



Conservative traders, natural selection and market efficiency

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Abstract

This paper examines the impact of conservative traders on market efficiency in an evolutionary model of a commodity futures market. This paper shows that the long-run market outcome is informationally efficient, as long as in every period there is a positive probability that entering traders are more conservative than their predecessors. Conservative traders are those who correctly predict the spot price with a positive probability, and more importantly, who in their mistakes err on the side of caution, and rarely overpredict the spot price as buyers, and underpredict the spot price as sellers. This result does not require entry of traders with better information than their predecessors.

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1. Introduction

This paper examines market efficiency in an evolutionary model of a commodity futures market with a sequential entry of traders. The traders' trading behavior is preprogrammed with the probability of overpredicting, underpredicting and predicting correctly the spot price. The traders

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do not maximize any objective function. The market constantly redistributes wealth among traders. The traders with more wealth will have more impact on the futures price since the futures price is simply the futures market clearing price. This paper shows that the futures price converges to the spot price, and the long-run market outcome is informationally efficient, as long as in every period there is a positive probability that entering traders are more conservative than their predecessors. Conservative traders are those who correctly predict the spot price with a positive probability, and more importantly, who in their mistakes err on the side of caution, and rarely overpredict the spot price as buyers, and underpredict the spot price as sellers. Importantly, the convergence result does not require entry of traders with better information or forecasting ability than their predecessors.

This is in contrast with Luo [18,19] who uses the similar model framework to the one in this paper. The continuous entry of traders with accurate prediction about the spot price in Luo [18,19] is the driving force in her model in achieving the market efficiency result. Luo [18,19] assumes that there is a positive probability (however small) that in each time period an entering trader has a higher probability of predicting correctly the fundamental value than all previously entered traders. The market selection will constantly shift wealth from less informed traders with less accurate beliefs to more informed traders with more accurate beliefs. Consequently, the predictions coming from the more informed traders with more accurate beliefs eventually get reflected in the futures price with greater weight than the predictions from the less informed traders. Eventually, the futures price is driven to the fundamental value.

In this paper, conservative traders make correct predictions (not necessarily often) but seldom overbid if they are buyers and seldom underbid if they are sellers. Such traders are conservative in their bids. They are not aggressive nor are they necessarily correct in their bids. Unlike informed traders with accurate beliefs, these conservative traders' information or beliefs are not necessarily more accurate than their trading counterparts. And they are not the most "fit" traders from a Darwinian context in that they do not necessarily accumulate the most wealth. However, their wealth seldom declines and in aggregate they become a dominant force in the market. Since the conservative traders' predictions are sometimes correct (not necessarily often), with a sufficiently large number of the conservative traders, this dominant force will push the market toward the efficient outcome.

The idea of market selection in promoting market efficiency through wealth redistribution among all traders has also been addressed in Friedman's [9] well-known conjecture. It says that noise traders will gradually lose money to the informed traders and consequently, the asset price will eventually be driven to the fundamental value as informed traders dominate the market. Later, Patel, Zeckhauser and Hendricks [26] place market selection in a behavioral context. In their descriptive discussion, they argue that in case of no rationality requirement on all market participants, natural selection provides pressure to the markets to restore efficiency.²

Here, one can view such conservative traders as loss averse. In the spirit of Benartzi and Thaler [3], these conservative traders resemble those who have a predominant concern about losses and who are conservative in their trading activities attempting to avoid any potential loss. They embody a central tenet of prospect theory (Kahneman and Tversky [11]).

² A related issue, although not the focus of this paper, is the validity of whether irrational or uninformed agents with less accurate information survive. This has been studied in a variety of contexts. They include De Long, Shleifer, Summers and Waldman [7], Luo [17,21,22], Kyle and Wang [14], Benos [4], Biais and Shadur [5], Sandroni [27], Hirshleifer and Luo [10], Mailath and Sandroni [23], Beker [2], Kogan, Ross, Wang and Westerfield [12], Sciubba [29], and Sandroni [28].

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