Agents' ability to manage information in centralized markets: Comparing two wholesale fish markets

Gianfranco Giulioni *, Edgardo Bucciarelli

Department of Quantitative Methods and Economic Theory, University of Chieti-Pescara, Viale Pindaro 42, 65127 Pescara, Italy

ARTICLE INFO

ABSTRACT

In this paper, we perform an empirical investigation to detect if and how agents' behavior changes with the amount of available information they have. To this aim, we use data from two wholesale fish markets of different thicknesses. We tackle the issue by investigating features such as the dynamics of the structure of attendance in auctions, the varieties of fish presentations during the seller's turn and the presence of long-term relationships between buyers and sellers. We perform the investigation in this way instead of focusing on the dispersion and dynamics of prices to prevent unobserved quality differences of the traded fish varieties from biasing the results of the analysis. The results of our investigation are consistent with a situation in which the magnitude of phenomena like buyers' loyalty to sellers and agents following rules of thumb increases with the market thickness.

© 2011 Elsevier B.V. All rights reserved.

1. Introduction

This work aims to contribute to the understanding of how markets for perishable products function. Markets for perishable products offer a number of issues to investigate (Kirman, 2007). Some of them are reported hereafter. The first point is why markets for the same commodity have different organizational settings (bilateral bargaining, ascending or descending auction), as is the case with fish markets. Second, perishable markets are kept in a clearing condition because stocks cannot be carried over, this feature makes them a good candidate for comparison with the standard textbook case. Third, the aforementioned property removes the presence of phenomena like inter-temporal substitution that makes the empirical investigation of the individual behavior simpler.

Although descriptions of such types of markets come from the Greek and Roman periods, recent scientific works on the topic are rare. Kirman and Vignes (1991), Härdle and Kirman (1995), Weisbuch et al. (1998) and Kirman and Vriend (2000) investigate the Marseilles fish market; Graddy (1995, 2006) focus on the Fulton fish market in New York and Kirman et al. (2005) on the Marseilles fruit and vegetable market. The above-mentioned papers show how markets for perishable products, contrary to what is expected, are characterized by patterns of behavior that may suggest imperfect competition and a segmented market. A possible explanation is that in these markets buyers act like agents for customers with very different elasticities of demand and bargaining styles; extensive knowledge of the sellers may also create the basis for tacit collusion and allow dealers to gather economic rents by exploiting the different elasticities and buying patterns (Graddy,

---

* Corresponding author.
  E-mail address: g.giulioni@unich.it (G. Giulioni).

2006). In the papers analyzing the Marseilles fish market, the authors find the presence of a significant level of loyalty from buyers to sellers. These long-term relationships could also prevent achieving a situation of perfect competition. In all of the cited works, however, the analyzed markets differ greatly from the ideal theoretical market mainly because their exchanges take place after a bilateral bargaining process instead of being the outcome of a centralized market organization.

Upon analyzing the Pescara and Giulianova[1] wholesale fish markets, this paper aims to contribute towards this strand of economic literature. Below, we will refer to these markets with the acronym MIPE, which is a shortcut for the Italian language expression *Mercato Ittico PEscara*, and MIGI that contracts *Mercato Ittico GIulianova*. The present work differentiates itself from the cited literature in two aspects: first of all, the investigated markets have a centralized structure organized as a Dutch auction. From this point of view, our situation is closer to the theoretical one than that analyzed in previous works which analyze markets where exchanges take place on the basis of bilateral bargaining. Secondly, we marginally rely on the observed prices to avoid the effect of unobserved qualitative differences.[2] We perform an empirical investigation to identify if and how agents' behavior changes with the amount of available information. Indeed, the two observed markets differ in size with MIPE being significantly larger than MIGI, so that operating in the first one implies managing a larger amount of information. Our aim is to investigate if agents take advantage of being in a larger context with a greater amount of information or if they are motivated to adopt rules of thumb and habits because of increasing difficulties in managing large information sets. The topic of the use of habits and rules by economic agents and organizations has been long debated in economics. (The most well-known works are perhaps those of Herbert Simon.) A relevant article from our point of view is the one by Hodgson (1997), which identifies seven circumstances "[...] in which habits and rules are advantageous for human decision-making or action." (Hodgson, 1997, p. 664). These circumstances are: *optimization*, *extensiveness*, *complexity*, *uncertainty*, *cognition*, *learning*, and *communication*. Hodgson maintains that the paradigm of *optimization* is not universal. It is only one of the seven circumstances that are reliant on habits and rules. The concepts of *extensiveness* and *complexity* seems particularly relevant to markets for perishable commodities. In our opinion, *extensiveness* mainly concerns buyers' behavior in markets characterized by bilateral bargaining (Kool et al., 1997, for example analyze the farmers' buying process). For the markets under scrutiny in this paper, the concept of *complexity*, which in Hodgson's taxonomy concerns the limited computational ability of agents (see also Heiner, 1983), is relevant. Our main interest is to investigate how the use of rules and habits changes with the market thickness. The eventual increase in relevance of these phenomena when the size of markets under investigation increases, could be seen as a signal that rules and habits are more grounded on *complexity* rather than *optimization*.[3] This fact is also in line with the observation that the concept of optimization loses its significance in changing and uncertain environments (Dosi and Egidi, 1991) like the ones we are observing.

The paper is organized as follows. After the description of the markets (Section 2), we examine, in turn, the behavior of sellers and buyers. For the former (Section 3), we discuss in particular their decisions in selecting fish varieties presented during a market session. The questions we want to answer are as follows: are there preferred structures? If yes, are they rationalizable? In analyzing buyers (Section 4), we focus on a different topic: the buyer–seller relationship. The main goal of this section is to identify the degree of buyers' loyalty in the analyzed markets. In Section 5, a global picture of the markets is obtained by analyzing the buyers' and sellers' decisions on their weekly attendance structure. Section 6 presents concluding remarks.

2. Markets description

MIPE and MIGI have centralized structures organized as Dutch auctions. In particular, in each of their sessions, two auctions go on simultaneously. We will refer to the three types of agents operating in the market as sellers, buyers and auctioneers. Sellers are the trawler owners who bring the fish to the market after catching it in the nearby sea. In turn, buyers purchase the fish to sell it to the final consumers, to supermarkets or to transform it (cooking or making ready-to-cook products). Finally, the auctioneers direct the transactions and decide the initial price for each type of fish (fish is arranged in cases of 4–5 kg).

2.1. Description of a typical session

Before the beginning of a market session, sellers are randomly selected, and the first two are each assigned to one of the two conveyor belts crossing the market hall. When the belts start moving, the selected sellers put the cases on one end of their assigned belt, and the cases flow slowly towards the other end. Each case, still unsold, stops on the automatic weighing machines located in the middle of the conveyor belts. The auctioneers stir the fish to let buyers see the fish lying at the bottom of the case; they often take a fish from the case and show it to the attendees. The auctioneers communicate to the

---

[1] Pescara is a medium-size Italian city situated approximately in the middle of the Italian East Coast. Giulianova is a smaller city about 30 km north of Pescara.

[2] As it will be specified below, our data record the fish variety and only in some occasions include a more detailed classification. Whether the price volatility observed in these markets for each fish variety is due to qualitative differences or to other factors is an open issue that we are investigating. A first step towards the understanding of buyers' bidding behavior can be found in Giulioni and Bucciarelli (2008).

[3] A recent paper related to the present one is that by McLaren (2003), which discusses the advantages and drawbacks of increases in market thickness.