



Review article

Asset markets in the lab: A literature review

Simone Nuzzo^a, Andrea Morone^{a,b,*}^a Dipartimento di Economia, Management e Diritto d'impresa, Università degli Studi di Bari, Aldo Moro, Italy^b Departamento de Economía, Universidad Jaume I, Castellón, Spain

ARTICLE INFO

Article history:

Received 2 August 2016

Received in revised form

3 December 2016

Accepted 15 February 2017

Available online 17 February 2017

Keywords:

Experimental asset markets

Information

Stylized facts

Trading institutions

Bubbles

Crashes

ABSTRACT

This paper aims at providing an overview of several topics that have been addressed in the field of experimental asset markets. Rather than being exhaustive in any single topic, this review is meant to gather the several research strands, and to provide a powerful picture of the main advances in the use of experimental techniques for the study of financial markets.

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1. Motivational framework

“The social scientist who would like to study in isolation and under known conditions the effects of particular forces is, for the most part, obliged to his “experiment” by the application of general reasoning to abstract models” (Chamberlin, 1948).

Because of the complexity of the real world, using field data it is not always possible to control for all the factors which are expected to be relevant when a given phenomenon is studied. As a consequence, validating theoretical model predictions by use of field data has some limitations. This drawback has led to a growing body of scientific research focusing on the use of experimental

methodologies to test theoretical models in a controlled environment, like a laboratory. The latter, differently from field techniques, allows researchers to keep under control all the variables which are supposed to be prominent.¹

Asset markets are among those fields which best suit a controlled laboratory environment. Indeed, variables like the fundamental value of a financial asset, the information conditions, and the asset life period are difficult to be accounted for in markets outside the lab, causing research on asset markets to be unmanageable when based on field data. In a laboratory environment, conversely, researchers can exogenously control and observe the key parameters of the market. This latter benefit has been one of the main factors driving research on experimental asset markets. At the end

* Correspondence to: Università degli Studi di Bari “Aldo Moro”, Dipartimento di Economia, Management e Diritto dell’Impresa, Largo Abbazia Santa Scolastica, 53, 70124 Bari, Italy.

E-mail addresses: a.morone@gmail.com, andrea.morone@uniba.it (A. Morone).

<http://dx.doi.org/10.1016/j.jbef.2017.02.006>

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¹ Also the external validity of the findings should be taken into account when choosing between the use of field or experimental approaches.

of the '90s some prominent surveys were published. In his seminal paper [Sunder \(1995\)](#) gave an authoritative survey of experimental asset markets focusing on (i) informational efficiency of markets, (ii) bubbles, and (iii) econometric comparison of field and laboratory data. [Duxbury \(1995\)](#) provided a critical review of the concept of market efficiency and how to test it. [Cadsby and Maynes \(1998\)](#) gave a survey on laboratory experiments in corporate and investment finance.

Since then, asset market experiments have been an area of increased research interest. After 1995 many papers on different fields of financial markets have been published, and there are several recent contributions which update the work of [Sunder \(1995\)](#). [Noussair and Tucker \(2013\)](#) reviewed experimental research on asset pricing; [Palan \(2013\)](#) surveyed bubbles and crashes; [Powell and Shestakova \(2016\)](#) reviewed the latest research on experimental asset markets, where the values of the traded assets are homogeneous across all agents; [Duxbury \(2015a,b\)](#) presented some interesting literature related to experimental and behavioural finance, focusing on biases, moods and emotions.

The aim of our paper is to provide a literature review of those parts of experimental financial economics which have not yet been updated since the end of the '90s.

To be more precise in Section 2 we will describe issues related to information release and market structure. Section 3 reports on the interaction between private and public information. Section 4 explores some stylized facts of the distribution of returns in experimental asset markets. Section 5 reviews the role of market institutions on trading activity. Section 6 briefly reports some new works on bubbles and crashes and discusses the role of traders' emotions and bounded rationality on asset markets. Section 7 analyses the role of payment incentives in asset markets. Finally, Section 8 concludes.

2. Information release and market structure

Plenty of research has been conducted to shed light on the relationship between market performance and market structure, with a particular focus on how information is released in the market. Indeed, there are some papers where information is polarized, i.e. some subjects are insiders and some others are uninformed ([Plott and Sunder, 1982](#); [Camerer and Weigelt, 1991](#); [Brandouy et al., 2000](#); [Noussair and Xu, 2015](#); [Palan and Stöckl, 2016](#)); where subjects can buy information during the trading period ([Hey and Morone, 2004](#); [Ferri and Morone, 2014](#); [Alfarano et al., 2011, 2015](#)); and/or where a fixed amount of partially trustable information is exogenously provided to all subjects before the trading period starts ([Barreda-Tarrazona et al., 2016, 2017](#); [Lux et al., 2016](#); [Morone and Nuzzo, 2016](#)).

[Brandouy et al. \(2000\)](#) provide evidence about price formation, asymmetric information and insider trading influence. They investigate, by means of a laboratory experiment, the effects of several manipulations of asymmetric information and communication in a double-auction stock market. They find that asymmetric information leads to inefficient trades when it is not revealed to market participants, causing insiders to make higher than average profits. On the contrary, the revelation of the presence of insiders significantly increases market efficiency but only in relation with bad news. Risk adverse traders' strategies may be responsible for the lower market efficiency when market participants are provided with good news. Communication of uncertain information (agents were forbidden to prove the veracity of their communications) decreases price efficiency, since the consequent rumour weakens insiders' signals.

[Schnitzlein \(2002\)](#) studies order-driven dealer markets where there is uncertainty about the number of insiders in the market. He finds that insiders are more likely to compete aggressively

when the number of insiders is common knowledge than in the treatment without disclosure. Moreover, uncertainty about the actual number of insiders slows the convergence towards the fundamental value of the asset. So, price efficiency is higher when the number of insiders is publicly known. This occurred because, in the disclosure treatment, the aggressive competition tended to reveal a lot of information and this allowed non-insider subjects to easily infer the insiders' information, and to adjust their behaviour accordingly. In the no disclosure treatment, non-informed agents do not succeed in making such an inference. Therefore, not only the presence of insiders but also what non-informed traders know about the insider presence affects market performance.

In an extension of the [Banerjee \(1992\)](#) and [Bikhchandani et al. \(1992\)](#) models, [Hey and Morone \(2004\)](#) study a (double auction) market where partially trustable information can be purchased at some positive cost. In this framework, on one hand, when information is private, socially undesirable herd behaviour may result; on the other, hand private information may be aggregated efficiently through the price mechanism. The authors find that socially undesirable behaviour does result, i.e. misinformed agents acting on their private information mislead the market. Nevertheless, socially undesirable behaviour can be eliminated through the market. Moreover, greater volatility is detected when the reliability and the cost of information were, respectively, lower and higher. Both conditions are responsible for less information and more noise in the market.

[Huber et al. \(2008\)](#) provide additional experimental evidence about the role of privileged information. In a framework where information is cumulatively distributed, the authors studied whether having more information leads to higher returns. While some research ([Copeland and Friedman, 1992](#); [Ackert et al., 2002](#)) shows that insider profits outperform the non-informed ones' when only two levels of information exist, [Huber et al. \(2008\)](#) design an experiment where having more information than others means to have the same plus some extra information. This study shows that there is a wide range of levels of information in which having additional information does not provide benefits in terms of higher returns. A positive relationship between information and higher profits was detected only for very high levels of information.

[Hanke et al. \(2010\)](#) study the economic consequences of the imposition of a Tobin Tax. The latter tax aims at fighting speculation and stabilizing foreign exchange markets. The experimental design consists of two double-auction markets where a foreign currency can be exchanged for the home currency. Each agent can simultaneously be active in both markets. Treatments differ with respect to two features: the market on which, and the moment when, the tax is levied. Results show that volume is negatively affected by the tax imposition, since transactions move from the taxed to the untaxed market. Market inefficiency does not change when both markets are taxed but significantly increases in the taxed market when only one market is taxed. The latter result confirms the findings of [Bloomfield et al. \(2009\)](#) and [Cipriani and Guarino \(2008\)](#). Finally, market volatility is not affected by the tax imposition.

One year later, [Kirchler et al. \(2011\)](#) show that the impact of a Tobin tax on market volatility depends on the presence of market makers. They show that, when a Tobin tax is levied on one market, volatility increases if no market makers are present. On the contrary, when there are market makers in the unique taxed market, volatility declines. In the last case, in which both markets are taxed, there are no significant effects on volatility.

[Noussair and Xu \(2015\)](#) study the occurrence of financial contagion and its relationship with information mirages in an experimental asset market. Two assets are traded and the value of one of them is, at some point, reduced by an exogenous shock. The correlation between the two assets may be known or unknown with 50% chance. In the former case, only half of the traders know the

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