4 Market with irreversibilities

In chapter 2, it was demonstrated that, under certain hypotheses, the unique price that becomes established in the market is constructed progressively by agents entering into contact with each other and dividing simultaneously into two groups, those who buy or sell and those who no longer operate.

Four hypotheses were made in order to reach this result:

- The good being exchanged undergoes no modification over time.
- There are no information costs or adaptation costs of any kind for any of the agents.
- Any agent can enter into contact with any of the other agents at any time and together with his memory these contacts constitute his only source of information.
- Each agent is only concerned with obtaining the best price – the highest if he is a seller, the lowest if he is a buyer. The minimum price acceptable to the seller and the maximum price acceptable to the buyer are invariant.

These hypotheses entail a concept of time with no direction. Whatever the state of the market at a given time, its final state will be the same. In other words, there are no irreversibilities, i. e. transformations of the good, constraints or costs implicit in the change of the market from one state to another.

Many different forms of irreversibilities are encountered in economics. In this chapter we shall consider three of them:

- Costs that we can consider as being connected with *frictions*. We shall examine two aspects of these costs successively: *information costs* sustained by an agent looking for a job or for a worker and *transition costs* (costs of laying-off or training workers for a firm, costs of adaptation to a new job for a worker),
- *Irreversibilities of investment*, which we shall examine in the context of one particular case: that of workers who invest by accepting the expense involved in moving locality and in changing from one labour market to another,

- *Irreversibilities of knowledge*, as the development of the market enables agents to acquire particular skills and knowledge.

Introducing irreversibilities into the traditional market equilibrium model is no easy task, as they only become apparent in a dynamic of evolution through a succession of states. On the other hand, they can be taken into account quite naturally in models derived from the one given in chapter 2.

The presence of irreversibilities generates a much wider range of results. The stable state characterised by a unique price independent of the history of the market is often replaced by multiple stable states associated with dispersed prices. The attainment of any one of these states is dependent on the random events affecting the progression of the system.

4.1 Background and problems

The impact of irreversibilities on the functioning of markets has of course preoccupied economists from the beginning. We could take as an example the many works devoted to the imperfection of information. For a long time, analysis was hindered by the domination of static models, which sometimes even resulted in inaccurate conjectures. However, certain works published over the last few decades have contributed to progress on this question. Here we will limit ourselves to citing the studies of Stigler on the economics of information (1961) and the analyses of J. Stiglitz (1967) and of S. Salop and J. Stiglitz (1982) on equilibrium in markets with imperfect information. These works have started to bring to the fore phenomena studied for some time by physicists working on the dynamics of irreversible systems, but they have yet to establish the general framework.

In fact, irreversibility implies "*a breaking of symmetry between before and after*" (Prigogine and Stengers, 1988). Hence the possibility of the occurrence of *events*. "By definition, an event cannot be deduced from a determinist law. It implies, in one way or another, that what has occurred could have not occurred, therefore reflecting a realm of possibles that no knowledge can reduce." Nevertheless, an event is only of interest if it is significant, in other words likely to transform future evolution and thus generate new coherences.

These aspects, often hidden in the literature on the subject, will be brought out clearly in the models in this chapter.