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Evolution and the Production of Rules—Some Preliminary Remarks

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Abstract

The notion of an evolutionary process was not "imported" from biology into social theory. The idea of spontaneous processes producing an unintended outcome was commonplace in the social sciences long before Darwin (Scottish Enlightenment).

At whatever level an evolutionary perspective may be applied, it always presumes the operation of three mechanisms: (a) a mutation mechanism, i.e., a process by which constantly variation and novelty are introduced—in Popper's terms: new tentative solutions—(b) a selection mechanism, i.e a process of systematic selection among the variants—in Popper's terms: a process of error-elimination—(c) a replication mechanism, i. e., a process by which variants or tentative solutions are preserved, reproduced or propagated.

Although both economists and biologists resort to equilibrium explanations—because a full and detailed specification of all causal forces cannot be given—the analogy between natural selection in biology and evolutionary processes in human societies is not that close.

The selection mechanism that is operating in cultural evolution works directly on the behaviour pattern itself, i.e., on the rules that govern behaviour, without necessarily wiping out unfit carriers. Moreover, cultural evolution—which is a matter of trial and error learning and imitation—is very fast when compared with genetic evolution.

Hayek works out the implications that follow from an evolutionary epistemology for the issue of socio-economic-political organization. His main subject is the social dimension of the knowledge problem or the problem of social learning. This problem has two distinct aspects.

Hayek's theory of the spontaneous order of the market—which is best known for its emphasis on the capacity of markets to utilize dispersed knowledge—delivers the insight that if we want to generate in society any particular order of a certain degree of complexity, we should look for general rules of conduct which, if followed by individuals, would tend to induce that order to form spontaneously. Hayek presents an instrumental justification of a particular type of rules. Rules of just conduct exhibit certain structural characteristics—they are negative, purpose-independent, abstract, universal and permanent—but Hayek's account offers only a very general schema which has to be filled in in detail.

As they are defined by Hayek, the general rules of conduct which allow for the formation of spontaneous orders, are not necessarily self-enforcing in the technical game-theoretic sense, contrarily to a widely held view.

It is Hayek's emphasis on the theme of the interrelation between the system of rules and its systematic outcome at the level of the order of actions that qualifies him as a Law-and-Economics theorist.

Hayek's theory of cultural evolution suggests that the abstract rules which contribute to the formation of a spontaneous order are themselves an unintended product of evolutionary processes. His theory of cultural evolution becomes disputable where it seems to argue that because of our "incurable ignorance" we ought necessarily to rely largely on unquestioned traditional rules instead of attempting to choose rationally or construct the system of rules that we want to follow.

The question of how the different kinds of rules differ in their nature (rules of conduct vs organizational rules) must be distinguished from the question of how they originate (whether they "spontaneously evolve" or are "deliberately designed"). The two dimensions are conceptually distinct.

The extension of the market analogy to the constitutional level, i.e., to the rules and institutions within which market coordination takes place, is not corroborated by the game-theoretic analysis of invisible-hand processes. This analysis does not warrant the conclusion that invisible-hand processes will always operate to generate efficient results.

The game-theoretic analysis involves several simplifications however. The arguments that are based on it cannot be considered conclusive.

The most developed parts of the theory of cultural evolution are the theory of nomos, as exemplified by the evolution of the common law, and the theory of the role of the judge.

In the theory of the common law and the role of the judge the emphasis is on the coordination of individual activities through a process of systematic mutual adjustment of expectations. The function of the judge is to assure a maximal coincidence of—legitimate—expectations, i.e., to create a situation in which the chance to form correct expectations is as great as possible.

The theory suggests that the role of the judge in making law is analogous with the role of an entrepreneur launching a new product: the entrepreneur is consciously trying to make a profit, thus unintentionally contributing to the overall allocation of resources. The judges, by upholding those rules which make it more likely that expectations will match and not conflict, are consciously trying to give greater internal coherence to the law. Each is unintentionally playing a part in the formation of a spontaneous order—in one case, the body of the common law, i.e., a system of rules of conduct conducive to the efficient operation of the order of actions which rests on it, in the other, the overall allocation of resources.

The analogy is not flawless: while it seems plausible to assume that the entrepreneur, when unintentionally assisting in the overall allocation of resources, is trying to make a profit, i.e., is guided by the profit motive, it is not clear why we should assume that judges are guided by the search for greater coherence. With respect to the role of the entrepreneur, "private vices" may be supposed to coincide with "public benefits", since only those entrepreneurs who de facto achieve positive profits in one way or another and can therefore be assumed to serve the interests of consumers better, will thrive and prosper, whereas entrepreneurs who do not succeed in doing so are eliminated sooner or later. But insofar as judges are public officials, the analogy seems to be particularly weak. Judges hardly constitute a homogeneous group and their interests and motivation may be highly varied.

Insofar as judges adjudicate particular cases by means of custom and precedent, stare decisis can be said to account for the transmission or replication mechanism in the evolution of the law.

It is explicitly recognized that grown law requires correction by legislation. It seems that legislation can be required both to generate novelty—i.e., as a mutation mechanism—and to eliminate errors in past developments—i.e., as a selection mechanism.

Evolutionary analysis as such does not provide us with a satisfactory normative framework for comparative institutional analysis. Hayek's "limits of reason" argument implies that, at least to some extent, we will have to rely on the explorative potential of open-ended, competitive, evolutionary processes and on the kind of experience that accumulates in trial and error learning processes. But it should not imply that we adopt an attitude of uncritical acquiescence in evolutionary drift.

One direction in which such a framework for comparative institutional analysis has been explored recently, is provided by the research programme of Constitutional Political Economy. The basic framework is derived from the contractarian analysis of multi-level individual choice.

An alternative direction in which the evolutionary perspective may be provided with a normative benchmark consists of complementing it with a realist ethical theory. Popper has found in evolutionary theory a forceful argument for objectivism and realism. An elaboration of this theme would go beyond the scope of the domain of Law-and-Economics.

Keywords: cultural evolution, spontaneous order, constitutional economics, Hayek, law and game theory

JEL Classification: BO, KO

1. A few remarks on the history of a paradigm

1.1. Darwin and the Political Economists

The relation that economics, and particularly the development of neoclassical economics has with physics has often been discussed. The relationship economics has with biology however is perhaps as intimate and may even go deeper. Moreover this fact is no accident: it is today a well documented historical fact that there has been a lot of cross fertilization of ideas between economics and biology, especially Darwinism.

It is still a widely held view that the concept of evolution was clearly formulated and introduced into science by Darwin and that modern Darwinism transformed biology into an objective science by banishing teleology, i.e., the doctrine that a process has a purpose and is directed to an end. Darwin, it is held, was the first person to set up a scientific and pragmatic model attempting to explain the diversity of life in terms of natural history (see Cramer 1993: 85).

On the other hand the significance of Darwin as the first person to introduce into science the concept of evolution, is increasingly becoming a matter in dispute.

It is recognized that the notion of an evolutionary process was not "imported" from biology into social theory but that the idea of evolution was commonplace in the social sciences long before Darwin. The notion of socio-cultural evolution to which Hayek refers is pre-Darwinian and was discovered by the Scottish moral philosophers of the eighteenth century whom Hayek has sometimes called "Darwinians before Darwin" (Hayek 1973: 23). It was the individualistic perspective of the Scottish moral philosophers that seems to have had an impact on the shift in perspective that is essential to Darwinian evolutionary theory (Schweber 1977: 233, 277ff.): from the species as the theoretical unit to the individual organism as the central unit of analysis.

Thus, Hayek's analysis of social evolution has an eighteenth-century flavor, almost as if he is consciously avoiding making use of ideas in the Darwinian tradition. He sometimes seems to suggest that Darwin did no more than apply the social theories of the Scottish Enlightenment to the field of biology. As Sugden notes, Hayek, in his eagerness to show that Darwin's theory of natural selection has roots in the Scottish Enlightenment tradition, may be failing to recognize how much was new in that theory (Sugden 1993: 399).

It is possible that Hayek's tendency to undervalue the work of Charles Darwin should be understood in connection with his opposition to "scientism". Loosely defined the term refers to the view that the methodology of the natural sciences is the apropriate methodology for the study of social phenomena. However, Hayek's views on scientism are complex and evolved considerably during his long career. In his ((1952),1979), which contains as part One the famous "Scientism and the Study of Society" that appeared originally in Economica in the early forties, Hayek complained of the great harm that had been done by modelling the study of social phenomena after the natural sciences and traced this tendency to Saint-Simon and Comte. He criticized what he called the Objectivism, the Collectivism and the Historicism of the Scientistic Approach. He proposed the

individualist and "compositive" method for the social sciences and stressed the subjective character of the data of the social sciences. Hayek is usually considered to have taken a step in the direction of Popper's views in his foreword to the "Studies in Philosophy, Politics and Economics" (see Hayek 1967: viii). Indeed, Popper had pointed out that these "scientistic" tendencies are in fact attempts to emulate what most people mistakenly believe to be the methods of the natural sciences, rather than the actual methods of the natural sciences (Popper 1994: 140).

Thus Hayek's views might be supposed to have become more "permissive" with respect to the scientism issue. But in his (1979: 153-155) he sharply criticized "the errors of sociobiology". Indeed, in the recent literature the view that social science can achieve true scientific status only by basing itself upon the findings of biology has resurfaced in sociobiology. The protagonists of this approach propose that the study of the human social condition should be made a sub-discipline of biology. Because of this it may seem not entirely futile to recall that the evolutionary approach has its roots within the social sciences. Social scientists shouldn't have an inferiority complex vis-à-vis biologists.

They may draw upon analogies from biology, but biology is no ideal to be emulated.

S.J. Gould divulged the view that Darwin drew upon the laissez-faire system of Adam Smith to construct his theory (Gould 1990). That is why Darwin's theory is about natural selection working on individuals, on bodies: ".. the only thing happening out there is that individual organisms are struggling for personal reproductive success." (Gould 1990: 21) Thus Darwin's theory was essentially Adam Smith's economics read into nature.

In our own time Dawkins (1976) popularized the gene's-eye view of Darwinism: he argues that the unit of selection is not the individual organism, but the "selfish" gene. Individual organisms are conceptualized in terms of "vehicles" or "hosts" (see also Dawkins 1995: 62), of "survival machines" programmed by genes to serve their ends. Several issues are involved in the units of selection controversy, but some preliminary clarification can be gained from Sober's (1984: 100) distinction between "selection for" and "selection of". There are two distinct concepts of selection: there is selection of objects and there is selection for properties. "Selection for" refers to causes of natural selection. It refers to phenotypic differences between organisms that determine their relative reproductive success. "Selection of" refers to effects of natural selection. The logical point to be kept in mind is the following: "selection of" does not imply "selection for". Both "orthodox" Darwinians and Dawkins can agree that the effects of natural selection pertain to gene frequencies in the gene pools of populations, while it is phenotypic traits of organisms that are "selected for".

However, a closer look at the literature reveals that commentators disagree as to what exactly the nature of the relationship between Darwin and the Political Economists is.

Depew and Weber have recently argued for three influences of economics on Darwin: the discourse of political economy enabled Darwin to challenge the then dominant evolutionary theories by transferring causality from internal transformational drives to external environmental forces; it helped him challenge Lyell's essentialism by bringing the individualist ontology of political economy into biology; finally models of economic

diversification enabled him to explain the diversity of living things in both space and time (Depew and Weber 1995: Ch. 5).

Scott Gordon believes that Darwin found the clue he needed in Malthus's "Essay on Population", especially in the single sentence which said that "population, when unchecked, increases in a geometrical ratio" (Gordon 1991: 505).

But Stephen Kresge recalls "that Darwin believed that the adaptation demonstrated by the diversity of ericaceous shrubs in the sparse habitat of the moors could refute Malthus's dire predictions of populations expanding beyond their means of survival. Malthus had arrived at his dismal forecast of fecundity inevitably exceeding productivity through brooding at length on the fate of Ireland. Ricardo followed Malthus in accepting as the context for their discussion of economic theory an economy, conceptually much like an island, in which only the division of income can be in any way determined", thus Kresge (Kresge and Wenar 1994: 31). But economic theory, Kresge tells us, neglected Darwin's response to Malthus and followed Ricardo's.

Gordon also believes the natural economy may be viewed as a zero-sum game. If some members of the group get more, others must necessarily get less (Gordon 1991: 508). It is not clear to us whether this was also Darwin's view. Anyway the human economy is a positive-sum game. Competition contributes to productive efficiency, increasing the sum of the game.

This last point suggests that the analogy between natural selection in biology and evolutionary processes in human societies may be not that close. On closer inspection, it is apparent that the differences are quite remarkable. Thus Popper writes with respect to the growth of scientific knowledge:

> "Thus, while animal knowledge and pre-scientific knowledge grow mainly through the elimination of those holding the unfit hypotheses, scientific criticism often makes our theories perish in our stead, eliminating our mistaken beliefs before such beliefs lead to our own elimination." (Popper 1972: 261)

Likewise, the selection mechanism that is operating in cultural evolution works directly on the behaviour pattern itself, i.e., on the rules that govern behaviour, without necessarily wiping out unfit carriers (Wärneryd 1990: 87). Thus one of the points at which Hayek departed from Darwinian theory—besides his appeal to group selection (Kresge 1994: 33)—concerns the fact that he seems to argue that in cultural selection rules are both what are selected for and what are selected (Vromen 1995: 167). It is rules that are taken to be decisive for the success or failure of individuals and groups. Moreover, cultural evolution—which is a matter of learning and imitation—is very fast when compared with genetic evolution. One of the characteristics of the human species is the great extent to which our behavioural repertoires are a matter of individual learning, instead of being genetically hard-wired (Vanberg 1994: 98). Through social learning, we learn not only from our own experience, we can benefit also from the experiences of others, a fact that tends further to speed up the process of adaptive learning (Vanberg 1994: 98).

1.2. The spontaneous order tradition in the social sciences

There is no need to resolve here any dispute over the influence of the Political Economists on Darwin. We may state with reasonable confidence that the idea of spontaneous processes producing an unintended social outcome can be traced back at least to the work of the eighteenth-century Scottish thinkers David Hume, Adam Ferguson, and Adam Smith.

Carl Menger has to be credited for having systematically restated—about one century later—the "general theory of the formation of law, morals, money, and the market" which was the great contribution of what Hayek (Hayek 1978: 265n) refers to as the "Mandeville-Hume-Smith-Ferguson" tradition. Particularly well-known is Menger's distinction between two ways in which institutions may come into existence. Some are "the result of a common will directed toward their establishment (agreement, positive legislation, etc.), while others are the unintended result of human efforts aimed at attaining essentially individual goals" (cited by Vanberg 1994: 146). The first are, in Menger's terminology, institutions of "pragmatic" origin and the second, institutions of "organic" origin.

The most important twentieth-century representative of this tradition is without any doubt the Austrian economist and philosopher F.A. Hayek himself. Hayek tends to associate spontaneous processes not only with absence of intentionality concerning the social outcome, but also with particular institutions such as the common law and markets, that have supposedly beneficial social results. Hayek at least seems to be appraising the spontaneous market order and the common law in terms of a criterion of general welfare (Sugden 1993: 410). The "absence of intentionality"-criterion has not caused much debate (Rutherford 1994: 83).

But the supposedly beneficial character of spontaneously grown institutions, and thus their adaptiveness or "efficiency" is certainly a matter in dispute. The controversial character of such claims is one of the points we intend to highlight in this paper. A social institution may be said to result from individual human actions, although the individual actions at issue were not motivated by the desire to produce the social institution. But the fact that a pattern of a certain complexity is an unintended consequence of individual actions need not entail that such a pattern has a social "functionality" or that it promotes "the common welfare" or "the general good".

The question of how institutions originate—"organically" or "pragmatically"—and the question of whether they serve "the common welfare" or "the general welfare" or "the general good" or not, are two seperate questions to which any combination of answers is, in principle, possible. As Vanberg points out, this simple truth, though clearly implied by Menger's discussion (Vanberg 1994: 147), has not always found sufficient explicit recognition within the Smith-Menger-Hayek tradition. Deliberately-created institutions may or may not "advance the general welfare of society", and the same is true for unintentionally grown institutions. The question of their social "functionality" has, for both of them, to be assessed separately from the question of their origin (see also Rutherford 1994: Ch. 5).

2. Hayek's research programme: from epistemology to Law-and-Economics

The evolutionary perspective is not restricted to the disciplines of biology and economics. It has been applied to a wide range of subject matters.

The field outside biology in which a Darwinian approach has been applied most persistently and successfully in recent times is without any doubt epistemology: a generalized Darwinian evolutionary perspective is at the core of the research program of evolutionary epistemology, major contributions to which have been made by authors like Popper, Campbell, Hayek and others (Radnitzky and Bartley, III (Eds.) 1987, see especially Chapter I by W.W. Bartley, III).

The central tenet of evolutionary epistemology is that evolution—even in its biological aspects—is a knowledge process, and that the natural-selection paradigm can be generalized to epistemic activities such as learning, thought and science (Campbell 1974: 47).

Evolutionary epistemologists argue that from natural selection to the growth of scientific knowledge the same basic principle of trial and error-elimination (Popper), of blind variation and selective retention (Campbell) can be found operating.

At whatever level a generalized evolutionary perspective may be applied, it always presumes the operation of three mechanisms: (a) a mutation mechanism, i.e. a process by which constantly variation and novelty are introduced—in Popper's terms: new tentative solutions—(b) a selection mechanism, i.e. a process of systematic selection among the variants—in Popper's terms: a process of error-elimination—(c) a replication mechanism, i.e. a process by which variants or tentative solutions are preserved, reproduced or propagated (Vanberg 1993: 185-186; Vromen 1995: 189).

Whatever particular form these processes or mechanisms may take, their interaction is always supposed to generate a gain in adaptive fit of some system relative to its environment. How is such increase in adaptive fit to be explained?

In an evolutionary explanation, change is accounted for in terms of actual, that is realized, past results, not in terms of results that are intended. Evolutionary adaptiveness is thus not a matter of calculation in advance, of forward-looking optimization. It is "driven from behind". It reflects what in the past has proven to be relatively more successful than other tried out alternatives (Vanberg 1993: 186).

Hayek scholars sometimes seem to forget that even Hayek's economic theory and political economy are rooted in a physiologically derived epistemological basis, the foundation of which he worked out already during the 1920s (Hayek 1952).

Hayek's work can be interpreted as a systematic effort to explore the ways in which we "learn from experience" (Hayek 1949: 46), in which we acquire, communicate and utilize knowledge. But Hayek's early reflections on the physiology and psychology of perception are preparatory to the discussion of his main subject: the social dimension of the knowledge problem, the problem of social learning, that is, the nature of the process by which knowledge is accumulated and utilized in society. Thus, Hayek works out the implications that follow from an evolutionary epistemology for the issue of socio- economic-political organization.

Of course, Hayek's approach to social theory is not, strictly speaking, a logical implication of his theory of mind. But there is a clear analogy between the two (Sugden 1993: 415).

Hayek's central argument in The Sensory Order (Hayek 1952, see especially chapter VIII)—which he considered the proper starting point for students of spontaneous order (see Hayek 1979: 199-200, footnote 26)—is that our perception of the world around us is theory-guided or conjectural in the sense that it is informed by a pre-existing system of classification (or set of classificatory dispositions) which is itself the product of a kind of "learning", the outcome of an evolutionary process that can be said to reflect the accumulated "experience" of the species (see also Vanberg 1994: 97; Streit 1993: 224-231).

Hayek's concept of perception as classification has a counterpart in his concepts of rules and rule-following behaviour (see also Hayek 1967: 43-65). Our perception and our behavioural responses to situations are both a matter of classification. Both are abstract in the sense that we respond not to the unique properties, but to typical features of situations by certain kinds of actions. In both realms learning is a matter of reclassification. If at the level of our cognitive apparatus the existing classification system generates expectations wich are disappointed, there will be a tendency for the mind to reclassify experience. The mind will rearrange sensory experiences into new configurations that allow better predictions to be made about reality (Butos and Koppl, 1993: 313). Those expectations that are "fit" tend to survive while those that are "unfit" tend to be weeded out. This selection process has a systematic counterpart operating at the social level. As we will see, the role of the judge consists of upholding those rules that will "maximize" the matching of expectations. Rules in effect draw the demarcation line between "legitimate" expectations and "illegitimate" expectations, thus defining the kind of expectations which can be expected to enjoy social protection. On all levels expectations have a tendency toward coherence and coordination. The criterion of fitness is confirmation of expectations as indicated by the success of our actions. Expectations more consistent with social reality give a competitive advantage to the individuals holding them. Rules are thus valued for instrumental reasons (Vanberg 1993: 182).

It is Hayek's emphasis on this theme of the interrelation between the system of rules and its systematic outcome at the level of the order of actions that qualifies him as a Law-and-Economics theorist (see also Hayek 1967: 66-81).

It is often stated that the modern approach to "Law-and-Economics" started in the United States in the early 1960s with the publication of Ronald Coase's famous article "The Problem of Social Cost" (Coase 1960). Thus it may not be quite obvious that Hayek's work can be considered a contribution to Law-and-Economics, be it a particular branch of Law-and-Economics.

To dispel possible doubts in this regard, it may be useful to cite from the introduction to the first volume of Law, Legislation and Liberty (Hayek 1973) the following paragraph which neatly summarizes Hayek's view on the relation between Law and Economics. Hayek writes:

> "Nowhere is the baneful effect of the division into specialisms more evident than in the two oldest of these disciplines, economics and law. Those eighteenth-century thinkers

> to whom we owe the basic conceptions of liberal constitutionalism, David Hume and Adam Smith, no less than Montesquieu, were still concerned with what some of them called the "science of legislation", or with principles of policy in the widest sense of this term. One of the main themes of this book will be that the rules of just conduct which the lawyer studies serve a kind of order of the character of which the lawyer is largely ignorant; and that this order is studied chiefly by the economist who in turn is similarly ignorant of the character of the rules of conduct on which the order that he studies rests."(Hayek 1973: 4-5)

In the remainder of this paper I will be concerned primarily with certain aspects of the theory of cultural evolution, the most developed part of which is the theory of the law and of the role of the judge. But first I will discuss in the next section what is implied by the concept of an evolutionary explanation.

3. Requirements for evolutionary explanations

3.1. Invisible-hand explanations and methodological individualism

There are basically two competing accounts for how functionality and adaptiveness can be explained. They can be distinguished as explanation by design and explanation by process. The first explains functionality as the product of somebody's design, somebody's deliberate intervention. It provides a teleological account of functionality. The second provides an account in terms of some specified process which can be shown to systematically generate adaptiveness without design. It provides a "non-teleological", causal account of functionality (Vanberg, 1993: 184).

Invisible hand explanations are typically process explanations.

Some authors distinguish between a "standard" or aggregative version of the invisible hand and an invisible hand explanation of the functional-evolutionary mould (see Ullmann-Margalit 1977 and 1978).

In the first version, with which we will mainly be concerned, the social rule to be explained is considered the unintended aggregate result of the actions of many decision makers, each intentionally pursuing only their own private interests. This makes it necessary to explain the pattern of individual behaviour in terms of individual motivations, and to systematically link it to an unintended aggregate result in the form of a social convention or a generally accepted rule of behaviour. Thus standard invisible-hand explanations concentrate on the process through which some social convention, institution, or rule emerges out of individual behaviour. For the institution to survive, the incentive would have to be such that once established all individuals would wish to continue to abide by the convention (the rule is self-enforcing), or the rule would have to be enforced by becoming established in a social or legal norm (Rutherford 1994: 84-85).

To provide such an explanation within the context of a theory of cultural evolution would mean to show how the behavioural regularities or rules upon which a spontaneous social order is based, and which the theory of the market order assumes as given, can

themselves be explained as an unintended, yet systematic, outcome of a process of interaction among seperately choosing individuals (Vanberg 1994: 82).

Valid invisible hand explanations of the standard sort will thus comply with the precepts of methodological individualism.

With respect to methodological individualism, several misunderstandings are to be avoided:

(a) Methodological individualism is distinct from normative individualism. Methodologi cal individualism is the methodological presumption that, whatever phenomena at the social aggregate level we seek to explain, we ought to show how they result from the actions and interactions of individual human beings who, separately and jointly, pur sue their interests as they see them, based on their own understanding of the world around them (Vanberg 1994: 1). Only individuals choose and act (Buchanan 1989: 83). Normative individualism is the normative presumption that the evaluations of the persons involved, their interests and values, provide the relevant criterion against which the merits or "desirability" of alternative rules are to be judged (Vanberg 1994: 1). Constitutional Economics embraces both presuppositions (Buchanan 1989: 83).

(b) It should be noted that the kind of methodological individualism we are advocating here need involve neither reduction nor the elimination of all social terminology. The methodological individualist can plausibly claim that any social explanation which makes no reference to individuals, in particular to mechanisms involving individuals which bring about social outcomes, has not given a complete or full explanation.

(c) A fully satisfactory invisible-hand explanation will do more than bring out the ratio nale, or "raison d'être" of norms and institutions, i.e., to infer the evolutionary prob lem that must have existed for the institution or the norm to have developed. Instead it will attempt to model the evolutionary processes in which the institutions and norms are generated. Starting with some well-defined problem situation, the theorist is to analyse where evolutionary processes of trial and error learning and imitation will lead to (Vromen, 1995: 181). Some progress in this respect has been made only since the development of evolutionary game theory and the analysis of repeated games.

(d) It should be noted that methodological individualism and the fact that an explanation is of the standard invisible-hand variety, though closely related, are by no means identical. The choice between methodological individualism and some potential al ternative such as "methodological collectivism" is a matter of choice among mutually-exclusive theoretical paradigms. The choice between an invisible-hand ex planation and, for instance, what Menger would have called a "pragmatic" explanation is, by contrast, a choice among explanatory schemes that apply to different kinds of phenomena (Vanberg 1994: 147 and 149). The potential scope of an explanation of the invisible hand variety is typically quite specific and the applicability of the invis ible hand approach is more limited than the applicability of methodological individu alism generally. The paradigmatic example is Menger's well-known explanation of the origin of money. The process that eventually leads to the institution of money is assumed to be entirely driven by the separate and independent pursuit of individual interests, without any need to rely on deliberate coordination of individual efforts.

3.2. Systematic limits to the potential scope of invisible-hand explanations of the standard sort

There has been within the spontaneous order tradition some tendency to exaggerate the explanatory scope of the concept of spontaneous order (Bianchi 1994: 248). Thus Vanberg recalls that David Hume, in the context of his discussion on a "theory concerning the origin of property, and consequently of justice" refers to the example of two men pulling the oars of a boat (Vanberg 1994: 64). Bianchi and Vanberg direct the same criticism at the way Hayek uses the notion of spontaneous order, but we believe this criticism is unjustified. Hayek never defined the concept of spontaneous order so restrictively as to be congruent with the set of rules that happen to be self-enforcing in the technical game-theoretic sense.

The explanatory scope of an invisible-hand explanation is limited in two ways however. First, many institutions have been deliberately established and, therefore, an invisible hand account cannot be considered to be descriptive of the actual process of their origin. But one might claim that an invisible-hand interpretation is of interest even with respect to such deliberately constructed institutions because it can provide information about the general nature of the institution and the forces that support it (Vanberg 1994: 150-151).

Second, there are certain rules which because of their very nature do not lend themselves straightforwardly to an invisible-hand explanation in the strict sense.

The confusion and ambiguity in this respect have been cleared up considerably since the development of game theory (see for general introductions into game theory, e.g., Fudenberg and Tirole 1991; Gibbons 1992; Myerson 1991; Rasmusen 1989; Osborne and Rubinstein 1994; Shubik 1984).

Game theory provides an analytical tool to systematically distinguish between a variety of stylized problem situations.

The two types of problem situations that are of major systematic relevance in the present context are coordination-type situations and Prisoner's Dilemma-type situations.

The aforesaid ambiguity results from the failure to distinguish sufficiently between these two different kinds of interaction problems and from the tendency to argue as if the kind of explanation that applies to rules which provide solutions to recurrent coordination-type situations can be generalized to other kinds of rules as well, including rules which provide solutions to recurrent Prisoner's Dilemma-situations (Vanberg 1994: 64, 89; Bianchi 1994).

Several commentators emphasize that an explanation of co-ordination-type rules cannot be considered simply a model for an explanation of Prisoner's Dilemma-type rules. Co-ordination rules are largely self-enforcing. Rules providing solutions to recurrent Prisoner's Dilemma-type problems are, by contrast, typically not self-enforcing.

The Prisoner's Dilemma is a situation wherein each party's selection of a (strongly) dominant action, which appears to be the rational thing to do, leaves each of them worse off than if each had chosen the more cooperative dominated action. The combination of (what appears to be) their individual rationalities leads them to forgo an attainable better situation and thus is Pareto-suboptimal (Nozick 1993: 50).

In Prisoner's Dilemma-type situations conflicting interests are clearly involved since everybody wants to be the only defector. Bianchi writes with respect to PD-situations:

"The paradox here is in fact that private interests cannot be generalized without losses, but what can be generalized (moral codes) does not obey private motivations." (Bianchi, 1994: 243)

However, Hayek's view in this respect seems to display greater nuance than Vanberg's and Bianchi's account of it would make us believe. Hayek discusses the various characteristics that general rules of conduct will typically exhibit (such as generality, open-endedness, their abstract character etc.), but the feature "self-enforcing" is not one of them.

Moreover Hayek writes:

> "The question which is of central importance as much for social theory as for social policy is thus what properties the rules must possess so that the separate actions of the individuals will produce an overall order. Some such rules all individuals of a society will obey because of the similar manner in which their environment represents itself to their minds. Others they will follow spontaneously because they will be part of their common cultural tradition. **But there will be still others which they may have to be made to obey, since, although it would be in the interest of each to disregard them, the overall order on which the success of their actions depends will arise only if these rules are generally followed."** (Hayek 1973: 45)

3.3. The functionalist fallacy and Hayek's group selection argument

As we have mentioned there exist two varieties of invisible hand explanations. An invisible hand explanation of the functional-evolutionary mould is quite distinct from an invisible hand explanation in the strict sense. The functional-evolutionary approach is based on an analogy with biological natural selection. The emphasis here is not so much on the individual behaviours that initially produce the social institution. A functional explanation explains only the continued existence of a pattern, i.e., its persistence, not its origin. The initial development of an institution need not be explained. It could be a matter of chance or accident. The key issue here is the non-intentional nature of the selection process, which is supposed to be "non-man-made" and carried out by the environment—or by "the system" so to speak. Individual intentions or purposes are supposed to play virtually no part.

In functional explanations it is therefore the "beneficial consequences" to which an institution, norm, or behavioural rule leads—or the functions served by "the phenomenon we wish to explain"—which are meant to explain its existence or persistence (Knudsen, 1993: 276). A familiar criticism raised against this kind of explanation is that it reverses the order of cause and effect. Moreover, a valid functional explanation should demonstrate the functioning of a causal feedback loop.

It is sometimes stated that in biology such an explanation would not be seen as problematic because it would normally be assumed that a natural selection mechanism had been involved (Knudsen, 1993: 277). Thus in biology a functional explanation should merely be regarded as a simplifying "as if" explanation of another, far more complex explanation based on Darwin's mutation and selection mechanisms.

In Darwinian evolutionary biology, natural selection provides the feedback loop: the relative reproductive successes or failures of organisms, i.e., their relative success or failure to produce offspring, determine whether there is change in the configuration of gene frequencies at the population level.

It should be noted that Darwinian natural selection does not refer to species or group selection, but to individual selection. Individual organisms are the units of selection. The explananda of Darwinian natural selection however typically are located at the level of populations. Natural selection typically works on a variety of individual organisms that are supposed to have stable, inheritable traits (there is individual stasis) and typically brings about regular or uniform patterns at the level of populations: the gene frequencies in the gene pool of a population will settle at an equilibrium. Biologists resort to equilibrium explanations because a full and detailed specification of all causal forces cannot be given.

But this kind of approach is certainly not unfamiliar to economists. Economists may be unable to identify all actual determinants of the behaviour of, say, individual firms in an industry. There may be no need to do so however, since economic "natural selection" forces an industry to move in the direction of equilibria (Vromen 1995: 103). Thus the "Chicago economists" argue that, due to evolutionary forces, "rational" industry behaviour can come about even if individual firms behave irrationally. Vromen argues that the essence of these selection arguments is captured by Ullmann-Margalit's (1978) notion of an invisible hand explanation of the functional-evolutionary mould (Vromen 1995: 103). Alchian had already sketched the outlines of a theory in which it is assumed that behaviour is determined by sheer chance. He argued that in the prevailing economic system, impersonal market forces see to it that those who happen to realize positive profits in one way or another are the survivors while those who suffer losses disappear (Alchian 1950). Thus the explanandum is to be located at the level of the comprising system, in this case the aggregate industry level.

It is in a similar sense that Hayek's contention is to be understood that in the theories concerning complex, spontaneously ordered phenomena the best we can hope for are "pattern predictions" and "explanations of the principle". Spontaneous orders are characterized by specific unpredictability—i.e. their detailed features are unpredictable—but also by general predictability—i.e. their general properties are predictable.

On the other hand, the approach of neo-Austrians like Kirzner (see Kirzner 1962) is informed by the methodological individualist belief that the coordination of individual plans in markets is brought about by the interdependent learning processes of individuals. Selection effects are thus sensitive to "behavioural input" at the individual level.

Hayek's argument becomes disputable where he seems to be arguing that spontaneous orders are beneficial by an appeal to the notion of group selection. Some of Hayek's statements refer also to the notion of the "function" or "functionality" of some rule or institution.

Most commentators agree that Hayek violated methodological individualism when he invoked the collectivist-functionalist notion of a process of cultural evolution that operates at the group level as such. Vromen, as we will point out further, is an exception in this respect.

Vanberg believes that Hayek is not only violating methodological individualism but in addition is committing the "functionalist fallacy" (Vanberg 1994: 61 and 84). This fallacy consists in assuming that by identifying the "benefits" that certain social rules provide to a group (community, social system, etc.), one has provided an answer to the question of why the the rules are practised in the group. The functionalist type of argument amounts to the claim that the existence, or rather, the persistence of a social pattern or institution is explained by its contribution to the "maintenance" of a social system.

The functionalist "explanation" thus distracts attention from the real challenge which is that of identifying the actual processes or mechanisms that establish the linkage between beneficial consequences and effective causes for behaviourally-generated rules and institutions (causal feedback loop).

Hayek's explanation of social rules in terms of "group advantage", Vanberg argues, is subject to this kind of objection: in order to provide an explanation at all, a functionalist argument would have to specify a process by which the fact that a social pattern (rule, institution) is advantageous to a group or social system can be reasonably assumed to contribute to the existence and persistence of the pattern (rule, institution) in question.

In social theory, the cases in which a socially-beneficial behavioural regularity can be shown to benefit directly the individuals practising it, will not cause any essential problem for an individualistic approach. If a certain type of behaviour is advantageous to the individuals exhibiting it, its explanation in terms of individual benefits may be the least onerous (Vanberg 1994: 86).

The problem lies with cases in which behavioural patterns that apparently are advantageous to the group in which they are practised, appear to be disadvantageous on the part of the individual exhibiting them. It is obviously with respect to these cases, Vanberg argues, that Hayek considers recourse to the notion of group selection to be necessary.

As Vanberg notes, there seem to be, essentially, two ways in which the beneficial effects a rule may have for a group can be assumed to account for the rule's existence.

One can either assume that there is a "feedback" based on the fact that individuals recognize a rule's beneficial consequences and take action—individually or collectively—to implement the rule. Like the invisible-hand approach this notion of a feedback mechanism based on recognition is consistent with methodological individualism, but its emphasis is on the role of deliberate design rather than unintended emergence. It directs our attention to political processes by which rules are chosen, changed and enforced rather than on an invisible-hand process.

The only other possibility consists in maintaining that the relevant feedback process operates at the aggregate, collective level as such and cannot be theoretically reconstructed as a systematic outcome of processes operating at the level of individual action.

Vanberg recognizes that feedbacks from the beneficial or detrimental social effects of rules to the chances for their persistence certainly exist (Vanberg 1994: 87).

His argument is rather that because of the highly complex nature of these feedbacks the general notion that social systems with "more successful" systems of rules will eventually win out, seems to be too vague to allow for sufficiently interesting conclusions about the systematic operation of a group selection process.

There is no doubt that it follows from Vanberg's statements that he believes that the only legitimate invisible hand explanations are the ones that comply with methodological individualism, i.e., invisible hand explanations of the standard sort.

It should be noted that Vanberg's view reflects an extremely restrictive methodological position. The legitimacy of Alchian-type explanations is widely recognized within economics. No less an economist than Buchanan stated recently that "the seminal Alchian (1950) analysis of the market's analogue to evolutionary selection can be extended to politics in relatively straightforward fashion" and that "the difference between the two evolutionary models lies in the compatibility with overall efficiency". (Buchanan 1993: 69)

Recently Vromen has attempted to rescue Hayek from the criticisms directed at his notion of group selection by presenting a reinterpretation of Hayek's statements in individualistic terms. When Hayek uses the term "group", it should really be read as "order" (see Hayek 1967: 66, footnote 1). This reinterpretation allows, so Vromen argues, an individualistic account of the replacement of groups based on the processes of not only between-group migration—as Vanberg recognizes—but also between-group imitation and within-group imitation.

We agree with Sugden (Sugden 1993: 403) that Hayek's appeal to group selection should be understood as a kind of temporary expedient that is more useful when working with less well-developed branches of social theory than when dealing with economic questions. We should regard Hayek's economics as the most fully developed part of his theory of spontaneous order.

4. A closer look at Hayek's argument

4.1. The social dimension of the knowledge problem

Hayek's economics, which is the best developed part of his theory of spontaneous order (Sugden 1993: 403) is mainly concerned to present a theory of the co-ordination of economic activities. The most important feature of his approach to the co-ordination problem is that, following Smith and Menger, Hayek does not see coordination taking place in a market which exists independently of the institutions (of law and justice) which define it. Hayek would certainly have agreed with A. Papandreou's dictum that "Adam Smith's "invisible hand" is invisible only to someone who is blind to the function of institutions" (Papandreou 1994: 221). Markets do not operate in an institutional vacuum. There is no such a thing as a "market as such". A market is always a system of social interaction characterized by a specific institutional framework, that is, by a set of rules defining certain restrictions on the behaviour of the market participants, whether these rules are informal, enforced by private sanctions, or formal, enforced by a particular agency (the "protective state").

Thus Hayek's approach shares much of the spirit of the research programme of Constitutional Political Economy. Constitutional Political Economy is a scientific sub-

discipline which is characterized by a particular kind of orientation in social analysis, namely its focus on the interrelation between the system of rules and institutions—e.g., the legal system—and the social pattern or order of actions resulting under those rules.

Rule-following is pervasive in human affairs. But why should we rely on rule-following in the first place? The fundamental reason why reliance on rules is advantageous is connected with the complexity of the ever-changing particular circumstances on which the effects of our actions depend. The rules of conduct which govern our actions are adaptations to our "irremediable ignorance" of those particular circumstances. Rule-following is thus a device for coping with the complexity of the environment in which we have to act on the one hand, and with the "limits of our reason" on the other. Only in a world of omniscient people, would there be no need for rules.

The social dimension of the knowledge problem has two quite distinct aspects. First there is the cross-sectional problem of using and communicating the fractional knowledge that is dispersed among the individual contemporaries in a society (Vanberg 1994:99).

This aspect is the subject of Hayek's theory of the spontaneous order of the market which is best known for its emphasis on the capacity of markets to utilize dispersed knowledge. But markets do much more than that (see also Hayek 1960: 22-38). Markets can be seen as ongoing, open-ended processes of trial and error-elimination, processes in which constantly a multiplicity of independent trials, of conjectural problem-solutions are tried out and selected upon through the choices of market participants. Through the interaction of experimental exploration and competitive selection markets can be expected to generate a cumulative growth of problem-solving knowledge (Vanberg 1994: 100). Hayek's notion of the market as a "discovery procedure" (see Hayek 1978: 179-190) alludes to this role of the market as an evolutionary learning process.

The theory of the market, or the catallaxy, is only one part of Hayek's idea of an evolutionary process of collective learning. The second aspect is concerned with the accumulation and growth of knowledge over time, i.e. the intertemporal problem of profiting from experiences that previously-living generations have made (Hayek, 1960: 27). With regard to the intertemporal dimension of the use-of-knowledge problem, Hayek has advanced a theory of cultural evolution as a process of competitive selection among the rules and institutions that define the frameworks within which social interactions take place.

Thus it follows from our previous remarks that we have to distinguish clearly between two aspects or levels of what is referred to as "social order": the order of rules on the one hand and the social pattern or order of actions resulting under those rules on the other hand. Though there exists a more or less systematic interplay between the two aspects, a clear recognition of their distinctiveness is essential for a proper understanding of how rules contribute to the formation of social order. The character of the rules will affect the character of the resulting order of actions.

The market process has to be understood as evolution **within rules** but the rules themselves upon which a market is based may well be variable. An adjustment in these rules may often be a better way to deal with alleged shortcomings or "market failures" than to replace market forces by a political mechanism.

The adaptive and innovative potential of market processes as well as their responsiveness to the preferences and interests of individual participants will be conditioned by the

general as well as the more specific characteristics of the rules on which those processes are based (Vanberg 1994: 102). Hayek is here mainly concerned with the rules of law:

> "Our main interest will then be those rules which, because we can deliberately alter them, become the chief instrument whereby we can affect the resulting order, namely the rules of law." (Hayek 1973: 45)

However, to recognize that markets operate and can satisfactorily operate only within certain constraints, is not to say that markets are necessarily perfect in this regard.

The real problem so to speak begins when it is asked what the specific content of these general principles under particular circumstances ought to be and how their content ought to be adjusted to changing circumstances as they may result, for instance, from the invention of new technologies.

Most of the time however the acting individuals will not be aware of the resulting overall outcome of their actions. This overall pattern was certainly not the aim of their separate actions. The acting individuals will mostly be motivated by beliefs that are related to particular circumstances in their immediate environment only. They will at most be aware of the immediate effects of following an established rule or deviating from it (Heath 1992: 40). In this sense the perspective of the acting individuals may be said to be myopic. If the resulting order is a value then it is a value which is the unintended and unknown result of the observance of other values (the rules of conduct) which to the acting individuals, since they are not aware of the functions of those rules, must appear as ultimate values (Hayek, 1973: 110-111).

Despite the difficulties implied by the use of the idea of "the function of rules" as an explanatory concept, one might argue—somewhat contrary to Vanberg—that such an awareness or comprehension of the "function" of rules on the part of the acting individuals is totally unnecessary for the preservation of the emerging overall pattern or order, as long as their conduct is **in fact**—and for whatever reasons—governed by the appropriate rules.

However, this is not the case with regard to the perspective of the judge and the legislator. As Hayek sees it, their viewpoint—and in a somewhat different respect also the viewpoint of the social scientist—is quite different. Thus Hayek writes:

> "The question which is of central importance as much for social theory as for social policy is thus what properties the rules must possess so that the separate actions of the individuals will produce an overall order." (Hayek 1973: 45)

And further:

> "Only in the philosophy of law, **in so far as it guides jurisdiction and legislation,** has the lack of such a comprehension of the function of law become significant." (Hayek 1973: 114)

From the perspective of the judge and the legislator, there is a meaningful sense in which "an abstract order can be the aim of the rules of conduct" (Hayek 1973: 113-114).

As opposed to "ordinary" citizens they may be supposed to be concerned with "the big picture" so to speak.

4.2. Hayek's twin conceptions

There exist different kinds of rules. Conceptually rules may be classified along two distinct dimensions, the one pertaining to their mode of origin (unintentionally evolved vs deliberately created) and mode of enforcement (spontaneous, informal enforcement vs formal, organized enforcement), the other pertaining to their structural nature (general rules of conduct vs organizational rules). (Vanberg 1994: 161)

The distinction which Hayek draws in this regard parallels his familiar distinction between two kinds of order. hi first approximation spontaneous order and organization can be distinguished by characterizing the former as governed by rules and the latter as governed by specific commands. Though he recognizes that organizations will to some extent have to rely also on rules and not only on specific commands, Hayek argues that the difference between those two kinds of order is systematically related to the difference between the kinds of rules on which they rest (Hayek 1973: passim).

For several reasons, but importantly because he aims at criticizing a particular kind of mistaken rationalism that he labels as constructivism, Hayek shifts attention almost exclusively to the "twin ideas of evolution and spontaneous order" (Hayek 1973: 23). Thus Hayek primarily concerns himself with spontaneous orders, orders that are entirely based on what he calls general rules of conduct.

Hayek's statements with regard to the "twin ideas of evolution and spontaneous order" are fraught with ambiguities however, causing considerable confusion among Hayek-commentators.

The expression "twin concepts of evolution and spontaneous order" is apparently intended to refer to a supposedly close connection between the notion of an evolutionary process and the concept of a spontaneous or self-generating order.

But how close is this connection?

Two distinct notions are involved. First, there is the notion that, if the behaviour of men is governed by certain general or abstract rules, their seperate actions will produce an overall order as an unintended result. Thus this notion is concerned with the working properties of market processes. As we pointed out, Hayek's theory of the spontaneous order of the market is best known for its emphasis on the capacity of markets to utilize dispersed knowledge. This insight has to be traced back to Hayek's early work on the problems and weakness of socialist planning. He tried to show that the centralization of production decisions would lead to discoordination between demand and supply of goods, as well as to production problems in the absence of prices allowing comparative cost calculation. The problem, as Hayek concieved of it, was more an epistemological problem than a calculational one, as Mises thought (Kukathas 1989: 57). The widespread recognition of the soundness of Hayek's arguments in this respect has only been reinforced by the collapse of the former Soviet system.

But, as we pointed out, the market process has to be understood as evolution within rules, as a process that is defined, and confined, by institutional and constitutional constraints.

Thus one can certainly concieve of the process of resource allocation through the price system as a spontaneous, evolutionary process, and one could characterize the outcome of this process as a spontaneous order, but it should be clear that the process can work satisfactorily only to the extent that property rights are clearly defined and strictly enforced.

Second, there is the notion implied by Hayek's theory of cultural evolution, that the abstract rules which contribute to the formation of a spontaneous order are themselves an unintended product of evolutionary processes. But this is a quite different claim.

In fact Hayek's theory of cultural evolution is intended to accomplish several things.

First, it suggests that the rules and institutions are subject to a process of competitive selection, comparable to the competitive selection occurring in ordinary markets (Vanberg 1994: 102). Thus Hayek, in talking of "the twin ideas of evolution and spontaneous order", suggests that the arguments he makes with regard to the subconstitutional market process can be extended to the process of change on the constitutional level. Hayek is apparently making the claim that his theory of cultural evolution is based on the same explanatory logic as the individualistic theory of the spontaneous order of the market. The latter shows how beneficial social arrangements that one might be tempted to explain as a result of deliberate design, can in fact be explained as an unintended outcome of the interaction among individuals who, guided only by certain general rules, separately pursue their own interests.

Second, when it comes to the normative issue of how we can know or find out what "good" or "appropriate" or "desirable" rules are, Hayek's concept of cultural evolution is typically connected with the stronger—and also more controversial—claim that our "incurable ignorance" (Hayek 1973: 13) which renders our reason insufficient "to master the full detail of complex reality" (Hayek 1960: 66) makes it necessary largely to rely on unquestioned traditional rules instead of attempting to choose rationally or construct the system of rules that we want to follow.

Thus at the core of Hayek's theory of cultural evolution is the notion that "the various institutions and habits, tools and methods of doing things, which... constitute our inherited civilization" (Hayek 1960: 62) have passed "the slow test of time" (Hayek 1967: 111) and can, therefore, be expected to embody the experience of generations. They are, as Hayek argues, the "product of long experimentation in the past" (Hayek 1978: 136) and "embody the experience of many more trials and errors than any individual mind could acquire" (1967: 88). What is distinctive in Hayek's theory is his account of social institutions and rules of conduct as "bearers of knowledge" (Kukathas 1989: 220).

Thus Hayek's theory of cultural evolution has a strong normative bent.

But it is especially from the normative viewpoint, that the suggested analogy between market competition and cultural evolution is so misleading.

It seems plausible to argue that appropriate rules, i.e. rules that will allow for the formation of a beneficial order of actions, will necessarily exhibit certain specific structural characteristics. Thus one might argue that the fact that general rules of conduct are

conducive to the formation of a particular kind of order of actions—spontaneous order—is correlated with and explained by the various but interrelated structural characteristics of such rules, e.g. the fact that they are end-independent, general, abstract etc...

But this is quite different from arguing for the claim that rules will lead to the formation of a beneficial order of actions because of their traditional character per se. The question of how the different kinds of rules differ in their nature must be distinguished from the question of how they originate (whether they "spontaneously evolve" or are "deliberately designed").

In a particular socio-historical situation there may exist a de facto correlation between the two aspects, but this need not be so. The two dimensions are conceptually distinct.

This fact is acknowledged by Hayek:

> "...and it is at least conceivable that the formation of a spontaneous order relies entirely on rules that were deliberately made. The spontaneous character of the resulting order must therefore be distinguished from the spontaneous origin of the rules on which it rests, and it is possible that an order which would still have to be described as spontaneous rests on rules which are entirely the result of deliberate design." (Hayek: 1973, 45-46).

Vanberg suggests that Hayek simply postulates that from a process of variation, based on individual innovations, and from processes of selection and individual imitation, rules can be expected spontaneously to emerge which benefit the group. Instead of systematically elaborating an individualistic "invisible-hand explanation", Vanberg argues, Hayek simply invokes the notion of "group selection" (Vanberg 1994: 83). We cannot agree entirely with Vanberg's interpretation.

As we pointed out before, it cannot be denied that certain statements in Hayek's writings can be interpreted as making out a case for group selection. Most commentators agree that the concept of group selection is a weak point in Hayek's system of ideas (Sugden 1993, 400).

But it should be noted that Hayek at least attempts to explain why it is that rules can be expected to emerge that will benefit the group and how the process of selection works, namely in his theory of the modus operandi of the judiciary and in his theory of expectations, to which we will return further. Whether that theory is plausible, is a separate question.

4.3. Hayek's theory of spontaneous order in a nutshell

Both spontaneous orders and the rules on which they rely have a certain number of distinct but interrelated characteristics. I will discuss the rules first. In the context of social order Hayek talks of "rules of just conduct".

He argues that the rules of just conduct on which spontaneous orders rely have a number of characteristics that make them conceptually distinct from rules of organization.

But the specification Hayek gives of the criteria that rules must meet in order to allow for the formation of a spontaneous social order remains very general. In fact Hayek specifies only a very general schema which has to be filled in in detail. The following characteristics of such rules can be highlighted:

(a) Rules of just conduct are generally prohibitions of unjust conduct; they are almost all negative in the sense that they prohibit rather than enjoin particular kinds of actions. Rules of just conduct which require positive action are rare exceptions (Hayek 1976: 36). The paradigm case of negative rules are the rules of private property. However, the question whether negativity has anything meaningful to say about the rules of contract—which certainly are to be considered as "rules of just conduct"—is a matter in dispute (see Kley 1994: 76).
(b) Rules of just conduct are end-independent or purpose-independent; they can never fully determine a particular action but only limit the range of permitted kinds of action and leave the decision on the particular action to be taken by the actor in the light of his ends. This can be achieved only by rules which define a domain of the individuals (or organized groups) with which others are not allowed to interfere (Hayek 1976: 36-37). They (the rules) "protect ascertainable domains within which each individual is free to act as he chooses". (Hayek 1976: 36). Another way to express the same idea consists of characterizing rules as multi-purpose instruments: "In the ordinary sense of purpose law is therefore not a means to any purpose, but merely a condition for the successful pursuit of most purposes." (Hayek 1973: 113)
(c) Rules of conduct are abstract. Rules facilitate the making of decisions in complex situations by limiting the range of circumstances to which one has to pay attention; they single out certain classes of facts as alone determining the general kind of action which we should take (Vanberg 1994: 112). Hayek believes that, because of the complexity of the ever-changing circumstances to which we constantly have to adjust ourselves, rule-guided selectivity, i.e. systematic rule-induced neglect of known facts, can be more successful than the selectivity of case by case rationality.
(d) Rules of just conduct are universal in the sense of being "the same, if not necessarily for all members, at least for whole classes of members not individually designated by name" (Hayek 1973: 50); they must be applicable to an unknown and indeterminable number of persons and instances. Used as a test of the appropriateness of a rule, the possibility of its generalization or universalization amounts to a test of consistency or compatibility with the rest of the accepted system of rules (Hayek 1976: 28).
(e) Rules of just conduct are permanent. To perform their functions rules must be applied through the long run. Hayek writes: "The facts that rules are a device for coping with our ignorance of the effects of particular actions, and that the importance we attach to these rules is based both on the magnitude of the possible harm that they serve to prevent and the degree of probability that it will be inflicted if they are disregarded, show that such rules will perform their function only if they are adhered to for long periods." (Hayek 1976: 29). This may be called the statistical or "insurance"-rationale of rules (Vanberg 1994: 113).

We will now turn attention to the concept of spontaneous order. This concept became the cornerstone of Hayek's social theory. But what are spontaneous orders?

They are the unintended social consequences of individual actions which are directed towards other ends. In other words, they are, in Ferguson's famous words, the result of human action but not the execution of any human design.

As was indicated already, spontaneous orders are formed when individuals follow abstract rules of conduct. hi other words, spontaneous orders emerge out of the interaction of a multiplicity of elements which, in their responses to their particular environment, are governed by certain general rules. The individuals themselves may be unable to articulate the rules they follow. Thus Hayek sees common law both as a codification of previously unarticulated rules of conduct and as providing a framework within which spontaneous orders can form.

The character of these rules will permit to infer only the general features of the overall pattern. As was indicated previously, spontaneous orders are characterized by general predictability only. The particular content of the resulting order will always be dependent on the specific circumstances to which the elements respond and consequently will be unpredictable. Finally, spontaneous orders rest on a "division of knowledge" which is analogous with the division of labor in classical economic theory. Because each individual makes use of his or her specific knowledge in deciding how to act, spontaneous orders embody a totality of knowledge that is not known to any single mind. This allows spontaneous orders to achieve feats of social organization that are beyond the capability of any planner.

It might be argued—though we would not—that the foregoing characterization of spontaneous orders contains nothing which implies that spontaneous orders are desirable or morally valuable (Sugden 1993: 396). Of course, the insight that a spontaneous order utilizes much more knowledge than can possibly be made accessible to any central agent or agency, is an important conclusion. It gives us reasons for doubting the ability of governments to achieve complex feats of social organization by deliberate planning. It also indicates the essential source of the potential efficiency of market arrangements in comparison to centralized, deliberately-planned arrangements.

But, one might argue, those are conclusions about what is feasible in human affairs and not about what is desirable. Hayek's philosophy presents an **explanation** of the role or function of rules of justice in the preservation of a social order but not a **justification** of any particular set of rules (Kukathas 1989: 203). From the standpoint of ethical theory, this may be a meagre result. We do not believe Hume's moral skepticism to be inescapable, but an excursion into ethical theory would go beyond the scope of this paper anyway.

From a Law-and-Economics standpoint however, Hayek's philosophy delivers an important insight: if we want to generate in society any particular order of a certain degree of complexity, we should look for general rules of conduct which, if followed by individuals, would tend to induce that order to form spontaneously, i.e. we should rely on spontaneous ordering forces. The reason is that in the case of complex spontaneous orders we will never be able to determine more than the general principles on which they operate; we shall often not be able to foresee the particular changes by which the necessary adaptation to altered external circumstances will be brought about (Hayek 1973: 63). In

this sense Hayek can be said to present an instrumental justification of a particular type of rules.

5. The evolution of the common law and the role of the judge

Chapter five of Volume I of Hayek's "Law, Legislation and Liberty" (Hayek 1973, Ch. 5) belongs to the most illuminating pieces of writing in legal theory that I am aware of. It contains in condensed form the major building blocks of Hayek's philosophy.

It has often been argued that the common law tends to consist of efficient rules.

Since the publication of Coase's "The Problem of Social Cost" (1960) it is generally recognized that the common law has allocative consequences. Coase has urged that the courts, in resolving disputes, assign property rights so as to reduce transaction costs and thus stimulate the outcome of a frictionless market system (De Alessi 1992: 330; Coase 1960: 19).

The recognition that common law rules have allocative consequences led research in several directions (Aranson 1992: 294). The first line of research involved a detailed examination of particular common law areas—contracts, torts, and property—and of specific rules within each area, to ascertain whether or not those rules are efficient. Thus Richard Posner's (1973) treatise on the "Economic Analysis of Law" consisted of arguments seeking to reconcile a vast array of common law rulings and doctrines with notions of economic efficiency interpreted as aggregate wealth maximization (Wagner 1992: 382). Posner's argument is that the common law tends to yield economically efficient solutions, but he provides no analysis of why this might occur, other than the argument that judges give weight to economic efficiency in their decisions.

But judges may appear to lack the appropriate incentives to promote economic efficiency Judges hardly constitute a homogeneous group and it seems clear that their interests and motivation are highly variegated. Consequently it is not clear why the common law would evolve this way and Posner did not indicate the process at work.

The second line of research involves studies of the general common law process itself and seeks to explain how courts might reach the efficient results that Coase and others claim to identify. That is, it involves the search for a mechanism which, given the participants' preferences, will lead to the adoption of allocatively efficient rules. The models thus purport to be positive (Aranson 1992: 295). Rubin (1977) and Priest (1977) hypothesized that efficient rules of common law evolve not because of deliberate choices by judges, who can act randomly, but because inefficient rules are more likely to be litigated and overturned. Under this approach, rules are changed through an indirect bidding process based on the ability and willingness of parties to litigate. As a different rule becomes increasingly more valuable relative to the existing one (precedent), more resources are allocated to litigate the existing rule (bids for and against a change). Continued litigation eventually leads to overturning the precedent; in the long run, "efficient" rules replace "inefficient" ones (Staaf and De Alessi 1991: 110).

This argument about common law efficiency is based on an analogy between litigation and bidding in auctions. A trial is viewed as a process by which a rule is put up for bid,

with the parties bidding through their expenditures on litigation. The typical presumption is that the party that spends more is more likely to win, with the result being that legal rules tend to reflect the desires of highest bidders (Wagner 1992: 384).

Buchanan (1977) had already criticized Posner (1972) for its failure to make the vital distinction between the two functional roles in which lawyers may find themselves: Posner appears to offer potential advice and counsel to future judges and legislators alike. But, recalls Buchanan, the judge should not change the basic law because by such behavior he would be explicitly abandoning the role of jurist for that of legislator. In his role of jurist he should enforce existing law instead of enacting new legislation. Buchanan referred explicitly to Leoni's (1961) distinction between law and legislation. It follows from Buchanan's argument that there is no justification at all for judicial introduction of the putative efficiency norm, presumably to be imposed independently of the political process. This view is implied by the adoption of the subjectivist-contractarian consensus or unanimity rule as a benchmark for efficiency. The normative political economist may advance alternative sets of rules as a hypothesis to be tested in the political exchange process, but he should never be allowed to take the arrogant stance of suggesting that this or that set of institutions is or is not more "efficient".

In a similar vein De Alessi and Staaf (1991) argue that the law and economics view of the common law as an efficient process that promotes the evolution of efficient rules through an auction-like mechanism is flawed because it fails to cope with the insoluble problem of aggregating preferences. For the litigation process involves two people only, with the rule subsequently applying to everyone. A statement about efficiency cannot be made without invoking some presumption about the preferences of those people who were not represented in the litigation. Without some way of aggregating those absent preferences, there is no way to determine whether the rules that emerge from a process of two-party litigation would be the same as those that would emerge from a process of collective choice operating under a rule of unanimity.

They argue that the belief that the efficiency of the common law is enhanced by assigning disputed rights so as to lower transaction costs is also flawed. The common law provides a form of unanimity by allowing individuals to contract around the rule and provides order by maintaining transitivity, through the use of precedent, in the application of the rule to new situations.

Aranson has highlighted another problem: in the neoclassical approach to law and economics, the common law judges, in rendering decisions that maximize wealth, are placed in the position of calculators of comparative values (Aranson, 1992). But this task confronts the courts with an insoluble economic calculation problem, analogous to the problem faced by central economic planners. Therefore, courts should prefer to come as close as they can to a rights-based jurisprudence. This method forces decisions back to a market relation, where the (radically decentralized and subjectively given) information obtains for making appropriate decisions. Thus the common law can be said to be efficient because it returns decision making to the locus of superior informational competence.

Aranson's approach in fact belongs to a third line of research, distinct from the two that were previously mentioned. And though it less abstract and places a somewhat different emphasis, it is akin to Hayek's view on the common law's superiority.

In Hayek's theory of the common law—or, more generally, of what he calls the "nomos"—the emphasis is on the coordination of individual activities through a process of systematic mutual adjustment of expectations (Hayek 1973: 86). It emphasizes that the decisions of judges, rather than being random or a function of the expenditures of each side, are strongly affected by precedent, thus providing a stable framework of abstract rules within which people can plan their economic activities. It argues that what should be assessed is not efficiency but the protection and maximal coincidence of expectations that can be considered "legitimate" and may thus be expected to deserve social protection.

The function of the judge is to assure a maximal coincidence of expectations, i.e. to create a situation in which the possibility of expectations in general being fulfilled is maximized or in which the chance to form correct expectations is as great as possible. But the chance of as many expectations as possible being fulfilled will be most enhanced if some expectations are allowed to be systematically disappointed.

Thus the judges, by upholding those rules which make it more likely that expectations will match and not conflict, are consciously trying to give greater internal coherence to the law.

But they don't need to know anything about the nature of the resulting overall order which they serve, beyond the fact that the rules are meant to assist the individuals in successfully forming expectations in a wide range of circumstances. They are unintentionally playing a part in the formation of a spontaneous order: a system of rules of conduct conducive to the efficient operation of the order of actions which rests on them. The body of the common law constitute a spontaneous order, which evolves as an unintended consequence of the following of meta-rules. One of the most fundamental meta-rules is that, when deciding a difficult case, the judge's task is to try make the law as a whole a little more coherent: he is required to think only about the internal logic of the law (Sugden, 1993: 408). But this is problably less true with respect to the Law in Europe that is more constrained by laws and articles than with respect to the common law in the USA and Great Britain, where the common Law is formed by cases.

Sugden (1993: 408) believes the role of the judge in making law is analogous with the the role of an entrepreneur launching a new product: the entrepreneur is consciously trying to make a profit, thus unintentionally contributing to the overall allocation of resources. Each is a rule-following agent: the judge is trying to give greater internal coherence to the law, the entrepreneur is trying to make a profit. Each is unintentionally playing a part in the formation of a spontaneous order—in one case, the body of the common law, in the other, the overall allocation of resources.

We believe the analogy is rather weak. First, the judge and the entrepreneur are so to speak operating on different levels: the constitutional level—the order of rules in the production of which the judge assists—and the subconstitutional level—the order of actions—respectively. Second, one of these levels can be said to be **presupposed** by the other. Third, Hayek sometimes suggests that the perspective of the judge is substantially less "myopic" than that of ordinary market participants, since the judge should have at least some understanding of the "function" of law (Hayek 1973: 114). Hayek's statements in this respect are somewhat ambiguous. Last but not least, while it seems plausible to assume that the entrepreneur, while unintentionally assisting in the overall allocation of

resources, is trying to make a profit, i.e., is guided by the profit motive, it is not clear why we should assume that judges are guided by the search for greater coherence. With respect to the role of the entrepreneur, "private vices" may be supposed to coincide with "public benefits", since only those entrepreneurs who de facto achieve positive profits in one way or another and can therefore be assumed to serve the interests of consumers better, will thrive and prosper, whereas entrepreneurs who do not succeed in doing so are eliminated sooner or later. But insofar as judges are public officials, the analogy seems to be particularly weak.

It will be clear that Hayek's model is different from the two previously mentioned kinds of models. One might say that it is to be located somehow in between these other two varieties.

On the one hand, there is no need to suppose that judges truly possess the necessary knowlegde and the appropriate incentives to promote economic efficiency. Efficiency is at best an unintended by-product. Efficiency considerations do not enter directly into the deliberations of judges.

On the other hand their decisions are clearly not of a random nature. One might say they are constrained by precedent but this expression doesn't convey exactly the point Hayek wants to make, since the law does not consist of particular cases. To express the central point, Hayek quotes a famous statement by the great eighteenth-century judge Lord Mansfield, namely that the common law consists of general principles, which are illustrated and explained by those cases (Hayek 1973: 86). Thus, Hayek highlights the fact that a law based on precedent is more rather than less abstract than one expressed in verbal rules: "it is part of the technique of the common law judge that from the precedents which guide him he must be able to derive rules of universal significance which can be applied to new cases." (Hayek 1973: 86)

The judge assists in the process of selection of rules. It seems interesting to try to find out in more detail whether it is possible to distil from Hayek's account of the role of the judge the three evolutionary mechanisms we identified earlier.

Generally speaking, we agree with Vromen that the mechanisms that are at work in cultural evolution can be identified as follows. Vromen writes:

> "Individual trial and error learning is the selection mechanism. Ways of doing things are maintained by individuals as long as they bring them satisfactory results. Otherwise, they will try out something else. Here we come to the mutation mechanism. New trials are experiments, which are performed either intentionally, as attempts to innovate for example, or unintentionally, as mistakes in following existing rules. Although they may be directed or guided by some heuristics, they are blind in Popper's sense of being "forays into the unknown". Imitation provides the transmission (or replication) mechanism." (Vromen 1995: 189)

Let's now have a look at what Hayek writes to see whether this general scheme is applicable to the modus operandi of the judiciary!

If there were no variation, evolution could not get started as a result of selection. At first sight there seems to be little room for a variation or mutation mechanism in Hayek's account of the judge's task.

The judge will merely assist in "the process of articulation of pre-existing rules" (Hayek 1973: 78). The judge "is committed to upholding the principles on which the existing order is based" (Hayek 1973: 120). He discovers the rules "presumed to have guided expectations in many similar situations in the past"... (Hayek 1973: 86). The judge "is not a creator of a new order order but a servant endeavouring to maintain and improve the functioning of an existing order." (Hayek 1973: 119) "The task of the judge will be to tell the parties in the dispute what ought to have guided their expectations,... because this was the established custom which they ought to have known." (Hayek 1973: 87)

Thus the emphasis is laid on the fact that judges adjudicate particular cases by means of custom and precedent. This is what is meant by stare decisis. Stare decisis can be said to account for the transmission or replication mechanism in the evolution of the law.

How does variation arise? "Experience will often prove that in new situations rules which have come to be accepted lead to conflicting expectations." (Hayek 1973: 115) And further: "Since new situations in which the established rules are not adequate will constantly arise, the task of preventing conflict and enhancing the compatibility of actions is of necessity a never-ending one, requiring...the formulation of new rules necessary for the preservation of the order of actions." (Hayek 1973: 119)

Thus variation is generated.

The necessity to preserve the existing order of actions and to prevent the disappointment of legitimate expectations may be said to provide some heuristics.

But:

> "This will in some measure always be an experimental process, since the judge.. will never be able to foresee all the consequences of the rule he lays down, and will often fail in his endeavour to reduce the sources of conflicts of expectations." (Hayek 1973: 102) And: "The judge may err,...". (Hayek 1973: 119)

By what mechanism are errors, i.e. unfit rules, eliminated?

> ".. it is only by their effects on that order of actions, effects which will be discovered only by trial and error, that the adequacy or inadequacy of the rules can be judged." (Hayek 1973: 102) "Like most other intellectual tasks, that of the judge is...one of testing hypotheses at which he has arrived by processes only in part conscious. .. he must stand by his decision only if he can rationally defend it against all objections that can be raised against it." (Hayek 1973: 120) "As in all other fields advance is here achieved by our moving within an existing system of thought and endeavouring by a process of piecemeal tinkering, or "immanent criticism", to make the whole more consistent both internally as well as with the facts to which the rules are applied." (Hayek 1973: 118)

Thus a learning process of trial and error-elimination accounts for the selection mechanism.

At this point an important qualification has to be made.

Hayek explicitly recognizes the fact that grown law requires correction by legislation (Hayek 1973: 88). It seems that legislation is required both to generate novelty—i.e.

legislation works as a mutation mechanism—and to eliminate errors in past developments—i.e. it also works as a selection mechanism.

How is Hayek's account of the evolution of the common law to be evaluated?

One of the problems with this model is that Hayek seems to be arguing that his model is positive, i.e. descriptive of the actual practices of judges, while in fact it has a strong normative bent. From a positive point of view, the assumption that judges are guided by the search for greater coherence seems less plausible than the assumption that in the market order entrepreneurs are guided by the profit motive.

Furthermore, Hayek's account has also led to some confusion among commentators. Thus Rutherford criticizes Hayek's analysis by pointing to the fact that "it is far from obvious that the common law is included in the spontaneous category" and also to "the fallacy.. that even if it is agreed that the common law often takes over rules that first evolved as customs, it is not possible to deny that judges do have to make decisions between conflicting rules, and do have to make new rules where gaps exist." (Rutherford 1994: 85-88). But the fact is that Hayek doesn't deny this at all! To the contrary he stesses the crucial role of the judge in this respect.

Hayek's position would be inconsistent if it could somehow be demonstrated that he defines the spontaneous category as being congruent with those rules that are, in the game-theoretic technical sense, self-enforcing. But as we have pointed out earlier, we were unable to locate any clear evidence that this is in fact Hayek's viewpoint. The fact that Hayek stresses the importance of corrective legislation reinforces this point.

But it is true that the way in which Hayek uses the expressions "law arising from custom and precedent" and "common law" may create ambiguity. As Benson recalls, much of common law was also royal law (Benson 1992: 12; see also Benson 1990). Though he recognizes that much of common law was simply a codification of the basic norms common to Anglo-Saxon society, Benson points out that even during its earliest periods of development some aspects of it were legislated and imposed by authoritarian kings. Furthermore, when a government's judges make new law through precedent, it becomes enforceable law for everyone in the society whether it is a mutually beneficial law or not. Therefore, Benson argues, the government-backed common law system is more likely to adopt inefficient rules than a genuine customary law system. Benson seems to be saying: the Common Law is basically government-made law no less than statute law.

The Benson-type critique of the Common Law process is somewhat misguided. A key to better understanding is provided by Hayekian legal theory. For Hayek the "rules of just conduct" are basically the rules of private property, contract, and tort (1976: 109). Let's consider for a moment the rules of contract. These rules are certainly vital for spontaneous economic order. They specify certain formal and other conditions that must be satisfied should a particular contract be valid and the obligations stipulated be legally enforceable. As such they increase the predictability and certainty in the parties' dealings with one another (Kley 1994: 76). "The whole network of rights created by contracts is as important a part of our own protected sphere, as much the basis of our plans, as any property of our own" (Hayek 1960: 141).

It has been said that the common law generally gives individuals the right to contract around the rules, thus providing flexibility. But this shouldn't be misunderstood. To say

that the rules of contract provide flexibility does not amount to the contention that these rules themselves are not perfectly general and the same for one and all. To the contrary, "freedom of contract, like freedom in all other fields, really means that the permissibility of a particular act depends only on general rules and not on its specific approval by authority. It means that the validity and enforcibility of a contract must depend only on those general, equal, and known rules by which all other legal rights are determined, and not on the approval of its particular content by an agency of the government" (Hayek 1960: 230).

Flexibility is perfectly compatible with, and indeed is fostered by generality and abstractness of rules.

Moreover, there is a sense in which Hayek's theory of "the mutual adjustment of expectations" can be said to provide fresh insights in this context. But this can perhaps be better illustrated with reference to the law in Europe—with which we are as a matter of fact better acquainted—than with reference to the common Law in the USA and Great Britain. It has been demonstrated by Maitre Xavier Dieux that at least in Belgian law the rule of "due respect to other persons' legitimate expectations" is a genuine general principle of objective law underlying, among others, the "pacta sunt servanda"-rule laid down in article 1134 of the Belgian civil code (Dieux 1995 Chapter III, see also p. 170, footnote 480). Xavier Dieux is a lawyer and of course he doesn't elaborate on Hayek's views, but his thesis illustrates that Hayek's idea of the "matching" of legitimate expectations is more than an armchair philosopher's reflection.

More consistent with Hayek's notions concerning the Common Law and apparently inspired by Adam Smith's vision is Yandle's (1991) concept of organic legal frameworks or constitutions. His paper probes the development of constitutions from individual, to community, to state, by focusing on the history of English Common Law. The organic constitution is rooted in "the man within"—Smith's Impartial Spectator—and grows informally from small groups finally to encompass the nation-state to form a basis for constitutional government. Constitutions grow from within, they emerge and thus cannot easily be transplanted. The role of judges in linking individuals to communities and then to the legislative body that ultimately orders the state, is equally acknowledged.

6. The promises—and limitations—of a game-theoretic approach to the problem of spontaneous order

6.1. Preliminary remark: the game metaphor in Hayek's work

It has almost become a commonplace to state that Hayek's analysis of social order offers a theoretical basis for a game theoretical approach to modelling the way institutions form (Bianchi 1994: 232) and to argue that game-theoratic notions and approaches capture essential elements of Hayek's view (Vromen 1995: 9).

We pointed out earlier that game theory is suited to explicate why Hayek's claim—or better: a certain not uncontroversial interpretation of this claim—is problematic in so-called Prisoner's Dilemma-games. Apparently, certain kinds of rules cannot be expected

to emerge from and to be enforced by a spontaneous process, except under very restrictive conditions. In the next section we will further elaborate on this theme.

But let's have a look at what Hayek himself has to say about the use of game theory. Hayek unequivocally dismissed game theory as a methodological tool in economics. Hayek states:

> "I don't think that game theory has really made an important contribution to economics, but it's a very interesting mathematical discipline."(Kresge and Wenar 1994: 148)

We conjecture that Hayek's negative appraisal of game theory is to be explained by the fact that Von Neumann and Morgenstern's (1944) key early book on game theory had dealt with zero-sum non-cooperative games almost exclusively. These are games where one player's gain/loss is always the other player's loss/gain as the returns sum to zero. But zero-sum games are more curious than ubiquitous in social life.

Hayek himself wrote:

> "The best way to understand how the operation of the market system leads not only to the creation of an order, but also to a great increase of the return which men receive from their efforts, is to think of it,.., as a game which we may now call the game of catallaxy It is a wealth-creating game (and not what game theory calls a zero-sum game), that is, one that leads to an increase of the stream of goods and of the prospects of all participants to satisfy their needs,..." (Hayek 1976: 115).

In fact game theorists rapidly switched attention to what should be done in non-zero-sum games. The immediate result was the famous Nash equilibrium concept. The basic idea is that rational players should select strategies which are best replies to each other because the selection of such strategy pairs will not cause either player to regret their choice. (Heap and Varoufakis 1995: 50)

Vromen has recently argued that the notion of equilibrium that Hayek suggests in his theory of the mutual adjustment and co-ordination of expectations and actions closely resembles the Nash equilibrium concept (Vromen 1995: 176). Vromen interprets Hayek's equilibrium concept as saying that when there is social order individuals have no incentive to change their existing patterns of behaviour (and not that individuals cease to act).

Indeed, Nash strategies—i.e. strategies which produce a Nash equilibrium—are strategies which, if implemented, confirm the expectations on which they were based. (Heap and Varoufakis 1995: 53)

This means that the claim stated at the beginning of this section, namely that game theory is a useful tool for developing the Hayekian research programme, has some prima facie plausibility.

6.2. The evolutionary analysis of repeated games (supergames)

Several attempts have been made to model the emergence of certain basic social conventions as the unintended outcome of the repeated interaction between self-interested players

(Rutherford 1994: 110). Most of the arguments can be related to repeated coordination, Prisoner's Dilemma or chicken games. The characteristic feature of such games is that either more than one Nash equilibrium exists, so that individual rationality alone is not sufficient to generate the desired coordination of action on a single play, or that some or all of the Nash equilibria represent a collectively inferior result. Evolutionary game theory tries to explain how a solution comes about in the absence of an apparent unique equilibrium (Heap and Varoufakis 1995: 233).

6.2.1. Repeated coordination games

In coordination games, each individual has an incentive to find and maintain a coordinated solution (Rutherford 1994: 111). It is characteristic of coordination games that there is no conflict of interests between the individuals. They can be said to have the same interest: to coordinate on a Pareto-efficient Nash equilibrium (Vromen 1995: 177-178).

With respect to coordination problems, it is typically possible to provide, in principle, a theoretical reconstruction of a process by which, out of a situation without any rules, and without any deliberate agreement, rules gradually emerge as a social result solely through separate individual actions, pursuing individual interests. Moreover, rules providing solutions to recurring coordination problems also tend to be self-policing or self-enforcing (Vanberg 1994: 90).

However, there is nothing in the spontaneous process that guarantees that, among potential alternative problem-solving rules, the "best" one will necessarily emerge (Vanberg 1994: 90). hi impure coordination games, the players may get stuck in a self-enforcing Nash equilibrium that is not Pareto efficient and thus suboptimal self-sustaining conventions may evolve (Vromen 1995: 177-179). In this sense evolution does not imply efficiency (Wärneryd 1990: 100).

Moreover, once a coordination rule is established in a group, it cannot be assumed that a shift to a more beneficial rule can, in general, be brought about by a spontaneous, invisible-hand process (Vanberg 1994: 90). It is easy to find examples of inefficient but stable conventions (Sugden 1993: 400). A paradigm case is the QWERTY keyboard.

As some commentators have pointed out, it may not be easy to reach a coordinated solution, and these difficulties are compounded as the number of players and number of possible solutions increases (Rutherford 1994: 111).

6.2.2. The evolution of cooperation in the Prisoner's Dilemma game

In a one-shot Prisoner's Dilemma defection is the dominant strategy.

In the finitely repeated Prisoner's Dilemma, mutual defection remains the only Nash equilibrium, at least to the extent that Nash backward induction is accepted (Heap and Varoufakis 1995: 169).

One qualification has to be made here, namely with respect to the role of reputation effects. The aforesaid problem is altered, as Schmidtz points out, when reputation becomes important, in which case players have incentives to cooperate until near the end of the game (Schmidtz: 1991, 102). Moreover, if the situation is a concatenated Prisoner's Dilemma—meaning that as one repeated Prisoner's Dilemma game comes to an end, the

players enter into other repeated Prisoner's Dilemma games with different partners—rather than merely a repeated one, then reputation can operate not only within games but between them as well.

In an indefinitely repeated Prisoner's Dilemma however, mutual cooperation becomes a possible Nash equilibrium outcome, i.e cooperation could emerge between interacting instrumentally rational players provided they cannot accurately pinpoint the moment in the future when their interaction or relation will end (Heap and Varoufakis 1995: 167-168). This seems to be good news. But there is also bad news. The bad news is that there are always multiple Nash equilibria in such indefinitely repeated games. In other words, almost anything goes.

In other words, game theory needs to be supplemented by a theory of equilibrium selection, if it is to explain how cooperation actually arises spontaneously in indefinitely repeated Prisoner's Dilemma games. Starting with some well-defined problem situation, the theorist is to analyse where evolutionary processes of trial and error learning and imitation will lead to (Vromen 1995: 181). Some progress has been made in this respect by Axelrod.

One of the central themes of the social theory advanced by the Scottish moral philosophers of the eighteenth century was that there exists a specific social mechanism that can be expected to generate spontaneously cooperation among self-interested individuals: the mechanism of reciprocity, of reciprocal reinforcement by mutually exchanging rewards and punishment in social interaction (Vanberg 1994: 92). This insight has more recently been revived by R. Axelrod in his book "The Evolution of Cooperation" (1984). By way of computer experiments Axelrod simulated competition among potential alternative behavioural strategies that actors may adopt in recurrent Prisoner's Dilemma-type interaction situations. The principal result that Axelrod found is that the simple strategy of "Tit-for-Tat" (the strategy of cooperating in the first move and then doing whatever the opponent did in the previous move) performed better than any of the other strategies that were included in the experiment. Axelrod ventures that since Tit-for-Tat has the best overall performance it may in the end, after some process of evolution, be the only strategy that survives.

In a population consisting only of Tit-for-Tatters all individuals cooperate with each other all the time (Vromen 1995: 182). This cooperation can be rationally sustained without the intervention of some collective agency like the State (Heap and Varoufakis 1995: 170). Tit-for-Tat does not require the help of an external authority for its maintenance. In this sense Tit-for-Tat can be called an efficient rule (Vromen 1995: 182).

Of course, these are strong claims. It is not easy to arrive at a balanced appraisal of Axelrod's contribution. His work has provoked a lively debate that is still going on. The following remarks seem worth to be mentioned.

First, the mechanism of reciprocity can be expected to generate sufficient incentives for cooperative behaviour in PD-situations only under certain restrictive conditions, i.e., Tit-for-Tat is operable only under a highly restrictive set of conditions. The "shadow of the future", i.e., the expected effects of one's own current behaviour on the opponent's future behaviour, must be large enough. Most commentators agree that organized enforcement will be required to solve Prisoner's Dilemma problems in environments (e.g., in large

groups of highly mobile individuals) in which the mechanism of reciprocity cannot be expected to generate sufficient informal private sanctions to discourage defection (Vanberg 1994: 93; Rutherford 1994: 115).

Second, we should not forget that Axelrod himself conceptualizes the evolution of cooperation in terms of three distinct questions:

> " 1. Robustness. What type of strategy can thrive in a variegated environment composed of others using a wide variety of more or less sophisticated strategies?
> 2. Stability. Under what conditions can such a strategy, once fully established, resist invasion by mutant strategies?
> 3. Initial viability. Even if a strategy is robust and stable, how can it ever get a foot hold in an environment which is predominantly noncooperative?" (Axelrod 1984: 95)

Axelrod's notion of a collectively stable strategy is defined in terms of uninvadibility (Axelrod 1984: 56). Axelrod argues that Tit-for-Tat is a collectively stable strategy. Once Tit-for-Tat is established as the strategy that is followed by all individuals in the population, it cannot be invaded by any single mutant strategy.

As Rutherford points out however, the stability of mutual cooperation based on Tit-for-Tat is very fragile. Any misinterpretation or misperception of a cooperative response as a defect response will lead to an endless sequence of retaliations (Rutherford 1994: 114-115). Axelrod's basic format assumes players costlessly and perfectly administer their strategies. They could not, for example, accidentally "push the wrong button" (El-lickson 1994: 165).

Moreover, Axelrod's demonstrations that Tit-for-Tat is both robust and initially viable are less straightforward than they might seem at first sight. Can Tit-for-Tatters invade a population of defectors? In order to argue plausibly for the initial viability of Tit-for-Tat, Axelrod has to make the crucial assumption that the Tit-for-Tatters can play selectively with each other in clusters. But as Vromen has pointed out, this amounts to a change in the original rules of the game that state that individuals are paired at random in each sequence of the game (Vromen 1995: 184).

6.2.3. The evolutionary play of the "hawk-dove" game

The chicken or hawk-dove game contains a mixture of conflict and cooperation. Plainly both parties will benefit if they can avoid simultaneous hawk-like behaviour, so there are gains from some sort of cooperation. On the other hand, there is also conflict because depending on how the fight is avoided the benefits of cooperation will be differently distributed between the two players. The problem is to get people to behave in complementary ways.

Sugden has analyzed how the game of chicken provides a simple model of how rules of property might come into existence in the form of conventions (e.g., the first-on rule) (Sugden 1989). He takes over Maynard Smith's notion of an "evolutionary stable strategy" (ESS), which is a slightly stronger idea than the notion of a Nash equilibrium (see Maynard Smith 1982). Just as Axelrod's notion of a collectively stable strategy—from

which it is distinct—the notion of ESS is defined in terms of uninvadibility But he distinguishes between cultural and biological evolution: the mechanisms he is concerned with are learning by experience and imitation, not natural selection.

Games like chicken have more than one Nash equilibrium, but the only ESS's in chicken are those that exploit asymmetries. But which asymmetries? To some degree the concept of prominence provides the missing ingredient. This means that, if we are to explain why one set of conventions has evolved rather than another, we must take account of a society's shared, but often unarticulated conceptions of "salience" (Sugden 1993: 420).

But there is another factor.

If we analyse how conventions establish themselves, and how one convention encroaches on another, we find that the processes of evolution favor those conventions that are best adapted to the transient conditions that prevail when no single convention is firmly established (also Sugden, 1993: 401). These need not be the conventions that are most beneficial when universally followed.

Thus the patterns of behaviour that establish themselves are not necessarily efficient.

The prevailing conventions, i.e. the patterns of behaviour that are self-perpetuating, have evolved because they are more successful at replicating themselves than other patterns. As Sugden puts it: "If they can be said to have any purpose or function, it is simply replication." (Sugden 1989: 97) This factor is crucial especially in the vital early stages of evolution, before any convention becomes firmly established.

7. Provisional conclusion

The game-theoretic analyses of invisible-hand processes do not warrant the conclusion that they will always operate to generate efficient results. The institutions that develop may be sub-optimal in nature and they need not be efficient to persist. The fact that an institution endures and seems to "do better" than some other institutions does not mean that it is necessarily efficient in an economic sense. Thus the extension of the market analogy to the constitutional level, i.e., to the rules and institutions within which market coordination takes place, seems highly questionable.

It will thus not come as a surprise that most commentators agree that the theory of repeated games does not corroborate Hayek's optimistic account of the ability of spontaneous or invisible-hand processes to create and maintain socially beneficial institutions.

We are not convinced however that the results of the game theoretic analyses discussed above could provide anything like a conclusive argument.

There are several reasons for this.

First, it seems unfair to put Hayek simply in the "Panglossian category" in the first place. As I have already indicated, Hayek clearly recognized that "the spontaneous process of growth may lead into an impasse from which it cannot extricate itself by its own forces"(Hayek 1973: 88) and that therefore grown law requires correction by legislation. Hayek's far-reaching proposals for basic constitutional reform testify to the same point.

Second, the analyses discussed above apply to the emergence of an institution in a situation where none existed to deal with the specific problem at issue previously (Rutherford, 116). In this sense, rules are analyzed in evolutionary game theory in an institutional vacuum (Vromen 1995: 190). Moreover, a "strategy" in an evolutionary game-theoretic analysis seems to leave no room for conscious choice at all.

Hayek to the contrary clearly recognizes that all evolution proceeds from within an ongoing social order by the method of what he calls "immanent criticism".

It may well be that the distinctive element in Hayek's account of institutions is one that cannot be captured by the game theoretical approach, namely the fact that social institutions and rules of conduct are "bearers of knowledge" (Kukathas 1989: 220): they embody knowledge of which we are otherwise unaware. Hayek's presumption in favour of grown institutions is based on this conviction.

The fact is that this is not the kind of thing that could be derived or proved. It is more like the hard core of a paradigm or "worldview". As such it has led to the development of a comprehensive research programme. But although it has some plausibility, it cannot be proved.

Nor does evolutionary analysis as such provide us with a satisfactory normative framework for comparative institutional analysis. Hayek's "limits of reason" argument implies that, at least to some extent, we will have to rely on open-ended, competitive, evolutionary processes and on the kind of experience that accumulates in trial and error learning processes. But it should not imply that we adopt an attitude of uncritical acquiescence in evolutionary drift.

One direction in which such a framework for comparative institutional analysis has been explored recently, is provided by the research programme of Constitutional Political Economy. The basic framework is derived from the contractarian analysis of multi-level individual choice. Value-maximizing agents make in-period choices as well as choices of rules which define the in-period situation. Both types of choices are based on the same subjective opportunity-cost considerations.

It must be admitted that in the present state of development of this research programme, there are relatively few concrete guidelines for operationalizing the approach in order to analyze actual constitutional processes. One way to give operational substance to the problem of efficient constitution formation consists of invoking some notion of exit or using an avoidance cost criterion.

An alternative direction in which the evolutionary perspective may be provided with a normative benchmark consists of complementing it with a realist ethical theory. Popper has found in evolutionary theory a forceful argument for objectivism and realism. It has been argued that in normative matters evolutionism is philosophically flawed because it is based on the naturalistic fallacy. This claim may itself be flawed however. The is/ought thesis shows the need for moral bridge premises in the derivation of moral conclusions from non-moral premises, but it does not undermine the possibility of evidential relations between moral and nonmoral beliefs (Brink 1989: 168). An elaboration of this theme would go beyond the scope of this paper however.

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