutionary theory. Going instead to the root of the matter, ascendant specialization emerges as the first cause of the Vice.

The second one, which may be called the urge to participate, is in Schumpeter (1949, p. 346) also, but in his Presidential Address: "most of us, not content with their scientific task, yield to the call of public duty and to their desire to serve the country and their age". Together the two factors account for a good part of the phenomenon, but one must remember that scientists are not "economic eunuchs", as Buchanan would put it. Human beings are mixed in action, the selfish interest plays a role even here: status, prestige and income, and research funds as well, particularly for the maintenance of the massive manpower which the development of knowledge demands, whatever the level of abstraction and the school of thought. So, interested behavior is the third cause.

A further exemplification of abstract and applied approaches is evident here. "Mixed behavior" may be understood in terms of Freud's structural model: superego (rule-following behavior, the pure sociological man is enclosed

here), ego (purpose-seeking behavior, the economic man here), and id (spontaneous behavior). To say that human beings are mixed in action is to say that actual behavior usually involves the three dimensions of the personality. In this perspective, the economic man is clearly in a higher sphere of abstraction than the "psychological man", since the latter encompasses other observable dimensions of human behavior; the economic man is a simplified version of Freud's ego and, as such, is a limiting case which tends to predominate in specifiable phenomenological domains, as business. Freud calls attention to unconscious determinants of behavior, and so the fourth and perhaps the most important cause of the Vice becomes evident, namely the scientific blindness (Kuhn 1971, pp. 37, 61).

Let me conclude with another example of the distinction between abstract and applied treatments of a problem, namely a brief sketch of an abstract alternative to the applied approach developed here. Matters may be really simplified. The Indetermination of Senior may be restricted to its first part, "the propositions of abstract economics, whatever be their generality and their truth, do not authorize normative conclusions". Abstract economists knows nothing about reality (a first approximation, a clean classification, no vagueness, no "loose talking"...). Human beings are economic men everywhere, including in sciences; Ockam's requirements (generality, logical consistency) dictate this. So, one may as well forget about Ricardian Vice and go straight to the point, calling the latter by its name, charlatanism. And charlatanism proliferates because the stakes are high and the cost of being caught low (low because the complexity of the phenomenon allows many intelligent ways of pretending knowledge). No doubt, even the most blinkered abstract economist will prefer the applied approach here. Senior and Mill are certainly right...

CONCLUSION

The art of economics presupposes attention to the specificities which characterize the time-space individuality of the phenomenon; in principle, or by definition, specificities are outside the scope of both abstract and applied theories. The art of economics also presupposes an applied theory which dialectically connects all abstract theories which are relevant to the understanding of the phenomenon. Applied theories are positive branches of knowledge which authorize normative conclusions when suitable attention is given to specificities. Abstract theories do not authorize normative conclusions. This formulation was called the Indetermination of Senior.

This formulation updates Senior and Mill and is consistent with, among others, Schumpeter and Knight. It carries the vision of a general pattern of division of labor in learning or knowledge: abstract science, applied science and art of science are three distinct spheres of knowledge, whether the field of inert matter, or life, or society is in question. The dialectic boundary-lines among spheres and fields evolve as knowledge increases, and may collapse (or emerge) here and there; nowadays, a unified science is "in heaven". There may still exist phenomena which are not illuminated by abstract or applied sciences, and where empiricism prevails; there may still exist phenomena which are illuminated solely by applied sciences, because the sphere of higher abstraction (the pure logic of the phenomenon) is not yet developed; nowadays, cases like these do not seem to exist in the field of economics.

The growth of knowledge means progressive division of labor or ascendant specialization across all fields and spheres of abstraction. The non-experimental nature of economics means conflicting demands over abstract economists, hinders specialization, and feeds the paradigmatic conflict between abstract and applied views. The growing complexity of the phenomenon as one moves from inert matter to society contributes to the above effects.

Debreu exemplifies the abstract economist as typically as Kuznets exemplifies the applied one. Schumpeter and Knight move easily and consciously in both levels, and the former crosses over social sciences frontiers. These frontiers lose sense in the case of Simon, but his insistence on the importance of the know-how shows a predominance of the applied bent.

Institutionalism fits perfectly into the concept of applied economics as developed here. The Indetermination of Senior may perhaps correspond to the most widespread shared basic conviction of institutionalists, if suitable allowance is made for the paradigmatic conflict between basic and applied views. A reconciliation of this statement with what institutionalists say and do was not conducted here, but some differences were discussed; the danger of empiricism was mentioned. On the whole, abstract mainstream economists are addicted to the Ricardian Vice, which is how Schumpeter calls the habit of ignoring the Indetermination of Senior, the habit of conducting and applying abstract analyses as if all crucial elements of reality were being illuminated.

Constitutional rule proposals which ignore the multiplicity of schools of economic thought, or the limited substitutability between moral and legal precepts, or the perverse effects of rules on behavior are examples of addiction to the Vice; in the case of the monetary rule, monetarist proposals which additionally ignore the level of structural transformation of the economy, or the changing character of the financial institution, or the bankers' requirement for compensating balances are more specific examples of the same fault. Four causes of the Vice were pointed: ascendant specialization, urge to participate, interested behavior and scientific blindness.

FOOTNOTES

(1) This paper completes a trilogy which was developed from an unpublished monograph, "The Public Choice Sedition: Variations on a Theme by Buchanan", written during the academic year 1988-9, when I was on leave at the University of Cambridge. This paper is entirely freed from that context, but it incorporates without special reference some of the conclusions and a few quotations from my two previous papers (Silveira 1989; 1990). The 1990 paper somewhat overlaps with this paper, but the aim there is to dissociate Frank Knight from a legitimizing role in the Public Choice Sedition and to show his affinity with the institutionalists; one may find there a list of my previous works on the Indetermination of Senior, written in Portuguese and before my acquaintance with the literature on the theme.

(2) I went back to the first version the famous paper (Friedman 1953). There is some teasing here, but also an attempt to convey the idea that the classification of an author as positivist, realist, instrumentalist and the like, must be linked with the level of abstraction of his theoretical work. And this is a criticism of most of Friedman's critics.

(3) I am much in debt to my father, Dr. Jose Maria da Silveira Jr. (27-11-1908/02-10-1988), Medical Practitioner, not only for long discussions here, but for the example of his daily professional practice. He strictly followed this well known ethical precept of his vocation.

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