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Price bubbles sans dividend anchors: Evidence from laboratory stock markets

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Abstract

We experimentally explore how investor decision horizons influence the formation of stock prices. We find that in long-horizon sessions, where investors collect dividends till maturity, prices converge to the fundamental levels derived from dividends through backward induction. In short-horizon sessions, where investors exit the market by receiving the price (not dividends), price levels and paths become indeterminate and lose dividend anchors; investors tend to form their expectations of future prices by forward, not backward, induction. These laboratory results suggest that investors' short horizons and the consequent difficulty of backward induction are important contributors to the emergence of price bubbles.

JEL classification: G12; C91

Keywords: Stock price bubbles; Short-term investors; Backward induction; Market experiments

1. Introduction

This paper uses a laboratory experiment to explore how investors' decision horizons affect the formation of stock prices. It has long been argued that speculation by short-term investors induces price volatility. Speculators are

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concerned primarily with capital gains; the dividends paid during their short investment horizon are relatively insignificant. Expectations of capital gains depend on higher-order expectations susceptible to cascading or mass psychology of the market. In markets populated by short-term investors, the argument goes, prices tend to lose their dividend anchors, can take any value depending on such expectations, and are, therefore, susceptible to price indeterminacy and bubbles.[1]

This conventional wisdom is not necessarily accepted in today's finance textbooks. We teach that the prices of securities are determined by their fundamental values – the sum of the discounted value of future dividends – irrespective of investors' time horizons. Even short-term investors are assumed to backward induct from future cash flows to arrive at the fundamental value of securities at the present time.

On the other hand, some theoretical research suggests that such backward induction may fail, and short-term speculative trading may give rise to bubbles. Rational bubble models (Blanchard and Watson, 1982; Tirole, 1985) consider indeterminacy of price levels of infinite maturity securities without terminal values. Short-term investors have no values from which they can backward induct. In addition, recent theoretical models argue that when investors have heterogeneous information and/or their rationality is not common knowledge, short-term investors may find it difficult to backward induct and security prices may diverge from their fundamentals (e.g., DeLong et al., 1990a, b; Froot et al., 1992; Dow and Gorton, 1994; Allen et al., 2006). Unlike psychological theories of mass hysteria or limited cognition, these models show that indeterminacy of security prices can arise because even rational investors may not have the knowledge, beliefs, and coordination devices necessary for prices to coincide with the fundamental values.

From these models, we conjecture that the difficulty of backward induction originating in investor short-horizons is a primary source of price bubbles. However, little empirical evidence exists to support this theoretical body of work. Since fundamental values of equities are rarely known, empirical studies of price bubbles using data from the field face the difficult challenge of separating bubbles from the possibility that the fundamental model is mis-specified.[2]

Laboratory experiments can address this problem by letting the experimenter assign parameters to subjects to control the fundamental value. Smith et al. (1988) showed that bubbles can arise in simple laboratory asset markets and conjectured that investors may conduct speculative trades aiming to sell the security to others at higher prices. Lei et al. (2001) experiment, however, rejected this conjecture. It showed that bubbles arise even when investors cannot engage in speculative trades; bubbles arise from errors in investors' decisions themselves. In contrast to these works, the objective of our experiment is to explore how investors' decision horizons

[1]In UK, 'short-termism' is a charge leveled at the expectations of financial institutions from the companies to which they provide capital. See Moore (1998) and Tonello (2006).

[2]See, Stiglitz (1990), and Fama (1991). LeRoy (2003) also states in a recent survey article that 'One would like to see the development of empirical tests that could distinguish between bubbles and misspecification' (p. 25).