

Chapter 10

Is a Stock Exchange a Computer Solution?

Explicitness, Algorithms and the Arizona Stock Exchange

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ABSTRACT

The paper examines, through a case study on the Arizona Stock Exchange, how computerization challenged the definition of the stock exchange in the context of North-American financial markets in the 1990's. It analyses exchange automation in terms of trials of explicitness: the computational formulation of what an exchange is calls for a detailed explication of the (variable, often conflicting and unanticipated) processes and properties of price formation. The paper focuses in particular on the argument of the concentration of liquidity in one single point, which was central to the development of the Arizona Stock Exchange (an electronic call auction). It then asks what kind of revolution is the 'explicitness revolution' in the design of allocation mechanisms.

INTRODUCTION

Expressing markets (or economic institutions in general) in computational terms is an intellectual venture that has often characterized, sometimes quite decisively, the ambitions of economics. But this venture is not only of an intellectual kind. It is also practical, industrial and commercial. Many of the innovations characterizing the organization of markets since the mid-seventies at least are in fact about the introduction of computers at the heart of

market processes, this being particularly visible in the case of financial markets. The Arizona Stock Exchange stands as an interesting example of how the vocabulary of stock exchanges evolved with the introduction of machines. This 'market' (I use inverted comas because its status as such was itself a matter of controversy), although modest and short-lived (launched in the early 1990s and closed in early 2002 due to a lack of volume), was an important player in the history of electronic markets. Its near-paradigmatic character explains that role: spearhead in the struggle for legal recognition of 'alternative trading systems', star in the

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academic literature on the quality of automated price discovery, and locus of innovation and algorithmic experimentation, the Arizona Stock Exchange enables us to identify salient points of what happens to markets (as objects not only of science but also of engineering) when they are confronted to algorithmic formulation.

This paper posits itself as a contribution to the sociological appraisal of market devices, that is, to the examination of how several kinds of apparatuses do contribute to the formation and deformation of market realities, in resonance with the viewpoints emphasized throughout actor-network theory (Callon & Muniesa, 2005; Callon, Millo, & Muniesa, 2007). The empirical context is the struggle for computer-assisted liquidity enhancement that characterised the transformation of North-American financial markets in the nineteen-eighties and nineteen-nineties. The argument is that computers posed a challenge to the very definition of what an ‘exchange’ is and also that presenting a market in the terms of a ‘computer solution’ introduced what I term a ‘trial of explicitness’: a call for detailed explication of the process and properties of ‘price discovery’. The underlying theoretical assumption is that to make something explicit is not about clarifying or implementing something that is already prefigured as a potential reality, but rather about putting that thing to the test of variable, often conflicting and unanticipated forms of actualization – hence the idea of ‘trial’ (Latour, 1988).

The account which follows draws primarily from archival sources.¹ The next section is a brief presentation of the idea of a trial of explicitness and its intellectual context. In the next section, I examine how electronic trading systems such as the Arizona Stock Exchange challenged existing notions of the stock exchange. Then, I present the connexions between this system and research in economics, and their corresponding investigation on the concrete explication of price equilibrium. I then focus more narrowly on the crucial argument of the concentration of liquidity in one ‘single

point’ and the electronic call auction. I finally examine the algorithmic advancement of the Arizona Stock Exchange in the face of multiple calls for explicitness. In the concluding discussion, I propose a critical comment on what does it mean to consider markets as computer solutions.

THE PROBLEM OF EXPLICITNESS

The notion of explicitness has two sides. One is the very mundane idea of being called to make a clearer and more detailed statement about something that was initially formulated in rather loose terms or only in terms of general principles. This idea of making something explicit is often linked to the problem of the ‘implementation’ of something (of an idea, a project, a measure or a rule, for example). The second side of the notion is philosophical – more difficult and complicated. It is linked to the concept of ‘explication’ (‘*explicatio*’ in Latin, perhaps best translated as ‘*explikation*’ for instance in German, or ‘*explicitation*’ in French).² The notion conveys of course something of an idea of unfolding, of deploying, of opening up (opening the fold, the ‘*pli*’), as opposed for instance to an idea of folding, or of complicating. But it is not very clear what this may mean and the philosophical problem of explication is an open one. Of particular interest for instance is the question of how prefigured (how ideated) is the thing that undergoes explication. Is explication about the laborious unveiling (or the working out) of something that is already there, implicit? Or is it a creative, performative, generative, provocative process that adds more reality to reality? And is it about the breath of intelligence tackling an initially chaotic matter and turning it meaningful (‘*pneuma*’ over ‘*plasma*’)? Or is it rather about a seamless play of folding and unfolding in a world which is constituted only by what happens at its surface?

A possible inclination for the second term of these two sets of questions is visible in a number of philosophical traditions which have been em-

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