Available online at www.sciencedirect.com

ScienceDirect

Journal of Economic Theory 158 (2015) 558–584

JOURNAL OF Economic Theory

www.elsevier.com/locate/jet

Private information and sunspots in sequential asset markets ☆

Jess Benhabib [a], Pengfei Wang [b]

[a] *Department of Economics, New York University, 19 West 4th Street, New York, NY 10012, USA*
[b] *Department of Economics, The Hong Kong University of Science and Technology, Clear Water Bay, Hong Kong*

Received 30 September 2013; final version received 6 November 2014; accepted 16 December 2014

Available online 29 December 2014

Abstract

We study a model where some agents have private information about risky asset returns and trade to obtain capital gains, while others acquire the risky asset and hold it to maturity, forming expectations of returns based on market prices. We show that under such a structure, in addition to fully revealing rational expectations equilibria, there exists a continuum of equilibrium prices consistent with rational expectations, where the asset prices are subject to sunspot shocks. Such sunspot shocks can generate persistent fluctuations in asset prices that look like a random walk in an efficient market.

JEL classification: D82; D83; G12; G14

Keywords: The Grossman–Stiglitz paradox; Sunspots

1. Introduction

The efficient markets hypothesis states that prices on traded assets reflect all publicly available information. In their classic work Grossman and Stiglitz [16] discussed a model where agents can obtain private information about asset returns and can trade on the basis of that information.

☆ We are grateful to referees and the editor for comments and to Federico Filippini who found an error in an early draft. Wang acknowledges the financial support from the Research Grants Council, University Grants Committee, Hong Kong under project number 693513.

E-mail addresses: jess.benhabib@nyu.edu (J. Benhabib), pfwang@ust.hk (P. Wang).

http://dx.doi.org/10.1016/j.jet.2014.12.003

If, however, the rational expectations equilibrium price reveals the information about the asset, and if information collection is costly, then agents have no incentive to collect the information before they observe the price and trade. But then prices no longer reflect the information about the asset, and markets are no longer efficient. Since then a large empirical and theoretical literature has explored the informational efficiency of markets under private information.[1]

We study the possibility of multiple rational expectations sunspot equilibria driven by non-fundamentals in asset markets with private information by introducing a simple time dimension to markets where agents trade sequentially. In our simplest benchmark model short-term traders have noisy information about the return or dividend yield of the asset, but hold and trade the asset before its return is realized at maturity. The returns to short-term traders consist of capital gains. Investors, on the other hand, who may not have private information about the returns or dividend yields, but can observe past and current prices, purchase and hold the asset for its final dividend return. While we do not impose constraints on borrowing, asset holdings, or short-selling,[2] we exclude traders that have private information on dividends from holding the risky asset from its inception at time 0 all the way to its maturity when terminal dividends are paid.[3] We show that under such a market structure, in addition to equilibria where equilibrium prices fully reveal asset returns as in Grossman and Stiglitz [16], there also exists a continuum of equilibria with prices driven by sunspot shocks. These equilibria are fully consistent with rational expectations and they are not randomizations over multiple fundamental equilibria. Furthermore the sunspot or sentiment shocks generate persistent fluctuations in the price of the risky asset that look to the econometrician like a random walk in an efficient market driven by fundamentals.[4]

Multiple equilibria also arise in Cespa and Vives [13] in a two period model of sequential trading with short-term traders and noise or liquidity traders, whose demands for assets are persistent, or correlated across periods. Risk-averse short-term traders limit their trading because of price uncertainty, but the persistence of asset demands by liquidity traders limits the information about fundamentals revealed by prices. This dampens the response of investor demand since prices become less informative about fundamentals (liquidation values), and thus tends to reduce price volatility. On the other hand faced with lower volatility, risk-averse short-term traders trade more aggressively based on their private information. Under these effects, driven by the persistence of the demand by liquidity traders across periods, they obtain two equilibria: a high information equilibrium with low volatility and prices that are informative about fundamentals, and a low information equilibrium with high volatility and prices that are less informative about fundamentals.

In the next two sections we start with a simple three-period model and derive results on the fundamentals and the sunspot equilibria of our model, and we discuss the intuition behind our results. In Section 4 we study more general information and signal structures to show that our results are robust to such generalizations. We relax the assumption that all short-term traders perfectly observe the same sunspot and allow them to observe private sunspot or sentiment signals that are correlated. We show that our results in the benchmark model carry over to this case. We

[1] See for example Malkiel [18].

[2] Compare, for example, with Miller [20] or Harrison and Kreps [17] where traders hold heterogeneous beliefs about terminal returns, but where short-selling constraints rule out unbounded trades.

[3] This market structure or similar ones involving short-term traders and long-term investors have been widely used, for example in Cass and Shell [12], Allen and Gorton [1], Allen, Morris and Shin [2], as well as in Angeletos, Lorenzoni and Pavan [3] where entrepreneurs sell their investments to traders. See our discussion in Section 9.

[4] See Section 7. For a survey of the literature on asset prices driven by sentiments see paper of Baker and Wurgler [8].