DYNAMICS OF CONVENTIONS:
A POST-CLASSICAL ANALYSIS

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ABSTRACT

Conventions are a type of social structure which enable human actions and help to co-ordinate economic activities. They are prior to, and the structural conditions for, actions. Conventions are the framework upon which agents rely for decision-making processes in the face of uncertainty. It is rational for agents to fall back on conventions, because in a world where knowledge is fallible and contingent, conventions provide a sort of tacit knowledge acquired by common, intersubjective experience.

So far, the study of conventions has not received an integrated theoretical treatment from the economics literature. By contrast, the thesis systematises the discussion of conventions by consolidating the bulk of knowledge which is dispersed in a vast number of unconnected works.

The thesis brings together the economics of complexity, time, and uncertainty into one integrated framework of analysis, which has not been tried before either. This theoretical setting structures and organises the ensuing arguments of the core treatment of the nature, dynamics and rationality of conventions. In preparing the foundations for the work as a whole the thesis also reviews critically many of the key concepts of conventional economics.

The core of the thesis addresses the concept of conventions by integrating and developing Keynes's version of convention and Hayek's notion of social rules of conduct. In this undertaking, the idea of limited knowledge is central and the conceptions of general equilibrium and optimising procedures are foreign.

The thesis investigates how conventions change. From the point of view of the capitalist firm, conventions take the form of routines. Routines are the basis for non-conventional, non-conformative action, and, therefore, for successful innovation. The way novelty arises has been explored in the works of Schumpeter (competition through innovation), Hayek (competition as a discovery procedure), Keynes (animal spirits) and the evolutionary approach of economic change (Nelson and Winter, Dosi). The thesis integrates and develops their approaches.

The thesis also examines a key convention in the discourse of economics: optimising rationality. The study of the nature of conventions suggests an alternative, more comprehensive account of rationality under uncertainty, based on the ideas of Simon, Keynes and Hayek, in which optimisation procedures are seen as a special case with limited scope. A "reconstruction of the economic man" is proposed.

The analytical results of the core part are then "applied" in order to uncover the conventions underlying price formation and the operation of the labour market, both in a large measure the result of normative factors.
I dedicate this thesis to the memory of my grandmother (and mother), Dalva Fonseca Pereira, for showing me the meaning of the words compassion and altruism,

and to Christiane, my wife, whose love and affection mean more to me than words can say.
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This thesis was not the result of a solitary and detached effort. Many colleagues and friends participated and contributed, directly or indirectly, to its completion. Keynes warned in the Preface of the *General Theory* that in order to avoid mistakes in excess one should not “think too long alone” and that “constructive criticism” and “conversation” are both indispensable ingredients for the success of a work. Thus, a great debt is owed to all those from whom this work has benefited.

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In the Department of Economics of UCL I experienced a lot of interesting things. I made many friends, although they do not embrace the same set of ideas I espouse. They probably even do not know what these ideas are. Also, funnily enough, they probably do not know how to define what is neoclassical economics, the “normal science” they practice. Alas, one should not blame them for their ignorance in unorthodox economics, but the present system which is mechanically and acritically reproduced. Syllabuses are devised and courses of the MSc/PhD programme are
chosen without contemplating distinct points of view (this observation applies to the
great majority of economics departments all over the world). Unfortunately, my friends
(and many other students) pay the price for concentrating their time and energy on the
study of mythical economic theories which in considerable measure lack
correspondence with the reality economic agents actually live and act. From the very
beginning, their minds are inculcated with absurd ideas such as the belief that
neoclassical theory offers the only viable approach to economic problems. It is an
equivocal view according to which a particular school of economic thought is the only
considered “scientific” and particular methods of analysis (equilibrium framework,
rationality as constrained optimisation) are seen as the sole guardian of “truth” in
economics. Any nonsense couched in a mathematical form receives more attention
than a neat and bright idea stated in ordinary language. The consequence is lack of
tolerance with different views, absence of pluralism in the academic environment, no
recognition of legitimacy in a divergent opinion, and an overt discrimination against
non-orthodox beliefs. The terrible result of this attitude is that the university, which
should be, first of all, the locus par excellence where the student supposedly makes
contact with a plurality of different ideas and experiences, and from that interaction
make his or her options, becomes a sort of factory operating under homogeneous mass
production, concocting well-behaved beliefs and attitudes to an unprecedented scale.
Nonconformity becomes heresy. No space for dissent is institutionalised. Rational
discussion of conflicting views is sacrificed. Obscurantism overcomes the search for
enlightenment.

Most probably, many of my colleagues might not even think in these terms, but
I hope that, in the future, when they become professional economists, they will not
reproduce such an unfair and prejudiced system. As I am an optimist, I trust some day
some of them will eventually find the conventional wisdom they were brought up as
problematic and unsatisfactory as I find it now and then pursue some sort of alternative
reconstruction.

Despite this gulf, we built many bridges in the name of friendship. In particular,
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Time present and time past
Are both perhaps present in time future
And time future contained in time past.
If all time is eternally present
All time is unredeemable.
What might have been is an abstraction
Remaining a perpetual possibility
Only in a world of speculation.
What might have been and what has been
Point to one end, which is always present.
(T. S. Eliot, “Burnt Norton”, *Four Quartets*)

Know then thyself, presume not God to scan,
The proper study of mankind is man.
Placed on this isthmus of a middle state,
A being darkly wise, and rudely great.
With too much knowledge for the sceptic side,
With too much weakness for the stoic’s pride,
He hangs between; in doubt to act, or rest;
In doubt to deem himself a god, or beast;
In doubt his mind or body to prefer;
Born but to die, and reasoning but to err;
Alike in ignorance, his reason such,
Whether he thinks too little, or too much:
Chaos of Thought and Passion, all confused;
Still by himself abused or disabused;
Created half to rise, and half to fall;
Great lord of all things, yet a prey to all;
Sole judge of truth, in endless error hurl’d:
The glory, jest, and riddle of the world!
(A. Pope, “Epistle II”, *Essay on Man*)

The less a man knows about the past and the present the more insecure must prove to be his judgement of the future. And there is the further difficulty that precisely in a judgement of this kind the subjective expectations of the individual play a part which it is difficult to assess; and these turn out to be dependent on purely personal factors in his own experience, on the greater or lesser optimism of his attitude to life, as it has been dictated for him by his temperament or by his success or failure. Finally, the curious fact makes itself felt that in general people experience their present naively, as it were, without being able to form an estimate of its contents; they have first to put themselves at a distance from it - the present, that is to say, must have become the past - before it can yield points of vantage from which to judge the future. Thus anyone who gives way to the temptation to deliver an opinion on the probable future of our civilization will do well to remind himself of the difficulties I have just pointed out, as well as of the uncertainty that attaches quite generally to any prophecy.
(S. Freud, *The Future of an Illusion*)

I do not know why human beings have a propensity to construct and follow norms, nor how specific norms come into being and change.
(J. Elster, *The Cement of Society*)
INTRODUCTION

Elinor and Marianne Dashwood, the main characters of *Sense and Sensibility*, are the two sisters whose appearance and temperament are strikingly different. Marianne is impulsive and sensitive. Elinor is sensible (rational?) and ready to observe social norms. Their emotions are constrained by the conventions of their time, which they follow without giving much thought about the reasons these conventions came to exist. They only know that they are there and learn that compliance or defiance may result in distress or enjoyment. Each tries to cope with her condition as well as possible, subject to their psychological make-up and values.

Had Jane Austen’s novel been written today, probably its unfortunate characters would not suffer as much as they suffered for being led to follow the conventions of eighteenth century England. Historical circumstances make conventions to evolve, but they are always there to guide or constrain people’s behaviour. They even need to be there, as a frame of reference, if someone seeks to experiment any sort of unconventional behaviour. Avant-garde artists, for instance, needed to know how the “accustomed ways of doing and thinking” (Veblen) were in order to “make it new”, to use Ezra Pound’s words. The “shock of the new” was, so to speak, the modernist convention.

This is to say that conventions regulate much of life in society. Rules of the road, codes of dress and etiquette or the uses of words are governed by conventions. In economic life, firms follow a set of specific conventions called routines, such as the technical requirements for production, organisational standards, accounting rules, typical industrial relations, norms of distributive bargaining, customary relations with suppliers and consumers, advertisement practices etc. Without these routines promoting co-ordination of their activities
and organising their behaviour in the presence of many types of complexities and uncertainties of daily life, firms would face persistent failure and death.

The aim of this work is to investigate the underlying economic processes which lead to the formation and transformation of conventions. Conventions are a type of social structure which enable human actions and help to co-ordinate economic activities. They are prior to, and the structural conditions for, actions. Conventions are the framework upon which agents rely for decision-making processes in the face of uncertainty. It is rational for agents to fall back on conventions, because in a world where knowledge is fallible and contingent, conventions provide a sort of (tacit) knowledge acquired by common, intersubjective experience.

I came to this subject after studying the works of Keynes and Hayek in many different areas. The disagreement between the two economists is well known. Indeed, the idea of an irreconcilable opposition between Keynes and Hayek was reinforced by Hayek himself in many of his writings; in any opportunity, he was always advancing his argument about the problems and failures of the "Keynesian revolution".

However, after some time doing my research I found an important commonality between them, arising from the theory of knowledge underlying many of their writings. Keynes’s concept of uncertainty and Hayek’s idea of ignorance (dispersed knowledge) lead to one practical solution: if knowledge is fallible and contingent agents fall back on conventions (Keynes) and social rules of conduct (Hayek). Conventions and rules are the repository of a form of knowledge, through which agents may formulate and communicate information for their daily decisions in the face of uncertainty. Thus, this connection was open to some kind of integration and development.
I also realised that the study of conventions has not received a comprehensive integrated theoretical treatment from the economics literature. This thesis systematises the discussion of conventions by consolidating the bulk of knowledge which is dispersed in a vast number of unconnected articles.

Although deeply investigated in philosophy, the concept of convention has only recently received more attention from economists. In philosophy, the basic reference is Lewis (1969). His approach strongly influenced the economics literature on conventions, predominantly from a game-theoretical or neoclassical point of view. For Lewis, a convention is an expected and self-enforcing regularity of behaviour. His approach conflates the conditions for action with the outcome of action. Almost every agent conforms, almost every agent expects other agents to conform, and almost every agent wants others to conform, given that almost everyone else conforms. Almost no agent wants non-conforming behaviour, for this would upset the equilibrium achieved (Lewis, 1969, 78). Game theorists treat convention as an equilibrium which everyone expects in interactions which have more than one equilibrium (Young, 1996, 105), or, to use Schelling’s terminology, the location of a “salient focal point”. Conventions develop because they solve problems of social co-ordination and co-operation. Agents’ behaviour is based on optimising procedures and probabilities might be assigned to the consequences of actions with greater confidence.

My approach goes beyond this account. The thesis analyses decision-making processes in the face of uncertainty in which resort to conventions is a natural and normal response, not an instrumental choice informed by probabilistic, calculable risk. Because of incomplete information and limited computational powers, and because the world is open, agents are
normally not in a position to behave on each and every occasion according to the standard assumptions of rational choice theory.

Moreover, although conventions are the structures (the conditions for) which promote some sort of co-ordination of economic activities (and, therefore, systematic and generalised conventional behaviour may create a context of stability and continuity), they are also the basis for change. They are reproduced by human agency, but they can also be transformed. From the point of view of the capitalist firm, conventions, as I pointed out, take the form of routines; change is change in routines. Throughout a process of competition (active rivalry) and discovery, innovation and economic progress may emerge endogenously. There is, then, a strong connection between conventional and unconventional behaviour, a resemblance between “the co-ordination of productive activities and the co-ordination of the growth of knowledge” (Loasby, 1991, 12).

Conventions can provide stability and continuity in daily affairs. The more the degree of continuity, the more predictable is behaviour, the easier is co-ordination (Loasby, 1991, 16-17). However, it is innovation, the result of a behaviour which is not predictable or expected, the cause of change. The emergence of the new alters the frames in which agents were accustomed to act. Successful unconventional action then disorganises and reorganises. Thus, order may arise out of chaos.

The way novelty arises has been explored in the works of Schumpeter (competition through innovation), Hayek (competition as a discovery procedure), Keynes (animal spirits) and the evolutionary approach of economic change (Nelson and Winter, Dosi, Freeman). In order to account for changes in conventions, this thesis integrates and develops these approaches. As a result, the thesis provides an account of the co-ordination of economic
activities in a context in which those activities involve generation of new knowledge. Thus, the focus of the analysis is not on convention as an "evolutionary stable strategy" (the game-theoretical approach) but rather as the basis of a precarious, "fallible co-ordination" (Loasby, 1991, 51).

Although my basic purpose is to investigate the nature and dynamics of conventions, I can only do so if I approach first the basic concepts which prepare the terrain for a discussion of conventions. Thus, the thesis brings together the economics of complexity, time, and uncertainty in the context of conventions into one integrated framework of analysis, which has not been tried before either. This theoretical setting structures and organises the ensuing arguments of the "core" treatment of the nature, dynamics and rationality of conventions. In preparing the foundations for the work as a whole the thesis also reviews critically many of the key concepts of conventional economics.

To go deep into the analysis of these concepts I address what Loasby (1991) calls "connecting principles in economics". There are perceivable interdependencies between propositions and explanation about a set of phenomena which form a "dense network" of "reliable knowledge". To build my approach I first try to "de-construct" and then "reconstruct" some conceptions informing economic analysis. This is why I also call this study an attempt to provide an analytical or conceptual "reconstruction of the economic man". In this undertaking, the ideas of limited knowledge, indeterminacy and conventional (rational) behaviour are central and equilibrium and optimising behaviour are foreign. By examining a key convention in the discourse of economics, namely rationality as constrained optimisation, the present study of conventions suggests an alternative, more comprehensive account of
rationality under conditions of uncertainty, in which optimising actions are seen as a special case.

Finally, the analytical results of the core part are then “applied” to the conventional elements underlying pricing and the operation of the labour market, both in a large measure the result of normative factors.

Since the aim of the thesis is to provide explanation of aspects (of the genesis, reproduction and dynamics of conventions) of an “open system or world”, it is not stated in terms of a system of propositions in a strict mathematical form; therefore, it cannot be completely formalised. No attempt will be made to define equilibrium solutions. To this work, deductive methods, pre-specification of contingencies or optimising procedures are alien ideas.

Regarding Schotter’s taxonomy of the two views about social and economic institutions, namely, “the behavioural view” and “the rules view”, the present account of the nature and dynamics of conventions is most adequately situated in the former. For, while the behavioural view regards “social institutions not as sets of predesigned rules, but rather as unplanned and unintended regularities of social behaviour (social conventions) that emerge ‘organically’”, that is, “outcomes of human action that no single individual intended to occur”, the rules view considers institutions as “sets of rules that constrain individual behavior and define the social outcomes that result from individual action”, the emphasis being on “the possibility of designing sets of rules or game-forms ... that, when imposed on a set of social agents, leads to prespecified equilibrium outcomes” (Schotter, 1986, 117-118). Thus, in this work, I will seek to emphasise that agents’ actions are largely dependent on the following of conventions suitable to the particular decision context. In doing this, I stress the limitations of human cognitive capabilities in relation to actual decision problems, and the horizon of time
required to formulate and solve any problem (cognitive attention constraints). Also, that the amount and quality of information required for actions may be, in many of the situations, insufficient. From this framework, I provide an account for the logic underlying changes in conventions.

The originality of this thesis is threefold. First, it provides a synthesis, in the form of a consolidated and integrated whole. Second, it is a more comprehensive picture of this theme as an alternative to the mainstream economic paradigm. The latter then becomes a special case of my general approach, applicable only under more strict assumptions. Third, since the dynamics of conventions has not received much attention, by concentrating on why they change the thesis goes beyond those studies which focus exclusively on explanations of why conventions are formed and reproduced.

On Conventions

It is important to differentiate precisely the meaning of some terms employed here. I mention the word convention or conventional having in mind two meanings, namely, linguistic and social (or economic) conventions.

The former relates to the idea of “conventionalism”, as expressed in the views of Poincaré and Duhem about the status of theories in science, according to which scientific statements are merely conventions of language mirroring decisions to embrace one of various possible descriptions or explanations of phenomena. Conventions govern not only the use of words and concepts in a given language, but also the formulation of any consistent system in logic, in mathematics or, why not, in economics. Thus, “scientific objectivity” stems from a general agreement, freely chosen and arrived at, over the conventions espoused. We may then
refer to something as “conventional economics”, that is, a particular language with a recognisable shared set of methods and concepts among its practitioners. That is why one may find conflicting “conventions of language”, such as, for instance, neoclassical economics or post-classical economics, each one providing distinct explanations and at the same time claiming to be based on the same “reality”, “experience” or “observables” (the analysis of processes, phenomena, events etc. in a capitalist economy).

In this case, a convention is like a “theory”, principles embraced by a set of people (a community of researchers), either by explicit choice or as a matter of habit, of reflex non-critical adherence, whose origins may be even unknown for many. What is important here is that conventions of this type are not naturally forced on people and can, if collectively wished, be changed. In this sense, the breaking of conventions may manifest the exercise of human freedom or the search for some sort of emancipation. Keynes’s “long struggle of escape from habitual modes of thought an expression” (Keynes, 1936, xxiii) is a good example of this.

On the other hand, social or economic convention is the term I will frequently use throughout this work and which is its main object of investigation. At each time and place people face an inherited set of conventions which evolved throughout time. These conventions are procedures for action sustained by general agreement. They are the ever present structural conditions for, and are reproduced by, human action. They exist independently of any one single agent or group of agents, but are reproduced by people drawing upon them. Put in another way, conventions pre-date conventional (or routinised) forms of behaviour and although are reproduced by these actions they are not reducible to them. Conventions do not completely constrain action but facilitate or enable it.
In the face of uncertainty, conventions, then, are the embodiment of some sort of (tacit) knowledge whose usefulness was acquired in practice by an impersonal interactive process of common experiences. People resort to this tacit knowledge embodied in conventions in order to perform both the most trivial and the most complex decisions of life. By resorting to these conventions, people reproduce or transform the stock of existing knowledge at their disposal in a particular geo-historical setting.

*On Labels*

Although I am aware of the problematic aspects involved in attempts at labelling, I would like to suggest here a taxonomy aimed at situating the theoretical affiliation of this thesis. This work goes along the lines of a tradition of economic analysis which I call “post-classical economics” (see Eichner, 1985, 6; Lavoie, 1992, chapter 1; Gerrard, 1989). The reason why I use this portmanteau term is that many currents of heterodox schools of economic thought can consistently be assembled in the same theoretical building, notably upon the pillars erected by the contributions of post-Keynesians, institutionalists, Marxists, neo-Schumpeterians (evolutionists) and Hayekian epistemologists. Based on these numerous streams forming the post-classical paradigm, the task of the post-classical analyst is then to search for possible commonalities and make the necessary connections in order to gain coherence and growth of knowledge. Although overlapping is common, the challenge is to avoid possible internal contradictions.

But, why “post-classical”? First, the contrast with “(neo)classical” or mainstream economics is evident. Post-classical economics is a paradigm whose concepts, starting points,
modes of thought and methods conflict with those of mainstream economics. This proposition would be quickly embraced by a considerable part of the above unorthodox traditions.

Second, although recognisable by common elements, mainstream economics is also constituted by many diverse currents. It is bound by “a common mode of thought and a common conceptualization” (Dow, 1996, xii). These shared beliefs are: substantive (optimising) rationality, the application of some sort of general equilibrium framework, methodological individualism, instrumentalism, the concept of scarcity (and the focus of analysis on exchange), and widespread use of deductive, closed, formal systems of analysis.

Despite the similarities, mainstream economics is very broad. It includes Walrasian and non-Walrasian general equilibrium theory, “hydraulic” Keynesianism, disequilibrium theory, Friedmanian monetarism, New Classical economics, New Keynesian economics, and so on. Although a new Keynesian economist would feel uneasy for being called, say, a Friedmanite or new classical, this would not happen if one calls him or her a neoclassical. The feeling of belonging in this case is stronger. Local differences are then overcome for the sake of a global agreed affinity.

The same reasoning could be applied to the post-classicals. Although some may feel uncomfortable under one strict classification (to some, to designate a Marxist as Post Keynesian is still a serious misrepresentation; some neo-Ricardians feel bad when called Post Keynesian if strong qualifications are not in place), none would complain, I believe, in being included in a post-classical paradigm which unifies, at the level of methodology, theoretical undertakings not engaged in the same type of neoclassical practices of research and that reject exclusive concentration on the deductivist (or positivist) approach. For being an inclusive term
which promotes unity (and recognises diversity) much more than division, I employ this
criterion of demarcation.

Having said that, in this work I attempt to link the insights and ideas of many authors
of the above unorthodox schools and seek extensions, generalisations and explanation which
aim at transcending the neoclassical approach. This can be called, after all, a post-classical (or
evolutionary or institutionalist or realist) analysis.

Plan of the Thesis

A brief overview of the argument is provided by summarising each chapter of the
thesis, which is divided in three parts.

The “foundational” part of the thesis is formed by chapters I to III. In chapter I, I
scrutinise important contributions for an account of complexity, concentrating basically on the
works of Keynes, Hayek, Simon and on the conceptual developments in the natural sciences,
in particular those related to the so-called “science of complexity”. In respect to the science of
complexity, I assess the extent to which it is possible to import consistently its analytical
discourse to the domain of economic analysis without jeopardising the peculiar discourse and
object of the latter.

In essence, the common underlying theme of all the above accounts is the belief in the
emergence of complex structures from the many simpler co-operative and conflicting
interactions between the parts of the whole, whether they are atoms, molecules, individuals or
firms.

In chapter II, I discuss the employment of the notions of logical and historical time in
economic analysis. The “problem of time” is in the core of a discussion of uncertainty; it is
partly because of the passage of time that uncertainty arises. However, time in economics is often the forgotten or hidden dimension, for it is normally treated in such a way which strongly violates its real nature. The passage of time pervades all circumstances affecting individual actions, human affairs in general, and economic conduct in particular. This is an essential characteristic of existence, for human beings do not exist outside time: history exists, and does not repeat itself.

In the light of the “arrow of time” account, this chapter also analyses the idea of determinism and the notion of equilibrium. The main conclusion is that if time is historical, irreversible, then one is led to dispense with the notion of equilibrium as conventionally employed in economic analysis.

From the concepts of complexity and historical time I then discuss, in chapter III, the concept of uncertainty, through the works of Knight, Keynes, Shackle and Davidson. By doing this, I highlight which conception of uncertainty the present work will make use of for a discussion of the nature and dynamics of conventions.

The interpretations of Knight, Keynes, Shackle and Davidson transcend, each in a different way, the narrow accounts which reduce uncertainty to probabilistic risk, by which genuinely uncertain situations are expressed in terms of certainty or certainty-equivalents. If the starting point of the analysis is Knight’s conceptual distinction between the notions of risk and uncertainty, then one is led to reassess conventional theories of “uncertainty”, for these are, in fact, theories of decision under quantifiable risk.

Recent theoretical developments based on the works of the authors mentioned acknowledge the important role the concept of uncertainty may play in economics. They have consolidated the “principle of uncertainty” as one of the most important methodological pillars
for economic analysis. If one assigns a prominent role to the principle of uncertainty along the lines of the above authors, then one is led to be aware of its theoretical implications and the analysis must necessarily follow a different route.

The “core” part of the thesis is constituted by chapters IV, V and VI. In **chapter IV**, I examine the nature of conventions and rules under conditions of uncertainty. Conventions, in Keynes’s sense, and social rules of conduct, in Hayek’s sense, are the appropriate concepts for an alternative analysis. The two approaches are complementary. Whereas Keynes provides an account of the nature of (insufficient) knowledge concerning events about future states of the world, Hayek has a theory of fragmented knowledge due to essentially complex phenomena. In both accounts, conventions and social rules of conduct are structures or general procedures which facilitate (and constrain) human behaviour.

In **Chapter V**, I investigate the determinants of the dynamics of conventions. I address here the concepts of routines, competition, innovation and change. To accomplish this task I integrate and develop many insights of Schumpeter, Hayek, Keynes and of the so-called “evolutionary theory of economic change” (Nelson and Winter, Dosi).

If conventions are an “attractor”, a point of arrival, they are also a point of departure. It is this latter attribute of conventions which opens a space for the understanding of their process of transformation as the result of the effects of successful innovation. Changes in conventions and routines are the basis for economic change. Routines change because the competitive process in historical time induce the introduction of innovation, the main weapon firms make use of in order to hold or improve their positions in their specific market or industry. Innovation is the result of non-conventional, experimental behaviour, which is prospected for within a framework of conventions and routines. Successful innovation renders
obsolete the existing set of routines firms draw upon and induces imitation by the firm's competitors. Though innovation upsets previous routines, it also owes its existence to these routines that it rendered obsolete. In this sense, in a dynamic system, routines carry with them the seeds of their own destruction.

In the light of the previous analytical results, I analyse in Chapter VI the conception of rational behaviour in economics. Rational choice theory is one of the most important analytical conventions in economics. I criticise this widely accepted, but narrow, version of rationality based on optimisation procedures and propose an alternative view of rationality with a more general perspective.

An attempt is made to integrate and develop Simon’s concept of bounded rationality, Keynes’s insights on rational conventional behaviour under uncertainty, and Hayek’s ideas of tacit knowledge and rule-following behaviour. I suggest replacing the notion of optimising rationality by the conception of rationality as contextual reasonableness. This provides a more satisfactory portrayal of rational action under uncertainty, conditioned by conventions and rules.

The corollary is that rational choice theory is a limited, specific account of behaviour in economic life, which may operate under quite restrictive conditions. It may even be useful for very simple and/or highly certain choice situations, but it is not satisfactory for highly complex and uncertain choice circumstances, that is, for action under conditions of uncertainty. If knowledge is fallible and contingent, the stubborn employment of optimisation procedures might be “irrational”.

The “applied” part of the thesis consists of an illustration of the argument. In Chapter VII, I discuss conventions in price formation. Conventions provide stability of prices. By
stabilising price movements and making them to a certain extent predictable, conventions stabilise purchasing power and allow for calculation.

A widespread conventional behaviour is cost-plus pricing. In this account, prices are not seen as market equilibrium prices, influenced exclusively by short-run variations in demand. They are not seen as resource allocators, but rather as "administered prices", their level fixed to cover the costs of production and to finance firms’ expansion plans. They are both reproductive and transformative; they must allow for the firms’ operations to take place not only today, but also tomorrow.

Conventions also influence agents’ behaviour in the labour market. In this specific context, “normative factors”, such as concern with custom, pay relativities and fairness, regulate, along with market forces, the wage structure and wage bargaining processes.

Finally, I give an account of inflation based on the role of conventions. Inflation is seen as the overall result of economic and “non-economic” factors, each operative differently according to different contexts in a open system, such as cost changes, variations in capacity utilisation due to effective demand conditions, conflicting claims over income distribution, power, and the breaking down of conventions.

In the Conclusion, I then summarise the basic ideas and arguments of this work.
I - COMPLEXITY

1.1) Introduction

In this chapter, I am interested in discussing conceptions of interactions. To accomplish that, I investigate some ideas of complexity, concentrating on the works of Keynes, Hayek and Simon as well as on the developments in the natural sciences, in particular those of the so-called "science of complexity". With regard to the science of complexity, I make some suggestions for a consistent import of its ideas to the domain of economics without jeopardising the specific aspects of both the discourse and object of the latter.

The common underlying theme linking the above accounts is that complex organic structures emerge from the many simpler co-operative and/or conflicting interactions among the individual components concerned, whether they are atoms, molecules, individuals or firms.

The aim of this chapter is to inquire into the main elements for an account of complexity as a preparatory foundational step whose primary focus is on the nature of uncertainty. Along with the discussion of time and uncertainty (chapters II and III), this is one of the methodological steps needed to prepare the discussion of both the genesis and dynamics of conventions in other parts of this work (chapters IV and V).

1.2) Keynes: Organic Complexity

The idea of complexity underlies many parts of Keynes’s works. His “organic” approach seeks basically to inquire into the relevance of the “hypothesis of atomic uniformity”.

For Keynes, this hypothesis - “what the mathematicians call the principle of the superposition of small effects” (Keynes, 1921, 276) - permeates many of the discussions in science. According to this view, the universe consists of bodies or “legal atoms”,

such that each of them exercises its own separate, independent, and invariable effect, a change of the total state being compound of a number of separate changes each of which is solely due to a separate portion of the preceding state. We do not have an invariable relation between particular bodies, but nevertheless each has on the others its own separate and invariable effect, which does not change with changing circumstances, although, of course, the total effect may be changed to almost any extent if all the other accompanying causes are different. Each atom can ... be treated as a separate cause and does not enter into different organic combinations in each of which it is regulated by different laws (Keynes, 1921, 276-277).

It is on these “different organic combinations” which Keynes focuses his attention instead. For there probably are different laws for “wholes of different degrees of complexity”, and “laws of connection between complexes” which cannot be expressed in terms of laws relating single elements. In this situation, the “natural law” is organic and not atomic: “If every configuration of the universe were subject to a separate and independent law, or if very small differences between bodies - in their shape or size, for instance, - led to their obeying quite different laws, prediction would be impossible and the inductive method useless” (Keynes, 1921, 277).

The existence of “wholes of different degrees of complexity” and “different organic combinations” opens the space for the idea that the world is characterised by “organic complexity”, to use Carabelli’s nomenclature.¹ Put in another way, the implications of starting

either from the hypothesis of atomic uniformity of the world, emphasising “separate and invariable effects”, or from the idea that individual parts have their existence by the very fact of belonging to a complex organic whole, are different.

So, by assuming the relevance of the organic approach one has consequently to criticise the application of the atomic hypothesis. As Keynes puts it:

The atomic hypothesis which has worked so splendidly in physics breaks down in psychics. We are faced at every turn with the problems of organic unity, of discreteness, of discontinuity - the whole is not equal to the sum of the parts, comparisons of quantity fail us, small changes produce large effects, the assumptions of a uniform and homogeneous continuum are not satisfied. Thus the results of Mathematical Psychics turn out to be derivative, not fundamental, indexes, not measurements, first approximations at best; and fallible indexes, dubious approximations at that, with much doubt added as to what, if anything, they are indexes or approximations of (Keynes, 1926, 262).

Two major analytical implications of this approach centred on the idea of organic complexity arise. They are related to the nature of knowledge in a complex world and its possible uses in economics, for the kind of knowledge one can acquire inflicts severe limitations on the use of both mathematical formal language and probability calculations in the analysis.

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2 It is worth noting in passing that the idea of complexity coupled to that of uncertainty was already present in Keynes’s thought well before his discussions about uncertainty, although en passant. In his memoir of Marshall, Keynes observes how limited are mathematical methods in economics as useful tools for “the economic interpretation of the complex and incompletely known facts of experience” (Keynes, 1924, 186). Contrary to what is the conventional belief, this is a statement which Marshall would equally subscribe if one considers his dissatisfaction with the uses (and abuses) of formalism in economics by his time.

3 By emphasising that “small changes produce large effects”, Keynes shows that he was mathematically acquainted with the theoretical developments which later would become the foundation stone of the science of complexity: nonlinearity. For a very interesting account of Keynes’s position on the use of formalism in economics, see O’Donnell (1997).
For Keynes, economic analysis based on this organic approach using "ordinary discourse" should be preferred to the more conventional approach based on strict mathematical "blind manipulations", for the former is not subject to the limitations that mathematical formalisation is. It is a justification grounded on the acknowledgement of the cognitive restrictions for obtaining and using knowledge:

The object of our analysis is, not to provide a machine, or method of blind manipulation, which will furnish an infallible answer, but to provide ourselves with an organised and orderly method of thinking out particular problems; and, after we have reached a provisional conclusion by isolating the complicating factors one by one, we then have to go back on ourselves and allow, as well as we can, for the probable interactions of the factors amongst themselves. This is the nature of economic thinking. Any other way of applying our formal principles of thought (without which, however, we shall be lost in the wood) will lead us into error. It is a great fault of symbolic pseudo-mathematical methods of formalising a system of economic analysis ... that they expressly assume strict independence between the factors involved and lose their cogency and authority if this hypothesis is disallowed; whereas, in ordinary discourse, where we are not blindly manipulating but know all the time what we are doing and what the words mean, we can keep 'at the back of our heads' the necessary reserves and qualifications and the adjustments which we shall have to make later on, in a way in which we cannot keep complicated partial differentials 'at the back' of several pages of algebra which assume that they all vanish. Too large a proportion of recent 'mathematical' economics are merely concoctions, as imprecise as the initial assumptions they rest on, which allow the author to lose sight of the complexities and interdependencies of the real world in a maze of pretentious and unhelpful symbols (Keynes, 1936, 297-298).

It is not that mathematical formalisation is unimportant, but that we cannot have the pretence of regarding it as the method of economic investigation. Rather, it should be an auxiliary tool for economic theorising, not an a priori imposition on the choice of techniques, the employment of it defining unequivocally the reliability or "scientificity" of the investigation undertaken.
Furthermore, the idea of organic complexity implies the need to re-examine the scope of probability and statistics for economic analysis. In a complex reality, the environment which both the observer and the observed inhabit is non-homogeneous through time. Such a feature by itself should prevent analysts from trying to obtain too much from statistical methods. For complex economic problems measurability and precision are jeopardised and the best we can get are rough approximations:

If we were dealing with the action of numerically measurable, independent forces, adequately analysed so that we knew we were dealing with independent atomic forces and between them completely comprehensive, acting with fluctuating relative strength on material constant over time, we might be able to use the method of multiple correlation with some confidence for disentangling the laws of their action; though, even so, our results might be only very approximate so long as we were limited by our technique to linear relations (Keynes, 1938, CW, XIV, 286).^4

Put broadly, the most important condition is that the environment in all relevant aspects, other than the fluctuations in those factors of which we take particular account, should be uniform and homogeneous over a period of time. We cannot be sure that such conditions will persist in the future, even if we find them in the past. But if we find them in the past, we have at any rate some basis for an inductive argument (Keynes, 1939, 316).^5

In sum, Keynes’s notion of organic complexity is in stark contrast with the underlying concepts of the atomistic approach to economics. Complexity entails interdependence; there is no space for an analysis based on ideas such as uniformity, separateness, simple aggregations

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^4 See also Keynes (1938), CW, XIV, 300.

^5 In the same sense: “States of the universe, identical in every particular, may never recur, and, even if identical states were to recur, we should not know it” (Keynes, 1921, 276).
and unrestricted measurability. The atomistic assumption requires a fragmented reality, an assembly of "pure facts", separated into various partial spheres and unrelated to any totality.

I.3) Hayek: A Theory of Complex Phenomena

Hayek’s later multidisciplinary writings (post 1960), the period covered by what Fleetwood (1995, 1996) calls “Hayek III”, are mainly concerned in providing explanations of both the nature of dispersed knowledge in a complex world and how agents seek to cope with this condition by resorting to social rules of conduct. Society forms institutions which assist in the discovery, communication and storage of knowledge. These institutions, in the form of social rules of conduct and the price system, make the existence of (spontaneous) order (not equilibrium) in a capitalist economy a real possibility.

In economics, as in other social sciences, the observer deals with "essentially complex phenomena". There is an endless number of events taking place at the same time and many events have direct and remote connections with other events:

the aspects of the events to be accounted for about which we can get quantitative data are necessarily limited and may not include the important ones. ... [I]n the study of such complex phenomena such as the market, which depend on the actions of many individuals, all the circumstances which will determine the outcome of a process ... will hardly ever be fully known or measurable (Hayek, 1974, 24).

These phenomena display "structures of essential complexity", whose characterisation could only be made with the aid of models composed of a relatively large number of variables. As a consequence, theories face the problem of specifying all the particular relevant facts
which enter into operation in each particular situation. If we try to predict something or to test it, “we have to ascertain all these particular facts” (Hayek, 1974, 32).

This notion of complexity comprises interdependence of actions. Individual decisions must take into account the plans of other people, for complexity “depends not only on the properties of the individual elements of which they are composed, and the relative frequency with which they occur, but also on the manner in which the individual elements are connected with each other” (Hayek, 1974, 26-27).

If there is an endless number of individuals performing many tasks in their numerous activities, then there is ignorance of many relevant facts. This “incurable ignorance” of the particular facts which are or will become known to somebody affects the whole structure of social activities. This structure “constantly adapts itself, and functions through adapting itself, to millions of facts which in their entirety are not known to anybody” (Hayek, 1973, 13).

From the point of view of its capacity to acquire and process information, human mind is limited. People are not able to collect the aggregate of all events, relations and forces at work which compose a given complex order. That is why knowledge about the world is fragmented among all the participants in an economic system. Dispersion of knowledge stems from

the fact that each member of society can have only a small fraction of the knowledge possessed by all, and that each is therefore ignorant of most of the facts on which the working of society rests. Yet it is the utilization of much more knowledge than anyone can possess, and therefore the fact that each moves within a coherent structure most of whose determinants are unknown to him, that constitutes the distinctive feature of all advanced civilizations (Hayek, 1973, 14).
The “coherent structure most of whose determinants are unknown” which I will be particularly interested in discussing with more detail in due time in this thesis is the set of conventions, rules and routines which enable human actions but is irreducible to them.

The idea of dispersion of knowledge is consistent throughout Hayek’s works. In his article “Economics and Knowledge” (1937), Hayek alleges that the main concern for economic analysis should be the “problem of the Division of Knowledge which is quite analogous to, and at least as important as, the problem of the division of labour” (Hayek, 1937, 49). Although attention has mainly been focused on the latter, the former is “the really central problem of economics as a social science” (Hayek, 1937, 49). Social sciences need to interpret how the spontaneous interaction of a vast number of people, each possessing fragments of knowledge, produces a situation in which prices fit costs and which could be originated by “deliberate direction” only by a mind who controlled the knowledge dispersed among all the persons involved:

the knowledge of the circumstances of which we must make use never exists in concentrated or integrated form, but solely as the dispersed bits of incomplete and frequently contradictory knowledge which all the separate individuals possess. The economic problem of society is thus not merely a problem of how to allocate ‘given’ resources. ... It is rather a problem of how to secure the best use of resources known to any of the members of society, for ends whose relative importance only these individuals know. Or, to put it briefly, it is a problem of the utilization of knowledge not given to anyone in its totality. ... The various ways in which the knowledge on which people base their plans is communicated to them is the crucial problem for any theory explaining the economic process. And the problem of what is the best way of utilizing knowledge initially dispersed among all the people is at least one of the main

6 “Through [the price system] not only a division of labor but also a coordinated utilization of resources based on an equally divided knowledge has become possible” (Hayek, 1945, 528). Or further: “Utilisation of knowledge widely dispersed in a society with extensive division of labour cannot rest on individuals knowing all the particular uses to which well-known things in their individual environment might be put” (Hayek, 1968, 181-182).
problems of economic policy - or of designing an efficient economic system (Hayek, 1945, 519-520).

Thus, a particular characteristic of the society we live in is this "unorganized knowledge": individuals are not in a position to acquire "the knowledge of the particular circumstances of time and place" (Hayek, 1945, 521). However, at the same time, some people seek to make good use of the "special knowledge of circumstances of the fleeting moment not known to others" (Hayek, 1945, 522). This may enable them to obtain valuable information in that particular context and, in conjunction with their specific skills, to benefit from this in a way which otherwise would not be available to them: "The knowledge of which I speak consists rather of a capacity to find out particular circumstances, which becomes effective only if possessors of this knowledge are informed by the market which kinds of things and services are wanted, and how urgently they are wanted" (Hayek, 1968, 182).

If the consequences of the emergence of new information are important, then, for Hayek, the best use of knowledge is made at a "microeconomic" level. For if the problem is mainly how to adapt to changes in the "particular circumstances of time and place", Hayek believes that decisions should be left to the individuals directly involved with these circumstances, who are supposed to know promptly the relevant changes and the resources available to perform the ensuing right decisions. Put in another way:

The whole acts as one market, not because any of its members survey the whole field, but because their limited individual fields of vision sufficiently overlap so that through many intermediaries the relevant information is communicated to all. The mere fact that there is one price for any commodity ... brings about the solution which (it is just conceptually possible) might have been arrived at by one single mind possessing all the
information which is in fact dispersed among all the people involved in the process (Hayek, 1945, 526).7

Although complexity implies ignorance, agents have at their disposal practical means of acquiring useful information. One is the price system, a mechanism for discovering, communicating and storing information. The importance of this system is the economy of knowledge which it provides, or how little people partaking in it need to know in order to take their decisions. Thus, a suitable metaphor for the price system is that it is a “system of telecommunications”.

Notwithstanding, there is an important source of information other than the price system. Knowledge is obtained not only via the “telecom system” in isolation, “but by the telecom system articulating with, and embedded within, a dense web of social rules of conduct” (Fleetwood, 1994, 6).

Social rules of conduct which have evolved through time are an important structure for knowledge dissemination. While knowledge dispersed in the price system has a dynamic character, in the sense that it induces agents to revise constantly their plans, knowledge dispersed in a social network of rules of conduct is stabilising, in the sense that, by being used, it continuously maintains the stability of the social structure which agents happen to be inserted (Fleetwood, 1996, 175).

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7 Underlying this reasoning there surely is an ideological case for the non-intervention of the State in the economic domain which one does not necessarily need to embrace. Description and explanation of mechanisms, processes, phenomena etc. are not always connected with a particular prescription by some kind of necessity.
In an account in many respects similar to that of Keynes, Hayek stresses that our ignorance stemming from complexity impose severe limitations not only on the use of knowledge by the observed agents, but also on the knowledge the observing analyst may acquire. The study of the complex nature of the world brings a different perspective for the analysis:

It seems indeed not improbable that, as the advance of the sciences penetrates further and further into more complex phenomena, theories which merely provide explanations of the principle, or which merely describe a range of phenomena which certain types of structures are able to produce, may become more the rule than the exception. ... And the more we move into the realm of the very complex, the more our knowledge is likely to be of the principle only, of the significant outline rather than of the detail. Especially where we have to deal with the extreme complexity of human affairs, the hope of ever achieving specific predictions of particulars seems vain. It would appear to be an evident impossibility for a human brain to specify in detail that 'way of acting, feeling, and thinking channelled by a society out of an infinite number of potential ways of thinking', which, in the words of an eminent anthropologist [Kroeber], is the essence of culture (Hayek, 1955, 20).

Human affairs can be so extremely complex that they place immense obstacles to those engaged in making predictions. In the face of complexity, one should aim to delineate at best “explanations of the principle”, “significant outline rather than detail”, “pattern recognition” (Hayek), or “first, dubious approximations” (Keynes). This led Hayek to say that “[i]t is high time, however, that we take our ignorance more seriously” (Hayek, 1964, 39).

Not only predictions are problematic because of this “incurable ignorance”, but it also may frustrate the establishment of a state of equilibrium, for “where we rely on spontaneous ordering forces we shall often not be able to foresee the particular changes by which the necessary adaptation to altered circumstances will be brought about, and sometimes perhaps
not even be able to conceive in what manner the restoration of a disturbed 'equilibrium' or
'balance' can be accomplished" (Hayek, 1973, 63). Conventional equilibrium theory and a
theory of complex order are not easily reconcilable.

Hayek's theory of the evolution of spontaneous socio-economic order is not based on
any idea of general equilibrium as an organising category. In doing so, Hayek breaks
completely with equilibrium analysis. Although he made use of the notion of equilibrium in his
early economic writings in the 1930s and 1940s, Hayek abandons this framework in his more
mature, interdisciplinary, post 1960, works. In the latter, the focus is on complex spontaneous
order adapting and evolving through time, where the key structures are the web of social rules
of conduct.

1.4) Simon: The Architecture of Complexity

Simon provides another important version of complexity. Similarly to Keynes and
Hayek, Simon also stresses the aspect of interaction defining the idea of complexity. But he
also introduces the notions of hierarchy and decomposability.

For Simon, complexity characterises systems which are "made up of a large number of
parts that interact in a nonsimple way. In such systems, the whole is more than the sum of the
parts, not in an ultimate, metaphysical sense, but in the important pragmatic sense that, given
the properties of the parts and the laws of their interaction, it is not a trivial matter to infer the
properties of the whole" (Simon, 1981, 86).

Complexity frequently takes the form of hierarchy. A hierarchical system is composed
of interrelated subsystems, each of the latter having, in turn, their own subsystems which also
have hierarchical structures, and so on, until we reach some lowest level of elementary subsystem. To make a partitioning and decide which is more elementary and which is more complex is a matter of arbitrariness for the purposes of the analysis. Although we may speak of more or less complex systems, this does not imply that there is a relation of subordination among subsystems. We may regard as hierarchical complex systems those constituted by, for instance, firms, the State, markets or national economies.

Complex systems have also the quality of displaying evolution through time. In the process of evolution of complex systems, problems are encountered every time and problem solving procedures are undertaken to select the best direction to move forward. Problem solving activities, such as, for instance, playing chess, making investments, consuming a good etc., involve, from the most superficial to the most intricate, a combination of trial and error, and selection. Selectivity comes from many rules of thumb, or "heuristics", which recommend which courses of action should be ventured first or which are more helpful. When immense problem solving situations emerge, agents attempt to reduce the problems to a manageable dimension. Selection also relates to some type of feedback of information from the environment (Simon, 1969, 97).

Complex systems evolve from simple systems much more quickly, producing a hierarchy, if there are stable intermediate forms than if there are not. A established hierarchy evolves throughout the guidance of stable configurations functioning as basis upon which further layers were being added.
I.5) The Science of Complexity

Recent theoretical developments in the natural sciences are prone to change in many respects, and in some aspects to change radically, the traditional view of the world most sciences tend to embrace. We are entering in a new conception of science and the new ideas and methods now available to perform the basic tasks of investigation which accompany it will sooner or later modify well rooted, but increasingly outmoded, scientific practices.

The new “science of complexity” is an alternative scientific paradigm to the classical Newtonian view of the world. Its endorsement to investigate processes in the natural world implies a radical reconceptualisation of conventional modes of thought. The purpose of this topic is to introduce its main ideas and assess the extent to which it is consistent and legitimate to incorporate them into the domain of economics.

The following ideas represent the mechanistic (Newtonian) image of universe: the world is like a neat machine, mirroring the predictable timeless path of the planets in the universe; all systems in it behave deterministically in equilibrium conditions; every phenomenon is subject to universal laws which an external spectator could uncover.

This model has recently been supplanted by a larger scientific image of reality. The new representation of the world proposes that the old belief in universal laws must be replaced by the idea that they are not universal at all; they apply only to particular circumstances of reality. The old view stresses ideas such as stability, uniformity and equilibrium, employing conceptions such as closed systems and linear relations (small inputs uniformly produce small outputs). In contrast, the new paradigm is concerned with the more “realistic” traits we experience in the world: evolution, irreversible changes, instability, diversity, “far-from-
equilibrium conditions”, one-way temporality and non-linear relationships (small inputs can activate huge repercussion).^8

The main ideas of the new paradigm are the following. Those parts of the universe which operate like machines are called closed systems and closed systems are only a small part of the whole universe. However, the great majority of phenomena which are relevant to be studied are open systems which are ceaselessly making exchanges with their environment (energy, matter, information). Social or economic systems as well as biological systems are open systems and, therefore, are not subject to be suitably explained in a mechanistic way.^9

Reality is not an orderly stable phenomenon in equilibrium, but a processual phenomenon marked by change and disorder. All systems contain subsystems permanently oscillating. A sole fluctuation or a mix of fluctuations may sometimes develop so vigorously, forcing the system into a far-from-equilibrium condition and then endanger or fragment its whole pre-existing structure. At this point of rupture - a crucial moment known as “bifurcation point”, in Prigogine and Stenger’s (1984) terminology - it is impossible to predict the ensuing direction of change, for the future is open for something between a deterioration into chaos or a jump into a new path of development, with a more differentiated, higher level of organisation - a “dissipative structure”, according to Prigogine and Stenger’s nomenclature.^^10

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^8 "Wherever we look we find evolution, diversification, and instabilities” (Prigogine and Stengers, 1984, 2). Or further: “The real message of the new concepts in science are that change and disequilibria are probably more ‘natural’ than equilibrium and stasis” (Allen, 1988, 117).

^9 See Prigogine (1976) for a case for the application of these new ideas to social systems.

^10 More precisely, a bifurcation point is like a branch, when there are two distinct choices available to a system, similar to a fork at which a path divides into two. Beyond this critical point the properties of a system can change abruptly. A dissipative structure is an organised state of matter arising beyond the first bifurcation point when a system is maintained far from thermodynamic equilibrium. See Coveney and Highfield (1990, 360-361).
In view of this, order can spring spontaneously from disorder by means of a process of self-organisation. Self-organisation is the spontaneous development of non-equilibrium structural organisation on a macroscopic level owing to collective complex interactions between a vast amount of individual parts of a whole (Coveney and Highfield, 1995, 432).

The new paradigm also re-examines the conception of time. An enquiry into the nature of time will be made in the next chapter, but it is worth emphasising some aspects here. In Newtonian systems time is reversible - an instant in the past, present or future is precisely like any other instant; events go either backwards into the past or forwards into the future time without upsetting the functioning of the system. Time is reduced to a parameter and "future and past become equivalent" (Prigogine and Stengers, 1984, 11). The notion of "absolute time" of the classical view implies that time flows at the same rate throughout the universe and people at different positions perceive the same "now". With the shift from this mechanistic dynamics due to the rise of thermodynamics the notion of time undergoes a crucial change: one moment is no longer the same as the preceding and events cannot replicate themselves. Hence, a direction for time arises, an "arrow of time" (in Eddington's words), which is the suitable metaphor for time irreversibility. This idea implies that there are many rival future possibilities, not cognitively fully apprehensible a priori:

what is the meaning of an arrow of time in a deterministic description of nature? If the future is already in some way contained in the present, which also contains the past, what is the meaning of an arrow of time? The arrow of time is a manifestation of the fact that future is not given, that, as the French poet Paul Valery emphasized, 'time is construction' (Prigogine and Stengers, 1984, 16).12

11 See Coveney and Highfield (1990), chapter 1.
12 On the idea of an "arrow of time", see also Coveney and Highfield (1990), in particular chapter 5.
If time is irreversible, to state then that certain processes are the outcome of anomalies or deviations resulting from highly unlikely initial conditions working their way through a traceable trajectory, is problematic. The opposite is truer, that is, time reversibility is the “anomaly”.

Instead of making use of the notion of equilibrium - as the end state of evolution at which all faculty for change is exhausted - it is advocated that “far-from-equilibrium conditions” be taken as the norm. Under non-equilibrium conditions, while some systems degrade, others may at the same time evolve in a more organised way.

Furthermore, if the focus is on processes of increasing complexity, then one is led to reassess the dichotomy between chance and necessity:

A system far from equilibrium may be described as organized not because it realizes a plan alien to elementary activities, or transcending them, but, on the contrary, because the amplification of a microscopic fluctuation occurring at the ‘right moment’ resulted in favoring one reaction path over a number of other equally possible paths. Under certain circumstances, therefore, the role played by individual behaviour can be decisive. More generally, the ‘overall’ behaviour cannot in general be taken as dominating in any way the elementary process constituting it. Self-organization processes in far-from-equilibrium conditions correspond to a delicate interplay between chance and necessity, between fluctuations and deterministic laws. We expect that near a bifurcation point, fluctuations or random elements would play an important role, while between bifurcations the deterministic aspects would become dominant (Prigogine and Stengers, 1984, 176).

Thus, instability is not the only aspect of this view, for patterns of self-organisation also emerge. By the very fact of being characterised by relevant interactions, complex systems may engender ordered structures due to a permanent process of socialisation and diffusion of
information among its many parts. However, it is not a game whose result is known in advance:

the more complex a system is, the more numerous are the types of fluctuations that threaten its stability. How then ... can systems as complex as ecological or human organizations possibly exist? How do they manage to avoid permanent chaos? The stabilizing effect of communication, of diffusion processes, could be a partial answer to these questions. In complex systems, where species and individuals interact in many different ways, diffusion and communication among various parts of the system are likely to be efficient. There is competition between stabilization through communication and instability through fluctuations. The outcome of that competition determines the threshold of stability (Prigogine and Stengers, 1984, 188-189).

According to the new paradigm, a theory of complexity is the analysis of the collective behaviour of many basic but interacting units evolving over time:

Complexity is an idea that is part of our everyday experience. We encounter it in extremely diverse contexts throughout our lives, but most commonly we get the feeling that complexity is somehow related to the various manifestations of life. Thus, to most of us the phenomena dealt with in traditional physics textbooks ... are fundamentally 'simple'. They seem simple because apparently only one object and one action (or a very few) are involved. In contrast, we think of our economic system, our language, the mammalian brain, or even the humblest of the bacteria as 'complex' systems, perhaps because a great number of interacting elements are involved (Prigogine and Nicolis, 1989, 6).

Complexity is the study of the behaviour of macroscopic collections of such units that are endowed with the potential to evolve in time. Their interactions lead to coherent collective phenomena, so-called emergent properties that can be described only at higher levels than those of the individual units. In this sense, the whole is more than the sum of its components, just as a van Gogh painting is so much more than a collection of bold brushstrokes. This is true for a human society as it is for a raging sea or the electrochemical firing patterns of neurons in a human brain (Coveney and Highfield, 1995, 7).
For complexity to emerge two elements are needed. The first, mentioned above, is time irreversibility. The second is nonlinearity, the idea that small changes on one level of organisation produce large effects at the same or different levels.\textsuperscript{13} From a technical point of view, the science of complexity makes use of nonlinearity. It is "[t]he mathematical property of combining in a more complicated way than simple addition. Nonlinear behavior is typical of the real world and means in a qualitative sense ‘getting more than you bargained for’ unlike linear systems, which produce no surprises" (Coveney and Highfield, 1995, 430). A linear relationship between two quantities indicates a directly proportional relationship. But nonlinearity implies asymmetric repercussion. An accompanying result of a nonlinear relationship is feedback - the outcome continues to activate more change. From nonlinearity may arise not only ordered but also chaotic forms of complexity.

In formal terms, we have the following (see Ruelle, 1988). Imagine a system described by a certain number of parameters \( x_i \), and the “rest of the universe” by a disturbing external noise \( w \) (or a shock). The “time evolution” is then

\[
\frac{d}{dt} x (t) = F (x (t), w (t))
\]

or, where the time \( t \) is discrete,

\[
x (t + 1) = f (x (t), w (t))
\]

\textsuperscript{13} “[I]n general, nonlinearity produces complex and frequently unexpected results” (Coveney and Highfield, 1995, 9).
where $x(t)$ is a vector with a smaller or larger set of constituents. It is also arbitrary which variables are filled in $x(t)$ and $w(t)$.

The occurrence of shocks generates an “aperiodic” time evolution. In the absence of shocks, one has an “autonomous” time evolution of the type

$$\frac{d}{dt} x = F(x)$$

Aperiodic behaviour can also be generated, if there is “sensitive dependence on the initial equation”. For instance, a small change $\delta x(0)$ of initial condition causes a change $\delta x(t)$ which grows exponentially as $t$ increases:

$$\delta x(t) \sim \delta x(0) e^{\lambda t}$$

where $\lambda > 0$ provided that $\delta x(t)$ remains small.

The trajectory $x(t)$ lies asymptotically for large $t$ on a set called a “strange attractor”. The type of behaviour described is called “chaos”.

The ideas of non-linear relations, chaotic behaviour, sensitive dependence on the initial equation etc. provide stimulating insights which might be very useful for the type of phenomena economic analysis deals with. However, one needs to be careful and not to overstate the case. The approach of the science of complexity may be a huge improvement for
though when compared with the traditional formalistic models of conventional economics, but techniques such as the mathematics of chaos are not in themselves an infallible remedy. One should not forget that chaos theory can be, in its equations, just as deterministic as, for instance, statics, though its results are much more interesting. Although in a bifurcation point much space is open for unpredictable results, it cannot capture the nature of phenomena such as "crucial decisions" in the Shacklean sense, "animal spirits" à la Keynes, or the rationality underlying the Schumpeterian entrepreneurial activity.

1.6) Formalism

Though complexity theory calls attention to the importance of nonlinearity as the more suitable mathematical technique to cope with real world phenomena, the viewpoint advanced here is that the study of human conduct in economic life has to be extremely cautious about the possibilities of successfully employing formal mathematical language. As seen above, both Keynes and Hayek are very careful about the claims for precision that the use of this method implies.

Formalism is the doctrine according to which the symbols contained in mathematical statements possess a structure with useful applications (see Coveney and Highfield, 1995, 427). As the average economist knows, the conventional position, based on a deductive conception of science and explanation, is that the use of mathematical techniques is the only acceptable and "scientific" procedure for successful economic theorising. The formal method of enquiry is seen as pre-condition and criterion of demarcation between "science and non-science" (see O'Donnell, 1997, 157). Instead, I would like to dispute this "wholesale
formalism” assertion (Woo, 1986) by raising some general points in relation to the belief that to analyse and explain successfully the nature of economic phenomena one needs necessarily to resort to deductive methods and closed systems.

In general, economists are always keen to champion the use of formal language in economics, but, paradoxically, as a rule, they have never tried to investigate deeply its limitations and adequacy to represent phenomena, relations and structures which are the outcome of human actions. The rule is a (irrational?) faith in the infallibility of mathematics. It is seen as the only way available to accomplish accurate arguments, to obtain reliably faultless results from a given set of statements. It is not an exaggeration to say that this vision of mathematics is like a religion. Mathematics is seen as the secret code describing the universe, the most secure form of knowledge.

Within the specific sphere of mathematics the definition of complexity is clear-cut. The complexity of a problem is described “in terms of the number of mathematical operations needed to solve it” (Coveney and Highfield, 1995, 14). In this case, what mathematical complexity theory has to do is to assess the degree of complexity of a problem. By doing this, one is then in a position to see the extent of its mathematical tractability. That is, the extent to which attempts to solve it are feasible. However, as the complexity pertaining to the economic realm is a completely distinct problem, one wonders about the practicality of trying to connect the concepts of mathematical complexity (a method to assist analysis) with those of economic complexity (the real world) in a consistent way. Mathematics by itself cannot have the pretence to describe all forms of complexity.
The concern with complexity opens space for an increasing dissatisfaction with the faith in the power of mathematics. As Coveney and Highfield remark,

[...] the great French mathematician Henri Poincaré had already shown at the end of the nineteenth century that the motion of as few as three bodies was too complex to yield a neat, closed form of mathematical solution, foreshadowing the modern understanding of chaos theory. Many important real-world problems, such as that of a peripatetic salesman who has to devise the most economical way to visit a set of cities, can be formulated simply enough, but attempts to find their solutions by systematic means rapidly become impractical as the problem's size (for the salesman, the number of cities) increases beyond a small number. Other examples of mathematically complex problems include descriptions of how brains learn from their interactions with the external world and how evolution led to organs as complicated as the brain in the first place. Such problems lie beyond the scope of pen, paper, and analytical mathematics; because of their immense power computers provide the only means of solving them (Coveney and Highfield, 1995, 15).

However, there are certain processes in the natural and economic world whose complexity is such that it is well beyond any computational ability of simulation. Such processes can challenge continually any endeavour to model them. Innate limitations obtain which make attempts of mathematical tractability a headache rather than a possibility for the advance of knowledge. The problem may quickly become too complex to solve in a reasonable manner. It is not unusual that elegant analytical mathematics is unable to give us optimal solutions - “hard optimization tasks are intractable problems” (Coveney and Highfield, 1995, 36).

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14 “[S]ome of the simplest mathematics can - horror of the horrors - contain randomness. And if that is not enough, ... mathematics can sometimes be impossible to use” (Coveney and Highfield, 1995, 21). See also pp. 27-28 for a discussion on the problems Godel’s theorem poses for mathematics (incompleteness and undecidability).
This is the risk involved in reducing the complexity of the world to the simplicity of mathematical models. This kind of reductionism may reach the point at which it is overcome by the cognitive limitations we are faced at every moment, for no matter how sophisticated our techniques of mathematical investigation are, they are always at a lesser level of complexity as compared to the richness of the world:

It is possible to achieve a degree of algorithmic compression for a chaotic system. This is a relief for any scientist daunted by the complexity of the real world: some very complex phenomena can be captured in a small set of deterministic equations. Chaotic systems are exquisitely sensitive to initial conditions, and their future behavior can only be reliably predicted over a short time period. Moreover, the more chaotic the system, the less compressible its algorithmic representation. Finally, if a property of the real world is algorithmically incompressible, the most compact way of simulating its behavior is to observe the process itself (Coveney and Highfield, 1995, 38-39).

Consequently, before embracing automatically certain conventional practices, economists should, therefore, be more aware of the problems and limitations involved when they choose their methods of analysis. The alert comes not from dissenting unorthodox economists, but from natural scientists:

The world’s economies possess nonlinear features characteristic of complex dynamical systems, although the market place is very much associated with a form of financial ‘survival of the fittest’. There are objective measures of economic and financial success, whether of nations or companies, such as gross national product, budget deficit, market share, profits and losses, revenues, and stock prices. Yet many factors on which these quantities depend are themselves ill defined. A Wall Street catastrophe could be triggered by a financial earthquake or a whispering campaign. Beliefs and rumors generated by stockholders, analysts, and speculators can induce fluctuations in price, stock, and currency markets that in turn feed back on the objective ‘fitness’

\[^{15}\text{For a more detailed account of the theoretical limitations surrounding the use of mathematics, see Coveney and Highfield (1995), chapter 2. For a criticism of formalism in economics, see Woo (1986).}\]
measures ... [I]t has taken economists a long time to recognize the inherent complexity of their subject. For decades, the central dogma of economics revolved around stale equilibrium principles in a manner entirely analogous to the application of equilibrium thermodynamics in physics, chemistry, and even biology. For the same reasons as natural scientists, many economists have sought to shoehorn all economics into theories whose merits are their mathematical simplicity and elegance rather than their ability to say something about the way real-world economies work. In this way, memes [ideas, units of cultural transmission, according to Dawkins] for classical equilibrium-based concepts have been infecting the minds of generations of science and economics students with the dogma that the behavior of a complex system can be deduced by simply summing its component parts (Coveney and Highfield, 1995, 335-336).

In the present context, I am not proposing that there is no validity at all in any imaginable mathematical method. What I want to dispute is the pretence that it should be an universal and boundless method. The use of mathematics in economics should be seen instead as a subordinate technique assisting, in some appropriate contexts, the undertaking of theorising. It is a means, not an end in itself. The formal method is only a symbolic form or a language which can be used to provide analysis and explanation of the nature of various economic phenomena, not the economic analysis or explanation per se; as such, it can be useful only when properly applied.

1.7) The Economics of Complexity: An Overview

From the previous discussion, let me now summarise the main elements of an account of complexity applicable to the study of economic reality.

An enquiry into the nature of complexity implies to contemplate the study of the evolving structures and patterns produced by the dynamic (internal and external) interactions among systems and subsystems. The higher the degree of complexity, the higher our ignorance
of the interactions entailed in a particular set of circumstances. Complexity and ignorance are closely linked.\textsuperscript{16}

The notion of complexity also refers to systems which are structurally hierarchically differentiated. As a consequence, the focus of attention on the actions of individual constituents alone is a reductionist approach that must be avoided; systems have properties and relations as wholes which cannot be explained exclusively from the single features of individual units. It is a distinctive way of seeing the links between “micro-rules” and “macro-behaviour”. The parts of a whole have their nature and function conditioned by this organic interconnection with the rest of the system. A systemic complex whole is different from a mere aggregate summation due to that dependence of the nature and existence of its constituents on their position in the whole, and to the associations involved. In this sense, systemic wholes are more than the sum of their parts.

Note that whenever I mention the word system it does not normally come together with any other adjective (for instance, physical system, biological system or socio-economic system). This is not accidental. By doing this one opens a door to make analogies between ideas employed in the natural sciences and their consistent use in economics. Although I am conscious of the perils of attempting to apply mechanically and uncritically the theoretical discourse of the natural sciences to the realm of the social sciences, as it is the case with conceptions such as equilibrium and statics, I believe that in this situation we have more to

\textsuperscript{16} “The individual choices which economists study are set in environment conditioned by the choices of other individuals. Isolated choice is not their concern. ... Choice within a complex system cannot be fully informed; neither can the study of a complex system from outside. Partial ignorance is intrinsic to the problems of choice which economists claim to investigate” (Loasby, 1976, 1-2).
acquire than to lose. By analogy, some extension, based on the novel view of science, could be attempted.

An important difference between the objects of study of the natural sciences and those of the social sciences is that, in the former, the simplest phenomena are less complex than in the latter. The degrees of complexity are distinct. Another distinctive characteristic is that in the social sciences, and economics in particular, prediction and control are not completely reliable criteria and much more difficult to achieve. Whereas in physics one can do careful and precise experiments, in economics these conditions do not normally apply; for instance, it is not easy to find long time series of good quality, and shocks and change can be recurrent. In economics, it is not an uncomplicated matter to discover an "underlying deterministic dynamics" (if there is any), as in physics.

Thus, this new "science of complexity in economics" should argue that the economy as a whole is a macro-system greater than the sum of its many parts, the latter being subsystems such as, for instance, the existing set of conventions and rules, firms, markets, the scope of State action etc. All its components come together to produce stable structures (subject to change), perceivable recurring patterns (transient by nature) and ordered states which emerge as the individual parts communicate with one another. More than that, each subsystem is a system in itself in the sense that it is also decomposable in parts of a lesser degree of complexity, whose interactions with each other also engender complex ordered structures. Broadly speaking, a market can be seen as a complex system composed by the activities of (sub)systems like firms which, by their turn, resort to other types of structures like
conventions, rules and routines. By acting upon these structures, firms reproduce or transform them.

Thus, like many other complex dynamic systems, a capitalist economy resembles a living organism evolving in time. It is a dynamic system because it is a system whose properties may change over time. It is complex because it is constituted by parts which interact with each other "in a nonsimple way" (Simon) and hierarchically. It is also an "open system", in the particular sense that open systems have an important and relevant dialogue with their surroundings and are also the result of a relevant dialogue among its interacting components. An open system has the capacity to affect and to be affected by the very act of partaking in a dialogue with the environment.

It is a living organism because self-organisation and adaptation are central properties. For instance, firms seeking to achieve their specific goals (survival, growth) are led to reproduce or change existing structures. It is a game of failure or success with unknown results. Evolution implies that typical behaviours, structures, relations etc. unfold with the passage of time in a non-deterministic way.17

Although self-organisation may obtain, chaotic states are also possible. Chaos is "the term used to describe unpredictable and apparently random behaviour in dynamical systems".

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17 "To find out more about the inherent complexity of life, we need to explore how it thrives on both self-organization and evolution" (Coveney and Highfield, 1995, 192). The system I have in mind could also be described, at one specific level of reality, in the following terms: it embodies "a multitude of 'elements' in the form of belief-models or hypotheses that adapt to the aggregate environment they jointly create. Thus it qualifies as an adaptive complex system. After some initial learning time, the hypotheses or mental models are coadapted. Thus one can think of a consistent set of mental models as a set of hypotheses that work well with each other under some criterion - that have a high degree of mutual adaptedness. ... More often there is a high, possibly very high, multiplicity of such sets. In this case one might expect inductive-reasoning systems in the economy ... to cycle through or temporarily lock into psychological patterns that may be nonrecurrent, path-dependent, and increasingly complicated. The possibilities are rich" (Arthur, 1994, 410-411). See also Heiner (1983), pp. 583-585.
Chaotic states are structures that never repeat and therefore no regularities are perceived. One may think here of the “sudden collapse in the marginal efficiency of capital” (Keynes, 1936, 315) or Marx’s idea of “anarchy of production” leading to crises.

The economy adapts, or new structures emerge, as it accumulates experience due to revision of the states of the intermediate subsystems or building blocks. Innovation may create unexploited market opportunities and extra-profit; the generation of novelty brings about the need to readapt to new contexts. Progressive improvements take place frequently. Because of this, the economy actually operates far from an optimum or “attractor”.

To illustrate, we could think of the existence of many complex systems and subsystems at distinct levels of hierarchy, each subject to different analysis and explanation, in the following manner:

\[\text{conventions, routines [ firms, institutions [ markets [ the economy [ the world economy]}\]

where \[\text{[}\] means that the preceding (sub)system is the structural condition for the operation of the following (sub)system.

In this scheme, conventions are the “standard operating procedures” which helps to co-ordinate the operation of other systems of higher degrees of complexity: each system is an “adaptive nonlinear network”, according to Holland’s (1988) nomenclature.¹⁸ A convention is

¹⁸ These networks “allow for intensive nonlinear interactions among large numbers of changing agents. These interactions are characterised by limited rationality, adaptation (learning), and increasing returns” (Holland, 1988, 118). Standard operating procedures “suggest and dictate actions to be taken under specific conditions. ... [They] have been acquired (learned) from encounters with similar situations in the past” (Holland, 1988, 119).
then an adaptive complex structure at a lower degree of complexity inside a much bigger macrostructure (the economy). For instance, the operation of firms depends on the prior existence of conventions or routines, but are not reducible to them. This is an account which stresses the aspect of “irreducible mutual inter-dependencies” (Lawson, 1997) in social and economic life.

1.8) What Are the Questions?

The Newtonian perspective has dominated the ethos of many branches of science for a long time, and economics is not an exception. This posture obstructed more suitable analysis of systems undergoing qualitative change and evolutionary development. New developments in physics, chemistry and biology allow now the possibility of importing from these disciplines new ideas and insights which fit better to explanations of the nature of economic processes and human actions. Instead of equilibrium and statics, the main concern is with non-equilibrium conditions and change.

Economics, since it emerged as an autonomous “science”, always tried to imitate the modus operandi of physics. For many economists, the mirror of economics is the natural sciences. In the Newtonian era this was unfortunate. Today, with the developments of the science of complexity, it is reasonable, to some extent, to do this. The irony is that little has been done to turn to the new approach. Now that eventually we are allowed to do that without falling into the traps of scientism, irrelevance or lack of realism, therefore, without expecting too much from the “pretence of knowledge” approach (Hayek, 1974), we do not find abundant evidence, but only sporadic endeavour in this direction.
That these developments are disturbing does not seem to have been fully grasped by the standard practice of research in economics. An important example suffices to illustrate the argument. In the 1980s, the Santa Fe Institute - “a multidisciplinary graduate and teaching institution formed to nurture research on complex systems and their elements” - sponsored a workshop on the theme “Evolutionary Paths of the Global Economy”. Economists and natural scientists gathered together in order to exchange ideas concerning possible common areas of interest in both fields of research.\(^\text{19}\) It seems that the great majority of economists has not assessed adequately the scope of the challenges posed by many natural scientists to the conventional methodological approach which informs economists’ usual way of doing things. The questions posed by many natural scientists were of the following character:

1) Why do economists downplay or ignore the role of psychological, sociological, and political forces in economic systems? 2) Rational Expectations (RE) theory with infinite foresight appears obviously wrong. Why is it so well accepted? 3) Can a system with a fixed number of variables adequately model innovation? (Palmer, 1988, 258-261).

It is ironic to witness natural scientists challenging economists for not including “non-economic” factors in their analyses, as well as ascribing to economic agents something that they do not normally possess (complete knowledge and perfect powers of cognitive attention, computation and interpretation). It is an accusation which comes not from other social scientists or even heterodox economists, but rather from those scientists whose methods of analysis the majority of economists always tried to imitate.

\(^{19}\) The resulting lectures, working groups and research papers are in Anderson et al. (1988).
To give an example of the quality of the responses, let me concentrate on Arrow's (1988) intervention. In two meaningful passages, Arrow recognised the disturbing implications of the new approach on what he calls “mainstream neoclassical economic theory”. First, after commenting that research based on the new methods of nonlinear dynamic analysis showed different results from the usual results of the analysis of models with equilibrium dynamics, he then concluded that “[t]he multiplicity of solutions is itself an embarrassment, since it suggests that economic theory, even if accurate, does not yield a unique pattern of dynamic behavior and hence predictions are far from sharp” (Arrow, 1988, 277; my emphasis). Second, after commenting on “a number of empirical generalizations about economic activities” presented by many participants, he then concluded that “[t]he generalizations partly accorded with the outcomes of equilibrium dynamics, but in considerable measure disagreed” (Arrow, 1988, 279; my emphasis).

If one of the main theorists of general equilibrium analysis reaches these conclusions, what should one make of this? Faced with serious challenges to his or her theories one should promptly embark on a revision of ideas. This is what is expected from scientists. If one believes that complexity theory is true, and if complexity theory destroys the faith in ideas such as general equilibrium, then equilibrium theory should be either discarded or radically reconceptualised, for the sake of consistency. It is as simple as that.

However, instead of trying to rethink the theory and assess the full analytical consequences of the science of complexity upon approaches such as the general competitive equilibrium theory, what one normally sees is a defensive behaviour. It seems that for an inquiry into one of the causes of such a conventional, regular and predictable behaviour one
could paraphrase Dawkins's (1989) ideas about religion, and restate that, by analogy with religion, economic beliefs are held for reasons of epidemiology alone: economic doctrines survive because they are uncritically told to young students at a susceptible age and the students, when they become teachers or professionals, uncritically tell the same thing to their students (and are also expected to do so) (see Coveney and Highfield, 1995, 334).²⁰

Thanks to these new discoveries, one cannot be prevented from reaching the conclusion that standard practices in economics are grounded on conceptions which are becoming increasingly obsolete. In the light of these developments, the task of reconceptualising economics is not a matter of preference, but rather of coherence and necessity due to this more satisfactory and realistic scientific image of economic reality.

²⁰ Notwithstanding, some interesting application of the new paradigm was provided in that workshop. For an stimulating employment of those techniques of the science of complexity for a “global economy”, see Holland (1988). For a general review of the main ideas and concepts surrounding “chaotic dynamics” as well as their possible employment in economics, see Ruelle (1988). For other contributions to the subject, covering different topics, see Allen (1988), Silverberg (1988) and Chick (1995).
II - THE PROBLEM OF TIME IN ECONOMICS

II.1) Introduction

This chapter examines conflicting notions of time in economics. The purpose is to highlight which conception of time is necessary to address later a discussion of uncertainty. In the light of the idea of historical time as opposed to mechanical time, I scrutinise both the idea of determinism and equilibrium analysis.

The attempts to build theories which take into account how the passage of time affects the performance of the economy, through the formation of expectations and their fulfilment or disappointment, and through the link between actions and their consequences, is one of the most complex in economic analysis, but, at the same time, one of the most fascinating.

The "problem of time" is in the core of a discussion of uncertainty; it is partly because of the passage of time that uncertainty arises. However, time in economics is often the forgotten or hidden dimension, for it is usually treated in such a way which violates its real nature. It is a fact of human affairs in general, and economic conduct in particular, that the passage of time pervades all circumstances affecting individual actions. This is an essential aspect of existence, for human beings do not exist outside time: history exists, and does not repeat itself.

Time is a dimension of change. Change can be perceived only as time passes, through our understanding that reality has been altered. As Carvalho states, "[u]ntil one deals explicitly with the concept of time one cannot analyze the concept of changes in the economic system" (Carvalho, 1983-84, 265).
The meaning of temporal flows is different from that of space. Although we can speak of the three dimensions of space, time has only one dimension. An event occurs at a unique time. Time, unlike space, has an irreversible direction, from the past to the future. Thus, the notion of an absolute now, of simultaneity, is at odds with time as change.

The irreversibility of time is evident in the growth of a tree or of a human being, the breaking of a glass or the undertaking of an investment decision. They cannot happen in reverse. Time-travel can be a stimulating exercise of imagination for physicists, but has no meaning at all for the analyst of socio-economic phenomena. To speak of timeless events is like to conceive of an empty space without matter; these are both nonsensical ideas.

II.2) Time in Economics

In economics, familiar taxonomies for analysing time make use of a two-way classification consisting of mechanical (or logical) and historical time.

In the mechanical approach, time is seen “to move forward to envisage outcomes and events that can occur only in the future, but then time moves backward again when that future is collapsed completely into the present by intertemporal reduction devices” (Vickers, 1981, 545). Future values of variables are assumed to be random variables accountable by probability distributions. The consequence is that there is no genuine “unknowledge” of the future; uncertainty is reduced to risk by a discounting procedure and transformed into knowledge. The future then will never bring novelty and surprise, for certain knowledge has been posited from the very beginning.

Mechanical time has the same nature as space - one can move from place to place like locomotion in space (from the left to the right and then back to the left; backwards and
forwards and then back to the original position). Time is reversible. There are no “qualitative permanent changes” (Carvalho, 1983-84). Mechanical time is time without direction. This is the notion of time usually associated with neoclassical economics.

Historical time is a sequential continuum without end. Actions taken yesterday cannot be reversed in order to solve problems today. Changes occur in time, not in space.\(^1\) Mechanical time is truly “atemporal”, while historical time has a direction: it runs from the irrevocable past towards the unknown future.\(^2\) It is in the present that everything actually happens. As Shackle says, the time at which action is taking place is the “all-embracing present”, that is, “the time in which the individual feels, thinks, decides and acts. ... Present thoughts and acts, so far as our consciousness can tell us, are all that is. To be is to be in the present” (Shackle, 1965, 189).\(^3\)

I cannot decide to go tomorrow to the Royal Festival Hall to enjoy Claudio Abbado conducting the Berlin Philharmonic in a Beethoven programme which was performed yesterday. Unfortunately, for not having gone yesterday I definitely lost it. This is the unavoidable consequence of that action and I cannot reverse it. As Bausor states,

\[\text{past events may be knowable, whether or not they are actually known. Future phenomena, however, are informationally unknowable until they slip into history. Indeed, this knowability of observation automatically places the objects of observation}\]

\(^1\) “States engender states in the sense that the ‘parameters’ of a certain situation change to transform themselves into new ‘parameters’. This means that history is not a collection of states associated with given parameters among which one can travel at will” (Carvalho, 1983-84, 266).

\(^2\) As Joan Robinson was fond of saying, “today is an ever-moving break between the irrevocable past and the unknown future” (Robinson, 1977, 8).

\(^3\) “[T]he nature of the ‘present’, the essence of the moment-in-being, is an impregnable self-contained isolation” (Shackle, 1958, 16). Or further: “‘Today’ is influenced, but not completely bound, by the past. Any action or decision taken today is either the result of blind habit and convention or it is directed towards its future consequences, which cannot yet be fully known” (Robinson, 1980, 86).
in the past. Equivalently, observation identifies the present as later than the observed event. To have seen something change, even the simple motion of a clock’s hands, signals that the present is not now as early as it had been, and that the observed thing is now past. ... Every distinct instant combines an idiosyncratic past with a singular future embracing its own special planning horizon. Thus each moment lies uniquely embedded within history; the situation currently inherited can never be repeated (Bausor, 1982-83, 164-165).

We can only fill the epistemic gap of the things that have not happened through imagination about what we expect will happen in many circumstances. Although in many situations we may say what we believe will happen in the near future, or sometimes even in a more distant future, the future exists only in our imagination.⁴

There are slightly different conceptions about the most suitable taxonomy of time, for different authors and purposes. For instance, Shackle (1954, 1958) starts from claiming that the essential distinction is between “dynamic time” (“the locus of actual experiences”) and “imaginary time”, the latter comprising “expectational time” (“images associated with future moments”) and “memory time” (“thoughts about events or situations associated with past moments”) (Shackle, 1954, 4). Later, Shackle (1965) suggests another classification with four categories: “mechanical time” (Kalecki, Samuelson, Hicks, Austrian capital theory), “timeless models” (general equilibrium models), “evolutionary time” (Marshall) and “expectational” time, the latter being his main concern and uncertainty its central concept. As Shackle stresses, “[e]xpectational time is an aspect of a decision maker’s effort to choose a course of action in

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⁴ “Historic time is significant because of the way in which it, or more precisely our imaginative perception of the possibilities inherent in it, determines what we do in our choice-decision moments, and because of the way in which the passing of time qualifies our stance at the decision points we confront” (Vickers, 1981, 546).
face of uncertainty about the outcome which would flow from this course or that” (Shackle, 1965, 187). He also refers to it as the “time of uncertainty”.

Possas (1987) suggests that there are three distinct dimensions of economic time, namely, chronological, historical and theoretical. The “chronological” notion of economic time is related to the passage of time in terms of the Gregorian calendar (one week, one month, one year etc.). The “historical” dimension relates to the historical “compatibility” of economic events and theorising. In this, there are two levels in which the domain of the “historical” overlaps with the domain of the “economic”. The first, more general connection, refers to the idea that the characteristics of a given mode of production necessarily determine economic relations and the basic theoretical categories; the stage of the historical process circumscribes the acts of theorising and the scope of economic theory. The second, more concrete connection, relates to the inevitable changes which take place in economic relations in the same historical phase without eliminating the basic traits of a given mode of production. This imposes on theorising the necessity of incorporating new elements. Finally, the “theoretical” dimension is related to the influence of the passage of time upon agents’ decisions. The latter is the realm of expectations under conditions of uncertainty.

Despite those apparently conflicting suggestions, the unifying perception is that real economic time is different from the idea of mechanical time employed by the classical (Newtonian) approach in physics, which was without qualification transported to the language of economics. Time as experienced by economic agents is historical and irreversible, while in classical science (and neoclassical economics) time is mechanical and reversible. Whether we

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5 For an assessment of Shackle’s approach, see Carvalho (1983-84).
consider Shackle’s “expectational time” or Possas’s “theoretical time” the idea is the same. In a “historical-time model”, the essential traits are: unknowability of the future, causation operating in a forward looking manner, non-repeatability of events (Bausor, 1984, 362). Therefore, a more suitable approach requires to treat time as an unidirectional flux. The idea of an “arrow of time” is the suitable image.⁶

Economic processes happen in time. The production of commodities takes time, and the consumption of both capital and consumption goods takes time. Uncertainty surrounds production also in the sense that firms enter into contractual commitments to employ the necessary resources to produce goods, while receipts will be determined in the market at a future date at an unknown price. Investment decisions are surrounded by doubts as to the future results of these decisions. Liquidity preference is directly affected by both expectations as to what will happen in the future and the degree of confidence in those expectations. The effects of current economic actions will become clear only after some time.

Agents must decide taking into account the fact that they do not know the whole set of pertinent information or possible future states of affairs which will enter into operation after they decide which course of action to follow. The identification of regularities may provide some form of knowledge; however, as the future is unknown, observations of past situations do not always afford reliable information concerning the possible future states to come. Predictions based on past experience are of limited scope. Decisions are taken under a veil of ignorance of varied degrees of uncertainty. The more remote the future considered the thicker this veil of ignorance.

⁶ See Prigogine and Stengers (1984) and Coveney and Highfield (1990). To play on words, neoclassical general equilibrium theory is the “Arrow without Time”. Time not as an arrow but rather as a boomerang.
The time horizon for investment decisions is longer than for most of other economic decisions. This means that the degree of uncertainty surrounding investment decisions is different from the uncertainty surrounding, say, consumption behaviour or price formation. Also, firms investing in the same market may perceive differently their future prospects: some might be successful innovators, others more risk-averse or others better equipped to start new undertakings (for instance, the leader in that market). In the case of investment, the situation is aggravated by the fact that investment decisions have to face a higher degree of illiquidity commitments, which renders the time horizon "rigid".

In sum, time is an important element surrounding economic decisions. It is through the passage of time that change and surprise surface, that our knowledge becomes "unknowledge".

II.3) Determinism

Determinism is the view according to which the state of the world at any moment determines a unique future. Every event that actually happens has to happen according to the iron laws of nature, to causal necessity. Nothing can be other than it is. Everything, including human action, really happens with absolute inevitability, with no room for alternatives. All our mental states and actions are no more than effects of other equally necessitated events.

Determinism is at odds with deliberation. If "hard" determinism is true, then no one can ever rationally deliberate about any sort of action. Deliberation has meaning only if genuine alternatives are available for people willing to act, if they could have acted otherwise. Determinism requires that only one course of action is genuinely open to a person; deliberation (or genuine choice) would then be "irrational".
In the economic domain, a form of determinism is the idea that human actions are not an important factor in the creation or transformation of economic reality. History is determined irrespective of the exercise of human choice; economic processes continue to develop regardless of whether we decide to act on them. Structures have their own existence autonomously, without the interference of intentional actions. The idea of free will, that a person is able to choose and act according to the dictates of his own will, is at odds with the deterministic faith.

The conventional view in economics is deterministic for it does not allow an important role for genuine choice. Decisions are pre-reconciled and the results of these decisions will always lead to a predeterminedly known end-state, that of equilibrium. Its deterministic character is evident for it is a scheme of things where necessary patterns obtain; nothing could be different.

These schemes preclude the creative nature of decision and the injection of something essentially new into the texture of affairs. Creativity in decision-making is antipodean to determinism and underlying ideas such as perfect foresight and certainty of knowledge. The new is the “unforeknowable” (Shackle, 1976, 33). The unforeknowable is what emerges in the form of change and “essential novelty”\(^7\).

But history is a generative process influenced by the transformative power of “originative, non-empty choices”. Pure determinism cannot be reconciled with a view grounded on crucial decisions:

\(^7\) “[D]eterminism assumes a single initial act of creation while free will supposes continuing creation” (Shackle, 1954, 7). See also Shackle (1958, 26).
Conventional economics is not about choice, but about acting according to necessity. Economic man obeys the dictates of reason, follows the logic of choice. To call his conduct choice is surely a misuse of words, when we suppose that to him the ends amongst which he can select, and the criteria of selection, are given, and the means to each end are known. The theory which describes conduct under these assumptions is a theory of structure, not creation of history. Choice in such a theory is empty, and conventional economics should abandon the word. Is the only alternative to a theory of necessary action a theory of non-rational, of arbitrary action? The escape we have suggested consists not in abandonment of rationality, not in abandonment of the adoption of the means which will lead to the selected end, but in abandonment of the postulate that the available ends are given. The escape from necessity, we suppose, lies in the creation of ends, and this is possible because ends, so long as they remain available and liable to rejection or adoption, must inevitably be experiences by imagination or anticipation and not by external occurrence. Choice, inescapably, is choice amongst thoughts, and thoughts, we suppose, are not given (Shackle, 1961, 272-273).

The orthodox view has, in my opinion, overlooked and ignored the difficulty of giving a meaning to the summation or integration of subjective experience over time. The very word “uncertainty” suggests an objectively existing future which it would be to our advantage to know exactly, comprehensively, and for certain. Uncertainty thus comes to be looked on as an inadequacy of our own powers, or a disadvantage of our situation, which are in principle to some degree remediable. I am suggesting instead the future is created afresh from moment to moment by the individual imagination. What we speak of as “uncertainty” is the essential freedom of this imagination, bounded by the consciousness of law in nature but not paralysed and killed by a knowledge of something objective. If we believe in a fully determined universe, a universe engaged in working out a destiny irrevocably fixed in the beginning, then the individual imagination is merely a link in the mechanism. But if we believe in a nondeterministic universe where creation of something essentially new can happen from moment to moment, then the individual imagination seems to be the locus, so far as human beings are concerned, of this continual projection of essential novelty into the world process (Shackle, 1954, 12-13).

Actual decision is not choice under perfect foresight or complete knowledge. Genuine decision is something taking place in the grey zone between pure determinism and absolute chaos. A non-empty decision changes the context in which a decision is part of, for, as Shackle remarks, “a decision is in some strict and full sense a beginning, something constrained indeed but not determined” (Shackle, 1959, 22). Crucial choices generate the new and give meaning
to the very idea of "history", for what one can understand by history is an \textit{ex post} understanding of what was not given or known \textit{ex ante}.

Conventional approaches in economics attempt to cope with the idea of time by idealising a situation where important aspects are ruled out. The "taming of time" is present in many analytical procedures devised with the aid of what Lawson (1997, 108) calls "fictitious idealisations":

The pure static system is one where either there are no changes, or where all changes take place instantaneously, so that all \textit{connected} changes take place simultaneously. ... The stationary state is a mere concession to intellectual weakness. ... The stationary state is at best as artificial as the static system, since while the latter abolishes expectation altogether, the former constrains it to such beliefs about the future as can be entertained without giving rise to change. The static system is clear-cut and goes the whole way to exclude time, the stationary state pretends to admit it (Shackle, 1959, 24).

In sum, an account of time on the above terms, to which the flow of time implies unpredictable results, is not consistent with any notion of determinism at all.

\textbf{II.4) Equilibrium}

In the light of the concept of historical time, let me now discuss an important notion widely employed in economic analysis, namely, that of equilibrium. This concept is used to investigate interactions and co-ordination of activities in a decentralised economy. As Dow states, "[t]he notion of equilibrium is inextricably tied up with the treatment of time" (Dow, 1996, 112). Some analysts refer to "the thorny problem of marrying the concepts of time and equilibrium" (Boehm, 1986, 21).
Equilibrium is one of the central organising categories of conventional economic theory. It is understood as a state of affairs in which there is no inherent tendency to change, a situation in which the forces that determine the behaviour of some variables are in balance. It is a position of rest or an end state.

In particular, an economic system is understood to be in equilibrium when it reaches a state in which for every good demand and supply are equal. Prices in this system are then equilibrium prices. If an equilibrium position is stable, then forces will be set in motion in order to restore the equilibrium position. The economic system is self-correcting.

There are many facets of the notion of equilibrium and the following accounts may help to clarify some broader elements. They are the conventional mainstream view of general equilibrium and the "gravitationist" view. They are chosen because equilibrium has an important role to play in the corpus of the theory.

Hahn describes the Arrow-Debreu equilibrium - "a special ideal type of the notion" (Hahn, 1974, 69) - in the following manner:

Goods are distinguished one from the other by their physical property, by their location in space and time and by the state of the world. A price is defined for each good. There are two kinds of agents - households and firms. Given any non-negative price vector each household chooses an action which defines a point in the space of all goods. It has the property that there is no other action available to the household under its budget constraint which it prefers. Again, given any non-negative price vector, firms choose an action represented by a point in the space of all goods such that there is no other action which is both technologically feasible and more profitable. An equilibrium is then a triple; a non-negative price vector, a vector of demand and a vector of supply, such that (a) the demand vector is the vector sum of household action at these prices, (b) the supply vector is the vector sum of firms' actions at these prices, and (c) for no good does demand exceed supply (Hahn, 1974, 47).
For Hahn, equilibrium might also be specified as “a state of affairs where (a) all actions are decided upon at only one instant of time and (b) actions always contain contingent elements” (Hahn, 1974, 52). This notion should mirror “the sequential character of actual economies” (53), a claim which reveals the wish of employing (unsuccessfully) some notion of time in the analysis.

In addition, Hahn also suggests a slightly different definition than the usual one: “an economy is in equilibrium when it generates messages which do not cause agents to change the theories which they hold or the policies which they pursue” (Hahn, 1974, 59). The agent’s theory at time \( t \) is a process in three stages. First, an agent separates the messages received in two categories: *exogenous* messages - “those which the agent considers independent of his own actions” - and *endogenous* messages - “messages by the agent to himself”. Second, for any sequence of exogenous messages from date \( t \) agents assign a probability distribution of the outcome of any contemplated sequence of actions from \( t \) ahead. Third, agents assign at \( t \) a probability to receiving any exogenous message at any date in the future conditional on the messages received since the date \( t \) and that future. An agent thus has a “theory” if a Bayesian calculation is made concerning the operation of the economy. It is a condition of equilibrium that there is no learning, that is, an agent’s theory is independent of the date \( t \). If agents are capable of translating the collection of messages they receive into actions, then we have a “policy”. Actions are undertaken conditional on the theories (Hahn, 1974, 54-56).

The notion of equilibrium can also be expressed in a different manner. As Milgate states, equilibrium is

that outcome which any given economic process might be said to be ‘tending towards’, … the idea that competitive processes tend to produce determinate outcomes. It is in
this last guise that the concept seems first to have been applied in economic theory. Equilibrium is, as Adam Smith might have put it (though he did not use the term), the centre of gravitation of the economic system - it is that configuration of values towards which all economic magnitudes are continually tending to conform (Milgate, 1989, 105).

In this “gravitationist” view, there are normal values, a “permanent state of things” (Ricardo), and deviations from them in the form of market values are regarded as accidental and temporary, frictions which in the long run will by necessity be eliminated. There is a centre of gravitation around which market values fluctuate in the short run and toward which they tend in the long run (e.g., to a uniform rate of profit). Equilibrium as a long-period position implies that the relevant adjustment processes have reached an end. Expectations concerning the relevant variables are not disappointed. Equilibrium, in this account, is a notional concept, not an actual one. More precisely, the focus is on the process of gravitation, rather than on the state of rest (see Dow, 1996, 129).

From the above accounts, whenever one is talking about equilibrium one is implying one or some of the following aspects:

1) a balance of forces whose outcome is rest,
2) no endogenous tendency to change,
3) simultaneity of decisions,
4) no demand-supply excess (market clearing),
5) no changes in agents’ theories and policies in response to signals from the economy,
6) a centre of gravitation toward which variables systematically tend.
The following can be derived from the above. One may refer to equilibrium when there is also:

7) satisfaction of expectations,
8) co-ordination success of agents’ plans,
9) a stationary state,
10) a steady path of change.

What unifies both the general equilibrium analysis and the gravitationist account is the underlying belief that the system is governed by deterministic forces engendering results known in advance. As I will show later, this belief is antipodean with the notion of uncertainty which I will make use of in this work.

In view of these, the points I would like to address next are: what is the relevance and adequacy of the notion of equilibrium as a central organising idea for economic analysis? Should equilibrium be seen either as a theory of wider applicability or as an auxiliary method of analysis for quite restrictive purposes? Should it be reconceptualised - some notion of equilibrium, not in its “general” guise, is retained - with the consequence that it becomes strongly circumscribed as a method of investigation? In the following parts of this chapter, I aim to provide some answers to these questions.
II.5) Critique

There are different alternative conceptions of equilibrium within economic paradigms. Different views of time lead to different interpretation of, and analytical status for, equilibrium. Analysis employing historical time cannot make the same use of the concept as analysis based on mechanical time.

If time is historical, the specification of equilibrium on the above terms becomes quite problematic. The difficulties are of the following types:

1) to reconcile the notion of equilibrium with that of uncertainty: the deterministic belief that the results of current individuals' actions are known in advance for certain with the belief that we do not know what the future will bring;
2) to reconcile the static view that the system is systematically forced to a state of rest with a dynamic account in which change, learning and evolution are important for the analysis;
3) to reconcile the type of idealisation implied in the idea of equilibrium with correspondence with reality.

As to the first point, I said above that the idea of equilibrium implies a form of determinism. If the system is always in (or forcefully tends to) equilibrium, then other alternative results are discarded \textit{a priori}. We know in advance, before consequences take place, that everything will achieve, necessarily, a state of equilibrium. Nothing could be

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8 See Dow (1996), chapter 6, for a more detailed treatment of this.

9 "As soon as the uncertainty of the expectations that guide economic behaviour is admitted, equilibrium drops out of the argument and history takes its place" (Robinson, 1974, 126).
otherwise. There is no escape from that. Agents’ decisions are only (logical) links in this unavoidable process of adjustment. In an equilibrium framework, there is no real choice, for decisions have no power to change creatively the trajectory of the system towards an uncertain or unpredictable, perhaps more profitable, path. Creativity, when it exists, is something which belongs to the very logic of the necessitated scheme of things. The element of essential novelty is completely lost.

However, the concern with future time accounts for ignorance of the states to come. The path of an open system evolving in time, subject as it is to change, cannot be predicted. That is, historical time and determinacy cannot be easily reconcilable. This critique can be made for both accounts of equilibrium.

As to the other aspects, I will concentrate my objections on the general equilibrium view, for it is the most problematic concept. General equilibrium theory requires the following:

1) perfect foresight and complete knowledge: agents know everything which is necessary to be known, including the consequences of their actions, a belief in conflict with our view of fallible and contingent knowledge;
2) efficiency: according to the criterion of Pareto optimality, agents end up with a selection of goods preferable (or indifferent) to those that they started with; no improvement in anyone’s position is possible without a worsening of someone else’s position;
3) stability; an idea which is at odds with the view that disturbance of equilibrium is more liable to take place;
4) uniqueness; but what characterises many economic decisions is indeterminacy of results (e.g., investment decisions).\textsuperscript{10}

The specification of a self-reproducing system based on general equilibrium analysis is built on a system of simultaneous equations, which does not need to define any date nor its solution involves history. Any point on it requires entirely both its past and its future. A distinct composition of output would imply a distinct set of equations. The available stock of inputs at any time is arbitrary and is not influenced by the technology and output composition available yesterday for the production of an ongoing output. The consideration of the effects of unforeseen changes alters completely the situation initially devised for a self-reproducing system, and, as a consequence, nothing based on the original set of equations can be said until we devise afresh a new system accounting for disequilibria (Robinson, 1974, 127-128).

A major problematic aspect of this account is the lack of correspondence between the theory and the actual operation of the economic system. General equilibrium analysis does not provide satisfactory account of the relevant economic issues.\textsuperscript{11} The important features of capitalistic productive processes are not approached: what happens to the system when it is out of equilibrium; what would occur if there is a change in tastes, endowments, and technological and organisational conditions; what are the effects of disappointment of

\textsuperscript{10} More recent efforts to advance alternative conceptions of the adjustment process in a variety of settings within the framework of neo-Classical theory have shown that, under general conditions, the adjustment process may give rise to complex forms of motion that are unstable and equilibrium itself may be indeterminate” (Harris, 1991, 90).

\textsuperscript{11} This kind of preoccupation led J. Robinson to state that “[i]t is not legitimate to introduce an event into a system of simultaneous equations” (Robinson, 1974, 130). Equilibrium analysis “applies rather to a once-over meeting of independent peasants at a rural market or to the prisoner-of-war camp where parcels were occasionally received from the Red Cross” (Robinson, 1977, 6).
expectations; what sort of impacts the activities of speculation might cause; what is the role of financial variables; what is the role of active price-quantity interventions by firms; adjustment mechanisms leading to convergence to equilibrium are complicated by the many types of barriers to entry; there is no complete mobility of both capital and labour to assure such adjustments and no absence of increasing returns.\textsuperscript{12}

The analysis refers to the end equilibrium result based on the allocative functions of markets. As Kaldor points out, it cannot say anything at all about the “creative functions” of markets (Kaldor, 1972, 181). Endogenous and cumulative changes engender departures from previous states or trends. Underlying mechanisms which lead to change are more pervasive than conditions facilitating equilibrium. In the equilibrium approach, as markets are continually in (or tending towards) equilibrium, change is due to exogenous factors or perfectly foreseen.\textsuperscript{13} But dynamic processes do not systematically produce equilibrium states, but rather unpredictable evolution of structures and patterns of behaviour.

The theory claims that prices constitute the only type of information, the only guide on which economic actions are based. But quantity signals are also an important informational basis for agents to analyse results and keep or revise their decisions. In the actual process of adjustment of supply and demand, quantity signals such as stock and/or order book changes are quickly felt and reacted to (Kaldor, 1985, 24ff.).

\textsuperscript{12} Even Hahn, a “friend” of the theory, admits its insufficiencies. In particular, he agrees that in an Arrow-Debreu model money has no role, that “it cannot take account of certain forms of uncertainty and certain forms of market expectations”, that it abstracts the oligopolistic features of a capitalist economy and that it rules out both informational asymmetry among agents and the possibility of coalition formation (Hahn, 1981, 78-79). In other words, that it cannot take account of crucial aspects of reality.

\textsuperscript{13} “[I]f only general equilibrium positions are studied, then the only source for involuntary change is change in exogenous variables” (Dow, 1996, 119). See also Loasby (1991, chapter 3) and Chick and Caserta (1994).
Equilibrium analysis assumes co-ordination success of the agents’ actions, for they know everything relevant that is happening. It does not have a view of knowledge in which its fallible character is stressed: “The fixed point of general competitive equilibrium depends upon the simultaneous interaction of buy and sell orders, which in turn depend critically upon knowledge of equilibrium prices, knowledge which assures coordination. Regret by either buyer or seller is banished. That time stops for the auctioneer is no accident” (Bausor, 1982-83, 166).

Equilibrium analysis depicts a sequence of harmoniously co-ordinated states. One of the prerequisites of the simplification (or distortion) of reality in such models is the assumption of omniscience on the part of all individuals taking part in the economic process. The issue that the world is characterised by agents possessing limited knowledge is not addressed. Hayek is then correct in stating that “there is something fundamentally wrong with an approach which habitually disregards an essential part of the phenomena with which we have to deal: the unavoidable imperfection of man’s knowledge and the consequent need for a process by which knowledge is constantly communicated and acquired” (Hayek, 1945, 530).

Therefore, the concept of general equilibrium has no relevant meaning disconnected of the precise specifications of the initial conditions for any model. At its best, this notion should be considered merely as the solution concept relevant only to a particular model, applicable to a limited number of cases (Milgate, 1987, 112). If specification of the domains of applicability is required, then a) a state of equilibrium as an empirical observation (or tendency) is but a particular (transient) aspect of a more complex reality, and b) equilibrium theories are of reduced scope.
The notion of equilibrium originated from a misleading mechanical analogy with movements in space, which cannot be applied to movements in time. Its unqualified application in the study of aspects of the social and economic system is also problematic. There is no going backwards to fix an error. This concept requires economic agents to be like atoms, but atoms are not endowed with purposeful actions. The difference with the natural sciences is that, unlike human beings, atoms and molecules do not express creative behaviour or free will. An important class of human decisions is by nature non-empty; they have an important role to play in the process of creation and transformation of reality. But the point is: if even in the natural sciences conceptions such as equilibrium are being re-examined due to recent developments, it is bizarre, to say the least, that in economics the concept has, at least in its conventional form, such an enduring life. In part, this is truly a case of inertia.

II.6) Reconceptualisation

At this point, the question I would like to raise is: should we recognise that the notion of equilibrium has an important role to play in economic analysis and, therefore, strive for some form of reconceptualisation on conventional terms or should we simply abandon it? My answer is that we should abandon it. However, a reconceptualisation of equilibrium is possible on alternative terms. As Hahn says, “we must consider new equilibrium notions” (Hahn, 1981, 85). This position has some ingenious solutions for this dilemma.

Bausor (1982-83, 1984) develops a “historical-time model” and proposes to conceive equilibrium as a dynamic persistence of habits and conventions (Bausor, 1982-83, 173). In this model, equilibrium entails “historical permanence” in the form of satisfaction of expectations. It is sheer accident, not necessity. A state of equilibrium obtains when there is intertemporal
coherence among agents’ plans, in the sense of similarity of previous expected and actual states.

In this account, disruptions are not violent; they are neither new relevant information nor generation of new insights from old information (Bausor, 1982-83, 176). Equilibrium is the “intertemporal continuity of ex post phenomena. ... [I]t suggests no correspondence between ex ante intentions and ex post actualization. Only certain knowledge prevents repeated disappointment” (Bausor, 1982-83, 174). This intertemporal consistency is not the same as instantaneous co-ordination; there is no reconciliation of ex ante decisions. It is, in sum, a very special, rare case:

General historical equilibrium exists, therefore, in the sense that there are special functions and special states of the system for which perceptions, expectations, strategies, and outcomes are all intertemporally equilibrated. It does not mean that an equilibrium state exists. ... Nor does its logical existence entail the very different assertion that an economy ever actually achieves equilibrium (Bausor, 1982-83, 177).

Chick and Caserta (1994) propose to specify a different, “pragmatic”, notion of equilibrium, christened “provisional equilibrium” (PE), as opposed to “final equilibrium” (FE). The first category of equilibrium is present, for instance, in the theories of Marshall and Keynes, as well as in Post Keynesian growth theory. The second characterises Walrasian and neo-Ricardian theories; respectively, the general equilibrium and the gravitationist views discussed above. The authors also call the attention for the suggestive distinction between “equilibrium theories” - “theories whose only purpose is to identify and characterise an equilibrium” - and “theories with equilibrium” - “theories which have an equilibrium result” (Chick and Caserta, 1994, 5).
PE is compatible with change; FE does not account for it. FE is the type of equilibrium “after which the economy may replicate its activities, but there are no further changes. It is a class of teleological positions, toward which the economy is either portrayed as ‘tending’ or for the discovery of which it is waiting, while all activity is suspended” (Chick and Caserta, 1994, 2). Change is either exogenous (comparative statics) or fully known and expected, where novelty is absent and change is part of equilibrium itself (comparative dynamics).

PE functions for “a particular, limited theoretical purpose”. It is a useful device for analysing “situations which may be transformed, by the very decisions which bring about a Provisional Equilibrium, into something else, with a new Provisional Equilibrium: the shock may be endogenous. ... Provisional Equilibrium is consistent with innovation, learning and evolution” (Chick and Caserta, 1994, 3). This view does not see change and evolution as the outcome of exogenous occurrence. Instead, “change might develop from within as a result of the passage of time or of a process of learning, or as a result of the resolution of a previously contained conflict” (Chick and Caserta, 1994, 12).

It is obvious from the above that both alternative accounts agree that the notion of equilibrium they have in mind is neither of the same type as the Walrasian general equilibrium theory nor the “gravitationist” view. Those accounts are interesting attempts to provide a more acceptable status to the notion of equilibrium, but they reach a meaningful conclusion: equilibrium is only achieved by chance, not as necessity, an outcome among an endless set of likelihoods with a very low degree of real possibility. It is a “temporary resting place”. A

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14 For other suggestions concerning reconceptualisation on alternative terms see also Hicks (1979) and Chick (1996).
reasonable thought is that it is quite improbable, for frequent changes, a much more pervasive feature of reality, disrupt any possibility of an enduring state of equilibrium.

For the concept to have any meaningful applicability, one needs to restrict severely its scope. If this is not done, then the risk of lack of realism is great. It is not useful for the more common situations we observe in a capitalist economy, for the latter is, in Schumpeter's words, “a method of economic change” which, because of “creative destruction”, is far from being stationary in any meaningful economic sense (Schumpeter, 1943, 82-83).

As Fleetwood (1995, 137) remarks, some believe that the abandonment of the notion of general equilibrium would necessarily lead to “analytical anarchy”. But why this should be the case? No cases are put forward to demonstrate this statement. Rather, this is a normative stance which imposes on the analyst that she or he ought to use the notion of equilibrium for the intended analysis. As Keynes states in a different context, the onus of the proof rests with the believer, not with the sceptical, for “it is for those who make a highly special assumption to justify it, rather than for one who dispenses with it, to prove a general negative” (Keynes, 1937, 109).

Bausor's “equilibrium in a historical model” and Chick-Caserta's “provisional equilibrium” attempt to make a compromise, so to speak, but at the end of the day ascribe to equilibrium analysis a quite reduced domain of applicability. A state of equilibrium is not a common fact in the fleeting reality evolving in time. Open systems are characterised by “a state of change” (or provisional absence of change) rather than by such things as equilibrium as the normal state of affairs. Thus, a change of focus is needed: in analytical terms, change should not be subordinate to equilibrium, but the opposite. In a process in historical time in which change often emerges, we might be faced with situations where a “temporary resting place”
manifests itself in the form of an “equilibrium”. But nothing in the system guarantees its persistence.

In this work, I aim to portray a system which is governed by entrepreneurial decisions seeking through time the most profitable opportunities. Such actions lead to constant upsets of equilibrium. Imagination and creativity often take place, engendering novelties and changing prospects in the competitive struggle, favouring those who have successfully used differential information or are more fortunate in their uncertain undertakings. As Dow states, “equilibrium rules out the exploitation of new opportunities, and thus creativity; ... the moving force behind competition” (Dow, 1996, 115).

There is no imperative supposition that an actual process of learning, normally a path dependent process (or, in the nomenclature of chapter I, time evolution with “sensitive dependence on the initial condition”), will lead to an equilibrium (Harris, 1991, 98). One might think this in terms of the two following dynamic processes:

Situation 1: \( \dot{x} = F x_e (x), \quad x_e = \text{equilibrium point} \)

Situation 2: \( \dot{x} = F x_o (x), \quad x_o = \text{initial condition} \)

\( S_1 \) is an “equilibrium process” in which the function specifying the adjustment process is uniquely defined in terms of the equilibrium solution \( x_e \) known in advance and impassive to the starting point. \( S_2 \) is a “path dependent process” in which the function specifying movement along any path is uniquely conditional on the initial condition \( x_o \) and might be regarded to change as experience accumulate along a given path. Provided that one realises the intrinsic
general feature of social and economic processes as one of learning on the basis of accumulated experience, as in \( S_2 \), then one cannot maintain the supposition of an adjustment to a predetermined equilibrium, whether unique or not.

If analysis of dynamic non-equilibrium processes are important, the operation of the "historical model" itself, should one make either a concession or instead discard something for its narrow applicability? If the aim is to account for the process of economic change, then the concept of general equilibrium is of little value. Insistence with this method does violence with the nature of real processes underlying the operation of economic systems. And it is not on flimsy foundations that one should focus the attention in order to provide explanations. Thus, rather than being an indispensable tool for economic analysis, general equilibrium theory may instead be an epistemic obstacle; as such, the analyst might well dispense with it. Paraphrasing J. Robinson (1980, 94), the search for an equilibrium is like looking in a dark room for a black cat that probably is not there. I dare to say that in the real world this probability approaches unity.\(^{15}\)

In the light of the discussions of complexity and time I am now able to investigate the concept of uncertainty which will inform the subsequent analysis of the genesis and dynamics of conventions.

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\(^{15}\) As Hayek says, "the situation which [equilibrium analysis] describes has [no] direct relevance to the solution of practical problems; ... it does not deal with the social process at all" (Hayek, 1945, 530). It is worth noting in passing that Hayek’s reluctance in embracing the concept of equilibrium grew over time (mainly after his 1937 paper). A general equilibrium framework cannot be reconciled with Hayek’s views, for an analysis which emphasises agents’ ”irremediable ignorance” (and processes) is not compatible with the idea that they fully know everything which is relevant to be known in order to move the system to a predetermined end state. For a discussion of Hayek’s views of the notion of equilibrium (and the alternative concept of order), see Fleetwood (1995), in particular chapters 5 and 10.
III - UNCERTAINTY

III.1) Introduction

This chapter discusses which concept of uncertainty is consistent with the previous accounts of complexity and time. By doing this, it aims to highlight which notion of uncertainty the present work will make use of for a discussion of the nature and dynamics of conventions.

Although incompatible accounts of the term uncertainty proliferate in the economics literature, an important version of uncertainty can be found in the works of Knight, Keynes, Shackle and Davidson. Their interpretations go well beyond the accounts which reduce uncertainty to probabilistic risk, by which genuinely uncertain situations are expressed in terms of certainty or certainty-equivalents. The starting point is Knight’s conceptual distinction between the notions of risk and uncertainty, which allows for a reassessment of conventional theories of “uncertainty”, for these are in fact theories of decision under risk, as acknowledged even by some of their practitioners.\(^1\) Throughout this text, I will seek to provide the arguments for that conceptual identification not being adequate.

Recent theoretical developments based on the works of the authors mentioned acknowledge the important role the concept of uncertainty may play in economics. They have consolidated the principle of uncertainty as one of the most important methodological pillars for economic analysis. If one assigns a prominent role to the principle of uncertainty along the

\(^1\) For instance, see Hirshleifer and Riley (1992, 10), for whom both notions are identical.
lines of the above authors, then one is led to be aware of its theoretical implications and the
analysis must necessarily follow a distinct direction.

I am not interested here in discussing the extent to which the works of each author
exhibit continuities or ruptures through time. Also, I am not interested in providing an ultimate
and “updated” account of uncertainty. My main concern in this chapter is to draw from those
authors, as well as from recent developments, the basic elements for an account of uncertainty
whose primary focus is on the genesis and dynamics of conventions.

III.2) Knight: Risk versus Uncertainty

Knight’s version of uncertainty is probably the most referred to in the literature. He
claims that he was the first to stress strongly the conceptual difference between risk and
uncertainty (Knight, 1921 [1933], 19). Indeed, the importance of his account stems from this
distinction and the peculiarity of his approach, where risk is seen as measurable probability or
known chance, and uncertainty as a non-quantifiable concept, for, by definition, it reflects a
situation of indeterminate values.

For Knight, uncertainty refers to a circumstance of numerically immeasurable
probability - under uncertainty, there is no place for an objective probability. Knight
distinguishes “measurable uncertainty” or risk - circumstances in which “a priori probability”
and “statistical probability” judgements are in principle feasible - from “unmeasurable
uncertainty” - circumstances in which at best “an estimate of an estimate” can be made, where
the phenomenon under consideration is unique:

It will appear that a measurable uncertainty, or “risk” proper, as we shall use the term,
is so far different from an unmeasurable one that it is not in effect an uncertainty at all.
We shall accordingly restrict the term “uncertainty” to cases of the non-quantitative
type. It is this “true” uncertainty, and not risk ... which forms the basis of a valid theory of profit (Knight, 1921, 20).

Knight’s discussion is made in the realm of his theory of profit determination, in which profits, “a peculiar form of income”, arise only in a situation of uncertainty. For Knight, profit is an uncertain, unpredicted residual income which only the passage of time will define at a later date after the decision was made. But, after being disturbed, the economic system will return to its long-run natural, perfectly competitive conditions.2

Knight also claims that the analysis of uncertainty requires a differentiation concerning change. What is important is not changes per se, but rather changes connected with uncertainty. For “it is our imperfect knowledge of the future, a consequence of change, not change as such, which is crucial for the understanding of our problem” (Knight, 1921, 198).

Anticipated changes cannot produce the same type of consequences as would be the case with unforeseen changes. There has to be a discrepancy between expected and actual results for uncertainty to take place. In Knight’s scheme, it is the fact of our lacking knowledge of the future which is the main determinant of profits:

Dynamic changes give rise to a peculiar form of income only in so far as the changes and their consequences are unpredictable in character. ... Change may cause a situation out of which profit will be made, if it brings ignorance of the future (Knight, 1921, 37).

2 Knight’s idea of profit as an uncertain residue which carries the system out of its normal state has some resemblances and some contrasts to Keynes’s views in both his Treatise on Money (TM) and The General Theory (GT). It is similar to profit determination in the GT, in the sense that profit is seen there as an uncertain residual income defined at the end of a production period; it is alien to the GT in the sense that in this book there is no postulate of a long run equilibrium state to which the system is systematically tending. On the other hand, Knight’s account is similar to Keynes’s TM in the sense that in this book the idea of a centre of gravitation still exists, but it is in contrast with it in the sense that there is no account of uncertainty in that book. I elaborate more on that in Andrade (1997).
It is not dynamic change, nor any change, as such, which causes profit, but the divergence of actual conditions from those which have been expected and on the basis of which business arrangements have been made. For a satisfactory explanation of profit we seem to be thrown back from the “dynamic” theory to the Uncertainty of the Future, a condition of affairs loosely designated by the term “risk” in ordinary language and in business parlance (Knight, 1921, 38).

Although a situation consisting of a known risk may be considered as “uncertain”, this “uncertainty” is believed to be easily transformed into certainty, for in many cases the outcomes become foreseeable according to probability calculations and, as the number of cases increases, the errors in these forecasts approach to nil. For that reason, change as such does not engender relevant effects if “the law of the change” is identified or capable of being specified. Besides, an unpredictable change will be analogously worthless if the probability of its occurrence can be measured:

In a well-organised society, if business men know either (1) what actual changes are impending or (2) the “risks” they run - i.e., what is the probability of any particular occurrence, - the effect in the long run is the same; the only result of such changes will be a certain redistribution of productive energy which will take place continuously and without any disturbance of perfect competitive conditions (Knight, 1921, 47).

This discussion of uncertainty leads to a more comprehensive discussion, namely, the theory of knowledge upon which it should be grounded. For practical purposes, we focus our attention on the existence of patterns known by experience and observation. Workable knowledge of the world requires the practical consideration of “properties or modes of resemblance between things” (Knight, 1921, 206). The environment is constituted by an infinite variety of events and relations which only an “infinite intelligence” can fully apprehend. But a “finite intelligence” should be capable of coping with this because many properties and
relations are limited or remain constant, some changes are predictable, and uniformity can be perceived. Certain properties may differ in degree, not in kind. So, we rely strongly on inferring one mode of behaviour from another, that is, we suppose that there is a predictable constancy in the association of properties.\(^3\)

But, in reality, where people are not normally guided by a "rigorous scientific procedure", the probability of mistakes is high. We are dealing here with contingent facts. In this case, we have "to 'estimate' not merely factors whose associates, implications, or effects are known, but in addition the degree of dependability of the association between the (estimated) factors (the immediately perceptible attributes or modes of behavior) and the inferred factors with relation to which our action in the case is to be controlled" (Knight, 1921, 214). Decision-making in general is grounded on such a "reasoning" of a still more vague and uncertain make-up: "We have to estimate the given factors in a situation and also estimate the probability that any particular consequence will follow from any of them \textit{if} present in the degree assumed" (Knight, 1921, 214).

Knight suggests a classification where there are three categories of probabilistic judgement. The first two, \textit{a priori} and statistical probability, are numerical; the third, estimate, is non-numerical.

\textit{A priori} probability is that used, for instance, in games of chance, where "the 'chances' can be computed on general principles" (Knight, 1921, 224) and we can "calculate the true probability from external data" (230-231).\(^4\) This is what we call today the classical approach of Laplace and Bernoulli.

\(^3\) See Knight (1921, 205-208).

\(^4\) A \textit{a priori} probabilities imply an "[a]bsolutely homogeneous classification of instances completely identical except for really indeterminate factors" (Knight, 1921, 224). For Knight, these categories belong to "the same
Statistical probability is associated to an empirical classification with reference to a set of instances: the “true probability” can only be obtained “from an inductive study of a large group of cases” (Knight, 1921, 231). This is the relative frequency approach of Venn and others.

A probability as an estimate rests on “no [empirical] classification [of instances], but is an estimate of an estimate” (Knight, 1921, 227); this type applies to situations where “there is no valid basis of any kind for classifying instances” (225) and where “there is no possibility of forming in any way groups of instances of sufficient homogeneity to make possible a quantitative determination of true probability” (Knight, 1921, 231). An estimate is an intuitive judgement which frequently guides people in their daily life, for most of the time people behave on “estimates rather than inferences, upon ‘judgment’ or ‘intuition’, not reasoning” (Knight, 1921, 223).

This conceptual distinction between the probability of the third type connected with an estimate and the other two types clearly emphasises the need for a precise differentiation between risk and uncertainty. Such a concern is remarkably expressed in a rather illustrative passage, where the fact of the uniqueness of some events as providers of uncertainty is stressed:

logical plane as the propositions of mathematics” (Knight, 1921, 224) and are “ultimately” inductions from experience” (Knight, 1921, 225).

Statistical probability is viewed as an “[e]mpirical evaluation of the frequency of association between predicates, not analyzable into varying combinations of equally probable alternatives” (Knight, 1921, 225). Knight also stresses that “any high degree of confidence that the proportions found in the past will hold in the future is still based on an a priori judgment of indeterminateness” (Knight, 1921, 225), adding that two aspects should be left differentiated: “first, the impossibility of eliminating all factors not really indeterminate; and, second, the impossibility of enumerating the equally probable alternatives involved and determining their mode of combination so as to evaluate the probability by a priori calculation” (Knight, 1921, 225).
Take as an illustration any typical business decision. A manufacturer is considering the advisability of making a large commitment in increasing the capacity of his works. He "figures" more or less on the proposition, taking account as well as possible of the various factors more or less susceptible of measurement, but the final result is an "estimate" of the probable outcome of any proposed course of action. What is the "probability" of error (strictly, of any assigned degree of error) in the judgment? It is manifestly meaningless to speak of either calculating such a probability \textit{a priori} or of determining it empirically by studying a large number of instances. \textit{The essential and outstanding fact is that the "instance" in question is so entirely unique that there are no others or not a sufficient number to make it possible to tabulate enough like it to form a basis for any inference of value about any real probability in the case we are interested in.} The same obviously applies to the most of conduct and not to business decisions alone (Knight, 1921, 226, emphasis added).

Thus, for Knight, economic decisions, in particular those concerned with investment, deal with situations which are unique. Knight claims that "statistical tabulation" lacks any practical guidance in unique situations. In this context, "there is no possibility of forming in any way groups of instances of sufficient homogeneity to make possible a quantitative determination of true probability. ... The conception of an objectively measurable probability or chance is simply inapplicable" (Knight, 1921, 231). One might even say that agents estimate the soundness of their opinions, and such an estimate is likened to some form of probability judgement. However, in reality, it has no meaning and it is deluding to say that such a probability judgement is objectively correct.

In sum, the basic conceptual difference between the notions of risk and uncertainty is that "in the former the distribution of the outcome in a group of instances is known (either through calculation \textit{a priori} or from statistics of past experience), while in the case of uncertainty this is not true, the reason being in general that it is impossible to form a group of instances, for the situation dealt with is in a high degree unique" (Knight, 1921, 233). This third type of probability judgement is christened "true uncertainty".
For Knight, the limitation of knowledge under conditions of uncertainty reflects the propensity to error of our judgements. He discards reasoning based on the idea of an absence of uncertainty, that is, the circumstance where all people are supposed to possess accurate and certain knowledge of the whole economic situation and of the results of our actions. If uncertainty so defined is not susceptible of measurement, then is not possible to speak of its elimination (for instance, through insurance devices) and people need to find other ways for coping with it.6

III.3) Keynes: Uncertain Knowledge

Keynes’s notion of uncertainty, and the connected concept of convention, is elaborated in two seminal texts, namely, chapter 12 (“The State of Long-Term Expectation”) of The General Theory of Employment, Interest and Money (GT, hereafter) and the article “The General Theory of Employment” (Quarterly Journal of Economics, February 1937). In the latter, Keynes emphasises some aspects of his ideas which in the GT were not so clear, making some concepts more precise. In his own words, Keynes seeks “to re-express some of these ideas” (Keynes, 1937a, 111) in order to show clearly where he is “departing from previous theories” (112).7

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6 It is interesting to point out in passing that, in relation to the uses of econometric techniques, one finds in Knight’s approach the same kind of criticism Keynes made to Tinbergen: “the possibility of prediction seems to rest upon the uniformity of nature” (Knight, 1921, 230). Or further: “The paradox, which carries us at once into the heart of the logical problem of probability, is that if we had absolutely homogeneous groups we should have uniformity and not probability in the result, or else we must repudiate the dogma of the ultimate uniformity of nature, the persistence of identity of things” (Knight, 1921, 218).

7 One of the methods of analysis employed here is to make an integrated reading of Keynes’s economics by means of simultaneously making use of the texts, lectures, notes, letters etc. that Keynes wrote during the preparation and after the publication of the GT. The idea is that many of the insights of the GT, as well as its unbiased understanding, make more sense after these works are taken fully into account in an organic and consistent way.
Keynes's purpose in the *GT*’s chapter 12 is to investigate the determinants of “the prospective yield of an asset” (Keynes, 1936, 147), that is, one of the determinants of the marginal efficiency of capital, which by its turn determines, together with the rate of interest, the scale of investment. Keynes warns that the issues approached are “on a different level of abstraction” (Keynes, 1936, 149) from the rest of the book.\(^8\)

The basic factors influencing current expectations about the prospective yields of an asset are both “existing facts which we can assume to be known more or less for certain” - as, for instance, the current stock of capital and of capital assets in general, the current level of consumption etc. - and “future events which can only be forecasted with more or less confidence” - namely, expected changes in demand, in consumers’ tastes, in money wages and in the stock of capital (Keynes, 1936, 147). The “state of psychological expectation” which comprises these future events is termed the “state of long-term expectation”, as contrasted to the “short-term expectation”, which is related to the current forecasts about the return of sales of the output of the existing equipment.\(^9\)

The formation of expectations does not take considerably into account those factors which are “very uncertain”. Very uncertain is not the same as “very improbable” (Keynes, 1936, 147).

\(^8\) In “the rest of the book” not only are long-term expectations regarded as relatively constant but also short-term expectations are in general fulfilled. See, for instance, Kregel (1976), who accounts for the manner Keynes copes with different aspects of expectations frustration across the book. Chapter 12 copes with a time span whose rule is dissatisfaction of expectations. The post-*GT* theory (and chapter 12) tells us the story of a different world, namely, the world of uncertainty and its implications for human conduct, the economic in particular. Furthermore, to stress that the issues approached are “on a different level of abstraction” implies that an account of the nature and uses of knowledge in economic life needs to resort to a broader, interdisciplinary approach in which philosophical considerations are indispensable.

\(^9\) Short-term expectations relate to “expectations as to the cost of output on various possible scales and expectations as to the sale-proceeds of this output” (Keynes, 1936, 47), that is, the expected rate of profit of the available equipment.
This distinction provides a link with Keynes's view of probability advanced in his *A Treatise on Probability* (1921).

Although in some situations very uncertain facts may become decisive, a reasonable guide to current decisions is to consider those facts to which an important degree of confidence is ascribed. The process of formation of long-term expectation is, thus, over-influenced by the current state of things, unless, Keynes stresses, we have solid justifications to change our opinion about the situation - "our usual practice [a convention!] being to take the existing situation and to project it into the future, modified only to the extent that we have more or less definite reasons for expecting a change" (Keynes, 1936, 148).

Decisions to invest depend on the state of long-term expectations and this depends on both "the most probable forecast we can make" and "the confidence with which we make this forecast - on how highly we rate the likelihood of our best forecast turning out quite wrong" (Keynes, 1936, 148). This "state of confidence" is thus associated with the perceived degree of uncertainty of the knowledge attached to a possible future event; it is one of the major factors influencing the rate of investment.

Nonetheless, the focal aspect of the analysis is that estimates of events in the distant future "amounts to little and sometimes to nothing" (Keynes, 1936, 150), for the knowledge upon which they are based is insufficient:

The outstanding fact is the extreme precariousness of the basis of knowledge on which our estimates of prospective yield have to be made. Our knowledge of the factors which will govern the yield of an investment some years hence is usually very slight and often negligible (Keynes, 1936, 149).
Later, Keynes (1937a) develops his version of uncertainty. Uncertainty refers to a feature of knowledge of future events which by its own nature cannot be acquired by a probability distribution:

By ‘uncertain’ knowledge, let me explain, I do not mean merely to distinguish what is known for certain from what is only probable. The game of roulette is not subject, in this sense, to uncertainty; nor is the prospect of a Victory bond being drawn. Or, again, the expectation of life is only slightly uncertain. Even the weather is only moderately uncertain. The sense in which I am using the term is that in which the prospect of a European war is uncertain, or the price of copper and the rate of interest twenty years hence, or the obsolescence of a new invention, or the position of private wealth owners in the social system in 1970. About these matters there is no scientific basis on which to form any calculable probability whatever. We simply do not know (Keynes, 1937a, 113-114).

We have to distinguish between two different sorts of things, namely, the current amount of knowledge informing a decision now and the unknown consequences of agents’ actions which will take place in a remoter future. There is a logical and temporal sequence implied. There will be future situations in which something unforeseen will occur, something which will affect the ensuing course of events, but we do not have any possibility or means of discovering either the time or the crucial event. In this situation, we are coping with unknowables although currently we act upon something that we know (or at least we believe we know). The future will become present and check our previous beliefs about the possible results of our current decisions. Knowledge is “fluctuating, vague and uncertain” at the moment of the relevant decision due to the existence of a flux of time which is irreversible and which contains the germs of unknown situations; unexpected situations may then emerge and become “crucial”. Our knowledge is limited due to the unlimited range of rival possibilities that may take form in the future as a result of either our decisions or the decisions of other
people. Thus, Keynes’s conception of uncertainty refers to a current state of contingent and fallible knowledge in the actual present concerning the existence of potential competing futures.

Keynes’s account is made in the context of an investigation which is antagonistic to the then (and current) conventional view of economics. Indeed, his 1937(a) article is an attack on the assumptions upon which Ricardo, Marshall, Edgeworth, Pigou and “more recent writers” have grounded their theories, for they consider “a system in which the amount of the factors employed was given and the other relevant facts were known more or less for certain” (Keynes, 1937a, 112, my italics). For this “classical” theory, expectations are given and the future is highly calculable through probability distributions. Risks are subject to “exact actuarial computation” and judgements based on probability calculations are “supposed to be capable of reducing uncertainty to the same calculable status as that of certainty itself” (Keynes, 1937a, 112-113).

Instead, the point is to what extent it is possible, in the process of accumulation of wealth, to gather knowledge about both the most direct and the most remote consequences of individuals’ actions. For the basic purpose of wealth accumulation or investment plans is the achievement of possible outcomes, “at a comparatively distant, and sometimes at an indefinitely distant, date. Thus the fact that our knowledge of the future is fluctuating, vague and uncertain, renders wealth a peculiarly unsuitable subject for the methods of the classical economic theory” (Keynes, 1937a, 113).

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10 For a detailed account of Keynes’s distinctive approach, in many levels of analysis, see Chick (1983).

11 As Keynes emphasises, “a mythical system of probable knowledge was employed to reduce the future to the same calculable status as the present. No one has ever acted on this theory. But even today I believe that our thought is sometimes influenced by some such pseudo-rationalistic notions” (Keynes, 1937b, 124).
Accumulation of wealth is made considering results in a remote future and not in a world in which the timing of production and consumption are simultaneously determined, as in the (neo)classical account. The methodological endorsement of Keynes’s principle of uncertainty changes completely the perspective of analysis. Keynes’s version of uncertainty is one of the fields which most clearly shows the irreconcilable differences between his method and the conventional approach. Keynes says of the latter that it is a “pretty, polite technique which tries to deal with the present by abstracting from the fact that we know very little about the future” (Keynes, 1937a, 115):

The orthodox theory assumes that we have a knowledge of the future of a kind quite different from that which we actually possess. This false rationalisation follows the lines of the Benthamite calculus. The hypothesis of a calculable future leads to a wrong interpretation of the principles of behaviour which the need for action compels us to adopt, and to an underestimation of the concealed factors of utter doubt, precariousness, hope and fear (Keynes, 1937a, 122).

Keynes’s principle of uncertainty could be described, then, as an important concept underpinning a theory based on “a hypothesis of a non-calculable future”, in the sense that under certain circumstances there is no possibility whatsoever of gathering enough information to justify the use of numerical probabilities.

We now need to discuss how the fact of uncertainty affects important decisions such as investment and asset-holding.

III.3.a) Uncertainty, Money and Investment

Keynes’s liquidity theory of the rate of interest as well as his theory of employment based on the principle of effective demand, with special emphasis on the theory of the
determinants of investment decision, are the areas in which contrasts with the conventional economic theory can be found. In his account, uncertainty affects strategic economic decisions such as money-holding and investment, that is, capital (portfolio) decisions *lato sensu*.

Keynes's theory of money and interest is a theory in which the rate of interest is seen as "the inducement *not* to hoard" (Keynes, 1937a, 110). As a rule, a higher liquidity preference leads to a higher rate of interest.

For Keynes, money has two basic functions, namely, unit of account and store of wealth. His emphasis is on money as a store of wealth, as opposed to the (neo)classical concentration on medium of exchange. Individuals hold money as a store of wealth as a rational reaction against the uncertain future. Increasing doubts about the efficacy of some conventions lead individuals to seek a safe place and the possession of money (or quasi-money) appeases this need. This behaviour "is a barometer of the degree of our distrust of our own calculations and conventions concerning the future. ... The possession of actual money lulls our disquietude; and the premium which we require to make us part with money is the measure of the degree of our disquietude" (Keynes, 1937a, 116).

Conventional economic theory disregards money as a store of wealth and focuses instead on the *quantity* of hoarding due to the consideration that the latter directly affects the general price level. By contrast, for Keynes,

the *quantity* of hoards can only be altered either if the total quantity of money is changed or if the quantity of current money income (I speak broadly) is changed; whereas *fluctuations in the degree of confidence* [my italics] are capable of having a quite different effect, namely, in modifying not the amount that is actually hoarded, but the amount of the premium which has to be offered to induce people not to hoard. And changes in the propensity to hoard, or in the state of liquidity preference as I have called it, primarily affect, not prices, but the rate of interest; any effect on prices being
The rate of interest is the premium which is offered in order to persuade individuals not to hoard money and to hold instead an alternative form of wealth. It is “the factor which adjusts at the margin the demand for hoards to the supply of hoards” (Keynes, 1937a, 117). Both the propensity to hoard and the quantity of money influence the rate of interest levels.

For Keynes, there are two alternatives for the entrepreneur with an excess of cash: to lend at the current rate of interest or to purchase capital assets. It is through the arbitration between these two alternatives that the rate of interest influences the prices of capital assets. However, it is not only the fluctuations of the rate of interest which affect capital asset prices, for “[o]pinions as to their prospective yield are themselves subject to sharp fluctuations, precisely for the reason already given, namely, the flimsiness of the basis of knowledge on which they depend. It is these opinions taken in conjunction with the rate of interest which fix their price” (Keynes, 1937a, 117). Uncertainty is thus pervasive in many parts of the whole economic system.

The basic determinant of the production of a capital asset is the relation between its cost of production and the expected future revenues which it may realise in the market place, that is, its marginal efficiency of capital. The volume of current investment depends on the level of the rate of interest \textit{taken in conjunction} with opinions about the prospective yield of the capital assets. That is the reason why, for Keynes, investment oscillates through time and generates cycles. Economic fluctuations are basically the result of agents’ difficulties in gathering enough information about the future in order to undertake their investment.
decisions. Thus, both the volume of investment and its oscillations rely on two types of opinions about the future,

neither of which rests on an adequate or secure foundation - on the propensity to hoard and on opinions of the future yield of capital assets. Nor is there any reason to suppose that the fluctuations in one of these factors will tend to offset the fluctuations in the other. When a more pessimistic view is taken about future yields, that is no reason why there should be a diminished propensity to hoard. Indeed, the conditions which aggravate one factor tend, as a rule, to aggravate the other. For the same circumstances which lead to pessimistic views about future yields are apt to increase the propensity to hoard. The only element of self-righting in the system arises at a much later stage and in an uncertain degree (Keynes, 1937a, 118).

This is an account which provides explanation for the causes of the cycle in a manner quite different from that of the “classical” economic theory. It is an account which relies neither on the determinants of the propensity to save nor on “scarcity of capital” - “those physical conditions of technical capacity to aid production” (Keynes, 1937a, 118) - as the dominant factor influencing the marginal efficiency of capital. For the conventional account, where “our knowledge of the future [is] calculable and not subject to sudden changes”, the assumption of a stable and highly inelastic liquidity-preference curve is not implausible. A decrease in money income, even modest, would induce a reduction in the rate of interest, in sufficient magnitude to achieve full employment of resources.

On the other hand, Keynes's principle of effective demand implies that the main determinants of effective demand are the expenditures on both investment and consumption, the former regarded as the most important variable for it is more subject to oscillations:

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12 Although uncertainty is pervasive, one does not necessarily need to endorse an explanation of the business cycle based exclusively on the role of expectations.
The theory can be summed up by saying that, given the psychology of the public, the level of output and employment as a whole depends on the amount of investment. I put it in this way, not because this is the only factor on which aggregate output depends, but because it is usual in a complex system to regard as the *causa causans* that factor which is most prone to sudden and wide fluctuation. More comprehensively, aggregate output depends on the propensity to hoard, on the policy of the monetary authority as it affects the quantity of money, on the state of confidence concerning the prospective yield of capital assets, on the propensity to spend and on the social factors which influence the level of the money wage. But of these several factors it is those which determine the rate of investment which are most unreliable, since it is they which are influenced by our views of the future about which we know so little (Keynes, 1937a, 121).

Along with the conditions of supply, effective demand governs the levels of output and employment. This is “a theory of employment because it explains why, in any given circumstances, employment is what it is” (Keynes, 1937a, 121-122).

In sum, Keynes’s analysis stresses the cognitively unattainable character of future events. There are no sufficient future markets or future prices there waiting to be known. It is in the nature of a monetary economy that time elapses between the taking of a decision and the unknown outcomes of the decision. Decisions to invest are the most affected by the future, for in this case the time span between decisions and results are longer and the attempts at escaping from illiquid positions demands more time.

Keynes’s conception of uncertainty as well as of the role of conventions are important contributions to an alternative economic analysis. A great part of the argument in the *GT* is based on the assumption of given long-period expectations and reduced scope for uncertainty in the book as a whole. But the emphasis post-*GT* implies that the fact of uncertainty is also crucial. One of the most important analytical consequences of the principle of uncertainty is
the necessary denial of the assumption, firmly held by the conventional approach, of perfect foresight and certainty of knowledge.

Keynes gives little attention to ideas such as long-period equilibrium, and in this respect his account contrasts to that of Knight. Indeed, this is the most problematic and contradictory aspect of Knight's economic theory (of which uncertainty is a particular aspect), for he tries to reconcile the apparatus of competitive equilibrium theory with his idea of "true uncertainty". As I emphasised in chapter II, the problem derives from the fact that it is not consistent to stress uncertainty and to assume that the economy tends over time inevitably to a state of rest, or that there is a centre of gravitation impelling the economy to this state, where we know the predetermined final result in advance, that in which change will be absent. Uncertainty entails open, non-imagined futures and an important scope for discovery, for change and for "unknowledge"; by contrast, equilibrium, as is typically defined, demands closures, inevitability and no room for "genuine choice", for at the end equilibrium will always obtain. The deterministic idea of an equilibrium requires the knowledge ex ante of a certain result: we know that mechanisms will be set in motion in order to produce unique equilibrium results (prices, quantities). In this sense, Keynes's analysis is not a timeless picture of reality based on simultaneity and predetermination of results but instead has a clear concern with irreversible temporal sequence, causality and ignorance about the possible futures to come. In his system, if there is an equilibrium result, it is fortuitous, not an expression of mechanical devices operating within the economy in order to engender an inescapable state.

Another important difference in the manner in which both approach uncertainty and probability is that Keynes views probabilities as beliefs attached to propositions about events and Knight to events themselves (Runde, 1995). While for Knight uncertainty is a property of
external material reality, for Keynes it is a property of knowledge, expressing degrees of belief (Lawson, 1988). That is, while the former conceives uncertainty in its ontologic aspect, the latter stresses its epistemic form (McCann, 1994, 52).

Nevertheless, apart from the correct conceptual distinction between risk and uncertainty, what really unifies the thinking of both authors is the view that under conditions of uncertainty there is no possibility of discovering numerical probabilities. For them, there is no guarantee that there will always be sufficient events that are similar enough to form an appropriate reference class of homogeneous events. As it will be seen now, this is the view which also underlies the accounts of Shackle and Davidson.

### III.4) Shackle: Crucial Experiments

One of the most consistent followers of the Knight-Keynes tradition is Shackle. He also emphasises the basic approach to decision-making processes under uncertainty found in those authors, minimising a significant role for decisions under risk based on probability distributions. What is distinctive is Shackle’s emphasis on the nature of “crucial, non-empty decisions” and on the role of creative imagination in human actions.

For Shackle, the fact of uncertainty entails the irreversible passage of time and the essentially dynamic character of economic systems: “Uncertainty enters only in regard to the temporal sequence in which the various outcomes will occur, a matter which ... is quite inadmissible when we are considering a static model” (Shackle, 1956, 87, fn.1).

Shackle refers to uncertainty as “unknowledge” or “lack of knowledge”; knowledge and uncertainty are the opposite sides of a spectrum:
where there is knowledge there is not uncertainty. Uncertainty, *unknowledge*, is what confronts the chooser of action - when his act of choice is going to be *once-for-all*, when it is going to be crucial, when it is going to be an experiment the making of which will destroy the possibility of ever making that experiment again. In such a case we cannot say what *will* happen, even if we only claim to say it half-heartedly, as a 'probability'. We can only attain some notion of the kind of thing that *can* happen (Shackle, 1983, 109).

As an alternative to the approach to decision-making processes based on probability distributions, Shackle provides an account grounded on the idea of "crucial experiments". A crucial experiment is by definition self-destructive and unique; it is a "non-divisible non-seriable experiment" (Shackle, 1958, 35). They cannot be reproduced endlessly. A unique choice itself changes the original context within which the choice is made and brings new information which agents will need to take into account in future courses of action: "Many experiments are self-destructive in the sense that the performance of the experiment is logically bound to alter irretrievably the situation in which it was performed, so that repetition is *logically impossible*" (Shackle, 1958, 37).

Many classes of decisions are not empty, for the consequences of these actions will be the unexpected. For Shackle, a non-empty choice "is a germination of *essential novelty*"; it is "an act of creation, of origination, something inspired from without the bounds of pre-existing thoughts and experiences" (Shackle, 1958, 104).

If non-empty decisions have an important role to play, then the future must be open to endless possibilities. Determinism is, thus, automatically rejected and free will and human imagination are exalted. In this aspect, what is implicit in Keynes (a denial of determinism) is thoroughly stressed in Shackle's work. The human mind is creative; it can conceive, and may
realise through action, imagined results which are not bounded by predetermined objective data.

Shackle’s version of uncertainty implies that the notion of probability as a substitute for knowledge cannot be widely applied to the context of human choice. Uncertainty requires inclusion of all the possible infinite results, imagined and unimagined, and decisions based on a well specified probability have to face the exclusion of many possible outcomes, for the set of outcomes is complete and predeterminedly known ex ante. A finite list of alternatives is given for the agent, whose task is then merely to search for the best:

If a person felt himself to have in mind a complete specification of the entire set or range of action-schemes open to him, and for each of these action-schemes, a complete and certain knowledge of its entire consequences as far as these were of interest to himself, and if also he could order these outcomes, one for each action-scheme, according to his preferences; then his selection of one action-scheme out of all those open would, we should surely say, be mechanical and inevitable, and would have no content of the kind which makes our working ideas about decision interesting. Decision would be empty, the mere registering of a formal solution to a purely formal problem (Shackle, 1959, 20).\(^\text{13}\)

Shackle replaces the notions of relative frequencies and mathematical expectation by his concepts of “focus gains”, “focus losses”, and “potential surprise”, a non-distributional indicator of uncertainty. At the moment agents take a decision, potential surprise evaluates the degree of “disbelief” in the many imagined results. When agents choose their courses of

\(^{13}\) “Probability operates with the indispensable supposition that the action-chooser has for each course of action a list known to be complete of possible outcomes of that action. Inventive expectation [the domain of ineradicable uncertainty] implies that no such list can in logic be available to the decision-maker” (Shackle, 1965, 195).
action, they concentrate on the “best” and “worst” imagined results, defined by “epistemic intervals”, rather than employing some form of weighted average of all imagined results.\textsuperscript{14}

The use of a list of relative frequencies is not suitable to a situation which portrays people’s “uncertain state of mind” (Shackle, 1956, 84) concerning the consequences of their unique actions. Cruciality of events opens space for the advent of new situations which may change completely the pictures conceived with the aid of probabilistic calculations. The affinity with Knight’s account is clear, since for Knight, as I pointed out above, a situation of uncertainty largely derives from the uniqueness of events.\textsuperscript{15}

In view of this, the conventional belief that it is possible to discover the attractiveness of an investment simply by reference to the traditional view of probability needs, thus, to be re-examined. Uniqueness of events makes such a calculation problematic. The decision to buy new equipment is an unique experiment, the conditions of which can in few situations be repeated, and for whose outcome the assignment of a numerical probability may have no meaning. It is not possible to specify a numerical probability for each hypothetical result of such an experiment, “whether on logical or on actuarial grounds”. It is not possible to attach probabilities to “unknowledge”. What the entrepreneur needs is a “clear-cut and simple basis of comparison”, whose acquisition is much more related to intuition, Shackle remarks, than to a precise mental calculation process. Investment decisions are not based on “an elaborate calculation of probabilities, even if the data for doing so existed” (Shackle, 1942, 118).

\textsuperscript{14} A detailed exposition and evaluation of these concepts can be found in Garner (1982) and Ford (1990).

\textsuperscript{15} This association between uniqueness of events and uncertainty in Knight’s account has not been duly emphasised by many commentators.
Shackles makes his point by resorting to two types of “worlds”. There is a world of “order”, where nature enacts its laws, “where a man feels that if his immediate act were different the sequel would be in some respects different, where, in fact, the course of the game can be influenced and affected, but not determined, by the individual player” (Shackle, 1959, 22). But there is a world of “inspiration”, where “there must be room for the creative process to be still at work”. In the latter, exact, unlimited prediction of human affairs is implausible. This world is constituted by crucial decisions affecting its very configuration and direction: “a decision ... is a cut in the logical connectedness of past and future. ... [P]art of what enters into a decision is uncaused” (Shackle, 1959, 23). The unexpected actualisation of non-imagined future possibilities, knowable only ex post, renders precise prediction of human affairs a vain and perhaps useless task. The world of order is bounded and driven by the humours of the world of inspiration. It is a subset of the latter.

Inspiration, or the act of creating something new from the existing state of events, revolutionises from within a given order of things. The “[i]nspired decision, true decision in our sense, is, precisely, an unpredictable initiative” (Shackle, 1959, 25); it engenders irrevocable changes. Such inspirations render the system dynamic.

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16 “[I]f decision involves essential novelty, prediction of human conduct is logically impossible” (Shackle, 1958, 21).

17 “[P]redicted man is less than human, predicting man is more than human. ... [M]an in his true humanity can neither predict nor be predicted” (Shackle, 1958, 105).

18 An act of original creation is “the sudden presence in a man’s thoughts of something essentially novel, something not arising, in its completeness and its essence, merely from some materials or arrangements of materials that were in his mind before, but manifesting ... ‘inspiration’ ... [that is] the birth of the fundamentally unpredictable thoughts” (Shackle, 1958, 22-23).

In sum, Shackle is much more akin to Keynes’s view than to Knight’s, in the sense that for Shackle uncertainty is epistemic (it is related to varying degrees of belief; it is a property of knowledge, not of reality) and also that in his system there are no natural forces attracting the economy to a predeterminedly known state of rest. Although Shackle insists on Knight’s conceptual differentiation between risk and uncertainty and in the inadequacy of believing that all probability should be measured, in his “scheme” of economic theory there is no place for the idea of competitive equilibrium conditions at all. Equilibrium and determinism, on one side, and imagination, crucial decisions and essential novelty, on the other side, are irreconcilable conceptions.

The problematic aspect of Shackle’s account is the extreme form of methodological individualism of his analysis. In the worlds he portrays it is as if the individual alone is radically sovereign in his or her decisions and it seems that social relations and structures does not facilitate (or constrain) choices at all. Instead, the methodological stance advocated here, which is evident in the conception of complexity addressed in chapter I and which will be further explored in the discussion of the nature of conventions in chapter IV, is that both human agency and structure, the individual part and the complex hierarchical whole, have important roles to play in a non-conventional account of economic conduct. On the other hand, if we take into account Keynes’s theory, in particular his view on conventions, we will observe a deep concern with the intersubjective nature of the individual decision.

III.5) Davidson: Non-Ergodicity

Davidson’s account of uncertainty is in a considerable measure consistent with the three previous versions. His notion of uncertainty makes use of the ideas of ergodicity and
non-ergodicity. In ergodic systems, the external reality is immutable. The future is simply a statistical replication of the past. Methodologically, the ergodic hypothesis underlies neoclassical economics. In non-ergodic processes, reality is creative. Crucial decisions engenders non-ergodic, uncertain environments, in which time is irreversible. The external reality in a non-ergodic system “is transmutable or creative in the sense that the economic future can be created by current and future human actions” (Davidson, 1995, 108).

In a world of ergodic processes, “economic relationships among variables are timeless, or ahistoric in the sense that the future is merely a statistical reflection of the past. The historical date(s) when observations are collected does not affect the estimates of the statistical averages” (Davidson, 1988, 331). In an ergodic situation, knowledge about the future consists of reliably projecting statistical averages based on past and current observations to circumstances about to take place. If the causes of change remain unaltered as the system moves through time then ergodic theory may have its say. Ergodic systems like timeless economic models tend to specify “a sufficient number of equations to determine all the unknowns in the system simultaneously (and endogenously)”. Such systems are timeless because they regard “that all decisions and actions that can affect the solution are taken at the initial instant; in essence all contracts are signed in the Garden of Eden without any false trades” (Davidson, 1982, 14).

On the other hand, a non-ergodic reality implies that the economy moves in historical time. This requires that economic processes are not stationary, that is, “if one conceives of

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21 It should be noted in passing that creativity is a source of non-ergodicity, but systems which are not creative can still be non-ergodic.
underlying stochastic processes whose distribution functions are not independent of historical time, and if the rates of change in the distribution functions are also not independent of calendar time (otherwise the rate of change is stationary hence predictable); ... and any estimated statistical average (which represents rational expectations) can be persistently and nonsystematically different from the future time averages actually occurring in the economy” (Davidson, 1982-83, 187).

Non-ergodicity also implies the existence of crucial decisions, an idea affiliated to Shackle’s principle of cruciality, and partly results from their operation. As Davidson states, “crucial choice involves, by definition, situations where the very performance of choice destroys the existing distributions functions. ... [T]he future is created by crucial choice decisions” (Davidson, 1982-83, 192). Crucial choice is the set of all important decisions where the results take place in the future and where states can never be totally reproduced over time. Crucial experiments change the economic circumstances, the “parameters”, in a non-predictable way.

Davidson defines uncertainty as the inverse of knowledge (Davidson, 1995). Under the ergodic assumption, probability is a form of knowledge, not uncertainty of the future. Under uncertainty, agents behave based on the belief

that during the lapse of calendar time between the moment of choice and the date(s) of payoff, unforeseeable changes can occur. In other words, the decision maker believes that reliable information regarding future prospects does not exist today. The future is not calculable, even if the decision maker is competent to perform the mathematical operations necessary to calculate probabilities of conditional events given the necessary information. ... The longer the lapse of time between decision and consequence, all other things being equal, the more likely the individual is to believe he or she is making a decision in this uncertain environment (Davidson, 1994, 89).
In a stochastic world, uncertainty is defined in terms of the existence of nonergodic processes. More generally, in a world where economic observations need not be generated by any stochastic process, *uncertainty about future relationships can be defined in terms of the absence of governing ergodic processes.* ... [In a nonergodic environment, past observations do not produce knowledge regarding current and/or future events, while current observation of events provides no statistically credible estimate of future time and/or space averages (Davidson, 1988, 332).]

Following Keynes, Davidson emphasises that economic agents resort to money as a typical precautionary behaviour in the presence of uncertainty. Non-ergodic processes and monetary theory are intrinsically connected, rendering close the relation between money contracts to uncertainty.

In a world of uncertainty, money is not neutral, even in the long run. The non-neutrality of money results from the fact that people perceive that holdings of money and/or of liquid assets give a higher degree of freedom and flexibility of response which enables them to cope with unanticipated opportunities and the self-protection against undesirable occurrences. Explicit money contracts afford a certain degree of predictability to agents, such as, for instance, contracts where delivery and payment is previously specified at a future date, or fixed money wage contracts. Thus, it is only in an uncertain world "that money comes into its own as a necessary mechanism for deferring decisions; money has its niche only when we feel queasy about undertaking actions that will commit our claims on resources onto a path that can only be altered, if future events require this, at very high costs (if at all)" (Davidson, 1994, 94).

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22 A situation of uncertainty consists of "any economic situation where decision-makers believe that sufficient information does not exist today to form the basis for predicting future events by means of frequency distributions" (Davidson, 1995, 110). Or further: "in a nonergodic world, the future is uncertain in the sense that history and current events can not provide a reliable statistical guide to knowledge about future outcomes!" (Davidson, 1988, 333).
In sum, non-ergodicity, fixed money contracts over time, non-neutral money, and the future as something not only statistically different from the past but also cognitively different, are the conceptions underlying Davidson’s account of uncertainty. This theory describes a world where there is no room for a general equilibrium (Davidson, 1988, 336). The ergodic axiom underlying conventional economics is, then, a form of “special case” (narrow applicability) if one assumes the existence of a reality marked by non-ergodicity and uncertainty.\(^{23}\)

III.6) The Principle of Uncertainty in Economics

The “principle of uncertainty” as formulated by what might be termed the “classical” accounts of Knight, Keynes, Shackle and Davidson has now been recognised and developed over the years. One may find further accounts, say, “modern” versions of uncertainty, in a massive number of contributions such as, for instance, Carabelli (1988), Dow and Hillard (1995), Fitzgibbons (1988), Lawson (1985, 1988), Lawson and Pesaran, (1985), O’Donnell (1989, 1991), Runde (1990, 1991, 1995), and Vercelli (1995, 1996), the great majority of the discussions belonging to a specific research programme that I classify as “Philosophical Keynesianism".\(^{24}\) While some authors tackle philosophical, mainly epistemological, issues,

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\(^{23}\) “In a classical model, on the other hand, the ‘scientific’ assumption of ergodicity implies an economy where money is merely a neutral numeraire that does not affect production and consumption decisions and the future is merely a statistical replication of the past” (Davidson, 1995, 115).

\(^{24}\) By Philosophical Keynesianism I mean a specific line of research which emerged within the Post Keynesian economic paradigm mainly concerned with philosophical and methodological aspects of the works of Keynes as a whole, whose starting point is both his *Treatise on Probability* and his *Juvenilia*, but also making extensive use of his economic works. It aims to study Keynes not merely as an economist but also as a “philosopher-economist”. Uncertainty is one of the main themes investigated within this line of research. For a more elaborated approach on this subject, see Andrade (1996).
others are also concerned with the specific theoretical implications that such an effort might entail for economic analysis.\textsuperscript{25}

In all accounts, the notion of uncertainty is associated to absence of knowledge and contrasted to completeness of knowledge, certainty of foresight and quantifiable probabilistic risk. All these interpretations have a common line of reasoning: conceptually, uncertainty, for not being knowledge in the form of a probability calculation, corresponds to a situation of numerically immeasurable non-comparable probability.\textsuperscript{26}

When future circumstances are unknown, or at least highly uncertain, the making of forecasts is not without problems. The environment may change without any possibility of anticipating the outcomes, so that the obstacles confronting those engaged in predictions are: "(i) that past experience may not be relevant to the time the prediction is extended; and (ii) that there is no method of rationally assessing the probabilities of the various possible changes due to a decided lack of information" (Rutherford, 1984, 381).

Underlying all these interpretations is the idea that our knowledge about future states of affairs is fallible and contingent. Uncertainty is accordingly a property of both the external material reality and knowledge (corresponding to degrees of belief) (Carvalho, 1988, 78; Lawson, 1988, 40). There is ontological (or systemic) uncertainty: the manifest uncertainty of

\textsuperscript{25} There is an endless number of bibliographical references under the head uncertainty in the recent literature. But it should be clear from now that my purpose here is not to make a critical review of this literature, but rather to assemble consistently and articulately the important elements for a discussion of uncertainty based on relevant accounts as a preparatory for a theory of the genesis and dynamics of conventions. Thus, the mentioned versions were introduced for being representative views which have a relative higher acceptance among the practitioners of a genuine Keynesianism.

\textsuperscript{26} A very useful categorisation of the modalities of uncertainty in terms of "hard" and "soft" uncertainty is provided by Vercelli: "Uncertainty may be defined as 'soft' whenever it is adequately described by a unique distribution of additive probabilities which is considered fully reliable. On the contrary, uncertainty may be defined as 'hard' whenever its representation involves non-additive probabilities and/or a plurality of probability distributions, none of which is fully reliable" (Vercelli, 1995, 256).
the environment, something with which the agent is faced. And there is epistemic uncertainty: the uncertainty of our comprehension of the environment, or rather, of the signals produced by the system (our beliefs that an event will occur) (McCann, 1994, 52-53). While Knight falls under the first category, Keynes and Shackle pertain to the second. Davidson's account represents, so to speak, an intermediary between these two categories. He seems to wander between the two conceptions, for if sometimes one is left with the impression that uncertainty corresponds to a feature of knowledge, most of the times it is as though there is no continuum of probability values, but only a clear-cut antithetical separation between absolute certainty and radical uncertainty; uncertainty is, then, a feature of reality.²⁷

The following table illustrates these differences and affinities:²⁸

<table>
<thead>
<tr>
<th>Probability is a property of knowledge or belief</th>
<th>Probability is an object of knowledge as a property of external material reality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uncertainty is a situation of numerically immeasurable probability</td>
<td>Keynes, Shackle</td>
</tr>
</tbody>
</table>

Although the interpretations of Knight, Keynes, Shackle and Davidson focus mainly on non-measurability, all of them allow for measurability (and, therefore, the frequency theory may have its say) as a sub-class of problems or as a special case of a more comprehensive

²⁷ On this latter point, see McCann (1994, 145, fn.156).

²⁸ Based on Lawson (1988).
approach. Their accounts *transcend* the conventional view of probability based exclusively on the relative frequency approach: there are cases in which insufficient information make probabilities non-measurable and non-comparable. It is only in that sub-set, which belongs to a wider class of cases to which a general conception of probability could be implemented, that one should be allowed to use numerical calculations. If it is a sub-set, then it is not all-inclusive as in some sense the above conceptions are. In this case, the task challenging the analyst is then to specify the proper realm of applicability of the frequency approach, that is, to find the appropriate reference class, and the necessary conditions for homogeneity, stability and stationarity to prevail.

The following figure illustrates the argument (see Hicks, 1979, 115).

Figure III.1 - Theories of Probability: Domains of Applicability

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29 See Hicks (1979, 114-115).
The area $X$ is the domain in which probabilities are numerical. The area $Y$ is that in which probabilities are orderable, but not numerical. The area $Z$ is that in which probabilities are not orderable or comparable. The shaded area could (roughly) be seen as the various activities in economics. Different (and contrasting) approaches to economic analysis emphasise different aspects. Some approaches are situated in $X$ (neoclassical economics), some in $Y$, and some in $Z$ (Keynes, Shackle, Davidson).

One general conclusion stemming from the previous accounts is the need to make a clear-cut distinction between the concepts of uncertainty and risk. Risk corresponds to a situation in which an event occurs with some known probability or where the size of the event has a probability distribution. We have, then, numerically measurable probability, as, for instance, in the rational expectations view (Lucas, Sargent) or in the subjectivist approach (Savage, Friedman). In this case, the list of imagined results is complete and finite, so that the probabilities attached to each sum to 1. But, in reality, we cannot imagine every outcome, and we would not be able to recognise completeness even if we achieved it.

On the other hand, in a state of uncertainty probabilities are unknown; therefore, neither a measurable probability can be attached to each possible imagined outcome nor a comparison between probabilities can be made. Moreover, under conditions of uncertainty, prediction of the future based on past observation is imperfect and may even be useless the further into the future we try to look.\textsuperscript{30} The uncertain future may be very different from the past and present, as a rule it tends to be. Having pointed clearly to this aspect is Knight's great conceptual achievement, despite some limitations and the internal tensions of his theory.

\textsuperscript{30} "Situations of risk are ones in which it is possible to identify classes of homogeneous or repeated events, situations of uncertainty ones in which they do not exist or, if they do, cannot be identified" (Runde, 1995, 7).
Probabilistic knowledge of the type met in risk situations is then insufficient for coping with many types of decisions, in particular investment decisions and asset-holdings. Risk theory applies only to very restrictive conditions where knowledge is supposed to exist in the form of reliable patterns observed from past experiences.

In conclusion, by a state of uncertainty one should then mean the circumstance in the historical time, in a non-ergodic reality, which is not cognitively apprehendable by a numerically calculable probabilistic risk or certainty equivalents. In this situation, our knowledge as to a set of possible rival futures, which, incidentally, are being partly shaped by events currently taking place, is lacking. I emphasise, therefore, the epistemic aspect of uncertainty.

If there is lack of knowledge, then one is not in a position to quantify it. Thus, in this situation, probabilistic knowledge is neither capable of safely guiding our decisions nor of providing any accurate prediction. Although widely found in the conventional theories of rational choice, such a presumption is, to say the least, problematic. Change, limited human computability, fallible knowledge, all of them require the need to revise and update the amount and quality of information supporting our decisions.

Agents have experienced unexpected "essential novelties" and, therefore, know that their knowledge of the world is uncertain. We can even say that we know something about the future but in our daily life conduct in general is based in our knowing very little of the basic facts which affect ourselves. We act according to beliefs which mean that we are neither completely ignorant nor completely well informed, but rather we that have imperfect knowledge of the relevant situations.
An investigation into the meaning of uncertainty calls for an analysis of the nature of knowledge and its relation to conduct. People do not grasp the present as it is and in its entirety, nor do they forecast the future from the present highly accurately, nor unerringly know the consequences of their own actions. As remarked by both Knight and Keynes, the possibility of prediction seems to rest upon the uniformity of nature and this is far from the fleeting reality in which we live.\footnote{Note that these views of the nature of knowledge have another important supporter: “I prefer true but imperfect knowledge, even if it leaves much indetermined and unpredictable, to a pretence of exact knowledge that is likely to be false” (Hayek, 1974, 29).}

Accordingly, the question is: how far is the world intelligible at all? People face practical difficulties when they try to make inferences and judgements based on contingent and fallible knowledge. A form of coping with these difficulties in the decision-making process is to resort to conventions and rules. The concept of uncertainty is the foundation-stone for a discussion of conventions and, therefore, for an analysis of their dynamics. My point is that one cannot even think about convention without previously conceptualising uncertainty. Conventional behaviour is the natural result of a world immersed in uncertainty.
IV - CONVENTIONS

IV.1) Introduction

In this chapter, I discuss the role of conventions under conditions of uncertainty. The basic starting points for the analysis are Keynes’s version of conventions and Hayek’s concept of social rules of conduct. The two approaches are complementary. In both accounts, conventions and rules of conduct are types of social structures which are acted upon.

Conventions are the ever present structural conditions or generalised procedures for human actions maintained by (tacit) general agreement. They are drawn upon and reproduced in action, but they exist independently of any one agent acting upon them. That is, conventions (or routines) and conventional intentional (or routinised forms of) behaviour are two different things: actions and human agency presuppose the pre-existence and relative autonomy of a set of social and economic structures (conventions, rules, routines) which are not to be identified with the former. There is an “irreducible mutual inter-dependency” between human agency and structures (Lawson, 1997).

Uncertainty implies that knowledge is fallible and contingent. The way people try to cope with this condition is by resorting to conventions and rules, for they provide a form of (tacit) knowledge. This pacifies agents’ anxiety concerning their irremediable lack of knowledge about many aspects of life and may render the results of actions more profitable. Conventions help to promote co-ordination of actions and play a stabilising role for the system. Systematic convention-following behaviour (routinisation of activities) may then bring stability and continuity over time.
Conventions tend to unify the structure of expectations. Because of uncertainty, our decisions have to entertain a set of plural rival answers to a specific question which we are dealing with at each moment. Conventions allow for the possibility of closing to a certain degree this epistemic gap.

A generalised reproduction of conventions (the establishment of some form of systematic, quasi-regular behaviour) over time engenders *conformative* behaviour. In this case, almost everyone conforms, almost everyone expects others to conform, and almost everyone wants to conform provided that almost everyone else conforms. It is this tendency of behaviour to converge which can bring some kind of "order on potential chaos" (Hahn, 1981, 74), not the set of equilibrium prices of the economy (as Hahn supposes).

However, actions do not always need to resort to conventions. Agents may choose to depart from a convention, to experiment other ways of doing things, and the result can be the creation of different frameworks for actions. Unconventional behaviour, or an unexpected variation of behaviour, may engender successful innovation, and is also an important feature of economic reality. A condition for that is the knowledge of familiar conventions. Thus, it is legitimate to study not only actions in terms of convention-following behaviour but also in terms of a search for new directions. However, the latter can only take place if the former already exists. If this is the case, then a space is open to a dynamic analysis.

**IV.2) Keynes: Conventions**

Keynes's account of convention is closely related to his notion of uncertainty. As I discussed in chapter III, Keynes's version of uncertainty refers to a situation in which there is no basis to form any calculable probability, for the amount of information required is
insufficient. He makes clear the need to demarcate not merely what is “known for certain” from “what is only probable” (Keynes, 1937a, 113). Uncertain knowledge implies that “We simply do not know” (Keynes, 1937a, 114).

Notwithstanding the situation of flimsy foundations of the knowledge people make use of when taking their decisions, it is an imperative of life that they have to act. But to act in such adverse circumstances requires the existence of some sort of “anchor” for decisions, some sort of generalised procedure to which agents consistently refer. This anchor is a type of social structure called convention. In order to overcome “the knowledge which is unattainable”, people largely ground their actions on a “conventional basis of valuation” (Keynes, 1936, 154).

The GT provides Keynes’s first attempt to characterise convention. Here (chapter 12), he is somewhat ambiguous about the notion of convention, for while in some parts he formulates it in the particular context of stock markets in other parts he seems to say that he is accounting for a generalised feature of conventions. But, even so, one still cannot find in chapter 12 a more comprehensive formulation of convention.

For Keynes, a convention denotes that individuals act as though

the existing state of affairs will continue indefinitely, except in so far as we have specific reasons to expect a change. This does not mean that we really believe that the existing state of affairs will continue indefinitely. We know from extensive experience that this is most unlikely. The actual results of an investment over a long period of years very seldom agree with the initial expectation. Nor can we rationalise our behaviour by arguing that to a man in a state of ignorance errors in either direction are equally probable, so that there remains a mean actuarial expectation based on equi-probabilities. For it can easily be shown that the assumption of arithmetically equal probabilities based on a state of ignorance leads to absurdities. We are assuming, in effect, that the existing market evaluation, however arrived at, is uniquely correct in relation to our existing knowledge of the facts which will influence the yield of the investment, and that it will only change in proportion to changes in this knowledge;
though, philosophically speaking, it cannot be uniquely correct, since our existing knowledge does not provide a sufficient basis for a calculated mathematical expectation. In point of fact, all sorts of considerations enter into the market valuation which are in no way relevant to the prospective yield (Keynes, 1936, 152).

Thus, in the *GT* Keynes addresses these two aspects of conventions: 1) the future will look like the past, and 2) the current situation is a reasonable guide to the future, provided that new and relevant information is not available.

An important aspect is the confidence in the long-run validity or expected stability of a convention. A convention is “compatible with a considerable measure of continuity and stability in our affairs, *so long as we can rely on the maintenance of the convention*” (Keynes, 1936, 152). Reliance on convention makes possible for individuals to make some decisions and undertake some activities having in mind that the only obstacle which he or she may eventually face and fear is “that of a genuine change in the news *over the near future*. ... [I]t is only these changes which can affect the value of his investment, and he need not lose his sleep merely because he has not any notion what his investment will be worth ten years hence” (Keynes, 1936, 153). Then, for Keynes, the trust in the preservation of the convention as well as the possibility of revising previous judgements in the light of recent results renders the process of investment a “safe” activity over time for the individual entrepreneur.

A convention so erected on these arbitrary and unstable grounds obviously has many problems as a substitute for certain knowledge. As Keynes stresses, “[i]t is its precariousness which creates no small part of our contemporary problem of securing sufficient investment” (Keynes, 1936, 153). Keynes specifies five ingredients which reinforce the precarious nature of conventions. Broadly speaking, they are, first, the decreasing element of knowledge in the
valuation of investment occasioned by the split between ownership and management; second, the unreasonable influence on the market of the fluctuations of an evanescent character in the current profits of existing investments; third, the sudden and deleterious impact of "waves of optimistic and pessimistic sentiment" (Keynes, 1936, 154); fourth, "the state of credit" (158); and, fifth, regarded with special interest, the "activity of speculation". The last ingredient, as well as "animal spirits", are the main causes of the instability of the system.

The other occasions Keynes said more about conventions were in two interventions following the publication of the GT, namely "Some Economic Consequences of a Declining Population" (Lecture delivered before the Eugenics Society on February 1937) and "The General Theory of Employment" (The Quarterly Journal of Economics, February 1937).

In the first article, Keynes restates his position of the GT, but there is no observation as to whether conventions are specific. On the contrary, he indicates that his discussion is a "philosophical reflection on human behaviour" (Keynes, 1937b, 124). People know by experience and thought that in the real world "[t]he future never resembles the past" (Keynes, 1937b, 124). But to act as though it does help them to cope with the fact of uncertainty:

We do not know what the future holds. Nevertheless, as living and moving beings we are forced to act. Peace and comfort of mind require that we should hide from ourselves how little we foresee. Yet we must be guided by some hypothesis. We tend, therefore, to substitute for the knowledge which is unattainable certain conventions, the chief of which is to assume, contrary to all likelihood, that the future will resemble the past. This is how we act in practice (Keynes, 1937b, 124; my italics).

[T]he importance of this convention by which we assume the future to be much more like the past than is reasonable - a convention of behaviour which none of us could possibly do without - [is that], as I think, it continues to influence our minds even in those cases where we do have good reason to expect a definite change. ... [T]he idea of the future being different from the present is so repugnant to our conventional modes of thought and behaviour that we, most of us, offer a great resistance to acting on it in practice (Keynes, 1937b, 125; my italics).
However, despite these important aspects stressed by Keynes in both this article and in the *GT*, a more comprehensive treatment of conventions is only made in the second article. Here, if there is any doubt about the context to which he wants his analysis to apply suffice it to say that this is a "general, philosophical disquisition on the behaviour of mankind" or that "this is how we behave in the market place" (Keynes, 1937a, 115). This analysis improves the previous account and renders much clearer the strategic role of conventions in a capitalist economy (and, perhaps, in the works of Keynes).

In order to cope with uncertainty, agents have *rationally* conceived "a variety of techniques" to assist behaviour. The three "principles" upon which a "practical theory of the future" based on conventions is grounded are:

1. We assume that the present is a much more serviceable guide to the future than a candid examination of past experience would show it to have been hitherto. In other words we largely ignore the prospect of future changes about the actual character of which we know nothing.
2. We assume that the *existing* state of opinion as expressed in prices and the character of existing output is based on a *correct* summing up of future prospects, so that we can accept it as such unless and until something new and relevant comes into the picture.
3. Knowing that our own individual judgment is worthless, we endeavour to fall back on the judgment of the rest of the world which is perhaps better informed. That is, we endeavour to conform with the behaviour of the majority or the average. The psychology of a society of individuals each of whom is endeavouring to copy the others leads to what we may strictly term a *conventional* judgment (Keynes, 1937a, 114).

The first two aspects are familiar: 1) the present is a plausible guide to the future and, therefore, to our current decisions, and 2) the existing state of opinion is a correct opinion
about the future unless new relevant information arises. But the third “principle”, the fact of
the interdependence of individual actions and of the limitations of individual judgement leading
to behaviour based on conventions, is new. Here Keynes highlights the intersubjective
character of the convention which was not previously emphasised.

Principles two and three allow for the possibility of changing a convention via non-
conventional behaviour. Although Keynes does not emphasise this aspect, one should be
aware of the fact that if some few agents know of “something new and relevant” coming into
the picture, and if most people act with reference to “the behaviour of the majority or the
average”, then asymmetries naturally emerge. Some agents may take advantage and benefit
from this situation via extragains, and improve their relative position. Dispersion from the
majority or average, and the possession of new information which can lead to unexploited
opportunities, is a source of potential benefits.

Because this “practical theory of the future” has been built upon fragile grounds, “it is
subject to sudden and violent changes” (Keynes, 1937a, 114). This will give rise to new
perceptions and feelings about current conditions and possibly lead to the replacement of the
previous conventions by “a new conventional basis of evaluation”.¹

¹ In his memoir “My Early Beliefs” (September 1938) Keynes remarks that “civilisation [is] a thin and
precarious crust erected by the personality and the will of a very few, and only maintained by rules and
conventions skilfully put across and guilefully preserved” (Keynes, 1938, 447). People’s judgements rely
strongly on “convention and traditional standards and inflexible rules of conduct” (Keynes, 1938, 447). This
statement confers a broader scope to the idea of convention, not only restricted to aspects of economic life.
IV.3) Hayek: Social Rules of Conduct

One of the main concerns of Hayek's later thinking in his multidisciplinary writings is to provide an account of the character of dispersed knowledge in a reality marked by complexity. As a result, he is also interested in investigating how people attempt to cope with their ignorance by resorting to social rules of conduct, structures or procedures which facilitate the discovery, communication and storage of knowledge. He explains the institutions which in the form of social rules of conduct and the price system make the existence of a spontaneous order (not equilibrium) in a capitalist economy a real possibility.

Complexity entails that ignorance of many particular facts and its effects compels people to follow rules. Resort to social rules of conduct are the result of this irremediable ignorance. They are intrinsically related. For "most of the rules of conduct which govern our actions, and most of the institutions which arise out of regularity, are adaptations to the impossibility of anyone taking conscious account of all the particular facts which enter into the order of society" (Hayek, 1973, 13).

Social rules of conduct are "those end-independent rules which serve the formation of a spontaneous order" (Hayek, 1976, 31). Rules of conduct are the microstructures which govern a higher complex spontaneous order. They have an impersonal character and are generally fitting: "the rules governing a spontaneous order must be independent of purpose..."
and be the same. ... They must ... be rules applicable to an unknown and indeterminable number of persons and instances" (Hayek, 1973, 50).

Hayek’s account of rules is also linked to a discussion of the nature of knowledge. Knowledge exists in different forms. There are different ways of knowing: knowledge “how” and “that”. “Know how” is action according to rules without the need of being able to explain them but merely being able to follow them (Hayek, 1962, 44). We always know more than we can deliberately state, for what we identify as purposive conduct is conduct following a rule with which we are familiarised but which we need not explicitly comprehend:

an observed movement is directly translated into the corresponding action, often without the observing and imitating individual being aware of the elements of which the action consists or (in the case of man) being able to state what he observes and does. ... In one sense we thus know what we observe, but in another sense we do not know what it is that we thus observe (Hayek, 1962, 47-48).

We make constant use of formulas, symbols and rules whose meaning we do not understand and through the use of which we avail ourselves of the assistance of knowledge which individually we do not possess. We have developed these practices and institutions by building upon habits and institutions which have proved successful in their own sphere and which have in turn become the foundation of the civilization we have built up (Hayek, 1945, 528).

Agents following rules know “how” but not “that”. Rules avoid the need to know “that”. Thus, agents are paradoxically knowledgeable and ignorant: they possess knowledge “how”, which is important to assist their daily decisions; nevertheless, they are in many

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4 Rules of conduct are of a general nature, for they apply in the same way to every member of society regardless of his or her particular circumstances, as well as being relatively fixed for the individual. Their general and fixed character does not allow them to adjust instantly to the particular changes taking place in the system, as would be the case in the conventional portrait of price adjustments of equilibrium theory (Runde, 1996, 181). But this does not imply to affirm that they do not change. Rules do change, as I show in the next chapter.
respects ignorant of knowledge “that”. This is what Fleetwood (1995, chapter 7) calls the “paradox of ignorance”.

General rules (partly) govern people’s actions and help them to perform a vast number of activities. They are the providers of suitable ways for actions. In this sense, they have a positive role. But rules have a dual character. If they enable actions, they also constrain behaviour, at the same time. Therefore, they have a negative character as well:

[Rules] will often merely determine or limit the range of possibilities within which the choice is made consciously. ... Even decisions which have been carefully considered will in part be determined by rules of which the acting person is not aware. ... The rules which guide an individual’s action are better seen as determining what he will not do rather than what he will do (Hayek, 1963, 56-57).

^  “Agents ... appear as skilful manipulators of a vast range of knowledge (‘how’) embodied in the macro and micro social rules of conduct. These rules are necessarily drawn upon in order for agents to acquire and communicate knowledge and engage in socioeconomic activity” (Fleetwood, 1996, 174). In fact, this characterisation of knowledge is not completely new. For instance, Polanyi had a similar view: “I shall take as my clue for this investigation the well-known fact that the aim of a skilful performance is achieved by the observance of a set of rules which are not known as such to the person following them” (Polanyi, 1958, 49). Or further: “The unspecifiability of the process by which we thus feel our way forward accounts for the possession by humanity of an immense mental domain, not only of knowledge but of manners, of laws and the many different arts which man knows how to use, comply with, enjoy or live by, without specifiably knowing their contents. Each single step in acquiring this domain was due to an effort which went beyond the hitherto assured capacity of some person making it, and by his subsequent realization and maintenance of his success. It relied on an act of groping which originally passed the understanding of its agent and of which he has ever since remained only subsidiarily aware, as part of a complex achievement” (Polanyi, 1958, 62-63). Ryle was probably the first to develop the idea: “It is therefore possible for people intelligently to perform some sorts of operations when they are not yet able to consider any propositions enjoining how they should be performed. Some intelligent performances are not controlled by any anterior acknowledgements of the principles applied in them. ... We learn how by practice, schooled indeed by criticism and example, but often quite unaided by any lessons in the theory (Ryle, 1949, 30, 41). However, Hayek has the merit of connecting the categorisation knowledge how/that with his theory of social rules of conduct.

6 A variant of this second aspect is that rules can penalise if non-conventional behaviour is attempted and it is not successful. Fear of punishment engenders conventionality in behaviour. But hope of achievement may induce unconventionality. Economic systems are in many respects guided by the resulting balance of these antithetic forces.

7 “Tacitly understood and unconsciously followed rules, then, are often represented in the form of custom or habit. They should not be thought of as referring to particular action, but as general guidelines. Moreover they are often of a negative kind in that they relate to what general action may not be taken” (Fleetwood, 1996, 171).
Rule-following behaviour is related to perceptible regularities. Systematically following “established procedures” may engender regularities and this comforts those uncertainty-averse individuals, fearful of “unknown worlds”. In this respect, Hayek displays an account similar to that of Keynes. According to Keynes, resort to conventions “lulls our disquietude” stemming from the fact that “we simply do not know” future states of the world. According to Hayek, [t]he resulting feeling that something dreadful is going to happen because one has infringed rules of conduct is but one form of the panic produced when one realizes that one has entered an unknown world. A bad conscience is the fear of the dangers to which one has thus exposed oneself by having left the known path and entered such an unknown world. The world is fairly predicted only so long as one adheres to the established procedures, but it becomes frightening when one deviates from them (Hayek, 1967a, 80-81).

Similarly to Keynes, Hayek also accounts for one of the aspects of conventions, namely following the opinion of the average or the majority:

The knowledge of some regularities of the environment will create a preference for those kinds of conduct which produce a confident expectation of certain consequences, and an aversion to doing something unfamiliar and fear when it has been done. This establishes a sort of connection between the knowledge that rules exist in the objective world and a disinclination to deviate from the rules commonly followed in action, and therefore also between the belief that events follow rules and the feeling that one ‘ought’ to observe rules in one’s conduct (Hayek, 1967a, 79; my italics).

Like Keynes, Hayek proposes that our ignorance forces upon us to follow the set of existing rules:
Norms are thus an adaptation to a factual regularity on which we depend but which we know only partially and on which we can count only if we observe those norms. ... In order to live successfully and to achieve one’s aims within a world which is only very partially understood, it is therefore quite as important to obey certain inhibiting rules which prevent one from exposing oneself to danger as to understand the rules on which this world operates (Hayek, 1967a, 80, 81).

The existence of rules placates the anxiety which stems from our knowing so little in a world of so much. Rules eliminate some natural sources of uncertainty but cannot eliminate all of them. Adherence to rules minimises uncertainty and gives the impression that people inhabit a safer world. It can bring about a sentiment of certainty to the extent that rules provide important information (knowledge “how”) for a determinate course of action. Hence, the recourse to rules shelters individuals from the fact of their incurable ignorance of many facts which affect their daily life. However, if rules enable actions, they cannot guarantee the success of a given course of action. For instance, they cannot assure the agent “that he will be able at the expected price to sell what he has to offer or to buy what he wants” (Hayek, 1976, 38).

Social rules of conduct are the embodiment of social knowledge. They are the result of a long adaptive process by means of which individuals living in an evolving society produce and use information and are themselves shaped by a knowledge which has passed the test of history.

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8 “Whilst the complex web of rules acts to decrease uncertainty in general, it will almost inevitably increase uncertainty in particular instances. Rules can only ensure that agents have the potential to interact in a potentially fruitful manner, they cannot guarantee that they will do so” (Fleetwood, 1994, 30). There are several ways of reducing uncertainty. Defensive devices may be followed such as “by concentrating on short-run decisions, by negotiating with their environment, and by taking care not to act in ways which might disturb the stability of existing coalitions. (The latter may rule out some attempts to ‘optimise’.)” (Loasby, 1976, 221).

9 “Hayek describes an historical, evolutionary process of trial and error whereby agents discover new rules or modify existing ones, using them as a basis for action. The reason rules can serve as a basis for action is
For Hayek, resort to social rules of conduct is a normal behaviour, necessary for the survival of society and of the market order. As he states, "tradition is the product of a process of selection. ... [T]radition is in some respects superior to, or 'wiser' than human reason. ...

Most knowledge - and I confess it took me some time to recognise this - is obtained not from immediate experience or observation, but in the continuous process of sifting a learnt tradition, which requires individual recognition and following of moral traditions that are not justifiable in terms of the canons of traditional theories of rationality" (Hayek, 1988, 75).

IV.4) Conventions and Rules: A Suggested Integration

The above discussion reveals that there is an important commonality between Keynes and Hayek concerning the importance for agents to follow rules and conventions. At the same time, I showed that in their accounts the existence of conventions and rules is closely related to the nature of knowledge in society. Complexity and the passage of time makes us ignorant or uncertain about many relevant current and future events which take place in our environment. However, there is a form of (incomplete) knowledge in the existing system of rules and conventions. Thus, I start from those ideas and insights and conceive an account because they embody the collected wisdom of the society" (Fleetwood, 1994, 7). For obvious reasons, the same reasoning can be associated to Keynes's account of convention.

Needless to say, we do not need to embrace all the consequences of this uncritical praise of tradition. It is obvious enough that to recognise the importance of rules and "tradition" in a capitalist economy or in a given society does not necessarily and automatically mean to espouse a conservative political orientation. But this is a digression which, although not without interest, may lead us too far away from the main task of this work.

A commonality which is different from, but not in conflict with, that found by Lawson (1996). For Lawson, Keynes and Hayek share "a disposition or orientation towards the practices of social sciences, which ... I shall refer to as a realist orientation" (Lawson, 1996, 96). Both embrace the view that the economy is "an irreducible holistic system" (Lawson, 1996, 110). This commonality expresses a critical attitude towards employing methods which are used in natural sciences without questioning whether they are appropriate for social sciences. Hayek calls this "scientism".

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based on the principle of uncertainty in which conventions and rules play a decisive role for economic conduct. The starting point is the recognition that uncertainty is pervasive, that in many circumstances people’s knowledge is fallible and contingent.

As Keynes suggests, a convention has three aspects: 1) the future will look like the past; 2) the existing state of affairs is a correct evaluation of the future unless new relevant information come into the picture; 3) resort to the judgement of “the rest of the world”, by observing and following “the behaviour of the majority or average” (that is, conventional behaviour is copy).

Conventions are procedures for action which help people to domesticate partly “the dark forces of time and ignorance which envelope our future” (Keynes, 1936, 155). However, as conventions are based on “flimsy foundations”, they can be potentially unstable when our trust in the convention is weakened.

Nevertheless, whereas Keynes also calls the attention for the potential instability of conventions than merely their stability, Hayek tends to stress the stability and solidity of rules.

What is evident in Hayek’s account of rules is their “static” character, for it seems that rules exist and are important only to the extent that they are reproduced - they constitute merely a position of arrival, an “attractor”, so to speak. He does not account for the situation in which they may function as a point of departure, the resort to which is to engender transformation of a given state of affairs. This is partly the reason why we also need Schumpeter’s account in order to provide a dynamic theory of conventions, as I will show in chapter V.

This major concern with the stability of rules seems to stem from the fact that “Hayekian agents” live (and want to live forever) in a world of calmness. Life out of this
ordered world is "dangerous". They are highly ignorance-averse, in the sense that they are often searching for a safe shelter in the form rule-following behaviour. Rules exist because of a successful selective spontaneous process where actions in general converged through time in order to produce a reference point. Furthermore, Hayek's account of rules of conduct is mainly concerned to explain events in the realm of the actions of people in general in society. This is perhaps one of the reasons why the property of the stability of rules is so stressed.

On the other hand, "Keynesian agents" (entrepreneurs) live in a world permanently facing the unpredictability of many events, where turbulence is frequent: there is crisis, unemployment and dissatisfaction of expectations. Keynes's account refers to the typical decisions an entrepreneur has to make concerning his portfolio (investment and money), that is, in the context of the determinants of the "prospective yield of an asset" (Keynes, 1936, 163), where the time horizon is supposed to be longer, non-liquid commitments are stronger, and where knowledge of the future is supposed to be more uncertain. The more remote this future the higher the degree of uncertainty of our current knowledge. In such a context, people's opinions and evaluations about a convention (their "specific reasons to expect a change") may prevent them from following a convention (the convention is then perceived as "unstable"). Hence, the higher degree of instability of conventions in Keynes's account as compared to Hayek's view of rules.

Furthermore, the precariousness of conventions is also related to the consequences of "animal spirits", the need to act which drives the behaviour of some entrepreneurs and may produce innovation and transformation of known frameworks - the same type of behaviour of, for instance, a Schumpeterian entrepreneur.\[12\]

\[12\] I will discuss this point in more detail in the following chapter.
In sum, while Hayek is concerned in explaining the nature of rules Keynes provides some insights for the understanding of the conditions for changes in conventions. Hayek’s rules of conduct are there (preferably) to stay, since he emphasises more the property of stability of conventions (and the possible existence of regularities). Keynes’s conventions can be more ephemeral because our beliefs and confidence can change. Nevertheless, the resort to conventions and rules is an imperative to those living in a society where knowledge is fallible and contingent. In this respect, despite some differences of emphasis, both accounts are analogous in many important respects and provide useful and constructive starting points for a broader discussion of conventions.

IV.5) Some Useful Definitions

Before proceeding in my analysis of conventions, let me attempt in this section to differentiate the meaning of some terms. Although sometimes the terms are used interchangeably, I will try to differentiate conventions (and conventional behaviour) from customs, habits and norms, for the sake of precision.¹³

Customs provide usual ways of behaving or of doing something. Customs engender established patterns of belief and are associated to the routines of daily life as well as the distinctive features which separate one culture from another. It leads to regularities in the actions of people and it is seen as possessing a “natural” character. It induces forms of repeated action, in which past performance affords the justification for present repetition, by displaying “what is done”. In contrast to law, it does not need to be enforced by the State or

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¹³ See Rutherford (1994, 52-55) for a slightly different categorisation.
by legal penalties, allowing, therefore, for some freedom of action (but custom moulds the setting from which law may originate, as the “crystallisation of settled expectations”). In contrast to habit, it is something which conscious persons engage in. To do what is regarded “customary” is to behave intentionally, for a specific reason, on the grounds that this is what is done. In this sense, custom goes beyond the scope of mere individual action towards an implied social context (Scruton, 1996).

A custom derives legitimacy by reference to tradition. People in society acknowledge the importance of certain practices and are bound by them. We may refer then to the bidding qualities of custom. Customs insert elements of regularity, predictability and conformity into social relationships. To break a custom may be forbidden and raise sanctions. This raises the question of the coercive character of custom.

Habits, by their turn, engender settled ways of behaving which are done frequently and almost without thinking; it is something that is, so to speak, “hard to give up”. A habitual behaviour is reflex behaviour, which takes place mechanically when the situation demands. It does not necessarily require full deliberation. It is a “self-actuating disposition” for action grounded on past experience.\(^\text{14}\)

On the other hand, norms are generally taken as “standards”, types considered to be representative of a group. Also, norms produce established, expected and self-enforcing forms of social behaviour. Social norms exist independently of individuals and exercise a coercive influence on them. Breaches of norms can result in the imposition of sanctions, in the form of criticism or ostracism. Social norms indicate to individuals what ought to happen.

Norms are prescriptive procedures serving as common guidelines for social action. The adherence to these “common expectations” may result in regularities in human behaviour. Since the term refers to social expectations about “correct” behaviour, norms imply the presence of legitimacy, consent and prescription. While deviation from norms is punished by sanctions, norms are acquired by socialisation and internalisation.\(^\text{15}\)

In view of these considerations, depending on the aspect being emphasised, conventions may resemble some of the above. For instance, conventions may have a normative character when they acquire an obligatory command over individuals. If conventions provide social bonds, they are also a constraint, a position well expressed in Hayek’s account of the “negative character” of a rule. Conventions are like norms when they compel people to follow particular practices or contemplate particular behaviours whose disobedience is subject to sanction or disapproval.\(^\text{16}\) However, at the same time, conventions are flexible enough to allow for the exercise of freedom without which creativity and innovation would be hampered.

Conventions operate as a motivation in the mind of someone who does not need to explain their functioning (“tacit knowledge”). Conventions have an “informational-support function” (Langlois, 1986, 237). They may change in due time by the successful operation of unconventional behaviour (in contrast to habit or custom, which are less malleable or more enduring).

\(^\text{15}\) Internalisation refers to the process by which an individual learns and accepts as binding the social values and norms of conduct relevant to his or her group or society. Socialisation implies the process whereby people learn to conform to social norms, a process which makes possible an enduring society and the transmission of its culture between generations. Notice that socialisation influences but does not completely determine people’s beliefs and actions.

\(^\text{16}\) This kind of circumstantial resemblance led Lewis to state that “[a]ny convention is, by definition, a norm which there is some presumption that one ought to conform to.... [...] It is also, by definition, a socially enforced norm: one is expected to conform, and failure to conform tends to evoke unfavorable responses from others” (Lewis, 1969, 99). See also Sugden (1989, 96).
Conventions are like systems of communication, sustained by general tacit agreement\textsuperscript{17}, sometimes explicit, sometimes implicit, adopted by agents in order to communicate their needs, and facilitate the achievement of their purposes as easily and quickly as possible.

Conventions are received and acted upon. They are prior to (condition for) actions, and are reproduced through (outcome of) action. In contrast to this view, notice that in the rational choice approach actions are always and exclusively supposed to be prior to conventions.\textsuperscript{18}

When one says conventional one is also implying lack of originality. In contrast, non-conventional implies creation and the possibility of originating something new. But the unconventional would not have existence without the conventional as the frame of reference for action.

At the beginning of this chapter, I argued that socio-economic structures and socio-economic actions are two different phenomena. Structures make human action possible (but can also be modified by them). Conventions (rules, routines) are the structural conditions which facilitate behaviour and are reproduced through actions. Thus, I make a clear separation between conventions (and routines) and conventional (or routinised) behaviour. Conventional behaviour draw upon and reproduce conventions; although dependent, each cannot be reduced to the other.

\textsuperscript{17} "In practice we have tacitly agreed, as a rule, to fall back on what is, in truth, a convention" (Keynes, 1936, 152).

\textsuperscript{18} In chapter VI, I will explore the idea of rationality based on conventions and contrast it with rationality based on the constrained optimisation rule.
Having said that, let me now discuss some aspects of conventional behaviour, that is, of action which by resorting to (previous) conventions reproduce them.

IV.6) Conventional Behaviour

The purpose of this section is to stress aspects of convention-following behaviour. It also aims to illustrate that the majority of the discussions of conventions fail to make the separation between conventions and conventional behaviour.

To fall back on conventions and rules implies a search for predictable behaviour. Knowledge of event regularities brings a feeling of security for agents in processes of decision-making in the face of uncertainty (see Heiner, 1983). They can decide based on the belief that they can find in the existing set of conventions a form of knowledge which, although incomplete, can justifiably help them. The knowledge of familiar conventions allows for action in the face of ignorance without having to execute complicated calculations.

Conventions are the result of an evolving "spontaneous order" which emerged from the repeated application of specific behaviour which proved to be "versatile and popular" by common experience (Sugden, 1989). As interactions tend to increase over time, a mutual understanding about what is the most adequate way of doing things emerges. This collective involvement engenders useful information concerning preferred courses of action and enable agents to continue to perform their current and future activities.

As mentioned before, an important element characterising convention-following behaviour is conformity.\textsuperscript{19} Agents know by experience that it is more convenient to follow

\textsuperscript{19} "[C]onventional behaviour suggests a process of convergence where agents look at what others are doing. The more who congregate in a vicinity, the more who join them" (Littleboy, 1990, 33).
identifiable and reliable conventions and to conform to them. Conformity is the line of least resistance and may help to avoid losses. As Lewis remarks, "a convention is a regularity of behaviour which holds as if in consequence of an agreement so to behave, by virtue of a general preference for general conformity to that regularity" (Lewis, 1969, 88). Moreover, conformity is a practice in which reciprocity is expected: "In the case of a genuine convention ... each wants to conform if the others do, and each wants the others to conform if he does" (Lewis, 1969, 120).

An agent who conforms to convention acts in the belief that others expect him or her to behave in this specified manner and also under the expectation that others will do their part. Each individual wants to conform conditionally upon conformity by the others.\(^{20}\) In this sense, conventions provide systems of mutual expectations.

Once a regularity is perceived, it is perfectly reasonable for agents to extrapolate it into the near future. As Keynes states, we act as if “the future will resemble the past”. Familiarity with regularities enables people to expect that analogous new cases will produce the same kind of behaviour or event regularity in the future. Each new behaviour in conformity to the regularity reinforces people’s perceptions of general similarity of actions. Expectations of future conformity of actions is a motivation to continue to conform, and so on. Once the process begins we may achieve a potentially stable self-perpetuating system of expectations which continues indefinitely, “unless and until something new and relevant comes into the picture” (Keynes, 1937a, 114). In that case, then, people will be experiencing a situation of stability and continuity.

\(^{20}\) See also Lewis (1969, 41-42).
The following general definition of convention shows that some authors seem to have in mind this idea of (systematic) stability as well as that conventions and conventional behaviour are the same thing:

A regularity $R$ in the behaviour of members of a population $P$ when they are agents in a recurrent situation $S$ is a convention if and only if it is true that, and it is common knowledge in $P$ that, in almost any instance of $S$ among members of $P$,

1. almost everyone conforms to $R$;
2. almost everyone expects almost everyone else to conform to $R$;
3. almost everyone has approximately the same preferences regarding all possible combinations of actions;
4. almost everyone prefers that any one more conform to $R$, on condition that almost everyone conform to $R$;
5. almost everyone would prefer that any one more conform to $R'$, on condition that almost everyone conform to $R'$,

where $R'$ is some possible regularity in the behaviour of members of $P$ in $S$, such that almost no one in almost any instance of $S$ among members of $P$ could conform both to $R'$ and to $R$ (Lewis, 1969, 78).

Note that this definition provides some important features of conventional behaviour:

a) it is a regularity;
b) it is common knowledge;
c) it is actual and expected conformity of behaviour;
d) it is discouragement to non-conformist behaviour.

However, the above definition of conventions is narrow, for it does not make the differentiation I am pursuing here. Furthermore, it does not emphasise other important properties of a convention, namely, its precariousness, as stressed by Keynes, its
intersubjective character, as stressed by Keynes and Hayek, and the possibility of a dynamic process derived from endogenous changes in a set of conventions. Non-conformist behaviour does take place in a capitalist economy, allowing, therefore, for the emergence of a dynamics of conventions. As Davis states,

a convention is a form of practical interaction between individuals, where average opinion exercises regulative effects on individual opinion while still accommodating judgment and action that departs from this central reference. It can be seen that such a structure is normative in the most general sense that it imposes an orientation upon individual behaviour without at the same time making that orientation binding. This is also reflected in the fact that the content of ruling conventions typically changes over time. ... Convention seen from this perspective is a dynamical structure. In essence, the competing rationales which average and individual expectation offer guarantee regular change in the content of any convention (Davis, 1994, 129; see also Davis, 1997).

Lewis’s definition is also narrow in the sense that it does not account for the properties of differentiability and rationality of conventions. In the next section, I propose an account for these aspects of conventions.

IV.7) Properties of Conventions

It is time now to raise some points related to the formation of a convention in terms of its basic properties, namely,

a) stability,

b) intersubjectivity,

21 In the next chapter, I will provide a broader approach in which dynamic aspects are brought into the analysis.
c) precariousness,
d) dynamics,
e) differentiability,
f) rationality.

IV.7.a) Stability

Conventions are stable because as frames of reference for action they entail reliance on its durability in the long run, "unless and until something new and relevant comes into picture". As Keynes emphasises, the state of confidence in a convention is the crucial factor which supports its temporal continuity and provides reference for conduct. Confidence, on the other hand, is dependent on the degree of uncertainty that decision-makers recognise (Dow, 1995, 117). Thus, a convention can be a "safe" place of arrival, in the sea of complexity and uncertainty, provided that trust and the possibility of quickly adapting to new information are at work.\(^{22}\)

Conventions allow for the reinforcement of the desirable aspects of continuity of a given situation.\(^{23}\) According to Keynes,

\[\text{\"Investors have definite knowledge that, by following conventions, they allow their investments to become reasonably 'safe' over a succession of short periods\" (Lawson, 1993, 196).}\]

\[\text{\"In estimating sales, incomes, employment, and expenditures, decision makers on all sides of the market may expect the previously prevailing conditions to continue, bringing to concrete expression Keynes's reliance on 'conventions', although ... conventions may change rapidly and with minimal warning\" (Vickers, 1978, 123). Or further: "Stable conventions reduce the likelihood of unsettling surprise. Conventions can supply fences, albeit rickety ones which can collapse under pressure, within which activity is perceived to be safe. .... [C]onventions are a response to living in an uncertain world, and they tend to foster stability within reassuringly familiar environments\" (Littleboy, 1990, 32, 269).}\]
only risk he runs is that of a genuine change in the news over the near future, as to the likelihood of which he can attempt to form his own judgment, and which is unlikely to be very large. For, assuming that the convention holds good, it is only these changes which can affect the value of his investment, and he need not lose his sleep merely because he has not any notion what his investment will be worth ten years hence. Thus investment becomes reasonably 'safe' for the individual investor over short periods, and hence over a succession of short periods however many, if he can fairly rely on there being no breakdown in the convention and on his therefore having an opportunity to revise his judgment and change his investment, before there has been time for much to happen. Investments which are 'fixed' for the community are thus made 'liquid' for the individual (Keynes, 1936, 152-153).

For being behaviour which follows the majority or the average, conventional behaviour may assure a relative stability in those cases where erratic individual movements threaten to destroy the flimsy stability achieved. Even if an individual agent meets an uncertain situation, stability can arise at the aggregate level, if conventions are widely espoused (Littleboy, 1990, 299).

Conventions are a source of order to the system because they provide the conditions for a situation in which there is "suspension of doubt" (Rogers, 1989, 17). To rely on conventions is to put temporarily aside how ignorant we are of many current and future events. As Shackle remarks,

[t]he stability of the system, while it lasts, rests upon a convention: the tacit general agreement to suppose it stable. This stability, once doubted, is destroyed, and cascading disorder must intervene before the landslide grounds in a new fortuitous position (Shackle, 1967, 247).

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24 "Conventions may change, and they may change quite suddenly, but they nevertheless exist at points in time, and they do lend an orderedness to the economic patterns of things" (Vickers, 1978, 28). Or, for a more specific context: "An essential component of monetary policy in a bank economy system is the establishment of credible conventions in terms of which the centrifugal forces of inelastic expectations can ensure the necessary stability of the system" (Rogers, 1989, 17).
The study of conventions can explain why a system can depart from an initial position of relative stability to one of a more unstable character. Furthermore, it can also explain how it is possible for a system to accommodate, after some period of disordered trajectory, at another situation of relative stability. It is the existence of conventions underlying the propensity to consume, decisions to invest, the longing to hold money and the claims in terms of money wage contracts which together might explain stability in a system that is patently far removed from a position of a Walrasian full employment equilibrium (Littleboy, 1990, 32).

Adding to its stable character, conventions are in some sense a vehicle for knowledge adjustment. The fact that agents resort to conventions when they make decisions in conditions of uncertainty allows for the possibility of error correction. The existence of an average or majority opinion as central reference for individual behaviour is an important source of assessment of the validity of an agent previous, subjective expectations. In this sense, a convention is an objective standard for direction which enables individuals either to revise their previous judgements in the light of realised results or rather keep the same course of action if it reveals to be successful through time. Thus, this modal or average frame of reference has a stabilising effect on the system.

IV.7.b) Intersubjectivity

Conventions entail complex interactions. When an agent takes a decision he or she must take into account that there are other agents taking decisions which will influence, to a higher or lower degree, the results of his or her action. Agents' implementations of plans affect and are affected by other agents' plans. Whenever an agent makes a decision, it is sensible to
consider the presence of others in a common environment. Expectations of rewards, as well as penalties, are always present in this game. My current plans are influenced by the results of others' past actions and will affect the ensuing future actions of other people. My future decisions will also be influenced by the immediate and remote interactions through space and time of the decisions of the people in the environment within which I take my decisions and execute my plans. The entrepreneur needs to be aware of the actions of other agents in his or her market, such as trade unions, suppliers, potential and actual competitors, State regulations, and so on. As I stressed in chapter I, isolation of actions is an unrealistic abstraction.

Conventions are procedures facilitating “practical interaction” among agents. This aspect of conventions reveals that they embody collective knowledge. This form of knowledge is acquired and communicated because people are involved in common praxes. As Lawson points out, “an important way in which people become knowledgeable about social practices such as conventions is through direct acquaintance with them; and this means through partaking in social practices. In this way people obtain direct knowledge of ways of getting by. ... [A]lthough people face uncertainty in the sense of being unable to ‘predict’ the future outcomes of all possible current actions, they possess extensive knowledge of current societal practices, obtained through their own involvement, which can provide the basis for determining how to get by” (Lawson, 1985, 916-917).

If conventions produce a form of “social activity” (Davis, 1994, 96), then the emphasis has to be on trust on group convention rather than individual convention. Conventions have the feature of “on-going systems of understanding” which relies on an “interpersonal exchange of thinking about proper action” (Davis, 1994, 105). This approach applies as much for Keynes (Dow, 1995, 119) as for Hayek.
Conventions provide a plurality of different individual beliefs - "a structure of expectations, of diverse opinion" (Davis, 1994, 129) - to which conduct conforms and draws upon, always germinated in a particular historical setting. They are the central frame of reference around which interdependent behaviour tends to converge; they might be regarded, so to speak, as the governing "magnetic pole" of an economy. To follow conventions does not imply that there is absolute uniformity of actions or that expectations are homogeneously espoused. Within orderly restrictions variety has its place.

IV.7.c) Precariousness

The precariousness of a convention springs from a weakening of people’s confidence which might lead to opinions, judgements and evaluations expressing distrust in the convention. Thus, Keynes is correct when he emphasises this aspect of the volatility of our knowledge of conventions, although he also recognises the importance of the stability of conventions for agents, mainly attached to the "state of confidence".25

The quality of precariousness of a convention is directly related to the emergence of novelty, which, by its turn, is directly related to the undertaking of non-conventional behaviour. I will address this aspect in more detail in the next chapter.

Ruptures in conventions may create uncertainty. Agents may react erratically and regularities prove to be fragile and illusory. Expectations, which are normally inelastic when a conventions hold, become elastic when conventions break down. Thus, there is an indirect

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25 A convention “will be compatible with a considerable measure of continuity and stability in our affairs, so long as we can rely on the maintenance of the convention” (Keynes, 1936, 152). See also Lawson (1985, 920-921).
relationship between the durability of a convention and the degree of success of an innovation: the higher the latter the lower the former.

On the other hand, if fractures in the set of known conventions increase uncertainty and endanger sentiments of predictability, it may create opportunities. This is why “deviant” behaviours are prospected for. The bonus of breaking a convention is the possibility of profiting from a transient situation whose basic understanding and prospects will not be available to others for a certain time.

IV.7.d) Dynamics

Convention are dynamic structures in the sense that they are subject to change. As I pointed out above, if it is a place of arrival, it is also a point of departure. For being based on an average or majority opinion, a convention carries the seeds of its own destruction, for there will always be people who are right and those who make mistakes. Dispersion is inherent in this situation. Although conventional behaviour is the expression of a conformity of behaviour, it cannot hide the occurrence of informational heterogeneity and diversity of actions.

There may always be somebody particularly more well informed than others who sooner or later will make use of a better information and benefit from it. Some individuals may possess unique information so that different prospects other than following a established convention may impel to a distinct course of action. The acquisition of “special knowledge of the circumstances of the fleeting moment not known to others” (Hayek, 1945, 522) is one of the routes to improve positions.

Innovation is the outcome of people undertaking non-conventional behaviour. If it is successful, it will bring structural change and the need to learn and adapt to the new context.
But, innovation is possible because one takes into account the existing set of conventions as the starting point for that matter. Conventions are not only the structures which help to promote co-ordination of activities, but are also the basis for change. Change is the result of an escape from a convention, an act of defiance, in order to create something new. To explore a route beyond a given predictable situation is a refusal to reproduce those structures which may instead contribute to their transformation. This is how conventions undergo transformation. As I will propose in the next chapter, changes in conventions are generated in the active process of competition. The underlying idea is that conventions are not necessarily static, but are fluid, in a frequent process of negotiation and revision.

IV.7.e) Differentiability

This property implies that there are distinct types of conventions. Different groups of agents entertain conventions in a variety of ways, depending on their different context, positions or roles. Consequently, distinct convention-following behaviour may emerge in different markets or situations. There are several kinds of "representative agents" and the types of convention to which they observe and follow are distinct. Although we may account for conventions at a more general level, their operation at a more concrete level is context-related. For instance, conventions regarding prospective yields of an investment in fixed capital are different from conventions associated to liquidity preference or speculation. Conventions underlying price formation by firms or trade unions' demands in the labour market concerning money wage contracts are distinct.26 Thus, although there are common lines for the

26 In chapter VII, as an illustration of the operation of economic conventions, I will discuss conventions both in price formation and the labour market.
identification of conventions, its actual manifestation is related to many different types of convention-following actions. Conventions empowering the decisions people make operate in a given time and in a given society. They are the product of a historical process.

IV.7.f) Rationality

To fall back upon conventions is a form of rational behaviour, although different, of course, of the version of rationality proposed by the utilitarian account of conventional economics.

Notwithstanding the fact that complete knowledge of the future and of the many events taking place at the same time in each specific circumstance is generally unobtainable, "rational behaviour is still facilitated by the general and extensive knowledge of current ways of doing things that the individual obtains through being a member of, and by actively participating in, society" (Lawson, 1985, 920). Agents know that there are "current ways of doing things" and act upon this knowledge. This constitutes a form of rationality. Faced with the uncertainty and complexity of economic reality, agents fall back upon existing conventional procedures. Under their limited cognitive circumstances, this is the most

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27 "People have an extensive knowledge of social practices of the society in which they find themselves, and that an important way (although not the only way) in which such knowledge is obtained (or at least modified) is through 'direct acquaintance' or, equivalently, through their own participation. Indeed, to use such knowledge in order to 'get by' is to help constitute those very practices. It follows from this account that, since motives underlying behaviour will be conditioned by knowledge and interpretations obtained through such practices, different societies or forms of organisation of society will give rise to different motives and so behaviour" (Lawson, 1985, 917).

28 "Conventions themselves are part of the organic system of social relations, and in a sense represent a closer acquaintance with the underlying structure than can be obtained by other methods. Hence, it may be highly rational to follow conventions, except in a period of structural change. And thus it may also be argued that in an organic world, the conventions themselves are factors which reinforce the elements of social and economic stability" (Hamouda and Smithin, 1988, 163).
reasonable course of action to follow. Conventional behaviour stems from “rational or purpose-oriented behaviour under conditions of uncertainty where actions of others are observed” (Littleboy, 1990, 271).

The logical conclusion is the view that individuals who can always entertain an optimising behaviour, in the sense that they are apt to base their decisions on a precise calculation of the future net consequences of their current decisions, and also make impeccable comparisons, is less reasonable, perhaps even “irrational”, than the those who resort to the collective wisdom embodied in conventional social procedures and activities. As Keynes remarks:

Generally speaking, in making a decision we have before us a large number of alternatives, none of which is demonstrably more ‘rational’ than the others, in the sense that we can arrange in order of merit the sum aggregate of the benefits obtainable from the complete consequences of each. To avoid being in the position of Buridan’s ass, we fall back, therefore, and necessarily do so, on motives of another kind, which are not ‘rational’ in the sense of being concerned with the evaluation of consequences, but are decided by habit, instinct, preference, desire, will, etc. All this is as just true of the non-economic as of the economic man. But it may well be ... that when we remember all this, we have to abate somewhat from the traditional picture of the latter (Keynes, 1938 [1979], CW, Vol. XXIX, 294).
A more comprehensive account of rational behaviour implies to regard optimising behaviour as a very special case of rationality, which would be followed only in very specific circumstances, not a supreme or universally applicable rule of behaviour applied to any case. It is not necessarily the typical way people actually behave in either the most prosaic of the situations or the most complex of the contexts.\footnote{I will discuss rational behaviour, in the light of the ideas advanced in this work, in chapter VI.}

Having investigated the main elements for a theory of the genesis of conventions and rules I am now in the possession of the analytical structure for the formulation of an account of the dynamics of conventions in a capitalist economy. This is the purpose of the next chapter.
V - DYNAMICS OF CONVENTIONS

V.1) Introduction

This chapter investigates the dynamics of conventions under conditions of uncertainty. To accomplish this task, I account for the concepts of routines, competition and innovation and integrate and develop some ideas of Schumpeter, Hayek, Keynes and the so-called "evolutionary theory of economic change".

In the previous chapter, I stressed the role that conventions play in the stability of the economic system. However, if conventions are an "attractor", they are also a point of departure. This latter attribute opens a space for the understanding of the process of transformation of a given set of conventions driven basically by the effects of innovation. Changes in conventions (or routines) are the basis for economic change.

My starting point is to regard routines as the type of structures which firms resort to co-ordinate their activities in the market place. By being acted upon, routines facilitate problem-solving, storage and communication of knowledge. Routines are the microstructures which assist the reproduction and learning of specific capabilities. Routinised behaviour (or routinisation) is then the term for regular and (possibly) predictable pattern of behaviour of firms.

If routines are the structures which help to organise the functioning of firms in their specific environments, and by being systematically reproduced they provide stability and (to a certain extent) predictability to the system, then innovation (a form of non-conventional behaviour), whose activation may render a given set of routines obsolete, brings as a consequence the need for adaptation in a context now changed by the emergence of novelty.
and increased uncertainty. In this sense, innovation, by bringing the unexpected, is destabilising.

The fact that innovation is introduced and some firms benefit from it in the form of supernormal profits, or improvement of relative positions, implies that in order to survive the rest are led to imitate their successful rivals. A consequence of successful innovative endeavours is that they bring asymmetries in the form of innovational leads and adaptational lags.

Innovations are the result *par excellence* of the actual and potential competitive struggle which firms are compelled to face with each other in their daily operations. Firms check the suitability of their existing set of routines through the process of competition and may discover new ways of doing things, as new information communicates the possibility of opportunities not yet known by their competitors.

In the evolutionary approach pursued here, capitalism is seen as an engine of progressive change. In Chapter I, I argued that capitalism is a dynamic complex system in the sense that it has many highly differentiated and tightly interdependent subsystems evolving at different speeds. This system is heavily based on structures or procedures for action such as conventions, rules, routines etc. which promotes co-ordination of the actions of economic agents such as firms.

By investigating the dynamics of conventions I am interested in the conception of dynamics as the study of behaviour of variables and parameters through time, the study of the causes of motion and irreversible change. For being an analysis inspired by the notion of market processes, there is no preoccupation as to the attainment by the system of a position of equilibrium.
V.2) The Conceptual Framework

The basic notions which will assist the investigation of changes in conventions are the following: routines, as I mentioned above, as the specific form conventions take, that is, they are the procedures firms draw upon to perform their activities\(^1\); innovation, as non-conventional, experimental behaviour which brings novelty to the system and creates supernormal profits; and competition, as the interactive process which leads to the discovery of new opportunities and the inducement to innovate (or imitate) by firms.\(^2\)

Firms have a set of relatively enduring structures (conventions, routines, relations, powers etc.). They resort to these structures and are therefore enabled to act. There is no reason why behaviour should be regular and predictable, although, depending on the circumstances, this can happen. The structures enable firms to act, but they do not determine how they will act; one cannot typically know this \textit{a priori}. Firms’ actual behaviour is not regular nor predictable - although one can explain the basis for action. Relatively enduring \textit{activity}, then, is located in the structures (routines) and not in the behaviour, actions or events that ensue.

The socio-economic system is characterised by complexity, non-ergodicity, uncertainty, creativity, and so on, which prevent socio-economic action to be regular or

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\(^1\) "[T]he behavior of firms can be explained by the routines that they employ. Knowledge of the routines is the heart of understanding behavior. Modeling the firm means modeling the routines and how they change over time" (Nelson and Winter, 1982, 128).

\(^2\) A firm, as I understand it, is a complex system whose purpose is to mobilise and co-ordinate resources as efficiently as possible in order to achieve some specific context-related ends, such as, for instance, growth or a stable market share, defined by its capabilities and experience. For a similar account, in some respects, see Loasby (1991, p. 59ff.). I also define a firm as a network of conventions and routines.
predictable. At best, one would expect to find some form of systematic, quasi-regular behaviour (not enough to base predictions upon). What might cause such quasi-regular behaviour is those structures such as conventions, rules or routines.

The features of the environment I am concerned in describing are the following. It is evolutionary: change arises through selection processes among heterogeneous groups of individuals competing which each other, making mistakes and learning over time, but never instantaneously. It is irreversible: past experiences partly shape the course of events in the present. It is self-organised: an evolved economic order is achieved as the unintended result of a set of distinct influences, such as, for instance, technological improvements, economic activities such as investment, pricing, consumption, wage bargain etc., and the search for stable institutions to inform expectations and actions.³

Firms are institutions whose behaviour is governed by the search of profits - not necessarily optimisation over well-defined and known choice sets and their consequences - attached to strategies as to their desired present and future growth, and by confronting actual and potential competitors in routine-guided processes. In an evolving, interactive environment, there is a tendency for the most lucrative firms to compel the less profitable ones out of the market. The market defines which firms are rewarded and which ones are unprofitable. This is the operation of “the economic analogue of natural selection” (Nelson and Winter, 1982, 4).

The term evolutionary here consists of a regard with “processes of long-term and progressive change” (Nelson and Winter, 1982, 10). The study of evolutionary processes is concerned with “the origins of qualitative change in things, and how the ‘parts’ of a system

³ See Dosi and Orsenigo (1988, 21).
came into being, and are maintained" (Allen, 1988, 97). This implies that the regularities which we observe in the present are not only the result of understandable dynamic processes produced from known conjectured conditions in the past, but they also represent specific features of the current stage, but from which a quite different future may emerge by those same dynamic processes. Evolution expresses the successful results of non-average values of variables and parameters. It is a continuing process in which a process of selection sanctions those firms which preserve the skill to learn from new circumstances.

So far, I have stressed the facts of uncertainty and complexity are the important structural cognitive constraints to the use of knowledge required in decision-making processes. But, if a context with such characteristics may threaten, it may also bring motivation for action. Uncertainty may bring doubt but also new opportunities. This dual aspect is a pervasive aspect of reality.

Static approaches contemplate routines only from the point of view of their reproduction. However, a dynamic analysis must regard their evolution and change via innovation. New, unexpected events may modify a given set of routines. If the static aspect is distinguished by reproduction, the dynamic property is perceived by "re-creation" of the system of routines. Innovation, then, is an activity which requires the resort to routines with the purpose of benefiting from their breaking.

As I remarked in the previous chapter, an aspect of conventional behaviour is that it is conformative. But actions does not necessarily need always to conform. People normally conform but they may decide depart from the familiar conventions. In the latter case, non-

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4 See Loasby (1976, 162-164).
conventional behaviour may engender successful innovation and bring disruptive consequences. But a condition for that is their belief that conventions typically support behaviour.

Economic systems are subject to an endless number of conflicts and unpredictable situations; the result may be that people will be facing "moments of crisis situations or structural breaks when existing conventions or social practices are disrupted" (Lawson, 1985, 921). These "structural breaks" are what Schumpeter (1943, 83) calls "the process of creative destruction", and its mechanisms will be approached later.

V.3) Conventions as Routines

Let me look more deeply at the features of routines (and routinised activities). Firms’ behaviour is informed much more by strategic orientations stemming from firms’ past experiences in a given market than by the outcome of a detailed enquiry of the remote net consequences of current optimal decisions extending into the future. Firms make use of a set of heuristics in order to perform their activities. Operating in an environment characterised by uncertainty, complexity, novelty etc., firms are faced with both the legacy of acquired traits and the unexpected emergence of change and diversity.

Nelson and Winter define routines in the following manner:

Our general term for all regular and predictable behavioral patterns of firms is "routine". We use this term to include characteristics of the firms that range from well-specified technical routines for producing things, through procedures for hiring and firing, ordering new inventory, or stepping up production of items in high demand, to policies regarding investment, research and development (R&D), or advertising, and business strategies about product diversification and overseas investment. In our evolutionary theory, these routines play the role that genes play in biological evolutionary theory. They are a persistent feature of the organism and determine its
possible behavior (though *actual* behavior is determined also by the environment); they
are heritable in the sense that tomorrow’s organisms generated from today’s (for
example, by building a new plant) have many of the same characteristics, and they are
selectable in the sense that organisms with certain routines may do better than others,
and, if so, their relative importance in the population (industry) is augmented over time
(Nelson and Winter, 1982, 14).

Systematic routinisation of behaviour engenders the institution of settled practices
which are discernibly “the same” over continuing periods of time. Routinisation is then the
term used to allude to “a repetitive pattern of activity in an entire organisation, to an individual
skill, or ... to the smooth uneventful effectiveness of such an organizational or individual
performance” (Nelson and Winter, 1982, 97).

Routines provide an organisational memory for firms; by following them firms have a
mode of information storage quickly and easily accessible for their many contingent purposes.
The routinisation of activity forms one of the most important ways of storing the firm’s
specific operational knowledge, for “organizations *remember* by *doing*” (Nelson and Winter,
1982, 99). It is also the channel which helps to co-ordinate firms’ ability to devise their plans
and performance. By performing routinely firms (re)create their idiosyncratic locus of
operational knowledge:

It is not just that routinization reflects the achievement of coordination and the
establishment of an organizational memory that sustains such coordination. It is that
coordination is preserved, and organizational memory refreshed, by exercise - just as,
and partly because, individual skills are maintained by being exercised (Nelson and
Routine-following action and *tacit knowledge* are closely related. This idea was discussed in the previous chapter, but it is worthwhile to approach it again. The idea of tacit knowledge means that there is a type of knowledge which in general cannot be completely articulated - "we know more than we can tell". Knowing "how" does not imply knowing "that". Mastery of a skill does not necessarily entail a proper reasoned perception of the essence of the skill. A significant part of the operational knowledge acted upon by firms remains tacit because this is knowledge which most of the times is not fully articulated.

Firms share with each other memories of common past experiences and these experiences shape a quite extraordinarily detailed and specific system of communication which underlies routine performance. Routinisation of activities inside a firm may alleviate the constraints imposed by human memory limitations.

Routinised behaviour might also be seen as truce, target and skill. As truce, it implies the recognition of actual and potential conflicts inside firms. Some forms of routinised actions may be restricted to excessively narrow domains as the outcome of "vested interests". Adaptations which may seem trivial to an external observer may be restrained because they upset the inner political balance of forces in a firm. In some circumstances, this brings inertia, even in those situations in which adjustment is strongly required. In other words, "fear of

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5 "To be able to do something, and at the same time be unable to explain how it is done, is more than a logical possibility - it is a common situation" (Nelson and Winter, 1982, 76). See chapter IV.

6 "Essential coordinating information is stored in the routine functioning of the organization and 'remembered by doing'. As in the case of individual skills, the specificity of the behavior involved is simply the obverse of its effectiveness; also, much of the knowledge that underlies the effective performance is tacit knowledge of the organization, not consciously known or articulable by anyone in particular" (Nelson and Winter, 1982, 134).

breaking the truce is, in general, a powerful force tending to hold organizations on the path of relatively inflexible routine" (Nelson and Winter, 1982, 112).

As target, the routine acquires the attribute of “a norm ... and managers concern themselves with trying to deal with actual or threatened disruptions of the routine. That is, they try to keep the routine under control” (Nelson and Winter, 1982, 112). The search for control of the many factors which affect firms’ life is a normal activity. In the face of uncertainty, the higher the predictability of actions the better the conditions for survival and growth. However, variation is not always detrimental. Conservation of prevailing routines is typically an operational target, but it is not the utmost goal. Revisions of routines which consist of improvements in the performance of firm’s capacity are without any doubt desirable. The fact that firms necessitate routinised forms of resistance to unwelcome changes in known routines thus becomes yet another reason why behaviour is so heavily influenced by prevailing routines. This is what one might call “the status quo of a functioning routine” (Nelson and Winter, 1982, 117).

As the skills of firms, routinisation of activities implies the consolidation of a number of constituent sub-routinisations, also additionally reducible, and is normally achieved without requiring the close attention of top management. Such a decentralisation in firms’ typical practices corresponds to the skilled individual’s ability to execute usual tasks without minding the minutiae of the operations performed. Routinised practices may embrace considerable straight interactions with the firm’s environment and entertain a set of choices that are conditional both upon the state of the environment and the situation of the firm itself, but these choices entail no process of severe co-ordination from above by the managers. If there is the need of a fortuitous intervention from the part of top management in the simplest level of
operation, then it may be a sign of the existence of an effort to adjust routines or even of serious complications with the operation of current routines - as one might state, by analogy, that in the case of individual skills, a consciousness of detail and attempts at articulation are symptoms of new learning or of difficulty in operating typically.

As I proposed in chapter IV, an important aspect of conventions is proceed as though “the existing state of affairs will continue indefinitely, except in so far as we have specific reasons to expect a change”. Thus, firms are presumed to act in the future based on the routines they used in the past. However, this does not imply to assert that their decisions will represent an exact reproduction of routines over time, for firms’ routines are linked in uncertain and complex ways to communication from inside and from the environment. Knowledge changes and may cause changes in routines. Thus, to state that firms decide in terms of a conscious and optimal selection from an ample list of options drawn from a knowable “state of nature” is not the best of the explanations. On the contrary, such a list is not broad enough, but restricted and idiosyncratic. If it exists, the process of choice is grounded on firms’ routines.

Change is normally absorbed through the path of least resistance. Time is needed to adjust to the new, variable according to context. Although routinised behaviour may lead to imitation, imitation of the routines of another firm is not easy nor sometimes can it be entirely achieved. Nevertheless, imitation, though not without costs and normally imperfect from the point of view of the firm, is the important channel throughout which new routines reorganise parts of the whole activity of the system (Nelson and Winter, 1982, 135).

External and internal conditions, in particular the firm’s capital stock, affect routines. Expansion or contraction of firms is related to the expected profits that can be made if firms
move from or towards routines. In addition, firms may also attempt to devise procedures and activities for continuously hunting for better strategies. Routines are a legacy from firms’ past experience and, therefore, they are appropriate, at best, to the sort of situations in which firms customarily finds themselves. Because change can be frequent, some routines may become “unresponsive, or inappropriate, to novel situations or situations encountered irregularly”. Firms expand or contract in reaction to disturbances, “with no presumption that the industry is ‘near’ equilibrium. Innovation is treated as stochastic and as variable across firms” (Nelson and Winter, 1982, 165-166).

In sum, the present approach is consistent with the ideas and insights introduced in the previous parts of this work. It is broad enough to encompass the narrow view which claims that firms’ actions are always based on optimisation. The complicated problem-solving efforts of firms are based on the activation of (previously given) routines. If systematically and continuously acting upon such routines, firms may be led to believe that stability and permanence are the transient features of reality and, therefore, some scope is allowed for firms to base their predictions on the existence of regularities (e.g., persistent success with their previous problem-solving efforts). However, the patterning of the problem-solving activity is exhibited only vaguely in the immediate results of that activity and even less clearly in the changes in the behaviour of firms that these problem solutions may activate.

V.4) Innovation as Non-Conventional Behaviour

The purpose of this section is to analyse why conventions change, the factors which cause routines to be broken down. The fact that behaviour does depart from routines is at the
core of a dynamic economy. I depict this process as the result of innovation which disturbs the stability of settled routines.

Successful innovation is the creation of novelty capable of affecting the system in relevant ways. It can be either incremental or radical, and implies the introduction of qualitative change into the system. The analysis of change concerns not only changes in production processes and in products but also changes in behaviours leading to new discoveries and the possibility of their economic exploitation. We can also mention changes in the economic structure and in its performance as well as in the institutions underlying economies and societies.*

By innovation one should understand “change in routine”. The concepts of innovation and routine are usually and suitably considered as opposed ideas (Nelson and Winter, 1982, 128-129). Put in another way, I can only behave unconventionally if most of the people behave conventionally:

Individuals and/or organisations deviate from the ‘normal way’ of doing things; adjust to ‘external’ (environmental) changes; respond in ‘creative’, new and sometimes unexpected ways to competitive or conflictual changes; or explore what they believe to be (rightly or wrongly) unexploited opportunities (Dosi and Orsenigo, 1988, 13).

[C]ertain kinds of ‘fluctuations’ and ‘non-average’ behaviour which emerge within a relatively stable structure (stable in terms of basic technologies, institutions, rules of interaction and expectation formation, etc.), slowly or suddenly, with or without exogenous shocks, become self-reinforcing and destabilise the structure itself (they produce ‘qualitative’, ‘morphological’ changes) (Dosi and Orsenigo, 1988, 31).

Or, in the same sense:

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* See Dosi and Orsenigo (1988, 13) and Possas (1987, 204).
Innovations always change the systems into which they are introduced. They disrupt established theories and policies, and violate the principles on which those systems have been decomposed into quasi-isolated sub-systems. They require the creation of new theories and policies, and new schemes of decomposition. They begin by changing the firm which introduces them (unless they are incorporated into a new firm), and may fail if the firm’s theories and policies are recalcitrant (Loasby, 1991, 93).

In an essential sense, innovation concerns the search for, and the discovery, experimentation, development, imitation, and adoption of new products, new production processes and new organisational set-ups. Almost by definition, what is searched for cannot be known with any precision before the activity itself of search and experimentation, so that the technical (and, even more so, commercial) outcomes of innovative efforts can hardly be known *ex ante* (Dosi, 1988, 222).

Innovation affects a system irreversibly, making it more dynamic. It will also face more uncertainty. Innovation produces uncertainty for it brings novelty and “unknowledge” as to the future course of events. After a period of time, diffusion of innovation takes place as well as the corresponding settlement of a new set of routines. Diffusion of innovation in the system through imitation is then the main channel throughout which a new behaviour is learned and routinised.

One way in which firms’ operational routinised behaviour can contribute to the advent of innovation is that practical considerations arise in the form of anomalies concerning prevailing practices. Thus, if routinisation of activities is a guide to problem-solving activity,

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9 "The fundamental uncertainty surrounding innovative activity is uncertainty about its results" (Nelson and Winter, 1982, 132). Or, further: “innovation involves a fundamental element of uncertainty, which is not simply lack of all the relevant information about the occurrence of known events but, more fundamentally, entails also (a) the existence of techno-economic problems whose solution procedures are unknown, ... and (b) the impossibility of precisely tracing consequences to actions” (Dosi, 1988, 222).
then innovations are in many respects the solution of puzzles which prevailing practices cannot handle properly.\(^{10}\)

The implication of innovation for the dynamics of a capitalist economy is directly related to the possibility of successfully doing things in a new way. This accounts for the evolutionary feature of capitalism.\(^{11}\) A capitalist economy is, as Schumpeter stresses,

by nature a form or method of economic change and not only never is but never can be stationary. And this evolutionary characteristic of the capitalist process is not merely due to the fact that economic life goes on in a social and natural environment which changes and by its change alters the data of economic action. ... The fundamental impulse that acts and keeps the capitalist engine in motion comes from the new consumers’ goods, the new methods of production or transportation, the new markets, the new forms of organization that capitalist enterprise creates. ... This process of Creative Destruction is the essential fact about capitalism. It is what capitalism consists in and what every capitalist concern has got to live in (Schumpeter, 1943, 82-83).

The advent of the new “revolutionizes the economic structure from within” (Schumpeter, 1943, 83), creating a new state of affairs and demolishing the old one. From the point of view of an analysis which emphasises endogenous change, the attention has to concentrate not only on “how capitalism administers existing structures” but rather on “how it creates and destroys them” (Schumpeter, 1942, 84). Put in another way, non-conventional

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\(^{10}\) “Problem-solving efforts that are initiated with the existing routine as a target may lead to innovation instead” (Nelson and Winter, 1982, 130).

\(^{11}\) “[I]n dealing with capitalism we are dealing with an evolutionary process” (Schumpeter, 1943, 82). Note that, in the same passage, Schumpeter acknowledges that Marx was one of the few authors who analysed capitalism with this aspect in mind. See also chapter III of Schumpeter (1943) - “Marx the Economist” - for an appraisal of Marx’s view of capitalism as a permanent process of change and economic revolution due to the introduction of innovations induced by competition.
behaviour in the form of innovation is a conscious purposive departure from the existing set of routines.

Firms carry with them the seeds of the destruction of previous stable frameworks. At any time, innovative efforts draw heavily on the mass of technical, managerial and organisational knowledge produced by past experience. This knowledge serves as a platform from which a successful jump - "a recombination of materials" - can be attempted. It is not possible to create something new from nothing or nowhere:

innovation in the economic system - and indeed the creation of any sort of novelty in art, science, or practical life - consists to a substantial extent of a recombination of conceptual and physical materials that were previously in existence. The vast momentum of scientific, technological, and economic progress in the modern world derives largely from the fact that each new achievement is not merely the answer to a particular problem, but also a new item in the vast storehouse of components that are available for use, in 'new combinations', in the solution of other problems in the future (Nelson and Winter, 1982, 130).

Existing routines are the structural conditions or components of the activity of innovation (and they might be changed by it). Innovation may arise from the activation of familiar routines. But for routinisation to become a crucial ingredient of the activity of innovation it is previously required that the routine be reliable and that the resort to a new routine be as devoid as possible of the "operational and semantic ambiguities of scope" that exist in many unknown situations. Having said that, it is important to qualify the strong dichotomy between routinisation and innovation. For reliable routines of recognised large scope supply the chief ingredients of new blends. Success at the innovative border may be
associated to excellence of the infrastructure represented by sound settled routines.\textsuperscript{12}

However, to regard the activity of innovation as a form of routinisation in this sense does not imply to consider that its effects can be in any sense likely to be anticipated.\textsuperscript{13}

The rewards from innovation come from the “extra-profits” generated by the transient monopolistic position. Competitors will seek to respond with the traditional weapons at their disposal: to behave imitatively. Leaders and “laggers” are closely related elements of the same phenomenon.\textsuperscript{14} This is a game whose results are determined by a number of intervening factors which nobody is able to predict in advance. Firms cannot know \textit{ex ante} whether it would be more profitable to be an innovator or an imitator. In fact, for any firm this hinges on other firms’ choices and on its history. It is not so easy to test out strategies before adopting them. As a consequence, it is not reasonable to presume an “optimal equilibrium” policy to emerge. The future course of events will uncover the best strategies. Besides, the benefit of hindsight may show itself an erroneous interpreter, for chance and contextual features may cause the same policies to be fortunate accomplishments for some firms and terrible failures for others (Nelson and Winter, 1982, 286).

\textsuperscript{12} “We propose to assimilate to our concept of routine all of the patterning of organizational activity that the observance of heuristics produces, including the patterning of particular ways of attempting to innovate. To the extent that such patterning persists through time and has implications for profitability and growth, it is part of the genetic mechanism underlying the evolutionary process” (Nelson and Winter, 1982, 133).

\textsuperscript{13} “[N]on-equilibrium systems achieve some kind of autonomy and freedom which means that they become ‘creative’, generating structure and complexity. The price which we pay for this, however, is a loss of ‘predictability’” (Allen, 1988, 102).

\textsuperscript{14} “Successful innovation leads to both higher profit for the innovator and to profitable investment opportunities. Thus, profitable firms grow. In so doing they cut away the market for the noninnovators and reduce their profitability, which, in turn, will force these firms to contract. Both the visible profits of the innovators and the losses experienced by the laggars stimulate the latter to try to imitate” (Nelson and Winter, 1982, 266).
The emergence of innovations engenders two sources of uncertainty for the system, an "information gap" and a "competence gap" (Dosi and Orsenigo, 1988, 17). The former implies that the system is now loaded with a higher level of uncertain knowledge; available information is necessarily and increasingly insufficient. The latter means that the limited ability of agents to cope with the new stock of information is further severely restricted. The consequence is an increase in the perceived level of uncertainty affecting the formation of expectations and the making of decisions.

The firm itself will seek to fall back to revised routines and attempt to interpret as sensibly as possible the new market signals. But markets, although they can give much of the required essential information firms normally need to perform in crisis situations, they cannot provide everything with absolute certainty. The environment cannot "deliver information about or discount the possibility of future states-of-the-world whose occurrence is, to different degrees, the unintentional result of present decisions taken by heterogeneous agents characterised by different competences, beliefs and expectations" (Dosi and Orsenigo, 1988, 18). It is this informational limitations as to the working of markets which render the search for new routinised activities the crucial rational response by firms.

Despite the disruptive effects stemming from innovation, not everything is permanent instability. The system has important endogenous stabilisers. Change and novelty are "disequilibrating" factors engendering non-stationarity in the environment; however, at the same time, change may emerge in such ways which can be "patterned" and, with the exception of critical discontinuities, may not produce radical fractures in the process of co-ordination of firms' actions. There are many elements contributing to bring some ordered behaviour to the system. One could regard the role of "the interaction between exploitable opportunities,
present in non-stationary environments, which are too complex and too volatile to be fully mastered or understood by individual agents, and institutions which, to different degrees, simplify and govern behaviour and interactions. As a consequence, ‘order in change’ is generated by varying combinations of a) learning, b) selection mechanisms, and c) institutional structures” (Dosi and Orsenigo, 1988, 25). In particular, agents fall back on routines.\(^\text{15}\)

In sum, the basic argument is that changes in routines are the result of the success of the activity of innovation. But what leads firms to innovate? The most reasonable answer is that they are pressed to do this by virtue of competitive forces and mechanisms operating in the economy.

V.5) Competition: Innovation and Discovery

Broadly speaking, competition is a contest in which people endeavour for doing better than their rivals. The process of economic competition reflects the endless, active struggle between firms for their survival and for the improvement of their relative positions in the marketplace. It is an interactive process in which a plurality of firms reciprocally affect the plans and positions of each other, voluntarily or involuntarily, with uncertain results.\(^\text{16}\) This is a picture quite different from that portrayed by conventional economic theory, in which competition is seen as a struggle whose sole purpose is profit maximisation and the only procedures used by the competitors are price adjustments.

\(^{15}\) “[P]owerful problem-solving routines (that is, ‘abstract’ and robust decisions rules which apply to entire classes of, often ill-structured, problems) are the general procedures through which ‘intelligent’ agents deal with environmental (‘substantive’) uncertainty and the (related) ‘procedural’ uncertainty stemming from problem-solving complexity” (Dosi and Orsenigo, 1988, 33, fn.2). See also pp. 18-19.

\(^{16}\) For a similar account see, for instance, Possas (1989, 55ff.).
Competition among firms is a process of creation and disintegration-consolidation of their comparative advantages. For this, the most important weapon is the activity of innovation. The main aim of the introduction of innovations is the achievement of extraordinary profits via a temporary “monopolistic” position. Since the struggle is permanent, it generates a state of affairs which is transient by nature.

This is the frame of reference which will assist my analysis of why conventions change. But, first, let me approach some aspects raised by Schumpeter and Hayek concerning the role of competition as a process which promotes innovation and serves as a discovery procedure.

V.5.a) Schumpeter: Competition Through Innovation

The author who deeply investigated the connection between competition and innovation is Schumpeter, for whom innovation is the strategic response to the actual and potential threats posed by firms’ competitors. Competition is the locus within which innovative behaviour may flourish and successful initiatives compel imitation.

Let me remind the basic features of his account. Innovation is the “carrying out of new combinations”. Innovation is:

1. The introduction of a new good ... or of a new quality of a good. 2. The introduction of a new method of production ... 3. The opening of a new market ... 4. The conquest of a new source of supply of raw materials or half-manufactured goods ... 5. The carrying out of the new organization of any industry, like the creation of a

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17 The paradoxical result of this account is that the main purpose of competition among firms is the search for a situation of monopoly, although temporary. That is, a picture completely different from the conventional idea of competition as the opposite of monopoly. See Possas (1989, 71).
monopoly position or the breaking up of a monopoly position (Schumpeter, 1934, 66).  

Schumpeter alludes to changes not from outside, but rather endogenous economic changes coming from within, by the “own initiative” of the system. Besides, in a process of competition, “new combinations mean the competitive elimination of the old” (Schumpeter, 1934, 67). Competitors are involved in a competitive struggle whose aim is “first [to] reduce and then annihilate” other firms’ profits - this process of competition expresses “leadership against one’s own will” (Schumpeter, 1934, 89). Under these circumstances, everybody must be alert. The price to pay for repeated mistakes or apathy is decline and death.  

The *modus operandi* of competition Schumpeter has in mind is quite different from that of orthodox theory, for which price competition is the dominant aspect in a context of “rigid pattern of invariant conditions, methods of production and forms of industrial organization” (Schumpeter, 1943, 84). He is also of the view that innovation ceaselessly upsets equilibrium (if there is any):  

in capitalist reality as distinguished from its textbook picture, it is not that kind of competition which counts but the competition from the new commodity, the new technology, the new source of supply, the new type of organization ... - competition which commands a decisive cost or quality advantage and which strikes not at the margins of the profits and the outputs of existing firms but at their foundations and their very lives. This kind of competition is a much more effective than the other as a bombardment is in comparison with forcing a door, and so much more important that it becomes a matter of comparative indifference whether competition in the ordinary

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18 “While in the accustomed circular flow every individual can act promptly and rationally because he is sure of his ground and is supported by the conduct, as adjusted to the circular flow, of all other individuals, who in turn expect the accustomed activity from him, he cannot simply do this when he is confronted by a new task. ... Carrying out a new plan and acting according to a customary one are things as different as making a road and walking along it” (Schumpeter, 1934, 79, 85). Here, if we substitute “accustomed circular flow” for “routinisation of activities” we get a more suitable picture of what we are investigating.
sense functions more or less promptly; the powerful lever that in the long run expands output and brings down prices is in any case made of other stuff (Schumpeter, 1943, 84-85).

This conception of competition portrays a reality in which competitive forces are present not only when firms compete directly with each other but also as an always possible threat. The mere threat of the competitive attack is a common disciplining factor.\textsuperscript{19}

In sum, the main role of competition in a capitalist economy is that it is the inducement \textit{par excellence} of the activity of innovation. Competition avoids any pretence of considering firms performing in a static environment as the authentic characteristics of the economic system we observe.\textsuperscript{20}

\textbf{V.5.b) Hayek: Competition as a Discovery Procedure}

Hayek’s account of competition is basically related to the \textit{informative} character of such a process. Acquisition of special information and the possibility of benefiting from this is facilitated by the continuous participation in the market process through competition.

\textsuperscript{19} “It disciplines before it attacks” (Schumpeter, 1943, 85).

\textsuperscript{20} Remarkng on the causes of fluctuations of the rate of investment, Keynes states that “[a]part from the many minor reasons why these should fluctuate in a changing world, Professor Schumpeter’s explanation of the major movements may be unreservedly accepted. He points to ‘the innovations made from time to time by the relatively small number of exceptionally energetic business men - their practical applications of scientific discoveries and mechanical inventions, their development of new forms of industrial and commercial organisation, their introduction of unfamiliar products, their conquests of new markets, exploitation of new resources, shifting of trade routes, and the like. Changes of this sort, when made on a large scale, alter the data on which the mass of routine business men have based their plans. But when a few highly endowed individuals have achieved success, their example makes the way easier for a crowd of imitators. So, once started, a wave of innovation gains momentum’. This convenient summary of Professor Schumpeter’s views is taken from Wesley Mitchell, \textit{Business Cycles}” (Keynes, 1930, Vol. II, 85-86).
The process of competition is a mechanism whereby agents discover the best opportunities at their disposal or failures are made transparent. Throughout the process of competition new information is brought to the surface and allows firms to make use of the knowledge produced. Competition and disappointment of expectations are intrinsically related:

competition is valuable only because, and so far as, its results are unpredictable and on the whole different from those which anyone has, or could have, deliberately aimed at. Further, that the general beneficial effects of competition must include disappointing or defeating some particular expectations or intentions (Hayek, 1968, 180).21

In a market economy, agents collect information which is transient by nature. Particular events take place, bringing new knowledge of the situation, and render available information obsolete. Economic competition is “a method of discovering particular facts relevant to the achievement of specific, temporary purposes”. The benefits of particular facts, which will be detected by the competition process, “are in a great measure transitory” (Hayek, 1968, 181).

This approach to competition - “competition as a discovery procedure”22, based on people’s ability to find specific knowledge for the purposes of profiting from this by fulfilling the expectations and needs of other people - aims to be a more realistic alternative to the conventional view. Hayek remarks on “the absurdity of the usual procedure of starting the analysis with a situation in which all the facts are supposed to be known” (Hayek, 1968, 182; 1979, 68).

21 “[T]he results of a discovery procedure are in their nature unpredictable” (Hayek, 1968, 184).
22 “Competition is thus, like experimentation in science, first and foremost a discovery procedure” (Hayek, 1979, 68).
my italics). For competition is "a process in which people acquire and communicate knowledge; to treat it as if all this knowledge were available to any one person at the outset is to make nonsense of it" (Hayek, 1979, 68).

For the "usual procedure" (neoclassical economic theory), perfect competition is seen as a "state of affairs"; for Hayek, it is the process or "the activity called competition". Competition as a process in a world where there exists a "complex structure composed of countless individual economic arrangements" does lead to a complex spontaneous order, but does not lead to equilibrium at all (Hayek, 1968, 182).

Broadly speaking, that is, economic competition as well as competition in general, the process of competition cannot tell us beforehand what will be the best and most successful course of action; but a posteriori it can inform people "only who did best on the particular occasion, and not necessarily that each did as well as he could have done - though it also provides one of the most effective spurs to achievement" (Hayek, 1979, 67-68). These "spurs to achievement" indicate that competition is a process which does not allow the system to rest in any meaningful economic sense:

Competition is, after all, always a process in which a small number makes it necessary for larger numbers to do what they do not like, be it to work harder, to change habits, or to devote a degree of attention, continuous application, or regularity to their work which without competition would not be needed. ... To those with whom others compete, the fact that they have competitors is always a nuisance that prevents a quiet life (Hayek, 1979, 77).

23 Compare this passage with Keynes’s statement that neoclassical theory deals with a system where "relevant facts were known more or less for certain" (Keynes, 1937a, 112).

24 For Hayek equilibrium is "a somewhat unfortunate term". This notion carries the belief that "the facts have already been discovered and competition therefore has ceased" (Hayek, 1968, 184).
Apparently, it seems that Hayek’s account is more radical than Schumpeter’s view, which allows for periods of “rest”, the “accustomed circular flow”. But there is an important unsolved tension in Hayek’s theory here. I showed in chapter IV that for Hayek rules are procedures for action (reference points) which serve as a “shelter” from the dangers of “unknown worlds”. But the process of competition engenders “spurs to achievement” and leads to frustration of expectation, to the very creation of these unknown worlds, which may render obsolete a given set of rules. Competition is a “nuisance that prevents a quiet life” and make people “change habits”. The explicit connection, emphasised by Schumpeter, between “making a road and walking along it”, is missing in Hayek’s account.

Nevertheless, Hayek’s view is compatible with the line of reasoning I have been adopting so far. The understanding of the importance of social rules of conduct conditioning human action, the idea of “irremediable ignorance”, and of the role of competition as provider of new information in an environment marked by many sorts of unpredictabilities, are the typical Hayekian themes informing the analysis sought here.

V.6) Keynes: Animal Spirits

Apart from the fact of competition, another element which may lead to “deviant” behaviour, to a departure from conventions, and, therefore, to innovation, is that related to what Keynes calls “animal spirits”.

For Keynes, among the spurs to investment, there is also those associated to the actions of people of “sanguine temperament and constructive impulses”. Certain results of enterprise are influenced by “the abilities and character of the managers” (Keynes, 1936, 150).
This implies that the instability of capitalism is due not only to speculation but also to “animal spirits”, that is, “the characteristic of human nature that a large proportion of our positive activities depend on spontaneous optimism rather than on a mathematical expectation, whether moral or hedonistic or economic”. Behaviour driven by animal spirits expresses “a spontaneous urge to action rather than inaction, and not ... the outcome of a weighted average of quantitative benefits multiplied by quantitative probabilities” (Keynes, 1936, 161).

Without these animal spirits, and counting exclusively on calculations based on “mathematical expectation”, the economic system would not have the same stimulus to evolve and progress. Initiative is only fruitful if also stirred by animal spirits; hence, “the delicate balance of spontaneous optimism” (Keynes, 1936, 162) having an important role to play. Investment decisions, apart from many other determinants, are in some respects affected by “the nerves and hysteria and even digestions and reactions to the weather of those upon whose spontaneous activity it largely depends” (Keynes, 1936, 162). Keynes judges these as being “waves of irrational psychology” (Keynes, 1936, 162). However, it is people’s “innate urge to activity” that makes “the wheels go round”; people usually “[fall] back for [their] motive on whim or sentiment or chance” (Keynes, 1936, 163).

We have here a different ingredient for the analysis, not related to the cold logic of economic determinants, but rather to the psychological factors which affect agents’ behaviour in their social or economic roles.

Animal spirits as this optimistic urge to action rather than inaction is an element which can propel behaviour not only in investment activities, but also in many other activities human beings are engaged, non-economic inclusive. Animal spirits are the longing to excel, whether

\footnote{For a very interesting account on these terms, see Matthews (1991).}
in politics, scientific work, sports, arts, or the workplace. However, my focus of attention is on the urge to act in relation to entrepreneurship, via expenditures in a new plant or in technical-organisational improvements, and, as such, to do something new in order to make profits. As a result of this form of non-conventional behaviour, the possibility of transcending a given set of established conventions or routines arises: animal spirits partly determine investment decisions and may be a source of innovation. One might well make an analogy with Shackle’s concept of inspiration or improvisation, analysed in chapter III. Animal spirits can be a source of creativity and as such is at the core of the make-up of crucial decisions.

Animal spirits are an important source of investment, and, also, of its volatility. For their being closely related to the state of confidence as to the uncertain future results of current decisions, they can change abruptly. The belief that animal spirits “are too powerful to be constrained by convention” (Littleboy, 1990, 288) applies only when conventions hold good. In a situation of increased uncertainty, animal spirits may give place to conventional behaviour. But, as soon as fears are pacified, this “spontaneous optimism” is free to flourish and can make “the wheels go round”.

There is an element of rationality in these actions, despite Keynes’s mention of their being “waves of irrational psychology”. The rationality of animal spirits entails the idea that the entrepreneurial activity may transform the economic system and this transformation depends in part on each businessman’s attitude to risk. The higher the animal spirits the higher the propensity to take risks and embark on more uncertain undertakings. It is a type of

26 “Entrepreneurship, indeed, reflects an urge to discover an opportunity which is not clearly discernible yet” (Littleboy, 1990, 269).
rationality more attached to intuition (and even gambling instinct) than to the behavioural rule associated to constrained optimisation. As a consequence, animal spirits produce a high degree of indeterminacy which cannot be remedied by resort to quantifiable probability distributions.  

V.7) Dynamics of Conventions

From the above, an explanation of why conventions change emerges. The basic assumption here is that the activity of innovation, which requires non-conventional, unpredictable behaviour, is the result of both “objective” and “subjective” factors. It is the outcome of an interplay between the process of competition and individual creativity.

Not only successful innovation leads to a departure from conventions, but the process of adaptation (imitation) requires gradual change in conventions. Creation and diffusion of innovations are the active and passive components present in the process of revision of routinised activities.

One of the beliefs organising conventional economics is that the process of competition takes the form of a perfect competition. Firms are large enough in number that no one has a substantial share of the market. They produce a homogeneous product employing the same production processes and normally have perfect information. There is free entry to the market or industry; if profits higher than normal are being achieved, then new firms can and will easily enter the market. The result of this free entry will be a “normalisation” of profits. Firms are

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27 "Animal spirits relate to ... judgements concerning revenues and costs in the future as well as the scrap value of the asset through time. Because uncertainties cannot always be reduced to probability statements (not even to a mean expected value, far less other moments), the rational investor, by which Keynes means the entrepreneur, will resort to alternative sources of guidance. Hope, perusal of the general opinion, or satisfaction in the enterprise for its own sake can replace, or supplement, detached assessments of present values” (Dow and Dow, 1985, 51).
price takers, that is, they cannot influence the prevailing market price. Nothing is said about the forces operating in the competitive process which are ceaselessly engendering vital behaviours in terms of search for innovation, whose consequence is change in the existing structures.28

My account of “competition as a process in time” (O’Driscoll, 1986, 154) differs in significant ways from this approach, for among the main weapons used in the competitive struggle is the search for successful non-conventional actions in order to improve, destroy or hold positions. The consequence of innovative endeavours is the destruction of existing routines. Firms which stick to outmoded routines become obsolete.

On the other hand, creativity, or animal spirits, has also an important role to play in the determination of unconventional behaviour. Along with the operation of those “objective” factors, this helps to bring an element of indeterminacy and contribute to make the economy an “open system”. It expresses the component of free will or human agency which may push the system to unpredictable paths, despite the operation of some sort of deterministic forces. It is the interaction between these forces which moves the system.

The present approach has some analytical implications. Standard practices in economics regard the consequences of agents’ choices as knowable and fixed. The “economic problem” is, then, to choose the best production and distribution arrangements, given the set of alternatives. Competition enters into the picture as a way of helping to comprehend the stimuli correctly.

28 “Competition means struggle, fight, maneuvering, bluff, hiding of information - and precisely that word is used to describe a situation in which no one has any influence on anything, where there is ni gain, ni perte where everyone faces fixed conditions, given prices, and has only to adapt himself to them as to attain an individual maximum” (Morgenstern, 1972; quoted from Robinson, 1977).
By contrast, in the present account choice sets are not given and the outcomes of
choices are unknown. Some choices may be definitely worse than others, but there is no
choice that is conclusively optimal *ex ante*. Different firms meeting the same market signals
react diversely, and this is even truer if the signals are relatively new. Competition, then,
engenders this diversity and recompenses, *ex post*, those choices which were sound in practice,
and penalises unsatisfactory perceptions. In the long run, competitive success will be the
criterion of promotion of those firms which make good decisions on the average and,
therefore, will compel revision of strategies of those firms which make “mistakes”.

Realistic explanations of complex economic systems evolving in time require, then,
that the narrow conceptions of the conventional view need to be re-appraised and
transcended:

Evolution does not lead to optimal behaviour, because evolution concerns not only
‘efficient performance’ but also the constant need for new discoveries. What is found is
that variability at the microscopic level, individual diversity, is part of the evolutionary
strategy of survivors, and this is precisely what mechanical ‘systems’ representations
do not include. In other words, in the shifting landscape of a world in continuous
evolution, the ability to climb is perhaps what counts, and what we see as a result of
evolution are not species or firms with ‘optimal behaviour’ at each instant, but rather
actors that can learn! Because of this, at any moment, behaviour in the system itself
will not be optimal, because of the existence of apparently random or highly eccentric
behaviour, which at that time is meaningless and on average loss-making. However, in
order to maintain adaptativity to the environment some stochastic, risk-taking
behaviour is retained by evolution. In short, then, evolution is both driven by, and leads
to, microscopic diversity and individual variability. Selection viewed at the
‘macroscopic level’ of averages cannot destroy the microscopic diversity. Indeed, it is
just this diversity which drives evolution! (Allen, 1988, 107-108).

In a account whose focus is on the role of conventions, rules and routines contributing
to promote co-ordination of economic activities in the face of genuine uncertainty, optimising
action is just one among a variety of other types of behaviour and may even be followed in one
circumstance or another (by chance!), but it is not a persistent, regular, inflexible type of
economic conduct. Otherwise, it would mean the death of enterprise. Maximising behaviour is
only realistic when it is conventional behaviour. But conventional behaviour is not always a
synonym for optimal choices.

In the light of the theoretical results achieved up to this chapter, I am now in a position
to continue my investigation and scrutinise critically a key concept of standard routines in
economics: constrained optimising decision (rational choice theory), one the assumptions of
what I call “analytical conventions”. I will do this in the next chapter, whose title is “Analytical
Conventions in Economics: Rationality”.
VI - ANALYTICAL CONVENTIONS IN ECONOMICS: RATIONALITY

VI.1) Introduction

In the light of the previous investigation, this chapter examines the idea of rational behaviour in economics. Rational choice theory is one of the most important analytical conventions in economics. I criticise this widely accepted conception of rationality based on constrained optimisation action and propose an alternative view of rationality with a more general perspective.

An attempt is made to integrate and develop Simon’s account of bounded rationality, Keynes’s idea of rational conventional behaviour under uncertainty and Hayek’s view of social rules of conduct and tacit knowledge. I then suggest a conception of rationality as contextual reasonableness. It aims to provide a more satisfactory portrayal of rational action in the face of uncertainty, conditioned by conventions. In this comprehensive account, the notion of optimising rationality becomes a special case.

The idea of rationality I am interested in here is the subject matter of ethics and morals. It is related to human conduct, more precisely, to purposeful behaviour. At a more general level, the idea of rationality is related to behaviour which applies reason in (or has reasons for) thinking out a problem or a course of action for a chosen end. A rational action has to contemplate some degree of consciousness of the context of the action and an objective. It has to satisfy some conditions such as 1) consistency, and 2) efficiency. It follows that irrationality would spring from behaviour being inconsistent, both in terms of the chosen ends or the means for their achievement, or inefficient.
That is why rationality is often understood in terms of logical consistency or a search for efficiency. We would then call somebody as irrational who states both $A$ and not-$A$ or acts aiming at both $B$ and not-$B$. In addition, a person might be regarded as irrational if he or she acts in flagrant violation of his/her interests or of his/her own acknowledged well-defined goals. Or if the person picks the less efficient strategy or course of action. In these examples, we would be facing a logical contradiction or discovering inefficiency and naming it irrationality.

The problem becomes, then, what kind of explanation about how people make choices under these requirements of rationality one should provide. In other words, what is this thing called a “rational being”. One possibility is to accept the case by case adjustment via the optimising rule, the situation in which agents have an unrestricted flexibility of behaviour to acquire and interpret information and to choose the best actions. Another is to seek an explanation which could encompass the rational choice theory and afford explanation for actual behaviour in many circumstances, including decision under uncertainty, in terms of convention-following action.

Economic conduct is a particular type of human action. It pertains to a broader set of actions. It is a subject matter discussed at length in economics and an ideal type of action - rational choice - is thoroughly deployed. This model has far-reaching influences and has mistakenly captivated researchers in different disciplines such as sociology, psychology and political science. I now turn to the basic features of this very specific view of human behaviour.
VI.2) The Conventional Version of Rationality

One of the most important ideas of standard practices in economics is that in making their decisions people behave rationally if and only if they replicate the so-called utilitarian homo economicus. The constrained optimisation hypothesis as the sole rule governing behaviour of individuals is an abstraction which aims at explaining the economic behaviour of human beings in terms of an ideal type of rational choice. This is what Gerrard calls “the purely logical approach to human behaviour” (Gerrard, 1993, 52).

“Rational” is the action of an individual who optimises some well-defined objective function expressed in terms of utility, subject to a set of constraints such as income and a set of prices. Rational choice is a theory of purposive action, for individuals expect their actions to generate outcomes, preferably beneficial in net terms.

To the extent that it is possible to state unambiguously a definition that commands widespread agreement among its proponents, the basic assumptions of rational choice theory are:

1) the optimisation objective,

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1 I will not enter here into a discussion of the problematic definition of utility, of its various meanings, and if, once arrived at, a definition is widely embraced. Consensus formation is as hard as a definition itself. This is one of that type of “metaphysical” discussions which defenders of the concept perhaps will never be able to sort out satisfactorily. Although largely employed, utility is rarely defined precisely. I do not know a convincing account showing, for instance, how to transform utility into price, one of the informative basis for calculation guiding economic behaviour. On utility and the problems its employment creates, see Meeks (1984), Broome (1991) and Sen (1991).

2 A recent presentation of this approach reassures that “human behaviour can be interpreted as the solution of an optimisation problem. Where such an interpretation is possible ... human behaviour is ‘rational’” (Borgers, 1996, 1375). Perhaps, the use of inverted commas in this statement reflects both uneasiness and unconscious apology for employing the concept.

3 See, for instance, Gerrard (1993), and Green and Shapiro (1994).
2) the feasible choice set,
3) the available information set,
4) the preference ordering,
5) the centrality of individuals in the explanation of collective outcomes (a form of methodological individualism).

By preference the theory means the statement that one good, event or prospect is preferred to one or more goods, events or prospects. A preference function is then an ordering of such preferences in terms of the maximisation of their utilities. The preference ordering encompasses the so-called axioms of rational choice. The basic axioms of rationality are:

1) completeness: the agent is able to order all available alternative combination of goods according to his or her preferences;
2) transitivity: if some combination of goods A is preferred to another combination B, and if B is preferred to another combination C, then, by transitivity, A must be preferred to C;
3) selection: the agent aspires for her or his most preferred state;
4) independence: the preference ordering between any two alternative choices is independent of any other alternative choice.\(^4\)

The corollary is that violation of these axioms of choice must be construed as "irrational" behaviour.

\(^4\) Other axioms are continuity and reflexivity.
What is supposed to mean a further improvement of the theory of rational choice is the incorporation of both Von Neumann and Morgenstern’s and Savage’s accounts of probability, according to which people act so as to maximise their *expected* utility, that is, the sum of the individual utilities each weighted by their probability of occurrence. Expected utility is a measure of the likely benefit of the consequences of agents’ actions, given their preferences.

Thus, the same ideas employed to define the concept of rationality under certainty are used for decision-making under “uncertainty”, with the exception that it is necessary to apply probability calculations (Zagonari, 1995, 1405-1406). By doing this, uncertainty is immediately equated to risk. In other words, the account of rationality as “the solution of an optimisation problem” considers decisions in situations in which probabilities are known, numerically measurable and comparable. It cannot tell us the story of the situations where probabilities are not known, non-measurable and not comparable, that is, under conditions of uncertainty where uncertainty is conceptualised in the manner of chapter III. For, as Matthews states, “[g]oals lie in the future and the future is uncertain; so the connection with uncertainty is inherent” (Matthews, 1991, 118).

Because of these characteristics, rational choice is a theory which relies heavily on the existence of a stable cognitive state of the world. Agents are able to acquire the amount of information needed for making consistently their decisions, without having to face structural cognitive obstacles.

Rational choice is also a *normative* theory. People *ought* to behave in the maximising manner in order to achieve efficiently their aims (the selected functions). It is a theory which

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5 “Choice situations in which time does not play a crucial role are rare. Most obviously, the consequences of any given action are spread out over time” (Elster, 1986, 10). In other words, the central problem is how to theorise the influence of time in a theory of decision-making under conditions of “hard uncertainty”.
concentrates on the rationality (or efficiency) of *means* rather than on the rationality of ends.

In sum, the rational agent faces the following set of considerations:

1) what are the possible (efficient) courses of action,
2) what are the events that might follow from those actions,
3) what is the likelihood of each event,
4) what is the value (utility) of each event to the agent.

Adherence to universal maximising action is automatic; it is stipulated that it should be pursued in every situation, in every context. People are always knowledgeable of both the quantitative benefits or losses and the probabilities of all possible outcomes or courses of action attached to their recognisable objectives, so that strict mathematical expectation calculation can be made, and people passively submit to them. There is no scope for free will, animal spirits, imagination or creativity. Thus, to be classified as “rational” we must “know what we want, have a shrewd idea how likely each course of action is to satisfy us at what cost, and choose the action which is thus the most effective means to our ends” (Hollis, 1994, 117-118).

Agents owe their rational existence to survival from the test of efficiency that some sort of Darwinian competition impinges on them. “Irrational” courses of action are eliminated and the “best” choice always emerges by an assumed, but hardly proved, highly selective process of validation.\(^6\)

\(^6\) For a critical appreciation of the “survival of the fittest” mechanism engendering the process of validation of maximising behaviour, see Langlois (1986), Heiner (1983), Gerrard (1993) and Hodgson (1993).
VI.3) Limitations

Much has been discussed about the pros and cons of rational choice theory. However, the point which seems to command almost general agreement is that one of the most problematic aspects of the theory is that, by demanding too much from human beings, it lacks correspondence with actual behaviour.\(^7\) Because it idealises human actions too an extreme degree, it is simplistic and optimistic.\(^8\) This has led many people to ridicule the ideal human being behaving according to what the theory postulates:

He tries to incarnate pure intelligence. The wheels of his intellect revolve in a vacuum, and if at a furious pace, so much the better. He acts always from calculation, never from impulse, affection or even hatred. He sees a long way ahead, cunningly adjusts his means to his ends, is all things to all men while caring little for any, never forgets himself, and is never carried away by enthusiasm or sentimentality. While making no mistakes of his own, at least none that mere intelligence could avoid, he sees through everyone else, notes their stupidities and uses them with superlative craft for his own purpose. He is icily competent, intimidatingly efficient, free from all romantic and humanitarian non-sense, knows what he wants, and moves toward it by the straightest line (Brand Blanshard, *Reason and Goodness*, 1961, cited in Perelman, 1979, 118).

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\(^7\) For the presentation of conclusive experimental evidence that actual human behaviour does not fit to the prescriptions of the subjective assessment of probabilities theory, see the classical study of Kahneman and Tversky (1974). For these authors, people rely on a limited number of heuristic rules which serve to reduce the complex tasks of assessing probabilities and predicting values to simpler judgement procedures. In general, these heuristics are quite valuable and effective, but sometimes they may lead to severe and systematic errors and predictable biases. See also the many contributions in Hogarth and Reder (1986), the great majority of them emphasising the contradictions of the rational choice theory with the actual behaviour of individuals. Some experiments were found to violate the standard axioms of the theory such as independence and transitivity. Also, as Elster points out, in several cases of decision-making under risk, people do not conform to the rule of maximising expected utility. For instance, agents tend “to overemphasize low probabilities and underemphasize large probabilities, a propensity which could lead to an irrational opposition to projects which have associated with them a very small risk of a very large accident” (Elster, 1986, 20). In sum, the available stock of empirical evidence contrary to the theory is more than sufficient to raise serious doubts about its relevance. But some elucidation can still be advanced on theoretical, argumentative grounds.

\(^8\) I regard as “optimistic” any theory of rationality which places excessive burden on the possibilities of human reason to understand, interpret and solve problems, and neglects not only its congenital limitations in apprehending the world (epistemic limitations), but also ontological features of reality such as complexity and uncertainty.
In what follows I will seek to raise some points in relation to some acknowledged insufficiencies and problems of the theory. By doing this, I intend to uncover what is “behind” the theory.

1) An important point relates to agents' capacity of successfully acquiring and processing information. Typically, agents cannot conceive of a complete list even of the most probable of the outcomes of their actions. As Keynes states, “we have, as a rule, only the vaguest idea of any but the most direct consequences of our acts” (Keynes, 1937a, 113). Under conditions of uncertainty, people do not possess complete information and the artifice of handling subjective probability in any situation can be insufficient and misguided.

People are not endowed with “perfect internal computers” (Hollis, 1994, 117). There are cognitive limitations in relation to individuals’ ability of computation. As Simon stresses, the complexity of the environment in which decisions are made surpasses agents’ capacity to conceive and elucidate problems in ways which take account of all relevant likelihoods and interactions. In the rational choice account, information overload is easily managed.

2) Rational choice theory stresses the instrumental character of action. People make their “rational” choices based on fixed preferences because they strictly follow the rules of maximisation of their own expected utilities: courses of action are, then, instrumentally chosen because they are believed to represent the most efficient way to the achievement of ends. However, it is only in very simple situations, where there is no uncertainty and no constraints on behaviour in the form of conventions and rules, that optimal courses of action can be freely and instrumentally chosen. In the real world, characterised by complex interactions and
uncertainty about future states of the world, people choose what is possible in the circumstances, subject to the guidance of the existing set of conventions.

3) The theory favours the rationality of means. There is no concern about the rationality of ends. As Hollis remarks, “[q]uestions of whether preferences cause actions or merely derive from what is chosen can wait” (Hollis, 1994, 118). But the rationality of ends is as important as that of means. Why should one concentrate only on one aspect? This question is not addressed. But a theory of rational behaviour should be capable of contemplating a combination of both dimensions of rationality. For instance, the pursuit of a maximum profit may be suicidal (therefore, “irrational”!), for in some circumstances this may entail the determination of an “equilibrium” price which would allow other firms to enter into the market and to threaten the position of the firms already operating in it without further actual competitors. In this case, this “rational” pursuit of an optimum might engender an irrational result for the firm in question. In other words, the search for profits is not the same as the search for the maximum or optimal amount of profit.

4) Rational choice theory has a reduced domain of applicability. It is not a suitable an explanation for rational behaviour under “hard” uncertainty (see Vercelli, 1995, 1996), for it equates risk situations with uncertainty. It cannot explain “preference reversal” phenomena (see Kahneman et al., 1990). It refers only to situations in which the environment is stationary, not for contexts of structural instability. It does not account for situations in which agents have distinct levels of expertise and differential information. It ignores the context of action. It regards exclusively just one type of social interaction, namely, exchange.

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9 For a similar criticism, see Simon (1983, 7).
5) There is a pretence of *universalism* underlying the theory. A problematic legacy of this approach is the belief that the axiomatic method of constrained optimising behaviour can and must be applied to all types of behaviour. Becker (1976), for instance, advocates the suitability of the “economic approach” to any area of social life, to “all human behavior”. Some sort of unified view of the universe (and of science) is behind the pretence that mathematical formalisation and a logical analysis of choice confer a “scientific” status to the theory of rational choice which is appropriate to many domains of inquiry. This scientist trap caught not only economics but also attempts at explaining in “rational” terms the objects of investigation (agents’ actions and their consequences) in political science, psychology and sociology. Elster characterises very well this pretence when he says that those who still insist on this universalising view suffer from a variety of irrationality called “hyperrationality”: “the failure to recognize the failure of rational-choice theory to yield unique prescriptions or predictions. As in Kant’s critique, the first task of reason is to recognize its own limitations and draw the boundaries within which it can operate. The irrational belief in the omnipotence of reason is what I call hyperrationality” (Elster, 1989b, 17).

6) The theory takes too little account of the “variability of motivations” (Sen, 1994), such as moral and other commitments, norms and values, other than the obsessive pursuit of objective functions throughout constrained optimisation. As Sen (1976) observes, agents behaving according to the rational choice theory abstract commitments and may become “rational fools”. In the same line, Hollis remarks that individuals in this account know the price of everything, but the value of nothing.

People can have reasons to act other than the enhancement of their own welfare function. They can perfectly choose to go *beyond* the exclusive search of their well-being.
Actions can be motivated by a plurality of reasons such as prudence, sympathy (or antipathy), commitment, public spirit, admiration, envy, generosity, co-operation, honesty, trust, or fairness. Rational choice is a theory about how people make choices, given their preferences. No account is given about the origins of these preferences. They are assumed to be grounded exclusively on people's self-interest.

7) The theory does not take into account the influence of conventions and rules on behaviour, which engenders a tendency to imitate others and explains why some actions and not others (non-optimal!) are taken. Rather, conventions are seen as an impediment to the achievement of an optimal, "rational" solution. That conventions frequently govern behaviour (the solution for decision-making processes under uncertainty) appears as a distortion of the idealised depiction of the world.

8) For the sake of mathematical tractability, as well concern with empirical testability, the theory concentrates on the inter-relations of prices and quantities as reflected in market transactions, that is, "observables" or "quantifiables". It disregards other aspects of decision-making processes and the influence of non-price-quantity variables (they are considered non-observable).

9) The theory is predominantly a characterisation of static conditions, for it supposes the stability and permanence of options and preferences. Although supposedly based on methodological individualism, it is not uncommon that some accounts contemplate complex holistic notions such as the situation, the market and the institutional framework. Also, it ignores the power of groups which can distort preferences and restrain freedom of choice (Hamouda and Rowley, 1994, 44).
The theory of rationality based on the optimising rule can be re-interpreted as the special case of a more general account. Under this view, rational choice theory would apply only to particular circumstances, given some ideal conditions and, therefore, cannot be generalised as it is typically made.

VI.4) Simon: Bounded Rationality

The first step for building an alternative analysis of how people make decisions in the face of uncertainty is to resort to Simon’s version of rationality. The starting point is to regard that satisfaction is a more suitable term than maximisation. It means the search for a satisfactory, but less than a maximum, result for the agent. As a consequence, we do not need to assume that people are maximally efficient in their decisions or that rationality should be seen only in terms of maximisation procedures. Choices attain enough, not optimal, well-being, given other situational possibilities. Satisficing actions cover a broader range of cases including those which the calculations necessary to maximising objectives are too demanding or too costly to perform. In this scheme, the notion of “procedural rationality” is opposed to “substantive rationality”.\(^\text{10}\)

In general terms, this conception, later replaced by the notion of bounded rationality, acknowledges that the situations agents face and have to sort out in their daily life are quite

\(^{10}\)“Behavior is substantively rational when it is appropriate to the achievement of given goals within the limits imposed by given conditions and constraints. ... [T]he rationality of behavior depends upon the actor in only a single respect - his goals. Given these goals, the rational behavior is determined entirely by the characteristics of the environment in which it takes place. ... Behavior is procedurally rational when it is the outcome of appropriate deliberation. Its procedural rationality depends on the process that generated it” (Simon, 1976, 130-131). See also Simon (1981; 1983).
complex in relation to their cognitive skills. The bounded rationality approach provides an account for the limited capability for analysis which is inherent to human beings. Human rationality is constrained by the situation, people’s knowledge and powers of calculation. As Simon states, his theory describes rational choice that takes into account the cognitive limitations of the decision-maker - limitations of both knowledge and computational capacity ... Theories of bounded rationality, then, are theories of decision-making and choice that assume that the decision-maker wishes to attain goals, and uses his or her mind as well as possible to that end; but theories that also take into account in describing the decision process the actual capacities of the human mind (Simon, 1987, 15, 17).

The consequence is that explanation of human behaviour in terms of rational choice models is unsatisfactory. While rational choice theory implies some sort of “human perfection”, Simon’s approach is more down to earth, for it stresses the element of “imperfection”, of “boundedness” in human rationality. The basic equation of this theory is: \( \text{bounded rationality} = \text{limited knowledge} + \text{limited computational powers} \). To overcome this condition, agents fall back on “rules of thumb” in order to take satisfactory decisions.

Furthermore, this view of behaviour has no belief that an equilibrium will be attained. If the environment in which decisions are taken is not static, rules of thumb are often revised and learned, and objectives and aspirations are also subject to change (Earl, 1994).

Thus, the basic conclusion is that perfect, “substantive” rationality is a problematic conception, for no human being has the knowledge or the mental faculties of cognition

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11 Agents possess “modest computational abilities in comparison with the complexity of the entire world that surrounds them” (Simon, 1983, 22).
required to assemble and organise in his/her mind all the information relevant to a complex decision. Commenting on the affinities of Simon, Keynes and Knight, Matthews remarks that there is a good reason why bounded rationality should be particularly important under uncertainty. Situations where there is certainty or where certainty takes only the form of exactly calculable risk are in principle simple, in that the amount of information needed for action is limited. The thought needed may therefore lie well within the bounds of our rationality. It is easy, therefore, to understand the force of Keynes’s idea that mental processes undergo some alteration if the cloud of uncertainty dissolves: the entrepreneur then need not hesitate to turn arbitrageur. Even if the situation is complicated, the amount of information that is required is still limited. ... But, in the case of Knightian uncertainty, there is no limit to the information that might turn out to be relevant - you could go on collecting it for ever. Even if you did, it would be pointless, because the boundedness of your rationality would prevent you from using it all (Matthews, 1991, 115).

Despite Simon’s important contribution to a discussion of rationality, one needs to be aware that the problem is not only one of quantity of knowledge, that is, that there is too much to be handled by people’s computational abilities. One has also to address the (possibly more important) issue of the quality of knowledge, of a kind which cannot be rendered computable.

Thus, the following step to delineate an alternative account of rational behaviour is to complement Simon’s concept of bounded rationality with Keynes’s idea of convention-following behaviour. I now turn to this.

VI.5) Keynes: Rational Conventional Behaviour under Uncertainty

For Keynes, the choice of a suitable course of action in any circumstance does not need to be predetermined by a fixed general strategy, detached of context. Usually, the choice
of a course of action belongs to the sphere of individual judgement, notably contingent on, among many other factors, the available elements of the existing situation.

There are four basic connected aspects of Keynes’s account of rational behaviour:¹²

1) it is purposeful behaviour, that is, behaviour directed at some desired objective in the face of uncertainty;
2) it is behaviour consisting of “doing the best possible” in the light of the available means and selected goals;
3) it is behaviour followed according to an “internalist” or relativist evaluation of which means are as liable as any other, in the predominant circumstances, to facilitate the chosen goal;
4) it is behaviour grounded on available knowledge whether or not this is as “decisively relevant” as that which is desired but unavailable.

In other words, a course of action is considered rational not depending on how much the agent following it knows, but rather only on how well analysed the action is, with regard to the achievement of some aim, employing whatever information is available, although incomplete. As Lawson states,

Keynes’ account of rational conduct entails a dismissal of the Benthamite maximisation hypothesis as some ‘pseudo-rationalistic notion’; an orientation towards doing what appears best in the circumstances according to an ‘internalist’ conception of what is best - though always guided by the search for good states of mind; an emphasis in conditions of uncertainty upon actions, ceteris paribus, for which available knowledge is not negligible; an acceptance that ends as well as means are subject to rational deliberation; a recognition that action must often be governed by relevant, if

historically specific, social rules and conventions; and, finally, an acknowledgement of a degree of both psychological motivation as well as indeterminacy in human affairs and in particular in regards to the decision-making process (Lawson, 1991, 220).

Agents entertain “some good reason” to act rationally, not the restricted pursuit of an optimum. Rational behaviour is based on “conscious deliberation”. Rational agents do “as well as possible”, given the knowledge available, the context of choice and their selected objectives. In this account of rationality under uncertainty, agents take the most of whatever relevant knowledge they have, even if it is less decisively relevant to the purpose at hand than some other element about which they are less well informed. The question of whether or not a course of action can be regarded as rational depends upon factors such as the variety of information available, and the circumstances of consideration. Specifically, an action that may be considered as inappropriate in one context need not be regarded as necessarily inappropriate or “irrational” in a context that is entirely different. Goals, themselves, are not entirely fixed or predetermined but change with time and are also subject to rational scrutiny.

Rational agents seek to achieve their goals throughout well reasoned courses of action, subject to their degree of knowledge of the situation, which is never perfect or complete. Thus, what is distinctive in this account is that the best here is not the best in terms of a maximum or an optimal. It is more related to the possibility of finding reasonable answers, not to the inevitability of an exclusive maximising rule of behaviour:

Generally speaking, in making a decision we have before us a large number of alternatives, none of which is demonstrably more ‘rational’ than the others, in the sense that we can arrange in order of merit the sum aggregate of the benefits obtainable from the complete consequences of each. To avoid being in the position of Buridan’s ass,

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we fall back, therefore, and necessarily do so, on motives of another kind, which are not ‘rational’ in the sense of being concerned with the evaluation of consequences, but are decided by habit, instinct, preference, desire, will, etc. All this is just as true of the non-economic as of the economic man (Keynes, 1938, 294).

In this internalist version of rationality, then, the resort to conventions (and even unconventional behaviour!) is perfectly rational. Conventions provide a “bridge” which helps to fill the gap of our uncertain knowledge of the situation and partly remedy this condition. For being “rules of expediency” (Lawson, 1989, 217), conventions are the reasonable vehicle for action in the face of uncertainty.\(^{14}\)

**VI.6) Hayek: Rules and Tacit Knowledge**

Hayek’s notion of agency as rule following is also useful here. Reasonable judgement can occur by agents tacitly and unconsciously (or semi-consciously) following rules and conventions that they (possibly) cannot articulate. As Hayek says, “In one sense we thus know what we observe, but in another sense we do not know what it is that we thus observe” (Hayek, 1962, 48):

So long as the individuals act in accordance with rules it is not necessary that they be consciously aware of the rules. It is enough that they know how to act in accordance with the rules without knowing that the rules are such and such in articulated terms (Hayek, 1973, 99).

\[^{14}\text{In this sense, to say that Keynes emphasises “reason and calculation”, and ignores “habits and institutions” (Hodgson, 1988, 226) is not the correct way of interpreting Keynes’s view.}\]
knowledge. Most people can, after all, recognise and adapt themselves to several different patterns of conduct without being able to explain or describe them (Hayek, 1988, 78).

Much of knowledge and skills drawn upon in people’s activities are known only tacitly. If a conscious reflection upon each act is not feasible, then much of the knowledge upon which we draw must exist at the level of tacit (practical) consciousness; it constitutes tacitly sustained or tacit (practical) knowledge: “There is a difference and a potential gap between what is said and what is done” (Lawson, 1997, 178).

Many of the conventions and rules people act upon in order to perform their activities are tacitly held. But this does not imply to say that they cannot in any sense be articulated: “Tacitness might, but does not necessarily, imply inarticulability” (Fleetwood, 1995, 96). An expert can know something tacitly (knowledge “how”) and discursively (knowledge “that”). A physicist riding a bicycle has knowledge how (to ride a bike) and that (such and such forces that allow her or him to ride a bicycle).

The importance of tacit knowledge is, then, threefold (see Fleetwood, 1995, 97). First, it is directly accessible. People do not need to gain access to it, they already have it, for they are socialised beings who, after a process of learning, have managed how to participate in many realms of social life and follow rules and conventions.

Second, it is not communicated and stored by “formal institutions”. It is embodied in the informal institutions which constitute social life, mainly social rules of conduct.

Third, it is “inalienable or non-transferable”, in the sense that tacit knowledge is dependent on the knower. Many facts which are embodied in the rules or conventions
themselves are not apprehended by the agents who know how to follow: “When agents know tacitly, they tend to know non-discursively” (Fleetwood, 1995, 97).

Thus, the intentionality of human action presupposes not only some sort of discursive consciousness but mainly a tacit or practical level of consciousness. It is the latter which renders possible human action as a continuous process. Discursive identification is only attempted in response to “explicit demands for clarification” (Lawson, 1997, 184).

With all these elements, I will now turn to a discussion of rationality under conditions of uncertainty in which the role of conventions and rules is stressed.

VI.7) A Reconstruction of the Economic Man: Rationality under Uncertainty as Contextual Reasonableness

The connection between conventions and rationality can be made when one argues that people’s ability to be rational depends on their “doing the best possible” and having “some good reason” in order to devise a strategy for the achievement of a goal that in great part is assisted by a type of (tacit) knowledge which is embodied in the system of familiar conventions. To this ability of using reason to think out a problem or devise a course of action I name reasonable judgement.

However, one should also stress the role of the features of the situation in which decisions are made. Action always involve intentions and a context. As Hogarth and Reder say, “descriptive models of choice need to include contextual variables that capture the effects
of framing and other irrelevant factors” (Hogarth and Reder, 1986, 8). For having neglected the active role of context, this is one of the crucial flaws of rational choice theory.

If the context of action influences the decision, and if the reasonableness of any course of action is more appropriate than its instrumental choice derived from constrained optimisation procedures, then one should understand rationality in terms of reasonable behaviour in the circumstances: on the basis of “some good reason” to act to do “as well as possible” (not necessarily to maximise), subject to one’s circumstantial constraints - income, prices, endowments, capabilities, position, and degree of knowledge.

What I aim to explain is a more encompassing situation - the situation of what I call contextual reasonableness (or circumstantial articulation). Rationality as contextual reasonableness aims to solve context-related problems subject to the practical and cognitive obstacles affecting the use of knowledge in the face of uncertainty. This conception comprises:

1) agents’ limited cognitive capabilities;
2) agents’ degree of knowledge of the situation (a gradient from complete certainty to radical “hard” uncertainty);
3) type of decision in the circumstances (investment, consumption, pricing, policy-making etc.);
4) characteristics of the environment (a gradient from highly simple to highly complex situations);
5) the spatio-temporal setting.

15 “What constitutes rationality (including attitude towards risk) is conditional on objectives and circumstances” (Matthews, 1991, 116).
In view of all these constraints, conventions have an important role to play in decision making processes: they embody knowledge that can be resorted to by agents to perform their multiple activities. Conventions are, at the same time, a prerequisite for actions (they enable them) as well as the result of actions (they are reproduced by them).

In this exploratory version of rationality, I emphasise the word reasonable. Although both adjectives, rational and reasonable, are in some contexts interchangeable, for both can denote “conformity with reason”, rigorously speaking, they can and must be differentiated in two different domains, the “theoretical” and the “practical”.

It is more convenient to talk, for instance, of a rational, logical deduction, but not of a reasonable deduction; of a reasonable compromise, not of a rational compromise. In some contexts, a rational decision can be a reasonable decision and vice versa.

The rational follows the strict rules of logical reasoning and operates in a theoretical domain. When associated to behaviour, the rational aims to deploy the most efficient means for the achievement of the ends chosen, acts according to pure reflection, and seeks to eliminate the influence of “non-rational” dispositions. No living human being exhibits these characteristics. But human beings are still ideally represented as if endowed with these characteristics. This rational person is a sort of “mechanism” destitute of her or his humanity and indifferent to the influence and responses of the milieu.

The contrast with the reasonable can be stark. The reasonable operates in a practical domain. A reasonable individual is one who judges and acts according to “common sense”.

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16 I develop here the insights of Perelman (1979).
17 Bertrand Russell once said that the rational man would be an “inhuman monster”.

What is acceptable in his or her circumstances and what should be acceptable for all governs his or her actions. It is behaviour normally concerned to conform to (specific and general) principles, shared with, and acceptable by, the others. Interdependence, not independence, characterises reasonable actions.

This calls for the possibility of some sort of “universalisation” of the reasonable conduct, for “what is reasonable must be able to be a precedent which can inspire everyone in analogous circumstances, and from this comes the value of the generalization or the universalization which is characteristic of the reasonable” (Perelman, 1979, 119).

An action which is characterised as reasonable in one situation may become non-reasonable, that is, arbitrary, “non-self-evident”, or even “ridiculous” (“irrational”?), in a different context. As common sense changes from times to times so the reasonableness of things follow suit. The reasonable of today may not be the reasonable of yesterday or tomorrow, but it is normally an endeavour towards more coherence, towards a more systematised view of things, which, incidentally, is the background for change and “progress of thought”. Systematisation based on the reasonable produces a satisfying solution as the bench-mark for action which then, after all, can be considered as a rational solution. That is why the reasonable must rule the roost.

The unreasonable is the boundary that any action, in principle, cannot violate. I can make choices among different possibilities but only up to a particular point; in the case of transgression, the unreasonable will materialise and occasionally penalise.¹⁸

¹⁸ But note that successful non-conventional behaviour shifts the boundaries of the unreasonable.
In an important sense, this argument is similar to Charles Taylor’s idea of rationality as *articulation*. The very nature of human action can be adequately grasped only in its own terms (Taylor, 1982, 93). Note here the affinity with Keynes’s “internalist” view. Through the analysis of the action itself we can assess the scope in which an agent is able to undertake a “perspicuous articulation” of the elements present in the situation. The enquiry into the traits of the context can supply us with the powers to articulate as clear as possible the problems at hand. As Taylor puts it, “we have a rational grasp of something when we can *articulate* it, that means, distinguish and lay out the different features of the matter in perspicuous order. ...” (Taylor, 1982, 90). I complement this assertion by stating that it is part of this “understanding” that conventions contain useful information which may assist behaviour. That is, in our attempt to articulate the information available, to interpret “what appears best in the circumstances”, and from this to take a decision, resort to knowledge embodied in conventions is rationally justified.

The consequence of all the above considerations is that the maximising rule becomes, then, a special case of this broader one, operating under very particular conditions *if* the agent consciously and systematically acts based on that rule of behaviour. But, due to the reasons discussed, it is not reasonable to believe that, in fact, this always happens. If it really happens, this can only be known *ex post*; only by chance can the outcomes of an actual action match the previous intended maximisation action, which, by its turn, needs to be defined normatively and instrumentally *ex ante*. One would then be in a position to demand some sort of logical-mathematical tractability to the particular decision-making process under observation.
Chapter VI - Rationality

The idea of rationality as "circumstantial articulation" explains behaviour that is contingent on conditions which are partly known and partly unknown, a behaviour which can be rational under certain conditions but not necessarily under others. It is not logically necessary, as in the rational choice theory.

It is rational behaviour, for it is based on the use of reasoning in thinking out a problem or course of action. But it is rational as reasonable, for it accounts for the capabilities of the observed agent, not for the harsh demands that the observer imposes on his/her object of study. It is reasonable for it is behaviour showing sensible expectations, within particular cognitive bounds.

To be rational, then, means not only to make strict calculations as to the courses of actions for a specific end (after all, some calculations are needed), but also to follow rules and conventions. Both, according to the context, are important for human purposive behaviour. Rationality as contextual reasonableness is, so to speak, a catch-all category which tries to place optimising rationality in its proper place.\footnote{In many respects, my idea of rationality as contextual reasonableness belongs to the family of other alternative versions of rationality grounded on a broader conception (each one emphasising different aspects), such as rationality as action based on a "prudent understanding of the situation" (Carabelli, 1988, 282), "designing or creative rationality" (Vercelli, 1996), or "situated rationality" (rationality as real capacity) (Lawson, 1997, 187). See also the contributions of Heiner (1983, 1990) and Vanberg (1993). As well, a somewhat similar approach may be found in Langlois (1986), who reasons in terms of "adaptive behaviour" or "situational analysis" - "the ability to act reasonably, to act appropriately to one's circumstances, to adapt" (Langlois, 1986, 230; see also p. 252). But, I would like to remark quickly, I do not venture to buy the whole bundle of his arguments.}

Also, what distinguishes the rational choice account is the rule of maximisation, not the property of consistency of action itself. Some sort of coherence of action is a property of any behaviour who claims to be rational, irrespective of the account one chooses to describe or explain it. It is perfectly possible to devise a conception of rationality in which consistency
endures, but maximisation is discarded. It is perfectly possible to be rational without being a maximising individual. This is one of the improvements an account of rationality as contextual reasonableness can make.

At the same time, it is a conception of rationality also grounded on intuition rather than exclusively on mathematical calculation. Intuitive judgements are prone to emerge more frequently, and lead to successful results, if people act in an accustomed situation derived from replication of past experience and crystallised in a set of conventions. Conventions are the background for action, allowing for intuitions to emerge in the form of, for instance, animal spirits and Schumpeterian entrepreneurship.20

Note that my account focuses on the antecedents of actions as well, for conventions and rules are there to be acquainted and activated in the decision-making process itself. In contrast, rational choice theory focuses exclusively on the consequences of actions. This is why the account is called consequentialist. In this approach, the drive of a rational agent is exclusively forward-looking, the resulting pay-offs of actions. Reasons for action are never backward-looking, nor contextualised. Surrounding state of affairs, past experience and social or economic structures are suddenly eliminated at the moment the optimising rule is applied; the future can be fully apprehendable by probabilistic devices. By contrast, in my approach, past events, prevailing circumstances and general procedures for action are important factors affecting behaviour with limited knowledge.

The past influences current decisions in that it brings a contour for action: structures, values, rules and conventions. There is a dialectical exchange between agency and structure.

20 Simon (1983, 24ff.) also stresses the importance of the intuitive element in rational behaviour - the role of "good intuition" or "good judgement". For an assessment of the role of intuitions in Keynes's work, see Carabelli (1988).
The agent is socialised in a common culture in a given society; social structure influences and circumscribes his or her actions. As Hollis states, “we are born into a world of institutions which socialise us, shape our goals and values, condition our options and outlast our demise” (Hollis, 1994, 130). However, if agents are affected by, they may also change, social structures. Through the exercise of free will, agents are capable of moving the course of events to unpredictable directions. Examples of this are Schumpeter’s entrepreneur, Keynes’s animal spirits and Shackle’s crucial decision and acts of inspiration. Thus, one can perfectly speak of the rationality of unconventional behaviour or the rationality of discovery.

In a process of frequent interactions evolving over time, a common understanding of useful practices emerge. Continuous adjustment of expectations and actions among parties may take place. As long as expectations are established as reliable predictors of behaviour, they can provide some sort of continuity and stability in daily affairs, if changes are absent.

To follow conventions and rules not only makes action more effective, but also may give agents intrinsic satisfaction - “doing like everybody appeases me”, ponders the individual behaving conventionally. These conventions are the basis of the economic and social order. They may well be, as Elster puts it, the “cement of society”. However, as Hollis suggests, they are more like the “mastic” of society, for they need to be flexible enough to allow for change in a process of continuous negotiation. Accordingly, conventions are, so to speak, the “mastic of economy”. They provide the elements of co-ordination of behaviour as well as the foundation for change of economic activity.

21 As Keynes says, “it is better for reputation to fail conventionally than to succeed unconventionally” (Keynes, 1936, 158). However, this is only part of the story. This statement, although acceptable in the context which is made, is not entirely true in the context of the analysis of successful unconventional behaviour, previously discussed. To behave unconventionally, to break well established conventions, is a legitimate form of creating a new “reputation”.
A theory of rational action under conditions of uncertainty has also to account for the possibility of imprecision of our calculations. Such theory needs to be aware of aspects such as the costs of theorising and calculating, the urgency of making decisions, evolution, flawed reasoning, the role of novelty, the normal occurrence of inconsistencies in behaviour, and cycles of structural instability (Hamouda and Rowley, 1996, 119-120).

People typically reason with vague assertions and value judgements. A theory of rationality contemplating these attributes of human reasoning needs to reflect this approximate and qualitative nature. As Lofti Zadeh states, “[m]ost of human reasoning ... is approximate rather than exact. In a way that is not well understood at present, humans have a remarkable ability to make rational decisions in an environment of uncertainty and imprecision. We can understand distorted speech, decipher sloppy handwriting, park in a tight spot, understand poetry and summarize complex stories. In so doing, we perform no computations in the conventional sense of the term. We do manipulate information, which is what computation does, but the objects of our reasoning are generally not numbers but fuzzy patterns without sharply defined boundaries” (quoted from Coveney and Highfield, 1995, 74). Most of our conceptual representations of the world have flexible meanings. They are formed in a grey zone loaded with imprecision and approximate reasoning. Thus, rational choice theory claims in terms of exactness are problematic. An actual rational agent stops calculating when the efforts in the decision making process are too huge. She/he cannot know precisely when the optimal point has been reached. The “stopping point is arbitrary” (Rutherford, 1994, 60). Any
attempt to conceptualise human behaviour in terms of non-human faculties is, to say the least, problematic.\footnote{\textit{Economics has veritably turned imprecision itself into a science: economics, the science of the quantification of the unquantifiable and the aggregation of the incompatible} (Shackle, 1972, 360).}

The present account of rationality seeks to afford a broader explanation of economic behaviour under conditions of uncertainty. It sees economic conduct from a more comprehensive perspective, where the concept of rationality is not rational choice as the yardstick for conduct. By referring to action in a context of conventions and rules it confers special emphasis on both the intersubjective element governing behaviour and that our knowledge is fallible and contingent.

Rational choice theory aims to provide, but cannot, a powerful universal generalisation of human conduct which could be observed in all instances of actions. One should not forget Shackle’s suggestion concerning the set of criteria for judging an economic theory: realism, adequacy, immediacy, inclusiveness and human reference.\footnote{See Shackle (1958). Also, one should mention “human logic”, as opposed to, but which does not eliminate the aid of, formal logic.} It is time for the abandonment of the sole criterion of mathematical tractability governing theory choice.\footnote{A still more comprehensive approach to human rationality would have to account for the role of emotions, a step which I will not take here. For a discussion on this, see Simon (1983, 29ff.) and Elster (1996). Also, Weber’s types of action seem to be useful for such an undertaking. For Weber, actions are a mixture of one or more of the following types of action: 1) “traditional”, those performed simply because they have been performed in the past; 2) “affectional”, those performed simply to express an emotion; 3) “instrumental”, action in which the agent not only compares different means to a goal, but also assesses the utility of the goal itself; 4) “value-rationality”, action in which the agent takes the goal as an end in itself and may not even compare different means to that goal. For a discussion on this see, for instance, Hollis (1994, pp. 147-151 and 160). Instrumental action, which is the exclusive concern of rational choice models, would then have to open a space to “affectional” action. But this might entail, after all, the complete débâcle of the instrumentalist, optimising model of human action.}

Therefore, if one judges rational choice theory in terms of its 1) relevance, 2) usefulness, 3) generality, 4) integration with other theories, then one is led to conclude that it
is not far-reaching. More sensibly, in the light of the conception of rationality as contextual reasonableness put forward, conventional rational choice theory is, on the whole, unsatisfactory: 1) it is sometimes irrelevant, 2) it is in some important circumstances useless, 3) it has a very low degree of generality because of the restrictive conditions required,\(^{25}\) and 4) it is an unsatisfactory starting-point to describe and explain not only economic behaviour, but also conduct in general.

The analytical implication is that rational choice theory is a narrow account of economic behaviour. It can operate under quite selective conditions. It may even be useful for very simple and highly certain situations, but fails for highly complex and uncertain choice circumstances. In other words, it is a theory which cannot provide suitable explanation of rational behaviour under uncertainty. If knowledge is fallible and contingent, and if conventions and rules render “rigid” the repertoire of feasible choices, then to apply constrained optimisation in each and every situation might be “irrational”.

In the light of the theoretical results achieved up to this chapter, I am now in a position to make an “applied” discussion of conventions. This is the purpose of the next chapter, where I analyse conventions in price formation and in the labour market.

\(^{25}\) "The orthodox definition of rationality ... is clearly too restrictive to cope with the unknowable future, and thus with any decision-making involving expectations, as all decision-making must" (Dow and Dow, 1985, 55).
Chapter VII - Pricing

VII - THE OPERATION OF ECONOMIC CONVENTIONS: PRICING

VII.1) Introduction

According to the conventional view, prices are the result of the interactions of supply and demand. A price increase indicates an excess of demand over supply in the market. Prices will adjust until demand and supply are equal. The demand curve measures how much agents wish to demand at each price, and the supply curve measures how much agents wish to supply at each price. An equilibrium price is one where the amount demanded equals the amount supplied. The price system provides a mechanism whereby changes in demand and supply conditions affect the allocative efficiency of resources.

However, in an important measure, prices are not completely determined in the market by demand and supply, but by other factors such as power, market structures, relations and conventions. The purpose of this chapter is to investigate one of these factors: the role of conventions in price formation, as an illustration of the argument elaborated in this work.

I start from Townshend’s insights about the conventional character of all prices. Convention-following actions help to provide stability of prices. By stabilising price movements and making them to a certain extent predictable, they stabilise purchasing power and allow for calculation.

A widespread conventional behaviour in the products market is cost-plus pricing. Firms resort to this “rule of thumb” because it propitiates their activities to continue over time. Also, demands for a “fair price” are pervasive. In this account, prices are not equilibrium prices, but reproductive and transformative.

Conventions also operate in the labour market, throughout the role played by
“normative factors”, such as custom and concern with fairness, which determine the wage structure and wage bargaining processes, along with market forces.

Finally, I give an account of inflation based on the role of conventions. Inflation is seen as the overall result of cost changes, of capacity utilisation variations due to effective demand conditions, of conflicting claims over income distribution, and of the breaking down of established conventions.

**VII.2) Prices as Conventions**

The account of conventions as put forward in this work suggests regarding all prices as conventional. They are set on the basis of a general implicit agreement that they will continue to be what they are until relevant information comes to the surface. This implies a reconsideration of the main determining elements in price formation. This idea, although not entirely new, is neither highlighted nor further elaborated elsewhere.

Townshend was probably the first author to point out the conventional aspect in the determination of prices. His remarks emerge from a concern with the necessity of providing stable prices to inform expectations and decisions. There are some processes in the real world which normally prevent prices from fluctuating strongly and they can be accounted for. For Townshend, this feature

must be either a *conventionality* of outlook causing stability of expectations as to the money-prices of durable assets of certain kinds, or else the *conventional* maintenance of some degree of stability of the money-price of the only other exchangeable value, viz. labour - that is to say, a conventionally stable wage-unit. ... Perhaps economic (price-) stability really depends on the prevalence of custom in regard to price-offers among the majority who all ‘think’ alike, combined with the prevalence of a divergency of views among those who think for (literally, for) themselves (Townshend, 1937, 161-162).
[I]n regard to actual money-prices, there is nothing save the force of habit, operating through conventional prejudices about the normality, or propriety, of certain price-levels for certain particular valuables, e.g. labour and money-debts, and through habits and conventions which limit the velocity of circulation of money on the one hand and its volume on the other, to prevent them from varying arbitrarily, even in the shortest period (Townshend, 1937, 168).

This “prevalence of custom” engendering conventional outlook in price setting is the basis of stability. The formation of conventions of price stability reveals the pursuit of mechanisms, socially defined, for stabilising purchasing power and the possibility of actual and prospective calculations on a more secure basis.

By regarding prices as conventional, one is able to embark on decision-making processes where the need for stable rules of conduct is always present:

If price stability, in reality, is not ensured by a direct governance of prices exerted through human reason by visible, objective circumstances which are themselves stable, then the practical needs of business and the workability of life demand that it be conjured ex nihilo by tacit, instinctive agreement, that is, by convention. For price stability of some degree is an indispensable support for stability of the rules of the business game and those of the broader game of survival itself. Stability by convention ... has to serve instead of stability determined by reason and knowledge (Shackle, 1972, 112).

However, although conventions provide stability of prices, prices do undergo the influence of many factors which as a result may cause a disruption of this stability. In a world where innovation is the main vehicle for accumulation of capital and de-/re-composition of relative positions, prices are, as a consequence, subject to change. Novelty brings the need to

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1 To my knowledge, only Shackle (1972, pp. 226-228) and Littleboy (1990, 288) also recognise the originality of Townshend’s insights. For Littleboy, in following this path - to regard all prices as conventional - one is able to destroy completely the maximising agent.
revise a given accustomed set of prices: "The real business of the market is a continual patching and piecemeal improvement of an always obsolescent set of prices" (Shackle, 1972, 268).

Price decisions are closely related to expectations of current and future stability, although beliefs of possible changes are always present. If prices are defined from the point of view of conventional judgements as to the various possibilities at stake, they cannot be the (determinate) equilibrium result which will be achieved sooner or later.

Tested and agreed by common practices and experiences, conventional or routinised forms of behaviour provide the foundations for possible successful actions based on the information embedded in prices. The rules of a game unstable by nature require this stability to inform decision. This is why "[a] price can be called conventional when, for example, it is left undisturbed ... on a principle of 'let well alone'" (Shackle, 1972, 221-222).

As the definition of prices involves expectational considerations of both short- and long-run range, the conventions governing them are in a special sense related to the specific aims at hand. For instance, the price of a given level of output (capital stock given) is the expression of costs incurred in the production period. Demand pressures, except in exceptional circumstances, play a secondary role in the determination of prices. However, prices are defined not only with the purpose of reproducing the conditions of production, but also with the aim of transforming them through the creation of funds in order to invest and expand the firm's stock of capital. The time horizon and relevant expectations associated with the different decisions involve different conventions.

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2 The idea of the need of this stability is also present in Hicks (1974, 78, 84).
The elements of time and expectations, thus, enter into the analysis in a relevant way.

As Shackle states,

prices depend, not only on tastes with their reasonably presumed stability, and on endowments with their short-period constancy, but on thoughts, the formal contents of mind, dependent on no slow-moving or tangible elements but swiftly composing, combining and dissolving themselves from moment to moment. In such circumstances, an agreed or accepted price will be, for each individual, a mere façade concealing a mass of reservations, of evolving judgements and intentions. But many prices will be allowed to remain as they happen to be found, because there is no time to investigate, no new source of data or suggestion, no impulse to attempt a change (Shackle, 1972, 221).

Prices which remain at a particular level for some time gain sanction and authority. People understand them as “right” and “just” prices and, as time passes, they get used to them. Accustomed prices become the reference which people learn to live with, prices to which agents adapt their habitual practices. In this sense, they are the prices which afford mutual cohesion for a given social life (Shackle, 1972, 227).

In a world where markets operate under conditions of uncertainty, price and output decisions are routinised practices. The conventional character of prices, the result of an interactive process where conflicting demands are always at stake, mirrors the ever present search for stable frames which can provide important information and facilitate decisions in economic life.  

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3 The idea of a fair price is also present in Hicks (1974, 79).

4 As Hicks (1974, 85) says, prices have a social function.

5 Hicks’s (1974) idea of fixprice and flexprice is useful to account for this need of stable rules in price formation, although from a different angle. For instance, in a fixprice system, prices tend to be fixed or stable, at least in the short run, not only because in a world where firms normally operate with less than full capacity adjustments to demand variations are normally made in terms of quantities, but also because conventions providing some sort of stability and continuity in the rules of the game, and a search for manageability and
VII.3) Conventions in Pricing

Pricing is a subject matter in economics which strikingly displays the contrast between theory and economic reality. Conventional economic theory affirms that prices are determined in order to achieve profit maximisation by means of the equality of marginal cost and marginal revenue. They are demand oriented, market-clearing prices.

However, conventional pricing behaviour in the real world is basically cost-oriented. That prices equate demand to supply via maximisation procedures is a narrow account of reality. Firms' actions cannot be easily reduced to a mere optimisation policy.⁶ Instead, prices are the resultant of a series of factors influencing economic activity, of various forces at work. They epitomise the vast set of elements circumscribing the firm's behaviour.

Prices are influenced by two sets of factors. The first is the structure in which a firm is immersed. It sets constraints to the firm's behaviour as to price formation such as forms of competition, the technology required to produce and invest, labour unions, types of regulation etc., although the strength of these restrictions constantly alter. The second is the domain of the firm's decision where past experience, cost structure and typical strategies for survival or growth play an important role. The interaction of both factors shape the process of price formation.

It is also worth to make a distinction between sectors where price changes are mainly cost-determined and demand-determined. It is not that demand is unimportant but rather that predictability, are pervasive in the market place.

⁶ "[T]he goal of management is not to maximize profits but to survive and grow to the full extent permitted by external circumstances" (Arestis, 1992, 144).
the typical features of a capitalist economy indicate that excess demand is a phenomenon much less common than excess supply. As Robinson states,

there are two distinct systems of price formation in the modern world, one dominated by supply and demand and one by costs plus profits. ... The market for some commodities is created by specialist merchants who buy to sell again, and make their profits out of price differences. They carry stocks; when the outflow of sales exceeds the inflow of purchases so that stocks are falling, they raise prices, and conversely. A large part of the produce of agriculture and extractive industries is handled in this way. ... [Producers of manufactures] offer their commodities at an advertised price and produce for sale what the market will take. There are various intermediate forms and overlapping conditions, but the main distinction is between these two types. ... [I]ndustrial prices [are set] in terms of gross profit margins expressed as a mark-up on average cost. ... In general, it seems that average prime costs fall rather than rise with rising utilization of plant. ... [F]irms generally prefer to lengthen delivery dates rather than to choke back demand by raising prices (Robinson, 1977, 18-19).

In oligopolistic markets, firms are not price-takers but price-makers, for they can decide prices. They fix prices and adjust production according to demand oscillations. Supply adjusts to demand through changes in the use of capacity. Firms' decisions are also influenced by the price decisions of other firms competing in the same market or industry.

Costs remain constant up to the point of full capacity utilisation. Systematic operation at full capacity tends to increase costs and then prices. If excess capacity is the typical feature of firms' life, then prices are governed by a mark-up on costs. Demand effects on prices are perceived at full capacity or near full capacity but it is not the normal condition. This is an

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7 But note that small firms may not be price-takers either: "all firms, however small, are demand-constrained, ... none are price-takers in the sense embodied in the modern theory of perfect competition, ... supply curves can be drawn for any firm, and ... the elasticity of demand a firm faces depends on its size and whether it acts alone or in concert with others in the industry. ... [E]ven a perfectly certain small firm cannot sell an indefinitely large amount at the going price. This is the crucial issue, for compatibility with the Principle of Effective Demand depends on firms' demands being determined by aggregate demand" (Chick, 1992, 162, 149-150).
explanation of price determination which regards spare capacity and less than full employment of resources as the "norm", with excess demand exerting influence on price decisions only in exceptional circumstances.

In view of this, the most conventional pricing behaviour followed by firms is that prices are cost-oriented or set on a cost-plus basis at a standard or conventional level of utilisation of capacity. This idea is inspired by the works of Hall and Hitch, Kalecki, Steindl, Eichner and Sylos-Labini, among others. As Lavoie states,

firms fix prices by adding a constant mark-up to their normal unit costs, calculated at a conventional rate of utilization of capacity and with a target rate of return in mind. The cause of this is that prices are not designed to be market-clearing prices; rather they are reproductive prices. If in a recession firms were to cut profit margins and engage in price wars, they would destroy the reproductive properties of cost-plus pricing procedures. ... Implicit collusion behaviour is upheld by price leaders and industry-wide customs and conventions (Lavoie, 1992, 143). 8

In the face of uncertainty, firms set prices based on conventions, routines and "rituals" which help to simplify some practical operations that would otherwise be an intricate activity. The cost-plus pricing approach is, thus, the conventional behaviour firms adopt without having to be concerned to an endless number of complicated decisions such as calculations of marginal revenue, of marginal costs schedule, and of optimisation procedures.

8 "Prices are determined according to a mark-up setting, which is imposed on money wages and prices of raw materials" (Arestis, 1992, 161). By its turn, the mark-up is like a fund to the firm's operations: "the mark-up is determined by the financial needs of firms relative to the monopoly power they can exercise" (Arestis, 1992, 139). And further: "The mark-up that connects the product price to the product costs is a decision variable. It is determined by the product's producer and depends on the objectives of the firm's product pricing. These ends decide the relation between the product price and costs; they determine the extent to which changes in the costs are incorporated in the price, along with the flexibility of its level. Changes in the price depend on their effects on the enterprise, and while the price can shift with the product's costs, it will do so if and only if the price change serves the ends of the enterprise. The mark-up price is firm determined rather than cost (or demand) determined, and it is the firm's determination of the price that relates it to the product's costs" (Shapiro and Mott, 1995, 36).
Although not fully elaborated, this insight was familiar for many theorists. For instance, Joan Robinson was aware of the importance of conventions for firms’ activities when she states that “[i]ninstinct and guess-work probably teach [the business man] no more than to do the same as other people”. She sees the profit margin as depending “very much upon historical accident or upon conventional views among business men as to what is reasonable. And any conventional pattern of behaviour which establishes itself amongst an imperfectly competitive group provides a stable result. So long as all adhere to the same set of conventions each can enjoy his share of the market, and each can imagine that he is acting according to the strict rules of competition, though in fact the group as a whole, by unconscious collusion, are imposing a mild degree of monopoly upon the market” (Robinson, 1947, 78).

For Harrod, there is a solid element of conventional behaviour in firms’ price decisions. The resort to “fairly simple rules” for arriving at a price avoid the obstacles associated to the lack of practicality of calculating the marginal values of each good and the related set of equations in a complex production process. The simple practical procedure most commonly used is a “ritual” based on the full cost principle (Harrod, 1952, 164).

For Shackle, the conventional element in the formation of prices is equally evident: “The easiest price to hit upon is the one that prevailed yesterday, modified perhaps by circumstances which both parties can recognize or by a convention that, for example, prices rise gently all the time (the convention of the years since 1945). Poverty and urgency demand a price, and convention supplies it” (Shackle, 1972, 157).

For Okun, conventions of fairness are at the core of price determination by firms. He stresses that “some additional factor must be invoked to explain why prices are much more responsive to changes in costs than to shifts in demand. What needs to be explained is not
rigid or sticky prices, but rather flexibility of prices in following costs even when demand is pulling in the opposite direction. I suggest that the asymmetry stems, in part, from implicit contracts or conventions that introduce a concept of fairness in the relations between suppliers and customers whereby price increases based on cost increases are generally accepted as fair, but many that might be based on demand increases are ruled out as unfair” (Okun, 1981, 169-170).

These rituals, conventions and routines mould an environment in which firms are led to regard that consumers have the perception of a “fair price” and stick to it as far as the firm in question does not overcharge or does not abuse its power (Lavoie, 1992, 134). Sellers and customers, as well as workers and employers, tend to embark on strong long run commitments in order to avoid or minimise the effects of disruptive novelties (although they can be inevitable).

In sum, there is also the active operation of “non-economic factors” within the economy which partly explains why prices are what they are.

Cost-plus models of pricing have three versions: mark-up, full-cost (normal cost) and target-return. Although different as to details, in essence they all express the same idea, that is, that prices change according to changes in standard or normal costs, in particular nominal wages and raw materials costs.9

Also, as anticipated above, a differentiation between short- and long-run factors affecting price changes can be made. Both affect prices in different ways. Short-run factors are related to output changes, where normal costs may change but the margin of profit remains

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9 See Lavoie (1992), chapter 3, for a more detailed account.
constant. In this case, the normal rule to be followed is cost-plus pricing.

However, as firms operate with a time horizon which goes beyond the current production period, “the pricing decision can no longer be separated from investment planning as in the case of the conventional theory of the firm” (Arestis, 1992, 144-145). Pricing is, then, also linked to the accumulation process. In this case, in which investment decisions are also affecting price decisions, firms follow the rule of target-return pricing: one of the main, if not the main, purposes of pricing becomes the rate of return (net profit) on capital employed. Now, not only normal cost but also the margin of profit may vary.\(^\text{10}\)

The firm sets its price with the expectation that a certain amount of profits will be made in the future. Expectations related to long-term survival are always present. If the time frame of the firm’s goals is important, then current profit is not the only variable which attracts the attention of the firm. Future profits also matter and the firm strongly regards the long-run impacts of its current pricing decisions. As Shapiro and Mott emphasise, “[w]hile the mark-up is decided in the short run, the firm that decides its level looks to the long run. The product pricing of the firm is forward looking and strategic, and because it is, the results of the pricing cannot be determined under the confines of the short run. The setting of the analysis has to be the long run one of the market growth and structural development” (Shapiro and Mott, 1995, 41).

Another crucial aspect of conventional behaviour in price formation is the recognition of a system of price leadership: other competitors in a specific market follow a leader by

\(^{10}\) “[F]or a given level of unit costs, the higher the level of investment, the higher the price level desired by firms. Pricing, therefore, ... is closely linked to investment” (Arestis, 1992, 161). Arestis here follows Eichner (1976).
imitating its pricing policy. The practice of following the leader mirrors the important property of interdependence of actions which characterise social and economic life (explored in Chapter I). The price set by one firm is influenced by the prices set by other firms. Moreover, not only actual but also potential competitors influence pricing decisions: entry barriers and exclusion prices play an important role in price determination. Routinised pricing behaviours are known to all operating in a specific market; these help to circumvent ruinous price wars. This intersubjective characteristic may in some cases facilitate implicit (or explicit) collusion.  

Firms are aware of this interactive character of price determination because they normally follow the price leader knowing that this is the most reasonable way of behaving in such circumstances. They see the leader as the "surrogate" for the other competitors. In general, the leader is the firm with the largest share of the market and/or the lowest costs of production (Arestis, 1992, 145). The policy of following the leader is conventional for it depends on an implicit general agreement or a shared understanding among the participants of a market that doing otherwise might cause worse consequences for many in the form of undesired and unnecessary instability (but the activity of innovation can result in the rupture of the prevailing general procedures for action).

The leader determines a price which is able to reproduce current production requirements and/or to create the necessary finance to back the desired investment plans which will meet the firm's growth goals. A huge part of funds for investment is then generated internally to the firm, coming from profits. With a certain price structure in the industry within

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11 Not only may entry-prevention affect price determination, but also other factors such as, for instance, government intervention. But note that there is also competition through non-price dimensions: provision of special services to customers, emphasis on reliability of product quality, prompt deliveries, financing arrangements etc.
which the leader operates, relativities are maintained or changed whenever the leader changes prices and those who are led follow suit.

An additional constraint in the definition of the mark-up may arise if imitation of the leader’s actions is not perfect or immediate. The leader does not have full control of the consequences of its decisions (as well as the decisions of the others) and imperfectly anticipate the reactions of its competitors following any change in prices. This element of apprehension as to sales loss to other firms, although mediated by the size of the share of the industry output and sales the leader entertains, is always present. In fact, this is the more realistic case, for even the leader is not completely sheltered from the pressures of competition, despite its strategic position in terms of price (and investment) policies definition (Arestis, 1992, 153; Reynolds, 1989, 247-250).

In sum, in general lines, the target rate of return is a “conventional rate of profit” and its strict correspondence with the realised rate of profit cannot be assumed, neither in the short run nor in the long run. Firms have information only about the previous rates of profit; they cannot know how the future rates will be. They count on some conventional measure of the profit rate that is supposed to cover part of both past and future expansion costs (Lavoie, 1992, 139).

VII.4) Conventions in the Labour Market

The important aspect of wage setting is that conventions and custom are probably more important than supply and demand conditions. Decisions are also affected by custom, pay norms and beliefs concerning equity in the workplace, across firms and within society, rather than merely the outcome of interactions of supply and demand in the labour market.
What Wood calls “normative pressures”, that is, “desires to enforce fair pay, ... constrained by conventions” (Wood, 1978, 53) play a crucial role, and are as important as “anomic pressures”, that is, those factors connected to market and conjunctural forces (surplus and shortage in the labour market). Normative pressures imply a significant role to “non-market” mechanisms, such as concern with the fairness of observed profit rates, the structure of relative wages, or emphasis on customary consumption levels made possible by habitual past income levels. Moreover, collective wage bargaining is the rule, not supply of and demand for labour at an individual level.\footnote{[E]veryone knows the enormous resistance to either rises or falls in money-wages - a resistance based surely on real conventions, firmly established both among employers and employed, and governing their offers, that rapid changes in money-wages are undesirable, and wide fluctuations from the conventional norm in some way ‘unjust’ to one party or the other. Thus the conflicting forces making respectively for higher and lower money-payments to labour may perhaps often be kept within bounds by conventional feeling weakening them materially as soon as one side or the other has secured any perceptible change” (Townshend, 1937, 165-166). In his view of the labour market as a “social institution”, Solow emphasises that “wage rates and jobs are not exactly like other prices and quantities” (Solow, 1990, 22), and that “the labour market really is different. ... [I]t cannot be understood without taking account of the fact that participants, on both sides, have well-developed notions of what is fair and what is not” (Solow, 1990, 3). Note that Marshall’s analysis of the main forces operating in the labour market also emphasises the importance of fairness, as Solow (1990) remarks.}

The influence of historical, social and institutional factors in the labour market is acknowledged by many authors. Keynes alludes to “the social factors which influence the level of the money wage” (Keynes, 1937a, 121). Hicks stresses the importance of the fairness of wage-contracts (Hicks, 1974, chapter III). Workers’ judgement of “fair wages”, of fair treatment by employers, include not only a comparison with other workers’ income but also their own past experience and the assessment of a fair profit. Custom establishes what is expected to be a fair system of wages. Standard rates are reinforced at each round of negotiations. For instance, wages may rise in non-expanding sectors not due to scarcity but because of “unfairness” (Hicks, 1974, 71). These perceptions are at the core of the resistance
to decrease an accustomed purchasing power.\textsuperscript{13} The element of interdependence is also strong in this account of conventional behaviour in the labour market.

As I observed before, Wood (1978, chapter 3) recognises that “normative pressures” can influence wages more than “anomic pressures”. In the definition of pay and wages, concerns with relativities and comparisons in terms of a reference set of workers and jobs are always present. Preservation of existing and past pay relativities is sought. Conflicts around fair relativities will always emerge. Workers take into account what is perceived as a fair relative wage or a fair share of profit.\textsuperscript{14} For Wood (1978, 22), concern with fair pay in relative terms can be more important than demands for fair pay in real terms.

Also, Okun points out to the long run commitments and arrangements between the firm and its workers as a common characteristic behaviour in the wage settlements. There is a “degree of fixity” involved in the decisions to supply and accept jobs, neither related exclusively to technical inputs of labour in the production process nor to legal or contractual barriers to hiring and firing: “It is the initial establishment of a relationship between an employer and an employee that imposes a ‘set-up’ cost, and that cost is generally shared by both employer and workers. As a result, the employer will have an investment in workers, and workers will have an investment in their firm. Bilateral monopoly is created, and it is made viable through the short-run sacrifice that each participant accepts in order to maintain the relationship for the long run” (Okun, 1981, 75-76).

In other words, wages are the outcome of a bargaining process between trade unions

\textsuperscript{13} See also Arestis (1992, 164).

\textsuperscript{14} “Unions may feel that since the firm is achieving high profit rates, they too deserve a higher share” (Arestis, 1992, 153).
and employers in which a series of factors are present. Wage settings reflect the competition and the struggle to maintain or improve relative positions. As such, money wage determination is derived from a conflict, basically a conflict over relative income shares. Workers try to set their wages by aiming a target wage, which expresses both a concern with functional distribution between wages and profits, and with an inter-wage distribution.

Wage negotiations focus on three aspects: 1) preservation of current wage, 2) achievement of a target wage,\footnote{"[W]orkers, whether unionized or, indeed, ununionized, bargain for a ‘target real wage’" (Arestis, 1992, 164).} and 3) reestablishment of wage differentials.

First, wage negotiations begin with workers trying to maintain the current level of wage. They contrast their current situation with their past condition and try to obstruct any worsening of accustomed previous purchasing power. If necessary, a revision of purchasing power can then be demanded. Occasional deterioration of the real wage due to past inflation will be taken into account in the ensuing round of negotiations (Arestis, 1992, 165).

Second, perceived gaps between current and target wage will lead to stronger demands for compensation. The perception that the difference between the current and the target rate is too high will lead to pressures to fill this gap. Accordingly, the degree of militancy may be increased.

Third, workers do mind about their position in the relative wage structure, as Keynes also emphasised. Decreases in wages are opposed because this would lead to a reduction in relative wages. Commitments to wage relativities restrict declines in the wage rates even in a context of higher unemployment. The rationale is that workers in one sector do not expect changes in the wage of other workers and if it happens they will attempt to match and increase

\footnote{"[W]orkers, whether unionized or, indeed, ununionized, bargain for a ‘target real wage’" (Arestis, 1992, 164).}
their wages (Arestis, 1992, 165-166).

We may even speak of leadership and imitation in the labour market, by analogy to the case of prices in the product market. Due to the pursuit of fair relativities, the best wage agreements become the reference which other future negotiations will consider. In this case, the "leader" sets a standard which the "imitators" will attempt to match. This is why "a major feature of the various wage bargains is their imitative character" (Lavoie, 1992, 385).

Wage increases rely on the "animal spirits" of the leaders of trade unions, of the members and also of the employers. They are also influenced by government's actions and public opinion. In this sense, money wages are for the most part an "exogenous" element in the determination of prices, their main causes being found in the historical, political and social circumstances which economic analysis alone cannot encompass if the aim is to afford a more comprehensive and realistic account (Lavoie, 1992, 377).

These are the basic factors affecting wage bargaining processes. Let me now turn to the determinants of inflationary processes.

VII.5) Inflation

As a result of the above discussion, we have now the basic elements to outline an account of inflation determination in which the role of conventions is emphasised. According to our previous arguments, inflation is normally a cost-led, not a demand-pull phenomenon.

Inflation is the aggregate result of changes in prices over time. If prices are defined at a "micro" level, inflation is determined at a "macro" level; it is also influenced by conventional behaviours in the product and labour markets. It is basically a phenomenon linked to firms' costs and the struggle over incomes (wages, profits and other forms of income) generated in
capitalistic production processes.

At the root of inflationary processes, apart from contexts of abnormal demand excess or unpredictable shocks in the firm’s cost structure (such as currency devaluations, sudden taxes or interest changes, crop failures etc.), one has also to contemplate the disruptive effects of the breaking down of settled conventions in the labour and/or product markets, such as, for instance, the absence of an agreement between workers and employers about which are the fair wages or of what is considered to be a fair profit rate in a specific sector of the economy. Unexpected events or innovations of various sorts may also have the strength to shake the stability of existing conventions and jeopardise the “normality” of the current state of affairs so as to induce a partial or full revision of the set of conventions in order to regain a new perspective of stable prices.

From all the considerations being made, the determinants of inflation in an open economy with government can be expressed in the following way:

\[
P = P\left(m, W, y, X, E, u, \mu, H\right)
\]

where

- \(P\) = inflation rate
- \(m\) = mark-up term
- \(W\) = wage rate
- \(y\) = productivity
- \(X - E\) = overall effect of price changes of raw materials
\( E = \text{exchange rate} \)

\( X = \text{world level of activity} \)

\( \mu = \text{shocks (taxes, interest rate, tariffs)} \)

\( u = \text{level of capacity utilisation, which is positively related to effective demand and indirectly related to the unemployment rate (Okun's law), that is, output changes are directly associated to employment changes (output growth may lead to unemployment reduction), so that the unemployment rate is} \ U = U(u), \text{and} \ dU/dt = c(u) \ du/dt, \ c(u) < 0 \)

\( H = \text{condensed effects of other variables, which cannot be captured via strict formalistic statements} \)

In other words, inflation is the aggregate result of a set of many changing factors affecting firms' costs, profitability and effective demand conditions. A more comprehensive account of inflation determination has to consider then:

1) firms' concern as to their expansion plans causing changes in the desired profit rate and in the mark-up;

2) changes in nominal wage rates;

3) labour productivity;

4) shocks (as the result of unexpected sudden changes in taxation, interest rates, tariffs etc.);

5) capacity utilisation levels reflecting changes in effective demand;

6) changes in costs as expressed by changes in the prices of commodities via the combined effect of world level of activity and exchange rate;

7) changes in costs related to variations in tariffs and corporate taxes;
8) capital flows and policy-making affecting the formation of exchange rates;

9) fracture of the set of familiar conventions in the product and labour markets, such as, for instance, concerns with fair relativities affecting wage bargains and the overall structure of wages, or perceptions of fair profit rates.

In sum, demand is but one factor among a more complex set of elements concurring at the same time, at different speeds, ways and intensities, to determine the rate of inflation of a country in a given historical context.

**VII.6) Types of Inflation and Conventions**

In the light of the previous discussions, let me illustrate now how different conventions operate under different types of inflation. A familiar taxonomy to analyse historical experiences of inflation classifies the inflationary phenomena in terms of mild or low inflation, chronic or inertial inflation, and hyperinflation. Instead of discussing these experiences in terms of the measurable monthly inflation rates, as, for instance, the classic investigation of Cagan and others, it seems more suitable to make an inquiry in terms of the typical conventional behaviours agents follow under each specific circumstance.

In economies with low inflation, price changes are mainly governed by costs and mark-up changes, with demand conditions exerting a secondary role. Price changes in one sector do not spill completely over the rest of the economy; sectorial increases are absorbed without having wider global impacts. Past inflation is not completely reproduced into the present. The transmission of the past results to the present is not perfect. Although some agents or firms may be experiencing a higher local inflation than the rate of inflation of the whole economy,
the typical behaviour is to act as if these increases will not be permanent. Expectations of
stability are more enduring. Big local shocks may have a comparatively small overall effect.

In economies experiencing chronic inflation, the past has an almost one-to-one
influence over the present. Propagation mechanisms are at work via indexation of contracts.
Last period’s overall inflation is an unbiased “predictor” of current price growth. The aim of
indexation of contracts via frequent income readjustments is to regain the previous,
accustomed real earnings at the beginning of each period of indexation. Past inflation sets a
floor for the ensuing inflation, engendering an inertial pattern. To follow the trajectory of past
inflation becomes, then, the main convention governing price formation. Localised price
shocks may have a proportionally large effect on the global inflation rate.

Hyperinflation abolishes the peculiar influence of past inflation in the determination of
current and future inflation rates typical of chronic inflation regimes. The convention now is
that the future will always be worse than the past. Price changes today are higher than past
ones and future rates will be higher than current ones. Conventional behaviour is grounded on
beliefs of increasing rates of inflation over time. Past inflation sets a floor for future
trajectories of inflation, which is always moving upwards. Expectations are highly elastic and
instability rules. Very small shocks may have huge impacts.

In a hyperinflation, domestic money tends to lose its function of store of value, being
gradually replaced by a foreign currency or another reliable substitute. There is a “flight from
money”. Contracts are increasingly shortened. Higher uncertainty and radical unpredictability
of events lead to the shortening of time horizons in calculations for decisions. Investment
decisions tend to be more affected.

In sum, depending on the type of inflation one is observing, one will find distinct types
of conventional behaviour, apart from the characteristic conventions which are present in any type of inflation (follow the cost-plus rule or assessment of the fairness of the current situation). The important thing to keep in mind is that distinct historical experiences involve context-related behaviour and, because of that, conventions strictly related to the context in which they are engendered may become more important and govern the more “conventional” conventions, but without ever eliminating the operation of the latter. It is just a matter of how, subject to contextual constraints, conventions are activated.
CONCLUSION

That decisions are taken under conditions of uncertainty is a fact that almost everybody would agree with. For the economic analyst, the challenge is how to theorise about decision making processes in which the knowledge people possess is incomplete.

One possible account of this is the mainstream view. Agents take their decisions either by regarding knowledge of the action context to be complete or assigning probability distributions to the consequences of their action with a great degree of confidence. In this view there is no distinction between risk and uncertainty. In this world, agents are fully-fledged optimisers, cognitively capable of choosing in every circumstance the best course of action, as well as being able to gather the amount of information required, though perhaps at a cost. Everything starts afresh again at the moment of the decision and agents have no constraints in the form of rules or conventions. There are no antecedents, only consequences. Conventions inherited from the past preclude the achievement of optimal results and are, therefore, distortions. The only “convention” governing behaviour is the universal optimisation procedure.

The starting point of this thesis, by contrast, is the acceptance of true uncertainty, the situation in which it is not possible to assign a probability distribution to the consequences of a course of action. This thesis sought to provide an account of behaviour in the face of uncertainty by focusing on the role of conventions as general
procedures for action sustained by implicit general agreement and in mitigating uncertainty.

Uncertainty arises from complexity of interactions and from the passage of time. When agents take their decisions, there are many events taking place at the same time as well as uncertain future results of their current actions and other people’s actions. Because our knowledge of the circumstances is incomplete, decisions are beyond the reach of conventional theories of probability; the imponderables belong to the realm of non-numerical, non-measurable, non-comparable probabilities.

Agents cope with uncertainty and ignorance by resorting to conventions and rules, which provide a sort of (tacit) knowledge for decision making processes. It is more rational to fall back on conventions than to apply in every place at every time the optimising rule, for while knowledge embodied in conventions was acquired by past socialised experience and is common knowledge, the knowledge which rational choice agents are supposed to possess is either unavailable or completely beyond human faculties of acquisition, processing and interpretation.

Conventions have a dual feature: they are the social and economic structures which help to co-ordinate human activities but also provide the basis for change. Change in conventions is the outcome of successful innovative, experimental behaviour induced by competition processes. The activity of innovation may render conventions obsolete and obliges revision of accustomed frameworks as well as imitation by the others. Thus, although it is rational to resort to conventions, it is also rational to undertake unconventional behaviour, for the activity of innovation is a sort of “wager”, which is implemented to obtain extraordinary gains and improve relative positions. The
rationality of unconventional behaviour is at the core of an account of the dynamics of conventions. Economic change can be interpreted as the result of human (non-conforming) actions that led to revision of conventions and rules.

I aimed at providing an account in which the idea of rationality is broader and which reconciles the constrained optimisation rule with convention-following actions in one general framework. Outcome-oriented behaviour and (non-consequentialist) convention-guided behaviour may perfectly well be some of the components of a general theory of action (see Elster, 1989b, 35; Rutherford, 1994, 77), which encompasses both those aspects related to individual self-interest narrowly defined and those impelled by other intentions, habits and psychological urgencies. The problem becomes one of how to demarcate the domains of applicability. A theory of rationality can only be successful and realistic if it contemplates many ingredients which are not conventionally regarded as "rational".

I now provide a summary of the main results of the thesis. I elaborated it in three stages: the foundational, the core and the applied.

The foundational part is constituted by the first three chapters. Chapter I discussed the concept of complexity, integrating and developing the ideas of Keynes, Hayek, Simon and the "science of complexity".

The concept of complexity covers several important aspects for an account of conventions. First, I stressed the organic character of phenomena in the world, in opposition to the "hypothesis of atomic uniformity". Individual parts of a whole have their existence by the very fact of belonging to a complex organic whole. In other words, "the whole is more than the sum of the parts".
The use of the concept of “organic complexity” raises some problems concerning the unrestrained employment of both mathematical formalisation and probability calculation as the basic tools assisting economic theorising, for their successful operation requires uniformity of nature and full measurability.

Second, in a world of “essentially complex phenomena” there is dispersion of knowledge and ignorance of many relevant facts taking place at the same time in specific circumstances. Individuals’ minds are limited in their capability of fully apprehending the endless number of events and cannot perceive many facts of experience. Because of that, agents have imperfect knowledge, subject to revision in the light of their experiences. As a practical solution, agents resort to some kinds of general procedures, mutually recognised through experience, such as conventions and rules.

The concept of complexity is also based on the idea of hierarchical systems, constituted by subsystems of a lesser degree of complexity which interact with each other and can be decomposable. Thus, firms’ activities in a capitalist economy are structured by a network of routines; each of these are different complex systems with distinct degrees of hierarchy. Complex systems emerge spontaneously from the simpler interactions among the parts concerned.

The notion of complexity entails relevant interactions. When agents take their decisions they take into account that there are other agents taking decisions which will influence, to a higher or lower degree, the results of their actions. The plans and the execution of plans affect the course of events conceived by others, and vice versa. Current plans are influenced by the results of others’ past actions and will affect the
future actions of other people. Future decisions will also be influenced by the decisions of the people in the common environment; and so on. Thus, intersubjectivity is the basic idea underlying complexity.

Complexity is one of the reasons why uncertainty arises. The other is time. Thus, in chapter II, I investigated which concept of time is needed to address a discussion of uncertainty.

There are basically two alternative concepts of time: logical and historical. For the purposes of this work, time is seen as irreversible, flowing from the irrevocable past to an unknown future. It is this notion of time which is consistent with the idea of uncertainty examined in chapter III.

The idea of historical time is at odds with deterministic explanations of the world. History is an open process in which free will and chance have an important role to play. Human imagination and crucial decisions preclude the full operation of rigid laws of necessity.

In the light of the account of historical time, this chapter also analysed the idea of equilibrium, in particular in its conventional Walrasian form. Much more than being an indispensable concept for economic analysis, general equilibrium may rather be an epistemic obstacle if the aim is the understanding of actual dynamic economic processes; as such, the analyst might well dispense with it. Some suggestions of reconceptualisation were made in order to render the concept more acceptable.

Chapter III discussed some versions of the principle of uncertainty, the important corner-stone which underlay my analysis of conventions as a whole. It traced the conceptual development of the notion of uncertainty throughout the works of
Knight, Keynes, Shackle and Davidson, stressing mainly the commonalities among them, but noting also important differences.

My starting point was that it is not correct to associate risk with uncertainty, for while the former can be numerically measured and, therefore, accounted for in terms of probability calculations, the latter, by definition, reflects a situation of lack of knowledge which probabilistic knowledge cannot remedy. It is not possible to measure uncertainty, for these probabilities are unknown.

Agents face situations in which they are ignorant about the future course of the relevant events that will affect their decisions and no certain knowledge can be obtained from the use of probability distributions. In economic life, uncertainty surrounds mainly investment and asset-holding decisions. Under conditions of uncertainty, agents draw upon conventions in order to make their decisions.

Crucial decisions cause uncertainty. In a reality where these “non-empty decisions” are taken, that is, decisions with “generative power”, which once taken change the original context of action, agents will face more uncertain knowledge about their imagined futures. Crucial experiments and the unfolding of time bring about essential novelty and situations characterised by “unknowledge”.

Crucial decisions create a uncertain, “non-ergodic” environment. In ergodic systems, reality is immutable; the future is a mere statistical reproduction of the past. On the other hand, in non-ergodic processes, the reality may be transmutable, creative.

My point is that one cannot even think about convention without previously conceptualising uncertainty. Conventional behaviour is the natural result of a world immersed in uncertainty.
The core part comprises chapters IV, V and VI. Chapter IV investigated the nature of conventions and rules. I found an important commonality between the approaches of Keynes and Hayek, not explored elsewhere. I then integrated and developed their ideas.

Keynes's conventions are general procedures which agents draw upon in response to the fact that they do not have sufficient knowledge about the future. In the face of uncertainty, people act as if "the future will resemble the past". Also, conventions are spontaneously arrived at, the result of past experience and interaction ("conform with the behaviour of the majority or the average"). Hayek's social rules of conduct are also social structures, acted upon to acquire (tacit) knowledge embodied in them. If they constrain, they also enable actions. Resort to these rules helps agents to cope with their "irremediable ignorance" derived from "essentially complex phenomena".

Conventions and rules are the embodiment of a form of knowledge. Systematic resort to conventions may create a transient context of predictable, reliable regularities which are believed secure. Conventions induce interactions among decision-makers. I stressed the intersubjective character manifest in the act of following a convention or rule, a position which is in contrast with analyses based on methodological individualism.

The central ideas underlying my account were: a) economic behaviour is essentially conventional, b) conventions are the structures or procedures which help to promote co-ordination of activities, and c) although providers of stability, conventions are not static.
Having investigated the main elements of a theory of the genesis of conventions
I then addressed, in chapter V, their dynamics of change.

An account of the dynamics of convention needs to begin from well defined
starting points. First, there are two important kinds of decisions, namely, conventional
and non-conventional. Conventional or routinised decision is stabilising and
reproductive. Non-conventional decision may be destabilising and transformative.
Successful unconventional behaviour engenders the new and changes the information
parameters or structures upon which previous decisions were made. They may give
rise to an emergent new behaviour, if there is convergence to the new behaviour
following the obsolescence of conventional forms of activity. This is distinct from a
stable consolidated pattern, where behaviour has already converged to an average or
modal practice. It is the latter (routine) which functions as the underpinning for the
operation of the former (innovation). The emphasis is on the centrality of routines
within the firm. I analysed economic change as change in routines.

Second, I took into account the strategic role of innovation as the driving force
of the changes of the system and the active role of the firm in a competitive
environment as source of novelty. Competition is a process of discovery of the new.

Third, some agents take more risks than others and this makes possible the
disclosure of unexploited opportunities, an increase in potential benefits, and the
creation of novel frameworks. Changes in conventions can be in many respects due to
this “spontaneous urge for action rather than inaction”. Keynes’s conception of animal
spirits, together with the ideas of Schumpeterian entrepreneurship and Shacklean
creativity, were the representations of aspects of reality which I developed in order to
account for the sources of unconventional behaviour leading to revision of conventions and rules.

Rational choice theory is one of the analytical conventions governing conventional practices of economic research. Chapter VI discussed this version of rational economic behaviour in the light of the basic concepts informing the present work.

I sought to integrate and develop the ideas of Simon, Keynes and Hayek about rationality and submitted an alternative, exploratory version. I named it rationality as contextual reasonableness.

This alternative view accounts for behaviour which is based on "satisfaction", not maximisation, and resorts to conventions. Agents' capability of being rational is bounded by both their limited powers of calculation and limited knowledge. Agents have some good reason to behave the way they behave and do as well as possible in the circumstances. One form of coping with the cognitive obstacles surrounding their actions is to resort to the existing set of conventions with which they are familiarised.

The analytical implication is that optimal decisions become limiting cases of economic behaviour within a larger set of behavioural possibilities. It can operate under quite selective conditions. It may even be useful for very simple and highly certain situations, but it is unsuitable for highly complex and uncertain choice circumstances. In other words, it is a theory which cannot provide satisfactory description and explanation of rational behaviour under uncertainty. If knowledge is fallible and contingent, to follow the optimisation rule might be "irrational".
In the light of the theoretical results achieved up to this chapter, I then made an “applied” discussion of conventions in the last chapter of this work, as an illustration of the argument.

Chapter VII analysed the most important types of conventions operating in price determination. The activity of pricing is the result of conventions, “rituals” and custom, which partly condition the basic practices necessary to run a business. They assist certain operations which in their absence would otherwise be costly and probably untenable from a practical point of view.

The basic rule is cost-plus pricing. In this account, prices were not seen as market equilibrium prices, influenced exclusively by short-run variations in demand. They are neither resource allocators nor indexes of temporary scarcity, but rather administered prices, their level fixed to cover the costs of production and to finance firms’ expansion plans. They are both reproductive and transformative; that is, they must allow firms’ operations to take place over time and may result in change of accustomed practices.

An analogy with routinisation of activities illustrates the case. Like routinisation, prices are reproductive mechanisms which allow the firm to continue to perform its basic activities. In the same sense, they can be also transformative devices. When innovations are successful they have the power to break accustomed routines as well as change prices. Lower prices and new routines are the outcome of successful innovations induced by the competitive struggle.

Prices in this account are both stabilising and “disequilibrating”. Prices expand markets, concentrate industries, develop new ones, and finance investment. Structural
change is intrinsic in the mark-up pricing of products, and it is the possibility of transformation of structures which comes with this type of pricing that makes it so important.

Moreover, the framework for the setting of most prices and wages is not the need to clear markets in the short run, but rather the longer-term considerations such as customer-supplier and employer-worker relations, concerns as to the fairness of relative positions, and the need to finance the firm's expansion plans. These factors isolate wages and prices to an important degree from the effects of changes in demand, and all of them contribute for quantity adjustment to be made, most of the times, in terms of employment and output.

Conventions also govern activities in the labour market, mainly throughout the role played by "normative pressures", such as custom, concern with fairness and norms of pay. Although market forces also influence the wage structure and wage bargaining processes, resort to conventions can be a more pervasive feature.

I then discussed inflation determination, taking into account the role of conventions. Different inflationary regimes produce distinct conventional behaviours. On the whole, inflation was accounted for as the overall result of cost changes, variations in capacity utilisation due to effective demand conditions, conflicting claims over income distribution, and the breaking down of established conventions generating an unpredictable and unstable frame of reference for action.

My approach in this chapter is consistent with the basic concepts and ideas of the previous chapters. The following elements are present:
1) conventional pricing behaviour is based on interaction, because of price leadership and imitation as well as the ever present concern with fair relativities;

2) prices are neither the result of deterministic forces nor the equilibrium solution of a co-ordination problem;

3) there might well be situations in which there is no sufficient knowledge to inform what are the "right" prices, so that firms embark on the existing "accustomed way of doing things";

4) prices are "referential information", but also points of departure;

5) there is relative stability but also precariousness in the setting of prices, for unpredictable shocks of various nature may occur;

6) changes in prices not due to demand variations may be the result of non-conventional behaviour leading to successful innovation.
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