Economics - manuscript number:2373
Title: Fundamentals unknown: momentum, mean-reversion and price-to-earnings trading in an artificial stock market

This paper presents an agent-based model for stock markets where the fundamental value of the asset is unknown. Two types of agents are modeled: zero-intelligence traders and technical traders. The latter use two moving (short and long) averages to make the decision to buy or sell. All traders use the price-to-earning ratio as a proxy for the fundamental asset price. The model is calibrated to S&P 500 data. Some stylized facts (absence of auto-correlation, fat tails, long memory in returns, and correlation between volume and volatility price) are shown to be reproduced by the model.

This paper suffers from several drawbacks:

1) The calibration procedure is not really defined and the formulation of an appropriate optimization problem to calibrate the model is missing. The approach proposed here is, roughly speaking, a trial and error approach. The results illustrated in Table 3 are not really satisfactory since the model and observed Kurtosis, Autocorrelation abs, and Hurst index are different by an order of magnitude.
2) One of the main contributions of this paper should be that the fundamental value of the asset is unknown and that only a proxy for this value is used. However, there is no evidence that this choice improves the results obtained by using other techniques, see, for example, the following papers:

- H.P. Boswijk, C. Hommes, S. Mazan, Behavioral heterogeneity in stock prices.Journal of Economic Dynamics and Control, 2007, 31(6),1938–1970;
- J. Kukacka, J. Barunik, Estimation of Financial Agent-Based Models with Simulated Maximum Likelihood forthcoming on Journal of Economic Dynamics and Control;
- M.C. Recchioni, G. Tedeschi, M. Gallegati, A calibration procedure for analyzing stock price dynamics in an agent-based framework. Journal of Economic Dynamics and Control, 60, 2015, 1-25 where the fundamental price are estimated.

3) The descriptive statistics of S&P 500 data is missing and it must be added.
4) The order price formula (see Eq. 6) could generate negative prices. How do the authors avoid this?
5) Equation (7) is meaningless. Please make the appropriate corrections.
6) Page 4 formula (1): specify the meaning of the geometric Brownian motion distribution;
7) Are the discount rates on page 8 annual or monthly? In both cases they are not realistic values if they refer to recently observed data.

My view is that the paper is not suitable for publication in its present form.
A version that addresses the questions raised above can be reconsidered for publication.