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THE ECONOMICS OF CONTRACTION – A CASE FOR THE COMPLEXITY VIEW

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CONTENTS

PREFACE AND ACKNOWLEDGEMENTS

Is it true that when major perturbation challenges the basic structures of a living and dynamic system, determinism vanishes? The author of this paper finds the positive answer to this question presented by some system scientists overtly optimistic. International Seminar on Systems Research, 12.-15.6.1985 in Helsinki was an excuse to make a paper "Homo oeconomicus in social disorder" on this subject. Since then the paper has enlarged to include more fully metaphysical comparisons between neoclassical theory and one particular area of System Science, complexity view. Still this paper lacks the answer. Possibly no valid answer exists.

Later a further version of this paper will be published in "Breakdown and Breakthrough: Evolutionary Systems Approaches to Socio-Economic Development" (editored by Ervin Laszlo) under the title "Discontinuous development and Neoclassical Economics".

My ideas about complexity view, neoclassical economics, the nature of evolution and possibility of studying qualitative change and in particular economic contraction have been shaped in numerous discussions. I received valuable comments from T. Allén, V. Csanyi, S. Honkapohja, H. Hämäläinen, K. Ilmonen, V. Jarva, O. Kuusi, K. Laaksonen, E. Laszlo, P. Malaska, U. Mäki, H. Nurmi, M. Ojanperä, J. Pekkarinen, E. Pihkala, J.P. Piimies, M. Pohjola, K. Räsänen, P. Sauramo, M.L. Smeds, T. Sneck, I. Szecsödy, R. Tainio, L. Uusitalo. For the english checking my thanks are due to Malcolm Waters.

1. INTRODUCTION

The Problem

This paper attempts to assess the feasibility of linking the notion of the "complexity view" to the description of an economic agent as assumed by neo-classical economics.

This study is not as such a criticism of economics. Rather, its purpose is two-fold: First, it critically examines the descriptive limits of the economic approach. Welfare economic questions are not touched upon in spite of the fact that it is obviously welfare economic and normative implications that the complexity view would change the most. The limits of economics are evaluated by comparing a highly simplified (stylized) illustration of consumer economics with the manifest features of complex phenomena. One particularly difficult phenomenon - economic contraction - is investigated and one of the foundations of modern microeconomics - the assumption that preferences are given or exogenous - is attacked.

Second, the paper describes one potential starting point - the complexity view - which could provide a fruitful basis for further analytical discussion in economics. Possible hypotheses arising from the methodological and metaphysical principles of the complexity view are stressed. The paper could be criticized as merely a repetition of the long-standing doctrinal dispute between the historical and analytical schools (c.f. "methodenstreit" at the end of 19th century). To some extent, this paper argues against the mainstream in favour of the historical approach. However, the author does not regard it as a repetition because of the obvious new possibilities that the complexity view offer for studying society in a non-mechanical way.

The term "complexity view" is used here "as a shorthand expression for the new perceptions of reality and for the new concepts, approaches or paradigms resulting from research and analysis of the behavior of complex systems and phenomena, whether natural or social" (**Ploman** (1984)). This somewhat tautological definition will do to start with. For a fuller description of "complexity" it might be useful to contrast it with a few concepts like ontological vs. epistemological complexity and emergency vs. predictability. These concepts are elaborated further in note 1. (Of course, there are several other classifications concerning different types of complexities (see e.g. **Gottinger** (1983)).

The paper completely ignores technical and mathematical details of far-away equilibrium systems, which are one of the main contribution Prigogine´s complexity tradition. To handle states of true thermodynamic non-equilibrium, nonlinear interactions (feedbacks in auto- and cross-catalytic systems) and highly differentiated systems (see **Lazslo** (1984)) is technically very demanding. The reader who is not familiar with the "standard" conceptual framework of the complexity view is recommended to consult note 2, in which concepts used in the text, such as dissipative systems, autopoiesis, bifurcation points, far-away equilibrium and structural instability, are briefly, described.

It is always risky for a social scientist to apply directly analogies or methods taken from the natural sciences: confusions are very likely to result. Hence, concepts which most clearly refer to the natural sciences are kept to a minimum in this paper. We attempt to avoid confusion with concepts like "entropy production", not least because of this author´s limited knowledge in the field of natural sciences.

Goldsmith (1981) criticizes Prigogine heavily for the fact that among the social patterns that Prigogine´s paradigm is designed to rationalize are population growth, increase in energy use, control of the weather, genetic engineering and creation of colonies in space. Goldsmith asks how it is possible that the universe is a self-organizing process if at the same time the evolutionary process is a man-made one. Goldsmith was also highly critical of both Jantsch and Prigogine for their loose use of concepts: "Structures, systems, complexity, stability, processess" were not properly defined. Moreover, the relationship between complexity and stability seems to be more complex than Prigogine assumes. The last two critical remarks also apply to this paper, but the author does not feel sufficiently competent to take an explicit stand to this criticism here.

In this study, we have attempted to avoid openly normative statements which arise from the ideas of the complexity view. The author does not believe that the complexity view as such can be legitimately and unproblematically extended to, for example, arguments for political decentralization. The author doubts, too, whether any general evolutionary dynamics is possible. For example, a competitive evolutionary (Darwinian) framework as a basis for the study to firms might be reasonable, but to extend it to consumer economics would be descriptively and morally suspect, if at all justifiable. What, for example, would be meant by the "survival of the fittest consumer"?[3]

This paper does not provide definite answers to any concrete empirical questions. Rather, it seeks, especially in the application of economic contraction, to develop some fruitful hypotheses which might later be evaluated empirically. It should be noted that we are working in highly specific area of research. Often the results we obtain are very theory-specific because we cannot directly perceive complex phenomena empirically without some intervening (theoretical) reasoning. When studying complexity, there are no pure empirical facts. When evaluating the descriptive power of economics in complex phenomena an obvious difficulty is to find a reference point against which the results of the approach might be contrasted. Thus, to compare economics with the complexity view is not necessarily to compare it with reality.

To study an economy in the spirit of the complexity view implies, among other things:

- First, characterizing complex phenamena as process-oriented, in contrast to the emphasis on solid system components and structures composed thereof (**Jantsch** (1980), p. 6);
- secondly, emphasizing systemic interconnectedness over space and time (**Jantsch** (1980), p. 8); and
- thirdly, stressing the self-organizing properties of different systems (systemic levels)

All these properties are implied by the fundamental idea of the complementarity of structures and functions **Jantsch** (1980), p. 41). Spatial structural entities are continuosly changing, partly as a result of functions. These functions are changing all the time as a result of this interconnectedness. Evolution is open not only with respect to its products, but also to the rules of the game it develops. This dynamics is illustrated in our model by referring to the interconnectedness of micro and macro functions and structures (the extended illustration of an economic agent in chapter 4.

Summary of contents

Chapter 2, "Homo oeconomicus", scetches the standard neoclassical concept of economic actor. It emphasizes the assumed givennes of the inner and outer structures of the agents, here consumers. Mechanics of utility and self-interest are still dominant in standard economics.

Chapter 3, "The science of complexity", gives a rough overview of the ideas presented under the title "complexity paradigm". It compares these ideas and concepts with those of neoclassical economics.

Chapter 4, "An extended illustration of homo oeconomicus" gives one specific model of an economic actor which combines some relevant metaphysical ideas of complexity view to the model of standard economics.

Chapter 5, "Economics of contraction" presents the crucial difference between economic expansion and contraction.

Chapter 6, "Economic contraction - three cases for preference formation" discusses specific dynamic properties of economic contraction related to endogeneity of preferences. It illustrates the theoretical ideas presented in the model of chapter 4. Three simultaneous processes of preference formation will be presented:

a) outer feedback (microbehavior-macroconsequences-microbehavior, i.e. general sociological theory)

b) inner feedback (individual reasoning-actions-consequences-reasoning, i.e. theory of lifestyle and behavioral lags)

c) internal preference formation (inner dynamics of preferences during bifurcation periods)

These simultaneous processes could sometimes account for the counterintuitive nature of economic contraction. Counterfinality, contradictions, inconsistency, irrationality, and processes of opposite effects may underlie evolution. To study exceptional phenomena like economic contraction is one way to study these normally latent forces influencing evolution. To understand social dynamics is to study phenomena which are not necessarily perceived by standard economic theory. To begin with we should ask:

Is it possible to comprehend phenomena of economic disorder, structural instability properly with the tools of standard (here consumer) economics? What are those tools?

2. HOMO OECONOMICUS

Substantively rational homo oeconomicus

By homo oeconomicus we mean here a classical concept used to illustrate an economic agent. It rests on two assumptions (see, for example, **Simon** (1976)):

1) The economic agent has a particular goal (for example, utility maximization)
2) The economic agent is substantively rational; i.e. he aims at given goals, whatever the goal is.

Simon contrasted substantive rationality to procedural rationality. The latter is based on the findings of modern psychology and is related to deliberation, learning procedures and cognitive processes which are unknown in substantive rationality. It is fair to say that these factors are also partly included and acknowledged in the modern theory of choice (see, for example, **Day** & **Groves** (1975), and for the biases, **Tversky** & **Kahneman**(1974)). However, much modern demand analysis (empirical consumer research) still lacks these theoretical ideas.

So far, the homo oeconomicus construct implies only the separate existence of means and ends and an internal consistency assumption (narrow rationality).[4] It is important to note that there are several interpretations of homo oeconomicus concerning its realism and pragmatic value. For example, **Machlup** (1978) emphasizes that the "ideal type" assumptions are meant only for studying the results of choices, not for illustrating choice situations of individuals. However, this is not the view adopted in this paper. On the contrary, one of the main claims to be put forward is that in order to understand the frequently counterintuitive results of choices (complexity) it is necessary to also study the (internal) "structure" of decision-makers.

To attribute psychologism to a neoclassical programme is, as **Latsis** (1976) pointed out, a fundamental, though frequent, misunderstanding. He argued that the development of marginalism (in the 19th century) "gave rise to the research programme of situational determinism whose central characteristics are the autonomy of economic decision-making and the deliberate exclusion of the decision-maker's inner environment from explanations of economic behavior." (**Latsis** (1976), p. 17).

Environmentally and situationally determined homo oeconomicus

Homo oeconomicus is one part of the core[5] of the neoclassical research programme. **Latsis** ((1976), p. 22) gave the following simplified illustration of the hard core:

i) Decision-makers have correct knowledge of the relevant features of their economic situation.

ii) Decision-makers prefer the best available alternative given their knowledge of their situation and of the means at their disposal.

iii) Given i) and ii) situations generate their internal "logic" and decision-makers react appropriately to the logic of their situation.

iv) Economic units and structures display stable, coordinated behavior.

According to Latsis, the libertarian-rationalistic model of choice is paradoxical, indeed:

> Decision-makers have only single-exit situations. There is no room for discretion. It is only the logic of the situation, not the individual, which defines behavior (**Latsis** (1976)). Modern economics excludes not only the decision-makers inner "environment"-psyche, but also the social environment (here outer structure).

Latsis emphasized the nature of given environments. Inner and outer environments of economic agents are predetermined and constant. Only so-called economic and quantifiable variables, prices and incomes, vary. Information is given (i), the logic of reasoning and rules are given (iii) and the outer environment is given and stable. These assumptions, sometimes referred to as the ceteris absentibus assumptions, or more frequently the ceteris paribus assumptions, imply that problems could arise in economic theory when trying to understand structural instability, structure in change. Maybe even a new language (or analytical apparatus) is needed if complex structures and qualitative change is to be studied. To conclude:

> When studying complex interconnected phenomena within a neoclassical framework, there are two problematic assumptions. The first is the fixed inner (cognitive) environment, a black box almost without any internal structure. The second is the given outer environment. All the institutions, norms, rules, laws etc are ignored. Even if their existence is acknowledged the feedback mechanisms (for example, chain: choice (t=1) - institution (t=2) - choice (t=3); t=time)) should be neglected for analytical reasons. (For example, for (ideological) precommitments see **Sen** (1976)).

This paper argues, following among others **Hollis** (1983) and **Field** (1984), that in microeconomics several implicit ceteris paribus assumptions and also feed-back mechanisms should be taken into account explicitly if we are going to understand complex development of the economy and society, especially when studying transition periods or evolution in the long run. The structural variables (parameters), the role of which often emerges when they are threatened by disturbances, consist of several institutional arrangements, norms, institutions and human predispositions.

However, to this author it seems that to study disorder is a definitely more profound task than merely extending the analysis to new unexplored areas or increasing the number of variables. Metaphysics should also be studied. Those concepts which normally enable an economist to produce a unified picture of reality should also be analyzed in a systematic way.

The mechanics of utility and self-interest

It has been argued (e.g. by **Thoben** (1982)) that metaphysical ideas in neoclassical economics are derived mainly from Newtonian classical mechanics. Thus:

1) All qualitative structures can be regarded as the aggregate of elementary, homogenous quantities.
2) These elementary quantities, far from capriciously, conduct themselves as if they were exposed to well-defined forces, notably the forces of push and pull.
3) Hence the movements of the particles become calculable and can be formulated in general "laws" which permit us to determine the state (**Lowe** (1951), p. 404).

This, roughly, is what microeconomics and consumer theory are about: choices of almost homogenous consumers, individuals with minor internal structures, can be aggregated directly; macrobehavior is understandable as a representation of the rational, not capricious, behavior of the consumer; predictions are trivial. No matter whether microeconomics is based on mechanistic analogy (**Thoben** (1982)) or on energetics analogy, as **Mirowsky** (1985) has put it[6], we could say that the mechanical world-view has its traces in economics. The externality of causation, the passivity of matter, the atomicity of fundamental entities, the absence of internal structure and complexity - all essential features in the mechanical world-view (**Bhaskar** (1975) p. 82) - can easily be found in the diagnosis made by **Latsis** (1976).

However, this is not necessarily a very fair illustration of modern consumer economics. Much work has been done to advance theory beyond the mechanistic approach. Still, lacking for the moment any better alternatives, metaphysics, especially in empirical work, should rest on some foundations - explicitly or implicitly.

Later, special emphasis is be given to the counterintuitive elements of consumer choice in an extended illustration (section 6). Intuition is much dictated by the mechanistic analogy of microeconomics. Studying one special case (the economics of contraction) offers a way of problematize intuition based on the dominant research tradition. However, we should first, find out whether the complexity paradigm can supply any coherent metaphysics for studying complex social systems. Before doing that, it should be underlined that the whole paper constitutes an attempt to create an approach for studying one limited area of economics in the spirit of the complexity view. In this sense, the evaluation of the complexity view could be biased.

3. THE SCIENCE OF COMPLEXITY

> "Basic features in these paradigm changes imply both a reaction against, and, more importantly, a going beyond fundamental canons of the classical Western scientific tradition, thus beyond what now appear as mechanistic, linear, closed, deterministic, reductionist, universalist paradigms of this tradition. There is a basic shift from simplicity to complexity, from structure to process. Instability, openness, fluctuation, disorder, uncertainty, improbability are introduced into scientific models of reality. Thus, the new paradigms concern non-equilibrium physics, dynamic open-systems, dissipative structures, the creation of order out of noise and disorder." (**Ploman** (1984)).

Why bother with metaphysics?

The philosopher Alfred North Whitehead emphasized that the task of philosophy is to reconcile permanence and change, to conceive of things as processes, to demonstrate that becoming forms entities that are born and die. It is these metaphysical ideas which form one basis of the complexity view (**Prigogine** & **Stengers** (1984), p. 95).

Metaphysics (or ontology) does not need any defence among contemporary philosophers (**Bunge** (1977), I, pp. 23-24). The situation could be different among social scientists, especially among those who emphasize "social technics" and pragmatic values of scientific activities. "Scientific ontology" as **Bunge** ((1977), I, p. 24) states "is a collection of general or cross-disciplinary frameworks and theories, with a factual reference, mathematical in form and compatible with - as well as relevant to - the science of today". Whether or not the complexity view is scientific ontology is an open question. It is, however, useful for an economist interested in disorder to attempt to draw a parallel between the complexity view and economics. (For the relevance of metaphysical questions to scientific progress, see **Bunge** (1977), I, pp. 23-24). One important, too rarely presented point should be made. It has both analytical and political dimensions:

> If economics and the complexity view are to be linked, the ideas of the complexity view should in the first instance be evaluated not according to its descriptive or predictive power but according to its congruence with both our contemporary theories about the economy and our conventional wisdom (i.e. common - sense thinking of decision - makers), which is often implicitly based on the former. To understand and govern systems by linking different views is possible only if the metaphysics of the views does not contradict.

One example of the problems caused by such incongruence in global policy discussion was met in the global modelling activities of the 1970s. As the influence of economists in the field of global modelling grew, concern with global issues derived from the problematique of the Club of Rome diminished (**Meadows** et al. (1982), p. 100). By applying a new framework with more narrowly defined boundaries, of the conventional theory the original concern for long-term global development almost disappeared. Neither was the linking of these two views necessarily advantageous for economic theory. It might be that large (i.e. containing much data) models with very simple structures are not the right direction to be taken towards understanding a complex global economy.

A paradigm?

What is meant by the "complexity paradigm"? The term complexity was already briefly touched upon in the introduction of this paper. For this author it has been very a difficult task to decide whether we are really talking about a "paradigm" - i.e. the entire constellation of beliefs values and techniques commonly shared by the members of certain (scientific) community - or something else like "theory, ideas, framework, approach". It seems to the author that to speak about a paradigm in the context of complexity places too much stress on "commonly shared". However, "paradigm" is used loosely in this paper as being synonymous with "view". Perhaps a real paradigm will emerge once theoretical ideas (e.g. autopoiesis, self-organization and dissipative systems) are more coherently connected to empirical research, also in the social sciences.

Is the complexity view also applicable to the study of social, here economic, dynamics? It is true that new perceptions concerning the dynamics between stability and instability, - between inertia and change - are emerging in several fields as **Ploman** (1984) argues. Ploman, though, goes a bit too far in connecting, for example, the time-geography of Hägerstrand and the linguistic theory of Chomsky. Still, one could add to the list offered by Ploman a number of evolutionary views (for example, **Daly** (1980), **Guha** (1982) or **Malaska** (1985)), applications of the theory of automata (**Roeding** (1977) and the theory of finite complex systems (see **Albin** & **Gottinger** (1983) and **Gottinger** (1983)), all of which have interesting implications for economic research. With the aid of these new approaches, it is possible to make economics simultaneously more abstract and more date (c.f. **Roeding** (1977)). Let us, however, remember that there have been several evolutionary theorists before, even in economics.

Joseph **Schumpeter** (c.f. 1947) is one of the most prominent. **Duesenberry** (1949) also stressed the irreversible nature of development, particularly in the case of consumption.

There are both internal and external tensions in the social sciences arguing for the inclusion of complexity in the analysis. Here we concentrate only on internal development. Discussion of increasing global complexity and turbulences, though important, is left in a general way to the next chapter.

Mechanistic (economic) models refer to the representation of the dynamics of physical systems. The representation of the dynamics of physical systems as deterministic and reversible requires that physical systems never change their identities over time. They can never become anything radically new. Prigogine´s approach (study of dissipative systems) emphasizes physical systems which exhibit radical novelty. This suggests the need for a new foundation of physics, one whose relationship to identity, time and dynamics differs from that shared by existing mechanics. We argued above that in neoclassical economics inner and outer invironments are given and that the approach is mechanistic. By contrast, the complexity view describes the manifest results of disorder. The issue (in this paper) is whether these new insights into the behavior of natural systems could have any relevance in economics, especially when studying turbulent periods and development in the long run. Again, readers unfamiliar with the jargon and definitions of the complexity view are urged to refer to notes 1-2.

Certainly, it could be argued that progress in the natural sciences (see **Prigogine & Stenger** (1984)) has applicability to and implications for the social sciences. No doubt, there are several areas of potential applications. However, it seems to this author that too much optimism is of negative value. One trivial note will suffice here: In the social sciences, and especially in economics, mechanistic (Newtonia, see **Thoben** (1982)) or energetic (**Mirowsky** (1985)) analogy has been very important. The fact that mechanistic explanation has been questioned in the natural sciences does not, of course, mean that it must be questioned in economics. Analogies do not refer directly to reality. They are only mental constructs. Progress in describing complex systems, for example, with the aid of catastrophe theory, changes the nature of theories, not necessarily because our view of reality has changed but possibly because of methodological progress.

It seems very likely that part of the popularity of the complexity view can be attributed, like social ideas generally, to ideological considerations. Notions of small-scale and freedom sell well. This is one reason why it is of utmost importance to apply the complexity view to society critically. It is possible that "small scale and real freedom of will" cannot be achieved without large-scale action and planning. The empirical questions are not considered further now. It is sufficient to refer to Steven **Lukes** work "Individualism" (1977), where he tries to show that real individualism, i.e. autonomy, self-respect, privacy and self-development, is not always served best by individualistic doctrines and arguments.

Complexity vs. the neoclassical paradigm

When comparing Ploman (see quotation above) and the core of the neoclassical economics (here the homo oeconomicus concept), the difference is obvious. It is not possible here to give a very precise picture of the difference between neoclassical economics and complexity paradigms. Instead, we simply illustrate the differences by means of the following pairwise list of the attributes associated with the description of change. The first word in each pair refers to neoclassical economics and the second to the complexity view:

Process/Change:

Neoclassical	Complexity
deterministic	vs. stochastic
reversible	vs. irreversible
controllable	vs. noncontrollable
predictable (ex ante)	vs. explainable (ex post)
quantitative	vs. qualitative
gradual	vs. revolutionary
homogenous	vs. heterogenous
linear	vs. circular

One basic difference lies in the perception of time. Neoclassical view is timeless in a sense (for so called Cambridge criticism see **Cohen** (1984) and **Parrinello** (1984)). Another related difference is the individualism (mainly methodological) of economics in contrast to the holistic view of complexity paradigms. An important difference is also in the assumptive role assigned to the researcher. In economics, the objectivity and passivity (outsiderness) of the researcher is emphasized, while the complexity view gives special weight to awareness of necessary subjectivity and involvement. The latter view emphasizes

the difficulty of separating subject and object, reflecting the ideas of relativity theory (see **Allen** (1984), and **Prigogine & Stengers** (1984)). It is argued that nowadays the researcher could, and even should, be responsible for "world-making" in a concrete sense. "We are not the helpless subjects of evolution - we are evolution" (**Jantsch** (1980), p. 8). This slightly paradoxical view among others has been strongly opposed by **Goldsmith** ((1981), p. 239).

Possibly the most controversial difference between the two approaches to be discussed below in section 6: is the question of free will in a bifurcation regime. According to the complexity view, there are a better possibilities (freedom) under a bifurcation regime for small actions to follow free will and effect the world than under "normal conditions".[7] In neoclassical economics the effects of constraints, if dealt with at all, are likely to operate in the opposite directions (see the extended illustration of an economic agent).

Finite complex systems

To give substance to what is meant by complex systems, we should describe some properties, following **Gottinger** (1983), of finite complex systems. Finite complex systems are systems of intermediate complexity, i.e. systems which are neither small nor infinitely large. For both polarities mathematical devices exist. **Albin** and **Gottinger** (1983) presented an approach, based on automata-theory, which could possibly also handle finite complex systems. In our paper the methods are not studied; only the properties of finite complex systems (FCS) matter now:

1) The FCS responds very sensitively to changes in its environment. Complexity is increased if responsive actions have, in turn, an impact on the environment. This property may be called external interaction. Adaptation and evolution are example of external interaction.
2) The FCS is highly interdependent with regard to the actions of its components. In social dynamics the internal interaction could lead to phenomena like "snowball" effects.
3) In contrast to simple systems where behavioral rules can be relatively easily aggregated to form total system behavior, the FCS is characterized by thresholds of complexity below which the system may show regular, stable patterns, but above which new and qualitatively different modes of behavior can occur.
4) An FCS is only partially or locally controllable. Effects of interventions are not fully understood and interventions produce global behavior which is not foreseen (**Albin**, P.S., **Gottinger**, H.W. (1983), pp. 255-256, **Gottinger**, H.W. (1983), pp. 2-3).

Separation of outer and inner sources of change (respectively 1-2), a certain degree of unpredictability and uncontrollability of systems are much in the spirit of Prigogine's findings. The same applies to **Albin** and **Gottinger's** ((1983), p. 256) assertion that FCS must be described with mathematical forms which specify irreversible time - in contrast to the differential equation forms of classical dynamics.

Complex systems often appear to be counterintuitive. Their behavior diverges from what "common sense" suggests their behavior ought to be. Economic contraction is a period of breakdowns, adaptability and evolution. Equilibrium properties of economic systems are no longer relevant. Optimality on one level does not lead to optimality on another when values are in transition. Possibly evolution is just a trial and error process in which irrationality plays a prominent role. These intuitively problematic phenomena will be discussed in the next sections. One thing seems to be clear: these new insights stress the limitedness of one particular scientific discipline and call for interdiciplinary approaches.

4. AN EXTENDED ILLUSTRATION OF HOMO OECONOMICUS

For dynamization purposes it is useful here to define the inner and outer environment of an economic agent as structures, in accordance with the structural-functional analysis by **Chase** (1979). A structure consists of those uniformities or patterns which can be discerned or alleged to exist in the phenomena studied. It should be emphasized that, contrary to Chase, latent structures also play a prominent role when, for example, analyzing novel behavior arising in a bifurcation period. Structural entities can be classified as

a) historical (mechanist),
b) non-human biological, or
c) human biological and social.

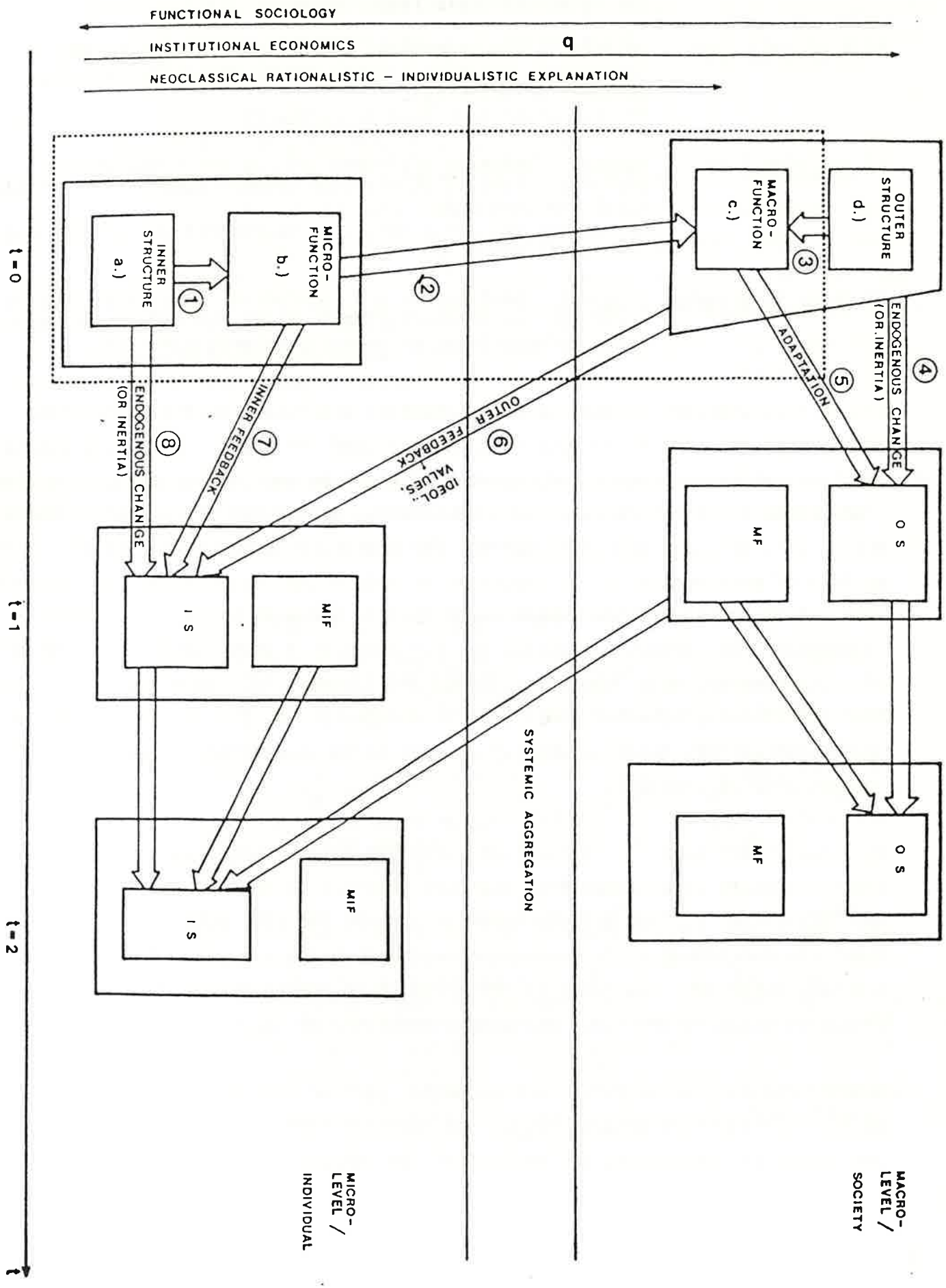
Here we refer mainly to last one, i.e. social entities.

A function is a condition or state of affairs that results from the operation of the relevant structural unit. In addition, contrary to chase function refers also more generally to the nature of the processes, the type of reactions and reaction kinetics (**Jantsche** (1981) p. 67).

It is argued in this paper that in the complexity view development (evolution) can be seen as a continuous interplay between structures and functions. Neither is predominant - in contrast to the view of structuralism or functionalism. In economics, "structuralist" ideas dominate as long there is assumed to be given inner and outer structures which dominate behavior. No simultaneous relationship is allowed between functions and structures in spite of the fact that, for example, **Schumpeter** (1947) argued that to understand change it is necessary to examine this simultaneous relationship. In this paper we try to give an illustration of an economic agent which explicitly, in the very spirit of the complexity view, describes the interplay between structures and functions. Some critical and clarifying remarks concerning structure-function separation (in the case of explaining change) are given in note 8.

The extended illustration of homo oeconomicus (to be called extended homo oeconomicus) consists of two structures and two functions and several intertemporal feedbacks (in figure 1 only feedbacks influencing individual preferences are stressed).

Figure 1. **Extented illustration of homo oeconomicus**



An extended illustration of homo oeconomicus: (figure 1)

a) Inner structure: Preferences, logic (reasoning) and more generally the rationality postulate (=homo oeconomicus) - entity. The inner structure leads to (arrow 1):

b) Microfunction: Private action determined by the inner structure and "economic" variables (income and prices) (for example, consumption activity). The microfunctions lead to (arrow 2):

c) Macrofunction: Aggregate behavior (followed by); systemic aggregation includes potential interaction between agents (for example, total consumption). Macrofunctions are a result of microfunctions and the outer structure (arrow 3)

d) Outer structures: Language, constitutive and regulative rules, institutions, norms etc. which restrict and direct functioning at macro- (also micro-) level (= normally ceteris paribus).

Figure 1 illustrates explicitly some potential extensions needed in economic analysis if the complexity view is to be included. In phase 1(t=1), the typical neoclassical explanation is represented by the area enclosed by the dotted line. From the inner structure (i.e. homo oeconomicus with given preferences), micro-action (cf. consumption) is "deduced". The macrofunction(ing) is a result of the actions of microagents. It is important to notice that aggregation is "systemic". Interaction between single agents gives rise to a result which is not pure "summation", as already emphasized by, for example, **Keynes** (1937) in his study of stock markets. Both **Schelling** (1978b) and **Elster** (1982) have argued convincingly that self-serving behavior could lead to unexpected results. Elster has emphasized that certain results, usually assumed to be intentionally generated, are in fact only by-products.

As already mentioned, in rationalistic-individualistic analysis the outer and inner structure is excluded from explicit analysis by ceteris paribus-assumptions. The "direction" is from private needs to general (social) action. As is well known, in functionalistic (Parsonian) explanation the analysis proceeds in the opposite direction: the focus is primarily on so-called system "needs". Neither tradition is sufficient when studying instability of structures (and functions).

General equilibrium analysis, a fundamental part of modern economics, studies mainly relationships between micro- and macrofunctions. The only institutions that exist in the economy are markets of the competitive type (**Schotter** (1981)).

All information in the economy must be transmitted through prices formed in such markets. Agents act parametrically and in isolation. It should, however, be remembered that, in spite of the problems attached to its emphasis on the equilibrium concept, "general equilibrium" is one possible, highly sophisticated, way to study complex situations created by market agents (again for "mechanistic fallacy", see **Thoben** (1982).

For the sake of abstraction, neoclassical economics usually assumes that structures are almost stable. (For the necessity of fixing goals in optimization models, see **Prigogine** and **Stengers** (1984, p. 207) or **Cohen** and **Axelroad** (1983); for the relative stability of economic structures, see **Harsanyi** (1960)). Obviously, in the complexity view neither the outer (macro) structure nor the inner (micro) structures can be assumed as given. Structures have "histories" of their own and they are constantly changing. We shall here give one, very tentative illustration of how changes, especially in the inner structure (preferences), might be described.

Upward, downward and horizontal links between the "boxes" in figure 1 illustrate obvious sources of structural change. In this framework trivial sources of structural change (with one connection) are as follows:

Endogenous changes in the outer structure (cases 4-5; cf.figure 1):

4) Usually inertia of the outer structures (slow variable) implies fixed structural entities; interaction between parts (cf. polity & economy) could lead to qualitative change, especially near bifurcation points.

5) Macroevents - function(ing) forces the structure to respond (functionally or dysfunctionally); i.e. structures adapt. For example, the emergence of property rights could be seen as a structural adaptation when umlimited resources become limited. **Ullmann-Margalit** (1978) and **Schotter** (1981) give interesting examples of the emergence of institutions as solutions to different game-like situations.

6) Outer feedback; the inner structure adapts to macroevents and the outer structure, which, in turn, are results of microactivities. Development of society implies changes in the inner structure. For example, industrialization - or urbanization - has created new ways of life (see, for example, F. **Hirsch** (1977), **Hirschman** (1982) or **Riesman** (1950). The outer feedback has not been a major area of research for "mainstream" economists. **Haavelmo** (1971) is a notable exception. His concern about the implications of a rising level of aspirations with increasing consumption ("appetite arousing cake") are of great significance for welfare analysis, even if not widely known. Evidently, preferences are not fixed but rather the results of possibilities (**Elster** (1982) and, more generally, of social development.

7) Inner feedback; a single agent, when making decisions, creates or limits future decisions. For example, the chain of "reasoning, action, consequences, reasoning" operates so that future decisions are also functions of the previous chain etc. If memory- or expectations- are included, the complexity of the "inner feedback" mechanism will be more obvious. There is conservative lag. Surprises also affect preferences if the world is too complex for the decisionmaker to develop a correctly specified model of the environment (**Cohen** and **Axelrod** (1983)). In consumer theory, one version of the inner feedback mechanism is included in so-called habit formation models (see **Pollak** (1976)), where the consumption of previous periods (=microfunctions) is assumed to affect this period's consumption (or preferences).

8) (Endogenous) change (potential) of the inner structure: Inertia of the inner structure is assumed to be so strong in economics that a given fixed structure can be assumed. Usually this assumption is called the assumption of fixed preferences. The reality of this assumption is most severely threatened when outer feedback (6) strengthens (for example, under social transformation), or when the inner feedback mechanism (7) works efficiently (for example, habit formation). A third possibility is that the structure itself is near its unstable bifurcation area (for example, in the turmoil of passions). In that case, even a small change in outer structure could cause a qualitative change in inner structure and in the action pursued. It is clear that these three sources (6-8) of preference change work together and that indirect links between them could be very complicated.

The framework presented above (figure 1) attempted to extend the traditional neoclassical model of an economic agent towards the principles of the complexity view. In this framework, the homo oeconomicus idealization is only one possible specification (upward arrows; dotted line). Complexity view ideas can be illustrated by the inclusion of diagonal and horizontal arrows. Their inclusion implies more emphasis on feedback mechanisms and the irreversibility of evolution. The nature of these mechanisms will be discussed briefly in the following section by analyzing economic contraction.

Before this, however, one problem needs to be emphasized. It was assumed above that structures adapt. This implies that the structures are somehow natural and fixed: structure maintans itself in spite of the constantly changing elements that make it up. It could, however, be argued the other way around. A rapid metabolism is a condition for the maintenance of the system (**Elster** (1978), p. 150)). For example, **Heiner** (1983) argues that routine decisions are one way to cope with uncertainty and rapid change met by an agent. Rules of thumb could be seen as representing a kind of inner structure which generates behavior. **Gidden's** (1979) idea of duality of structures (or structuration) is also hostile to the artificial separations of dynamic-static or diachronic-synchronic: rules and resources (structures) both constrain and enable action. There is no sense in separating permance and change. However, these problems will be left unanswered in this paper.

Next we shall beriefly scetch a specific case of economic ontraction for applying the extended model of this section. After that (section 6) we shall point out some potential directions for the study of the feedback mechanism illustrated in figure 1: Economic contraction and a) outer feedback, b) inner feedback, c) self-organization of preferences. (We shall not consider endogenous change in the outer structure.) It will be shown that these mechanisms may have effects which operate in opposite directions, i.e. a change in outer feedback and inner feedback when the feasibility set of choices is restricted plays a stabilizing role while inner feedback destabilizes. This is, of course, a matter for empirical research. The results are only speculative and illustrative.

5. THE ECONOMICS OF CONTRACTION

In this paper, we examine "complexity" by considering the example of economic contraction. It is assumed that the resources available for consumption in the economy (nation) become more limited and that, at least for some consumers, the set of feasible choices becomes narrower because of a decrease in income. The problem will be dealt with more concretely in section 6. This section only discusses the crucial difference between economic expansion and contraction and its implications.

Is it possible to evaluate symmetrically from the results of an x % increase in consumption the implications for an x % decrease in consumption? Or, to give a numerical example: does income elasticity of 2 for say, cars, estimated from the growth path of the economy, imply that, in the case of a 10 % decrease in income, expenditure on cars will decrease by 20 %? Intuitively, it is evident that, both at macro- and micro-levels, the results of negative and positive growth are not symmetric. The problem is that negative growth periods are so exceptional in developed countries that there could not be any empirical content (information) in the estimated parameters of econometric models. Again intuitively, even purely theoretical arguments of standard economics could be regarded as being almost absurd under contraction (cf. the law of decreasing marginal utility).

To put the proposed argument more abstractly:

> If an economic contraction is to be studied, neither structural entities, nor relationships between them, can any longer be assumed to be indisputably given (as possibly they can in the case of expansion). Economic contraction is an example of a case where new (compared to expansion) structures and functions arise.

The first step in studying economic contraction is to put forward expolicitly a hypothesis of possibly latent functions and structures. This is done in section 6 when discussing the extended illustration of an economic agent. It is, of course, a matter of discretion when an analytically useful simplification of given structures should be offered for the sake of closeness to reality. Here we are trying to convince the reader that, among other things, the stochastic nature of process (bifurcation periods) and the thresholds of evolution sometimes leads to an emphasise on the irreversible and singular properties of economic processes, and thus to an emphasise on the structural differences between expansion and contraction.

An example of the crucial difference between economic contraction and expansion is given by a non-mathematical, loose formation of a question originally posed by **Schotter** (1977):

Example: politically sustainable economic expansion vs. contraction

Let us assume: There is one divisible commodity A to be shared by n players (n>2). The original, status quo allocation of A is "approved" by all the players. These shares are proportional to the power structure. The power structure is fixed.

For the next period there are two alternatives:

a) x % increase in A to be shared between the players.
b) x % decrease in A to be shared between the players.

If the power structure is fixed, the case for the positive increment is almost trivial: the increment will be divided according to status quo shares. What about the negative increment?

Intuitively, it seems most unlikely that the strongest (the payer with biggest original share) will also agree to accept the biggest share of the negative increment.

The question is analyzed more elegantly in **Schotter** (1977). He distinquishes two games (cf. a and b above):

a) The "Benefit Game"
b) The Avoidance-Garbage Game

In the first case linear growth is both economically and politically efficient. Given, a homothetic objective function and "meaningful" initial allocation, the linear growth path will be the only one that will be optimal as the budget grows. In terms of political efficiency, the linear growth path minimizes the maximum complaint that any player (sector) or group of players could have against the growth plan (**Schotter** (1977), p. 410).

In the second case (equivalent to the Shapley-Shubik Garbage Game), the politically efficient contraction will no longer be linear (**Schotter** (1977), p. 414). Now economically and politically efficient solutions are different.

More technically: in the benefit game there exists a unique core which is identical with the nucleolus (i.e. the politically efficient solution). The garbage avoidance game has an empty core. If the original allocation of the economy is non-symmetric, the contraction defined by the nucleolus will not be linear.

A contraction or compression (discretionary) has so far received little attention from economists (see **Morgenstern** (1966), **Morgenstern** and **Thompson** (1976), **Schotter** (1977)). In consumer economics the question is, as far the

author knows, neglected completely.[9] In pragmatically-oriented marketing studies the problem has been studied - of course as a result of the depressed 1970s - by **van Raaij** and **Eilander** (1982) and **Shama** (1980).

Contraction should be distinguished from ordinary cyclical downswings, which are temporary and where structures are assumed to be unaffected by variations in the growth rate. To this author it seems that one of the greatest obstacles to the long wave approach (cf. Kondratiefs of 50 years duration) being taken more seriously is precisely the fact that it is implicitly assumed that structures are virtually unaffected by preceding periods. The idea of a constant duration of a period is a very strong assumption. The function-generating structures would have to be very special to regularly generate cycles of constant duration.

This paper concentrates on private consumption only. Several questions concerning the implications of economic contraction for consumption patterns could be asked:

- Could preferences change in response to social processess? How do habitual choices respond to economic contraction? Is it possible that there is some inner dynamics in preferences which is catalyzed by external factors, in this case economic contraction?
- Are goods with a high income elasticity as flexible as standard theory perhaps assumes, or do consumers decrease consumption evenly?
- Do individual patterns of consumption change in more differentiated or identical directions?
- Is it only patterns or also preferences that change?

Our approach will emphasize the unity and simultaneity of processes (of possibly opposite effect) influencing consumption patterns both at macro- and micro-levels. Obviously, economic agents respond to new situations both consciously and unconsciously; both psyche and institutions adapt and new forms of behavior emerge. It is possible that disturbances and instability at macro-level do not lead to instability at the micro-level of individuals.

6. ECONOMIC CONTRACTION - THREE CASES FOR PREFERENCE FORMATION

When studying an economic agent in economics, the basic hypothesis is that the agent (here assumed to be a consumer) will always choose a most preferred bundle from the set of feasible alternatives. Preferences are logically disconnected with the feasibility set, i.e. constraints, and usually assumed to be fixed. Preference order should be unaffected by restrictions of the feasibility set.

It might be that, during normal periods, preference orders (values, interests, wants) are sufficiently invariant to changes in the feasibility set (i.e. the order x PyPz does not change no matter whether x is obtainable or not). This paper argues that when structures encounter radically new tensions preferences may change. This argument has surprisingly strong implications. Studying preference change explicitly alters the results of the analysis: in the short run the stability of economic systems seems to be increased. A reader not familiar with more general discussion on endogenous preferences is urged to refer to note 10.

When an agent encounters a disturbed environment (in this case, resources become more limited) there are at least three ways to react. First, an agent could try to influence the environment. As will later be seen in the case of economic contraction this is unlikely because of depolitization: economic contraction may create ideologies which emphasize individual acts and responsibility instead of political collective actions. As Woodward has so nicely put it, one obvious way to cope with self-caused problems is to externalize causes (**Woodward** (1982), p. 272). The term "turbulence" has been much used for this specific reason.

Secondly, an agent could change his behavior so as to conform to the new regime, but at the same time retain his old preferences. This is the obvious way to view the matter in economics: patterns of behavior adapt immediately to the shock. Problems arise if there are inflexibilities as a result of habit formation, i.e. inner feedback. A decrease in resources could lead to new consumption patterns which are based to quite a large extent on addiction and signalling (signal of social status) commodities. This might lead to a situation where the agent decreases most his consumption of "necessities", food etc., during the first stage when income decreases (c.f. Sweden in the 1970s). If there were a symmetry between growth and negative growth, the first items to experience a decrease in consumption should be "luxuries", not necessities.

Thirdly, an agent could change his preferences according to the new situation. This is the most problematic case. Let us consider just one possibility for which there is vague empirical evidence: defensive mechanisms (at the social and individual levels) when conflicts, anxiety and frustrations are encountered. Under economic contraction, both individuals with reduced resources as well as disturbed societies create new goals. Aspiration levels are lowered, so that there are seemingly no visible adaptive tensions in the new situation. This kind of adaptation of values and political interest at the macro-level and preferences at the micro-level could stabilize disturbances and changes in patterns of behavior. However, there certainly exist some thresholds above which disturbances of the environment lead to radically new orientations and breakdowns at both levels. Behavioral results following adaptation in values and preferences could be more stable within periods (in the short run) than the results of direct behavioral adaptation without a change in preferences. Similarly, the latter is more resilient, i.e. in spite of (or because of) its continuous change (local instability) it is less prone to major breakdowns.

It is assumed in economics that an agent always reveals his preferences directly in choices. Valuation of choices is independent of possibilities. If choices change, it is not because of a change in valuations (preference order) but because of a change in constraints, mainly in income and prices. Analytically, it is a very difficult empirical question (see **Stigler & Becker** (1977)) whether a change in behavior can be attributed to a change in "objective" canstraints (second type of adaptation) or to a change in preferences (third type of adaptation). This matter cannot be dealt with adequately here. Obviously, a change in behavior in a bifurcation period is the result of both kinds of adaptation.

Next, we shall analyze economic contraction with the aid of the extended model of Homo Oeconomicus presented in the chapter 4. Stability-maintaining properties of outer feedback (case a) and internally endogenous preferences (case c) in transition periods will be purposely emphasized because of their counterintuitive nature (in economics). Both cases belong to the third adaptation strategy of preference change (see above). The destabilizing properties of inner feedback (case b) will also be stressed. This is because it is precisely the inner feedback mechanism which (of the three feedback mechanisms studied) is most consistent with and typical of the modern economic theory of choice and consumption. One result of this paper is to point out the bias of (pure) economic theory towards short-term (local) instability (because of direct behavioral

responses to disturbances) and long-term stability because of its neglect of potential breakdowns (thresholds) of social and individual systems. These preliminary guesses lack rigorous analysis. Undoubtedly, terms like "stability, instability and resilience" demand more thorough analysis. The counterintuitive result (that, at least in the short run, macro disturbances (instability) do not necessarily increase instability of the micro-level and thereby back to the macro-level) could be studied with the aid of extended illustration and applied to a "precedence" relationship of micro and macro order, optimum- or predictability. Possibly one could study phenomena where micro or macro level irrationality is a necessary requirement for "rational" behavior at the other level.

Economic contraction and outer feedback

The idea of an outer feedback system is not, of course, a novel one. For neoclassical economics it is nevertheless problematic (**Parrinello** (1984)). The doctrine of the sovereign consumer is violated if a change in the system of production (cf. urbanization followed by industrialization) leads to a change in the composition of consumption (especially in preference order).

Let us return to the case of contraction. It could certainly be argued that a "disturbed" macro-level, e.g. a decrease in the resources to be shared out, could possibly result in the growth of class (or group-) consciousness and, in the long run, in a new regime at macro-level. But, it could equally as well be argued that when stability is threatened strategies will be developed (consciously or unconsciously) which promote smooth adaptation at micro-level. The programme of positive adjustment nowadays strongly advocated by the **OECD** (Paris 1982) is one example of the latter. The positive adjustment argument emphasizes the necessity of adaptation at micro-level: market agents should adjust to economic "realities" which are "results of turbulences in the macrostructure (the global economy). There is "less room" for Keynesian demand management.

Joachim **Hirsch** (1980) uses the term "negative ideology" to describe the ideology following recession and turbulence in West Germany. It emphasizes the need to adapt to "unavoidable development" and results in political apathy. James **Alt** (1979) analyzes the politics of economic decline in Great Britain. His results are very similar to these obtained by Hirsch. "Rather than the chaos and unrest which many have predicted, elections with decreasing turnout and weaker attachment to the various political parties would seem to be the order of the day" ... "It

is more probable that the politics of indifference will continue to grow." (**Alt** (1979), p. 273).

These examples show that the relationship between outer and inner structures and functions are not self-evident. Here behaviour is clearly determined by the values which instability, partly causally, induces. Macroinstability could generate stability-maintaining feedback from the micro-level (inner feedback). Negative ideology is just one example.

A very important consideration when analyzing contracting economies is the perception citizens receive. As **Crosby** (1979) stresses in his interesting paper on relative deprivation, the behavior of a person when deprived is the result of several factors: whether the individual is extra- or intropunitive, whether the individual feels he has high or low personal control, whether opportunities are open or blocked. Depending on the alternatives, the outcome could be: violence against society, constructive social action, stress symptons or self-improvement. Situations which are almost identical could have very different implications. It is precisely this fact which is so important when analyzing the far-from-equilibrium (dissipative) system or examples of catastrophe theory (cf. stock markets, aggression etc. (**Zeeman** (1977)). Under certain conditions (near a bifurcation point), small stochastic variation in structures (parameters) could lead to different kinds of qualitative behavior. The outer feedback mechanism from macro-level to individual agents is very complicated.

When analyzing the outer feedback mechanism, one essential point should be borne in mind: the outer structure is also endogenous. Clearly, one obvious implication of connecting the complexity view to the description of an economic agent is to pay attention to the dynamic nature of institutions. Game-theoretic presentations made by **Schelling** (1978), **Schotter** (1981) and **Ullmann-Margalit** (1978) are quite promising in this respect. In these studies, emergency and the role of several institutional arrangements are illustrated. When studying "disorder" it is not enough to stress the endogenous nature of wants and aspirations. Rather, one should also consider the outer structure partly as the result of decisions made by individuals.

Economic contraction and inner feedback

What happens to an addicted person if the feasibility set (from which choices have to be made) is restricted? Addiction (c.f. smoking) is one obvious manifestation of inner feedback. Other concepts related to inner feedback are habit formation (consumption in previous periods affects the choice in this period), and adaptive preferences. The hypothesis of adaptive preferences (**von Weizsäcker** (1983); for the concept, see **Elster** (1983) p. 110) states that there exists a positive feedback between consumption of this period and past consumption, and also that the consumption of others (see, also, **Pollak** (1976)) could have similar effects. Such kinds of obviously "inflexibility increasing" phenomena could be included in standard economic models by applying specific dynamic utility and demand functions (**Elster** (1979), **Pollak** (1976), 1978), **von Weiszäcker** (1971, 1983)).

At the level of outer structure (see previous section), there may be certain stability-maintaining feedback mechanisms (ideology etc.) when the feasibility set become restricted by economic contraction. The reaction is not similar in the case of inner feedback. The inner feedback mechanism, familiar to economists although not the standard approach, stresses stronger reaction in the case of a restricted feasibility set. A decrease in "resources" in habitual choice situations obviously leads to tensions, which, in turn, give way to the emergence of new desires, beliefs and actions. The obvious inflexibility of consumption (as a result of addiction, learning and habit formation etc.) may imply an increase in instability in both the micro- and macrostructure. This is, of course, a subject for deeper study and empirical research. Let us, however, look at one facet of inner feedback more explicitly: social networks.

"Consumption style and way of life" are theoretical concepts which are included implicitly in the inner feedback mechanism (i.e. micro functions arising from the inner structure and inner feedback. The concept "consumption style" links (causally) living conditions (resources), consumption needs and aspirations (preferences) and consumption behavior (activities). For the concepts and empirical application, see **Uusitalo** (1979). This viewpoint emphasizes that the social network also belongs to the very inner structure (in addition to "individuality"). It rightly stresses the artificiality of speaking about pure individuals.

Interdependent utilities belong to the inner feedback. It is a phenomenon which is manifested when consumers do not take each other parametrically (as given) - as is the case with outer feedback - but possibly act in order to influence the other's decisions, or at least react to them. Addiction was one example of pure individual (positive) feedback: individual behavior (microfunction) - preferences (inner structure) - behavior etc. Interdependent utility (or demand) implies (positive or negative) feedback: individual function - social structure - individual structure - individual function. In our extended illustration the temporal inner feedback (c.f. addiction, experience) is almost analogous to temporal - spatial feedback of the social network (see **Pollak** (1976) and **von Weizsäcker** (1983)).

Local social structures (social networks, such as the neighborhood, family etc., the results of which are to some extent controllable[11] by participants) are of particular interest when studying economic contraction. It is at this level that comparisons take place. Some examples of the notion of signalling practices are given in note 12. Here we only briefly present some testable hypotheses about the implications of comparison interdependency in the case of economic contraction. These arise from the symbolic and informational aspects of commodities:

> The ability (status, wealth etc.) to engage in signalling is likely to be less evident in a stable environment, where long-standing social networks exist. In less-stable environments, the budget-shares of signalling commodities are likely to be bigger. A decrease in resources could create situations where, more than ever, one has to give default signals as to the ability to consume. Consumption patterns change radically because of a simultaneous decrease in resources and concentration on observable commodities (see **Frank** (1985)). Maybe this is how we should understand the Swedish experience in the 1970's: the most flexible item in family budgets when private consumption has decreased has been food, which is not normally a signalling commodity.
>
> If comparison interdependency assume more importance under economic contraction, the unpredictable systemic (interdependency) properties of macrobehavior also start functioning more clearly. Market failures (as a result of externalities in consumption decisions) increase. Individually optimal decisions no longer lead to a social optimum. This does not, however, tell us whether there could be any better judge (central planning) than consumers when the economy contracts.
>
> The situation in markets where imitative behavior (as a result of "communication", **Frank** (1985)) is dominant resembles stock markets where speculative decisions dominate. **Zeeman** (1977) has described stock markets with the aid of catastrophe theory. It is not too far-fetched to compare speculative stock markets with commodity markets under economic contraction (and imitative behavior). Thus relatively sudden "switching" between different consumption patterns at macro-

level could take place. **Benhabib** and **Day** (1981) in their "experience dependent choice"-model (a kind of inner feedback model) showed that the likelihood of an erratic sequence of rational choices - i.e. choice sequences that do not converge to a long run stationary value or to any periodic pattern - could increase when income increases. This suggests that it might be high income societies that are most unstable in response to income and price variation.

Because of inner feedback, choices of previous periods affect individuals directly and indirectly through social networks. Stable periods[13] may give way to habit-like consumption and routinized social structures, and inflexibility is a result of this development. This internal dynamics could encounter severe challenges even if the disturbances were not significant.

In the case of inner feedback it is consumption patterns that are stable or instable. These properties are directly visible. The results of outer feedback and especially of internal dynamics of preferences are less visible (direct) in the behavioral dimension. Interestingly, it seems that from the viewpoint of economics, which concentrates mainly on inner feedback, economic contraction is likely to be more destabilizing than from the viewpoint - not typical, if even possible in economics - of outer feedback and internally endogenous preferences.

Economic contraction and internally endogenous preferences

The third source of preference and possibly behavioral change, although connected to outer and inner feedback, is an internally endogenous change in preferences. It could be claimed (as in this paper) that preference change could happen almost autonomously without any exogenous shocks because of, among other things, the hierarchical nature of preferences. Change can be seen as a result of interaction between the various parts making up the hierarchy. A hierarchy of preferences is obvious, if we want to stress the specific nature of man (see **Frankfurt** (1973)), (with the highly problematic consequences of infinite regress (see **Elster** (1978) pp. 162-163) although an assumption very seldom made in economics. Below we shall roughly illustrate possible tensions making for internal change in preferences by referring to the example of economic contraction. Clearly, there is no universal abstract theory of one-dimensional preference structure which could explain behaviour when disturbances are met.

Why do tastes continously evolve? **Mckenzie** ((1979), p. 146) states: "The answer may be simply that people have a creative consciousness, a creative capacity to generate wants partially, if not independent of the external world. By this I mean that a person can take external stimuli and create a want or value which is totally new, unknown or unperceived by anyone else who may have confronted the same set of circumstances." This is very much the matter in internally endogenous preferences. External impulses could catalyze, not cause, a change in preferences. Here the question is what kind of catalyzer an economic contraction could be. How do agents' internal components interact with each other and with the environment to generate evolutionary change in themselves and the surrounding environment? The answer will be very tentative.

Sometimes preferences could be structured so that environmental disturbances, here restrictions in the feasibility set caused by economic contraction, would be "neutralized". (This is the only case studied here. By neutralization we mean that micro-level adaptation caused by macro-level disturbances might reduce instability at macro-level). A possible neutralization mechanism stressed by **Elster** (1983) is "sour grapes". When an agent's feasibility set becomes restricted he revalues options in order to reduce cognitive dissonance. Sour grapes is a purely causal process of adaptation (**Elster** (1983) p. 117), taking place "behind the back" of the person concerned. It is also possible to intentionally change preferences by "character planning". The tension between what you can do and what you might do could have two separate results. In the case of drives we are dealing with sour grapes. In the case of meta-preferences (higher-order preferences), dissonance reduction is possible by conscious strategies of liberation, character planning.

Elster (1983) distinguishes several concepts related to adaptation of changes in a feasibility set. For the sake of brevity we mention only a few: causally induced vs. intentionally engineered adaptation of preferences to possibilities (see above), downgrading the inaccessible options vs. upgrading the accessible ones, and state-dependent vs. possibility-dependent preferences. When a person comes up against a new situtation, the existing multidimensional preference structure could lead to qualitatively different actions/choices depending on the state of the structure (cf. conceptual separations above).

If, for example, the structure is near its "bifurcation area", the roles of causally induced preferences and character planning are interwoven, and very

little variation in the environment could cause unexpected results. In standard economics, a one-dimensional preference structure is revealed by consistent choices. This is a very problematic point of departure (see **Elster** (1979, 1983), **Roeding** (1977), **Sen** (1976) and **Simon** (1976)), especially when studying behaviour under structural instability. Related to this, the method of optimization has definite limits. **Heiner** (1983, p. 582) argues that a wide range of behavior in economics is governed by switching and hysteresis effects and has been obscured precisely because of the application of traditional optimization theory.

One possibility is that preferences are structured to "higher and lower" self (or first and second order preferences). For example, self-control ("egonomics" **Schelling** (1978)) can be seen as a game between higher and lower self. Under structural instability these two selves could interact exceptionally. It is possible that a part of action is routinized under normal periods and that the role of free will and moral questions (which would not exist if individuals were completely constrained on all sides) is stressed when stability is threatened. Interestingly, **Heiner** (1983) argues just the opposite. Routines are typical when the environment is most turbulent.

Hirschman (1982) emphasizes the role of latent (periodically) higher order preferences. "It seems that we cannot really apprehend fundamental change, individual as well social, without appealing to some combination of both "basic" and "contingent" factors." The basic factors are those underlying deep roots, for example, higher order preferences, and contingent factors are those preferences revealed in every day activities. **Hirschman** ((1982), p. 72) continues, "To explain important turns in our lives and societies exclusively in terms of precipitating events would downgrade us to mere playthings of chance; to attribute such turns only to autonomously occurring changes in volitions would on the contrary make us appear as more noble and capable of self-determination than we really are." Several interesting questions arise. Problems arise, too. One important problem is the role of surprises (see **Cohen** and **Axelrod** (1984)) and imagination (see **Earl** (1983)) for evolution.

The essential role of creativeness, and also learning, is quite evident in a dynamic and complex world. Obviously, preferences cannot be explained only by referring to exogenous shocks (outer and inner feedback mechanism). However, the self-organizing role of preferences is such a difficult challenge for scientific explanation, and especially for this author, that the above examples are all that is provided on this topic for the moment.

Free will and disorder

As already emphasized, there is for the moment no complete theoretical approach in neoclassical economics which could connect theories of individual action (individualism) with more holistic theories embracing "collectivist" concepts such as social norms. We conclude this paper with a few words on free will and disorder. The examples above give reason to be critical of the optimism shown by some representatives of "complexity science": crisis and disturbances do not necessarily mean more freedom, especially if the freedom is not realized/perceived. Freedom of will when the "will" is not autonomous is a very problematic abstraction.[14]

Laszlo ((1958) p. 19) argues that the determinism of development vanishes when a major perturbation challenges the basic structures of a living and dynamic system. This argument could be a self-prophecy if researchers could convincingly show that necessities are not "real". This is partly a political question: How to emphasize the "subject-nature" of a man? How to separate illusions from reality? However, it should be remembered that as a description "free man" could be false when analyzing turbulent societies.

The nature of conflict between voluntaristic and deterministic theories (and voluntarism and determinism) is of utmost importance when trying to evaluate the significance of the complexity paradigm for economic theory. Obviously, neither free will nor system (or structure) alone "determines" behavior. It is possible that at the collective (macro) level disorder means freedom to change the system, as **Laszlo** (1985) argues, but at micro-level structures and routines followed by macro disturbances could even cause decrease (perceived or real) in freedom (cf. everyday activities). This is one possible result of economic contraction. These speculative remarks are merely meant to make the analysis more complex.

7. PROPOSITIONS CONCERNING THE LINKING OF THE COMPLEXITY VIEW TO NEOCLASSICAL CONSUMER ECONOMICS

It seems to the author that if the complexity view is to be taken seriously the following propositions concerning the description of an economic agent should be presented:

Under structural instability (bifurcation period)

1) The inner structure (hierarchy of preferences and reasoning; normally excluded by the assumption of narrow rationality and given preferences (consumer theory) or given technology (theory of the firm))
   a) changes; and/or
   b) interacts;
   c) and the result is the unpredictable emergence of new structures and functions (inner feedback mechanism; micro-micro connections)

Structures change partly as a result of exogenous shocks and partly endogenously as a result of interaction between parts. The interaction between parts implies the property that the whole is more than the sum of its parts (see **Bunge** (1977), p. 40). By "unpredictable" we refer mainly to epistemological complexity and to the present state of neoclassical economics. Possibly unpredictability belongs to the ontological category, to emergency of unpredictable structures.

The assumption that preferences are given when an economic agent faces a new unexpected environment is a very strong one. There are situations, such as that of Sour Grapes described by **Elster** (1983), where, when opportunities or resources are becoming more limited, preferences also change or adapt.

2) Outer structure (normally excluded by the ceteris paribus assumption) (institutional and social black box)
   a) changes; and/or
   b) interacts (with seemingly autonomous parts of the macrostructure);
   c) and the result is the unpredictable emergence of new structures and functions (macro-macro connections).

Under structural instability, seemingly autonomous areas (e.g. the economy, culture, politics) lose part of their "independent" status. This could be exemplified by Politics of Economic Decline (see **Alt** (1979)). Analytic dissections, like economics and politics, lose a part of their foundation. Just how much is an open question. Is it worth losing an analytical instrument? In a stable environment and in the short run independency assumptions will suffice.

3) Inner and outer structures
   a) interact;
   b) as a result unpredictable and unintentional structures and functions could rise (micro-macro connections).

It is most important to emphasize that, even though under structural instability the development, both at micro- and macro-level, is often unpredictable and unintentional, there is nevertheless a certain logic; development is not chaotic. For example, disasters such as natural catastophes do not often give rise to social chaoses (for disasters, see **Quarantelli** (1978)). "Disorder" also has its own logic.[15]

In discussing endogenous preferences three separate feedback mechanisms (sources of change) were studied. The first was macro or outer feedback: microbehavior, macroconsequences, microbehavior etc. (general sociological theory). The second was micro or inner feedback: reasoning actions, consequences (micro-level), reasoning etc. (lifestyle, learning, habits and customs). In addition, there is a third source of preference change: internal structure (psyche etc.) could change (switch), especially in its bifurcation area.

Explaining consumption patterns when complex interconnectedness of macro- and microlevels prevails often leads to counterintuitive results - anomalies from the viewpoint of standard economics. It might be useful to explicate phenomena by studying both internal and external reasons for change together. It is which is essential in studying self-organizing systems: internal structure (here preferences) has a logic (and dynamic properties) of its own, and at the same time structure also responds to changes in external factors, i.e. environment. The joint presence of these dynamics implies counterintuitive development in bifurcation periods. It is possible that macro-level disorder (suboptimality, counterfinality, unpredicatability) may arise from micro-level order (rationality, predictability) - and vice versa. In this connection, it is interesting to note that **Becker** (1962) argued that market rationality (i.e. predictability) is consistent with household irrationality. Likewise, the previous section argues that macro-level disorder - economic contraction - could lead to a large degree of order and predictability at micro-level. Especially in economics, neglected (i.e. social and psychological) structures could respond in a stability-maintaining way. Ideological response at macro-level and defensive response at micro-level are examples of such possibly stability maintaining factors. It is evident that to concentrate solely on the internal feedback mechanism of preferences (habits, customs etc.), the only mechanism studied more thoroughly in economics, would place too much emphasis on destabilizing forces in the short run.

Clearly, in such a short paper my aim has been very rough. The biggest problems stem from the multidisciplinary nature of the effort. The use of concepts like

stability, order, predictability and emergence calls for further analysis. However, I think that to stimulate research on complex economic phenomena requires the construction of these kinds of sketchy frameworks as a basis on which qualitative development and the suitability of different approaches can be evaluated.

Rather than give a full description of propositions 1-3, let alone the proofs, we illustrated the propositions by means of the schema of figure 1 above. It emphasized one critical factor of social change: the interwoven and destabile nature of preferences. We conclude this paper by presenting three more propositions (which follow partly as a consequence of propositions 1-3):

4) Under structural instability, the role of the directional time assumes more importance. Symmetric and reversible, i.e. timeless, processes (descriptions) no longer suffice (cf. economic contraction).

5) Under structural instability, simultaneous relationships between structures and functions are emphasized. Functions and structures respond to changes in structures and functions.

6) The greater the instability (change) and the faster the change, the more likely it is that propositions 1 - 5 are of importance to economic analysis. Eventually, more emphasis will have to be given to the formation of new structures and conscious and unconscious processess of self-organization. The "emergence of the unexpected implies less emphasis on ex-ante analysis (predictions) and more on ex-post descriptions (explanation).

NOTES:

Note 1: Robert **Klee** (1984) argues that the discussion on emergence has been clouded by a lack of agreement on what the appropriate "unit of emergence is. This problem is also evident in our paper. Klee recommended "properties" as the units of emergence. He distinguishes four types of emergent properties in response to an increase in complexity. Property P is emergent at a level of organization in a system, with respect to that system´s lower-level microstructure MS, when:

> **i)** P is unpredictable in principle from MS
> **ii)** P is novel with respect to MS
> **iii)** MS exhibits a much greater degree of variance and fluctuations from moment to moment than does the level of organization where P occurs, P´s constant and enduring presence in the system would not seem to be wholly determined by MS
> **iv)** P has direct determinative influence and effects at least some of the properties in MS
> (**Klee**, R. (1984), p. 48)).

Our approach stresses "unpredictability" and "novelty" (emergency) with respect to the system´s lower-level microstructure. Klee argued that these distinctions are also very problematic for representing emergency. For example, he emphasized that unpredictability is not necessarily very reasonable because it is not possible to test it in any absolute way.

For our purposes Bunge´s argument concerning the difference between unpredictability and emergency is useful: "Emergent does not mean unexplainable or unpredictable. Firstly because "emergence" is an ontological not an epistemological category. Secondly because it is the business of the science not only to acknowledge emergence but also to incorporate it into theories and thus render it understandable and sometimes also predictable" (**Bunge** (1977), p. 191).

Emergency refers "more" to ontology and unpredictability to epistemology. The difference between epistemological and ontological complexity is related to the difference between unpredictable and emergent properties. Take, for example, a TV-set. It is very complex from the viewpoint of the author. The author could not predict what would happen if one mechanical part were substituted by another. A TV-set is complex, but only to the extent that it is the author who says so. This concept of complexity is context-bound. Here it represents epistemological complexity and unpredictability. Economic contraction is epistemologically complex from the viewpoint of economics because in economics highly interconnected phenomena, here "losing", can not easily be evaluated. There may exist some other framework (here the complexity view) which could tackle the problem more adequately. In the case of ontological complexity, there may be none. However, it might be that the approach that admits the existence of genuine ontological complexity, for example, the complexity view when studying bifurcation periods, could better tackle better ontological complexity than the view which does not admit that there are phenomena beyond human reasoning.

Epistemological complexity is very much bound to the subject and his knowledge, while the ontological complexity is more "objective". There may be a solution to an epistemilogically complex problem, but an ontologically complex problem totally lacks a solution.

When emergent properties come onto the scene, there is unpredictability, to some extent, no matter what the epistemological framework is. We could call this

ontological complexity. These possibly overlapping distinctions need elaboration, but it is hoped that they illustrate the fact that there is no universal concept of complexity. On account of our restricted knowledge we can never say or test whether ontological complexity is only epistemological complexity. We could, however, compare different epistemological views and "struggle" towards an understanding of complex phenomena as well. In this paper, complexity is usually taken to epistemological complexity and unpredictability, but it is possible that some systemic properties, say under economic contraction, are also ontologically complex, emergent. In spite of these different meanings, the concepts are used quite loosely in this paper.

Note 2: There are several concepts, as well as doctrinal schools, related to the complexity view (see **Jantsch** (1980)). It is therefore useful to give explicit consideration to some of the key concepts.

By stability (i.e. local) we mean that important characteristic properties (or quantities) range within a limited area, controlled by some cybernetic process which resists disturbing forces. In our text structural instability refers mainly to perceived (by agents) complex dynamics. It should be stressed that mathematical (theoretical) complex dynamics generally studies both:

a) unstable nonperiodic (varying, chaotic) behavior and
b) evolving regimes of qualitatively different behavior (**Day** (1982)).

The latter is the main aim in our non-mathematical study. From the viewpoint of homo oeconomicus, instability (or new "strange attractor") is assumed to be perceived as "unexpected". **Schwartz** et al. ((1984), p. 20) and **Heiner** (1983) have correctly stressed that perception, action and reality are not necessarily related under structural instability.

Bifurcation points are points of structural instability. For example, $k(1)=1$, $k(2)=3$ are bifurcation points in the equation (**Day** (1982))

$$X_{t+1} = kX_t(1-X_t)$$

New qualitative regimes possibly evolve at bifurcation points. In far-away equilibrium, systems disintegrate into "chaos" or jump to a new, more differentiated, higher level of order or organization which is called a dissipative system (**Prigogine-Stengers** (1984)). "The capacity of systems to evolve strikingly different qualitative patterns of behavior as a parameter is varied became the basis for Prigogine's celebrated work on bifurcation and self organization" (**Day** (1982), p. 6). In this study inner and outer structures are precisely the parameters which are, normally assumed fixed in economic analysis.

Autopoeisis is a related concept to dissipative systems. It is systems ability to continuously renew themselves and regulate this process in such a way that the integrity of their structure is maintained. The author finds autopoiesis a very interesting theoretical framework for economics, where reproduction and the very infrastructure of societies is neglected almost completely.

Implicit variables are included in economic models in parametric given form. It is obviously necessary to classify variables and parameters (slow variables, **Day** (1979)) in a different way when studying disorder. Institutional arrangements could be included explicitly and questions arise as to whether these arrangements

could have different status. (One separation (Searle's) could be constitutive vs. regulative rules (**Field** (1984). The former are those rules which are not subject to any negotiations while the latter are rules which may be modified without calling into question the fundamental organizational basis of society.)

Note 3. The unavoidable eclectism of the paper could make it difficult to obtain a clear picture of the problem at hand. Our examination seeks to apply very general ideas of the complexity view to economics. To follow in the "spirit" is, of course, a highly subjective exercise which is biased by preconceived attitudes toward economics. One example will suffice to illustrate this point: the author is much inspired (possibly biased) by social scientists like Jon Elster and Amartya Sen, both of whom represent the multidisciplinary tradition of science with a wide area of interests also in social practice.

Note 4. In economic theory, in the last half century, reliance on pure internal consistency conditions has increased significantiy, starting off with Samulson's use of "the weak axiom of revealed preferences" (**Sen** (1984), p. 9). It seems, however, to the present author that there should also be at least some further assumptions on the existence of means and ends for descriptive purposes. By contrast, the classical assumptions of perfect information or egoism could be omitted when illustrating the core of modern consumer theory.

Note that ideas about rational choice have been exported to, for example, political theory. The analysis of linking the neoclassical model and the complexity view is also relevant to political theory where political interests (cf. preferences) are given (**Schwartz** et al. (1984)).

Note 5. In Lakatos' terminology every science is a research programme of a special kind and a core of a research programme refers to the fundamental statements or axioms on which the research programmet is built. These axioms are regarded as irrefutable by the supporters of the research programme and are not directly tested. It has been argued that neoclassical economics could be evaluated as a research programme. The discussion of growth of knowledge, paradigms and research programmes (cf. **Fulton** (1984)) has been spirited and it has been questioned whether it is at all possible to analyze economics within the framework developed to study the natural sciences. Here, however, we have taken the Lakatosian concept of core for granted and the well-known article of **Latsis** (1976) as our point of departure. A far more difficult task is to find the core of the "complexity sciences".

Note 6: Mirowsky (1985) argues that it was the rise of energetics in physics that induced the invention of neoclassical economic theory by providing the metaphors, the mathematical techniques and a new attitude towards theory construction. (..) Utility was redefined so as to be identical with energy.

Note 7: This is paradoxical claim for a view ehich at the same time emphasize non-controllability and stochasticity of evolution. However, paradoxes are essential ingredients for complexity view when explaining evolution through contradictions.

Note 8: The structure-function separation has several related concepts. Being and becoming is a basic polarity in metaphysics (**Bunge** (1977), and **Prigogine** & **Stenger** (1984)). **Bunge** ((1977), p. 273) refers to thing vs. event, stuff vs. process, and structure vs. change. All of them are more or less vague. Structures are also illustrated by concepts such as category or system. Action and process are related to functions. For many "species" of structur - (es/alism) and function - (s/alism), see **Elster** (1979), **Bunge** (1977) and **Thompson** (1983). For semantic issues concerning "structural"in economics, see **Machlup** (1958).

It should be noted that the structure-function separation is not necessarily very satisfactory, as, for example, **Bunge** (1977), p. 273) and **Thompson** (1977) have argued. According to Bunge´s ontology "everthing is in flux". Thompson argues for relativity of worldviews and vague limits on classifications in his very interesting book "Rubbish theory". However, here structures are illustrated by stock concepts and functions are more flow-like concepts. Functions differs slightly what for example Jantsch assumes.

By inner structure we mean the body and psyche of an economic agent usually assumed to be a black box with a minor structure. By outer structure we refer to the environment (usually given) of the agent, especially his social and political environment. For convenience, nature, in spite of its utmost importance, is omitted from our analysis: it suffices to say that most likely it is the Man-Nature relationship that has emphasized most the problems of complex feedback systems during the last ten years.

An agent´s control over the consequences of his acts decreases the more aggregated is the level we study. This explains why the inner feedback and outer feedback differ in their nature. It should be recalled that just as "mind" and "body" are two abstractions from one reality - the person - so, too, are "individual" and "society" two abstractions from one reality - the "social individual". This issue is remarkably well illustrated in **Steedman´s** paper ((1980), p. 64), which concentrates on problems caused for welfare analysis by non-autonomous preferences.

Note 9: Because of the very specific interest of our analysis, two important economic phenomena are omitted: income distribution and unemployment. Both areas would be of interest in an empirical analysis of economic contraction.

Note 10: Endogenous preferences and structures

"The idea of a general sociological theory in which preferences and desires are explained endogenously as a product of the social states to the generation of which they also make contribution.. (theory) appears to be light-years away" (**Elster** (1982), p. 86). This theory would include:

A) An explanation of individual action in terms of individual preferences and beliefs (rational/intentional explanation).
B) An explanation of macrostates in terms of individual actions (systemic aggregate properties).
C) An explanation of desires (preferences) and beliefs in terms of macrostates (functionalist/causal explanation).

If any of these cases, it is case A) which corresponds to homo oeconomicus and C) to the "sociological" explanation.

Because of the multidisciplinary nature of this study and the emphasis on "becoming", a rough illustration of endogenous preferences should be given. The inner feedback-loops are more or less an area for psychology while the outer feedback-loop belongs partly to sociology. (For example, procedural rationality (**Simon** (1976)) refers to the inner psychological structure, which is neglected in economics, and similarly broad rationality (**Elster** (1982)) refers to the social nature of preference formation which is also neglected in economics). It is questionable whether an economist should investigate the area of preference (or structure) formation at all. If structural instability and the emergence of "new" is to be analyzed, it seems to this author that a multidisciplinary view should be chosen at the risk of making the analysis defective.

Economists interested in how tastes change (to endogenize preferences) have taken different approaches. One polarity is the choice between welfare analysis and demand analysis, another is the degree of consicousness of preference change. The former is studied by, for example, **Pollak** (1976) and **von Weiszäcker** (1971). The latter is analyzed by **Elster** (1982). A very important contribution which argues for the assumption of fixed preferences by referring to the human capital approach is the article "De Gustibus Non Est Disputandum" by **Stigler** and **Becker** (1977).

It could be said that for the moment the neoclassical view is still described by the following quotation: "Despite these qualifications, economic theory proceeds largely to take wants as fixed. This is primarily a case of division of labor. The economist has little to say about the formation of wants; this is the province of the psychologist. The economists´s task is to trace the consequences of any given set of wants." (**Friedman** (1962), p. 13).

In "evolutionary theories", as **Prigogine** and **Stengers** (1984) have emphasized, "One of the most important problems is the eventual feedback between macroscopic structures and microscopic events: macroscopic structures emerging from microscopic events would in turn lead to a modification of the microsopic mechanism. "(p. 191). Surprisingly (to this author), Prigogine and Stenger argue that at present the better understood cases concern social situations. **Allen** (1984) takes the same optimistic view.

But, for example, Jon **Elster** (1983), Anthony **Giddens** (1979) and **Albin** and **Gottinger** (1984) - all social scientists - have especially emphasized the insufficiency of efforts to connect different feedback mechanisms. In social sciences there is no general theory connecting individualistic theories (figure 1: upward direction) and collectivistic views (figure 1: downward) in a dynamic context (figure 1: from left to right).

Another related problem concerns whether creative evolution could ever be conceived if the elements composing it were defined as permanent individual entities that maintained their identity throughout all changes and interactions (see (**Prigogine** & **Stenger** (1984), p. 95 and **Schumpeter** (1947), p. 150).

Note 11: In the lifestyle studies, typical problems (counterfinality, nonintentional results) of outer feedbacks are not explicitly studied. Inner feedback is assumed to be controllable; results of actions can be seen as a result of intentional actions. Even the consequences of actions for preferences can be controlled to some extent. Certain consistency problems can arise if one always know how his actions affects on the following periods preferences and actions. However, the author believes that the outer feedback differs most clearly from the inner feedback mechanism just in the way actors perceive the consequences of their actions. For example, you cannot easily see what is the connection between your consumption decision, the degree of international openness of the economy and its influence on your preferences (outer feedback). Still, you could possibly evaluate the implications for your behavior of taking up smoking. The inner feedback is probably more controllable and less prone to unintentional surprises.

Note 12: "The mates we choose, the employees we hire, the people whose company we seek" - all depend on the information we are able to gather about other individuals. (**Frank** (1985), p. 102). When an individual´s ability level cannot be observed directly, observable components of his consumption bundle constitute a signal to others about his level of "ability". Frank´s view emphasizes the communicative nature of consumption. Another similar case where consumption activities has "come loose of its satisfaction function" are position goods (c.f. **Hirsch** (1977)): Only the relative places in ranking matters. The tragedy of this kind of distributional struggle lies in the fact that if everyone stands on tiptoe, no one sees better. What is possible for the single individual is not possible for all individuals. "The Tragedy of Commons" (Hardin in **Daly** (1980)), "The Tyranny of Small Decisions" (**Kahn** (1966)), " The Fallacy of Composition" (**Elster** (1978)) are all examples of the possible unpredictability, nonintentionality and suboptiomality which are very much systemic properties of higher levels (and more typical of outer feedback than inner feedback).

Note 13: One possible solution is to periodize development. In stable periods, normal analysis with structures in given parametric form will do but when there are disturbances etc. more emphasis has to be given to stochastic and irreversible processess. The advantages of periodization in economics has been emphasized more generally by Arthur **Spiethof** (1957).

Note 14: Contraction could reduce alternatives but at the same time ideology (cf. negative) and cognitive processess, like "sour grapes", could restrict the area of willing and desires. Subjective(ly defined), well-being could remain unaffected. According to **Elster´s** (1983) definition one essential dimension of freedom is the autonomity of wants. The autonomity should be emphasized because it is a constitutive nature of a "man". As **Frankfurt** ((1973) p. 7) stresses: "No animal other than man, however, appears to have the capacity for reflective self-evaluation that is manifested in the formation of second-order desires. Second-order desires (or loosely preferences) means the ability of man to want to have certain desires and motives." This is of utmost importance when analyzing preferences: there exists higher order preferences if autonomy (or freedom) is taken seriously. However, there is one problem, the infinite regress (**Elster**

(1979, 1982). There are infinitely many "steps upward" if one is trying to reach the autonomous level of free will. The process of higher and higher preferences is never-ending. In a way, avoiding psychic causality is an impossibility. The process should ultimately come to a halt at some level. In this sense freedom is impossible. As Elster argues, the problem of preference formation and the endogenous preference change is the greatest obstacle to complete freedom. (**Elster** (1979), p. 162).

Note 15: Frequently, it is a question of the framework in terms of which we analyse the problem. Social psychologists have characterized the rules of disorder by studying children (**Marsh** et al. (1978)). What is disorder from the point of view of adults may well be natural and orderly from the viewpoint of children. Anthropologists have also stressed that, for example, rationality and irrationality (which are broader concepts than in economics) are highly context-bound (see **Hollis** and **Lukes** (1983)).

REFERENCES:

Albin, P.S. - **Gottinger**, H.W. (1983) Structure and Complexity in Economic and Social System, Mathematical Social Sciences 5/1983, pp. 253-268.

Allen, P.M. (1984) Toward a New Science of Complex Systems, Universite Libre de Bruxelles, Draft version for the Club of Rome, July 1984.

Alt, J.E. (1979) The Politics of Economic Decline: Economic Management and Political Behavior in Britain Since 1964, Cambridge Univ. Press, Cambridge 1979.

Becker, G.S. (1962) Irrational Bahavior and Economic Theory, The Journal of Political Economy, Vol. IXX, February 1962, pp. 1-13.

Benhabib, J. - Day, R.H. (1981) Rational Choice and Erratic Bahaviour, Review of Economic Studies 1981, pp. 459-471.

Bhaskar, R. (1975) A Realist Theory of Sciences, Leeds Books Ltd., 1975.

Buckley, W. (1967) Sociology and Modern systems Theory, Prentice-Hall, New Jersey 1967.

Bunge, M. (1977) Treatise on Basic Philosophy: The Furniture of the World, Volume 3, Ontology I, Dordrecht, Reidel Publishing, 1977.

Bunge, M. (1977) Treatise on Basic Philosophy: A World of Systems, Volume 4, Ontology II, Dordrecht, Reidel Publishing, 1977.

Chase, R. (1979) Structural-Functional Dynamics in the Analysis of the Socio-Economic Systems: "Development of the Approach to Understanding the Process of Systemic Change", American Journal of Economic and Sociology, July 1979, Vol. 38, No. 3, pp. 293-305.

Cohen, A. (1984) The Methodological resolution of the Cambridge contreversies, Journal of Post Keynesian Econmics, Summer 1984, pp. 614-629.

Cohen, M. - **Axelrod**, R. (1984) Coping with Complexity: the Adaptive Value of Changing Utility, American Economic Review 1/1974, pp. 30-.

Crosby, F. (1979) Relative Deprivation Revisited: A Response to Miller, Bolce, and Halligan, The American Political Science Review, Vol. 73, 1979, pp. 103-112.

Daly, H. (ed.) (1980) Economics, Ecology, Ethics: Essays toward a steadystate Economy, W.H. Freeman and Company, San Francisco 1980.

Day, R.H. (1982) Dynamical Systems Theory and Complicated Economic Behavior, Modelling research group working paper 8215, Department of Economics, University of Southern California, Los Angeles 1982.

Day, R.H. - **Groves**, T. (1975) Adaptive Economic Models, N.Y., Academic Press, 1975.

Duesenberry, J.S. (1949) Income, Saving, and Consumer Behavior, Cambridge, Mass., 1949.

Earl, P. (1983) The Economic Imagination, Towards a Behavioral Analysis of Choice. N.Y., M.E. Sharpe, Inc., 1983.

Elster, J. (1978) Logic and Society, Contradictions and Possible Worlds, Pitman Press Ltd, Bath.

Elster, J. (1979) Ulysses and the Sirens, Studies in Rationality and Irrationality, Cambridge, Cambridge University Press, 1979.

Elster, J. (1983) Explaining Technical Change, Oxford University Press, 1983.

Elster, J. (1983) Sour Grapes, Studies in the Subversion of Rationality, Oxford University Press, 1983.

Field, J. (1984) Microeconomics, Norms and Rationality, Economic Development and Cultural Change, 1984, pp. 683-711.

Frank, R.H. (1985) The Demand for Unobservable and other Nonpositional Goods, American Economic Review, March 1985, 101-115.

Frankfurt, H.G. (1971) Freedom of the Will and the Concept of a Person, The Journal of Philosophy, Vol. LXVIII, No. 1, 1971.

Friedman, M. (1962) Price Theory: A Provisional Text, Chicago 1962.

Fulton, G. (1984) Research programmes in economics, History of Political Economy, 1984, pp. 185-204.

Giddens, A. (1979) Central Problems in Social Theory - Action, Stucture and Contradiction in Social Analysis.(Finnish edition Otava 1984).

Goldsmith, E. (1981) Superscience - Its Mythology and Legitimisation, The Ecologist 5/1981.

Gottinger, H.W. (1983) Coping with Complexity, Perspectives for Economics, Management and Social Sciences, D. Reidel Publishing Company, Theory and Decision Library, Volume 33, Dordecht 1983.

Guha, A.S. (1981) An evolutionary view of economic growth, Clarendon Press, Oxford, 1981.

Haavelmo (1971) Some Observations on Welfare and Economic Growth, Reprint Series No. 72, University of Oslo, Institute of Economics, Oslo 1971.

Harsanyi, J.C. (1960) Explanation and Comparative Dynamics in Social Science, Behavior Science 5/1960, pp. 136-145.

Heiner, R.A. (1983) The Origin of Predictable Behavior, American Economic Review, Sept. 1983, pp. 560-595.

Hirsch, F. (1977) Social Limits to Growth, Routledge & Kegan Paul, London 1977.

Hirsch, J. (1980) Der Sicherheitsstaat. Das "Modell Deutschland", seine Krise und die neuen sozialen Bewegungen, Europäische Verlagsanstalt, Frankfurt am Main 1980. (In Finnish, Vastapaino 1983).

Hirschman, A.O. (1982) Shifting Involvements, Private Interest and Public Action, Princeton, Princeton University Press, 1982.

Hollis, M. (1983) Rational Preferences, The Philosophical Forum Vol. XIV, No. 3-4, 1983, pp. 246-262.

Hollis, M. - **Lukes**, S. (eds.) (1982) Rationality and Relativism, Basil Blackwell, Oxford, 1982.

Jantsch, E. (1981) Autopoiesis: A Central Aspect of Dissipative Self-Organization in Autopoeisis: A Theory of Living Organization (ed. M. Zeleny), North Holland, New York 1981.

Jantsch, E. (1980) The Self-organizing Universe, Pergamon Press, Oxford 1980.

Kahn, A.E. (1966) The Tyranny of Small Decisions: Market Failures, Imperfections and the Limits of Economics, Kyklos (1966).

Karsten, S. (1983) Dialetics, Functionalism, and Structuralism in Economic Thought, American Journal of Economic and Sociology, April 1983, Vol. 42, No. 2, pp. 179-192.

Keynes, J.M. (1937) The General Theory of Employment, Quarterly Journal of Economics, Feb. 1937, 51(2), pp. 209-.

Klee, R.L. (1984) Micro-Determinism and Consepts of Emergency, Philosophy of Science, 51(1984), pp. 44-63.

Latsis, S.J. (ed.) (1976) Method and Appraisal in Economics, Cambridge University Press, Cambridge 1976.

Laszlo, E. (1985) The Crucial Epoch, Essential knowledge for living in a world in transformation, Futures, Feb 1985, pp. 2-23.

Lowe, A. (1951) On the Mechanistic Approach in Economics, Social Research, Vol. 18 (1951), pp. 403-434.

Lukes, S. (1973) Individualism, Basil Blackwell, London 1973.

Malaska, P. (1985) Organic Growth and Renewal, An outline for post-industrial development, paper to be held at the European Symposium the of International Council of Social Welfare in Turku June 9 - 14, 1985.

Marsh, P. - **Rosser**, E. - Harre, R. (1978) The Rules of Disorder, Routledge & Kegan Paul, London 1978.

Machlup, F. (1978) Methodology of Economics and Other Social Sciences, Academic Press, 1978.

Machlup, F. (1958) Structure and Structural Change, Weaselwords and Jargon Zeitschift für Nationalökonomie, Band XVIII, 3, 1958.

Mirowski, P. (1984) Physics and 'The Marginalist' Revolution, Cambridge Journal of Economics, 1984, 8, pp. 361-379.

Morgenstern, O. (1966) The Compressibility of Economic Systems and the Problem of Economic Constants, Zeitschift für Nationalökonomie, XXVI, 1966, pp. 190-203.

Morgensttern, O. - **Thompson**, G. (1976) Mathematical Theory of Expanding and Contracting Economies, Lexington Books, Toronto 1976.

Parrinello, S. (1984) Adaptive Preferences and the Theory of Demand, Journal of Post Keynesian Economies, Summer 1984, pp. 551-560.

Ploman, E.W. (1984) Reflections on the State of the Art and the Interest of the United Nations University in the Field of Complexity, Draft for the Club of Rome, July 1984.

Prigogine, I. - **Stengers**, I. (1984) Order Out of Chaos-Man's New Dialogue with Nature, Heinemann, London 1984.

Pollak, R.A. (1978) Endogeus Tastes in Demand and Welfare Analysis, American Economic Review, May 1978, pp. 374-379.

Pollak, R.A. (1976) Interdepent Preferences, American Economic Review, June 1976, pp. 309-320.

Quarantelli, E.L. (ed.) (1978) Disasters, theory and research, London 1978.

van Raaij, W. - **Eilander**, G. (1982) Consumer Economizing Tactics for Ten Product Categories, Papers on Economic Psychology, Number 26 Erasmus University, Rotterdam 1982.

Riesman, D. (1950) The Lonely Crowd, Yale Uneverisity Press, London 1950.

Roeding, W. (1977) A New Approach to Modelling Some Economic Problems, 1977, in Lecture Notes in Economics and Mathematical Systems (eds. Beckamn & Kunzi) 144, Mathematical Economics and Game Theory, Essays in Honor of Oscar Morgenstern, Springer Verlag 1977.

Schelling, T.C. (1978a) Economics, or the Art of Self-management, American Economic review, may 1978, pp. 290-294.

Schelling, T.C. (1978b) Micromotives and Macrobehavior, W.W. Norton & Company, New York 1978.

Schotter, A. (1981) The Economic Theory of Social institutions, Cambridge University Press, Cambridge 1981.

Schotter, A. (1977) Economically efficient and politically susubstainable economic contraction, in Lecture Notes in Economics and Mathematical Systems (eds. Beckman & Kunzi) 144, Mathematical Economics and Game Theory, Essays in Honot of Oscar Morgenstern, Springer Verlag 1977.

Schumpeter, J. (1947) The Creative Response in Economic History, Journal of Economic History, Nov. 1947, pp. 149-159.

Schwartz, M. - **Thompson**, M. (1984) Beyond the politics of interest, Working Paper, August 1984, International Institute for Applied Systems Analysis, Laxenburg, Austria.

Sen, A. (1984) Consistensy, Presidential lecture at the meeting of the Econometric Society, Madrid 1984.

Sen, A. (1976) Rational Fools: A critique of the behvioural foundations of economic theory, Philosophy and Public Affairs, 6/1976-77 pp. 317-44.

Shama, A. (1980) The Impact of Stagflation oc Consumer Psychology, Marketing in a Slow-growth Economy

Simon, H. (1976) From Substantive to Procedural Rationality, in Latsis (ed.), 1976.

Spiefhof, A. (1952) The "Historical" Character of Economic Theories, Journal of Economic History, 1952, pp. 131-139.

Stigler, G.J. - **Becker**, G.S. (1978) De Gustibus non est Disputandum, American Economic History, 1952, pp. 76-90.

Thoben, H. (1982) Mechanistic and Organistic Analogies in Economics Reconsidered, Kyklos, Vol. 35, 1982, pp. 292-306.

Tversky, A. - **Kahneman**, D. (1974) Judgement under Uncertainty, Science, Sept., Vol. 185, 1974, pp. 1124-31.

Ullman-Margalit, E. (1978) The Emergence of Norms, Oxford University Press, New York, 1978.

Uusitalo, L. (1979) Consumption style and Way of Life, Acta Academica Oecomicae, A:27, Helsinki School of economics, 1979.

Woodward, S.N. (1982) The Myth of Turbulence, Futures, August 1982, pp. 266-279.

von Weizsäcker, C.C. (1971) Notes on Endogenous Change of Tastes, Journal of Economic Theory, Dec. 1971, pp. 345-372.

Zeeman, E.C. (1977) Catastrophe Theory, Seleted papers, 1972-1977, Addison-Wesley publishing Company, London 1977.