Noise Trader

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INTRODUCTION

Let us start with differentiating between *noises* and *shocks*. While the two terms have some differences, they share some characteristics. Shocks are unexpected large events that affect an economy, while noises are the aggregation of small events which could have powerful influences on the market than a shock can be. Noises and shocks both result from uncertainty and have certain influences on the financial market. Their differences are notable however. Information about shocks is available to everyone in the market but information about noises is not. For an example of a shock, suppose there is an earthquake in Antarctica. Noises, in contrast, come from information asymmetry. For instance, a trader receives messages of an acquisition for company alpha from a manager in company beta, but other traders in the market do not receive the information. Although the information could be wrong, the informed trader who receives the messages will buy more stocks of company alpha in the market. The sudden increase in the demand of company alpha's stock triggers the price of its stock rising sharply, which creates a noise.

Before the shocks happen, traders assign probability measures of shocks and consider their impacts when making financial decisions. Suppose all the traders in the market are fully rational and the initial allocation is Pareto-optimal, then the private information observed by a trader would not cause trades (Milgrom & Stokey, 1982). Thus, the existence of noise trading would provide liquidity to the market (Black, 1986; Dow & Gorton, 2008). However, observed market crashes, such as the Black Monday in 1987 and the burst of Dot-com Bubble in early 2000s, raise the questions whether all the traders in the market are fully rational and markets are efficient.

BACKGROUND

Lucas' asset pricing model (Lucas, 1978) suggests asset prices are the discounted value of dividends with time preferences. The asset price p_t^e (Krusell, 2007) is equal to

$$p_t^e = E_t\left[\sum_{s=t+1}^{\infty} \beta^{s-t} \frac{u'\left(y_s\right)}{u'\left(y_t\right)} d_s\right],$$

where β represents for consumer's time preference, $u'\left(\cdot\right)$ is consumer's marginal utility function, y_t is the endowment consumer received at time period *t*, and d_t is the dividend asset paid at time period *t*. But in the real world, the fluctuations of asset prices in the financial market are far greater to be explained by changes in dividends (Shiller, 1981), suggesting the asset prices are affected by more than fundamentals (Shiller, 2003).

Harrison and Kreps (1978) argued that heterogeneous expectations on dividends policy may cause the price of stock to differ from its fundamental value. De Long, Shleifer, Summers, and Waldmann (1990b) provided a theoretical basis for the noise trader approach. They proposed that the existence of noise traders could lead to divergences between market prices and fundamental values. Additionally, they suggested that some financial anomalies, like the excess volatility of asset prices, the mean reversion of stock return, and the equity premium puzzle could be explained by noise trader risk. Another paper (De Long,

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Shleifer, Summers, & Waldmann, 1990a) by the same authors suggested that with the presence of positive-feedback investors, rational arbitrageurs' early positions trigger positive-feedback trading which drives asset prices away from fundamentals. Cutler, Poterba, and Summers (1990, 1991) formalized the role of feedback traders and presented evidences on the characteristic speculative dynamics of returns across markets. Frankel and Froot (1990, 1991) proposed the forecast models of chartists and fundamentalists in which portfolio managers place different weights on chartist and fundamentalist views, explaining the appreciation of the US dollar in 1981–1985.

The noise trader approach (Shleifer & Summers, 1990) aims to explain the equity premium puzzle and other phenomena which cannot be explained well by efficient market hypothesis. There are two main assumptions in noise trader approach. First, not every investor in the market is fully rational: noise traders' demand for assets is affected by their beliefs or sentiments. Second, the limits of arbitrage prevent fully rational investors from bringing the price back to fundamental values. The existence of noise traders may drive out rational arbitrageurs in the market and create positive returns. Shleifer and Vishny (1997) mentioned that with the existence of noise traders in the market, rational arbitrageurs may avoid high volatile positions, dampening the effect of arbitrage which brings prices back to fundamental values.

FUTURE RESEARCH DIRECTIONS

Given the theoretical background of noise traders, the remaining question is how to reveal noise traders in real data. This section introduce several studies related to noise traders from different approaches.

Heterogeneous agent models (Hommes, 2006; LeBaron, 2000, 2006, 2012) consider agents being boundedly rational and following heuristics or rule of thumb strategies, where the models generate stylized facts, such as clustered volatility and fat tails in asset returns, in the financial market. Several studies since 2005 have focused on estimating the parameters of these models and comparing estimated findings to that of observed historical data (Alfarano, Wagner, & Lux, 2005; Boswijk, Hommes, & Manzan, 2007; de Jong, Verschoor, & Zwinkels, 2010).

Baker and Wurgler (2006, 2007) formed a composite investor sentiment index, where the investor sentiment has significant effect on capital market prices. They found that small stocks, young stocks, unprofitable stocks, high-volatility stocks, non-dividend-paying stocks, extreme growth stocks, and distressed stocks tend to be disproportionately sensitive to broad waves of investor sentiment. When the sentiment is low, these stocks earn relatively high subsequent returns. On the other hand, when the sentiment is high, their subsequent returns are relatively low.

Barber, Odean, and Zhu (2009a, 2009b) analyzed trading records for 66,465 household at a large discount broker and 665,533 investors at a large retail broker and documented that buying and selling decisions of individual investors are highly correlated and persistent. In addition, retail trade imbalances forecast future returns. Over short horizon, such as a day or a week, stocks heavily bought by retail traders earn strong returns, while stocks heavily sold by them earn poor returns. However, over annual horizon, the retail trades move only the prices of small stocks in the same direction of their trade.

Bloomfield et al. (2009) distinguished noise traders from informed traders and liquidity traders, and designed a laboratory market to investigate the behavior of noise traders and their impact on the market. Their results indicated that noise traders have positive effects on market liquidity, acting as rational liquidity providers or behavioral contrarian traders. However, the presence of noise traders adversely affect the informational efficiency of the market when informed traders hold very valuable

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