



Overpricing and stake size: On the robustness of results from experimental asset markets



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HIGHLIGHTS

- We assess the effects of a stake size variation on experimental asset markets.
- Our results show that a fivefold increase in stake size leads to higher trading frequencies.
- Mispricing and overpricing, however, are not fundamentally different for different stake sizes.

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ABSTRACT

We assess the effects of a stake size variation on experimental asset markets. Our results show that a fivefold increase in stake size leads to higher trading frequencies. Mispricing and overpricing, however, are not fundamentally different for different stake sizes.

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1. Introduction

Incentivizing choices has been a methodological cornerstone of experimental economics (e.g., [Smith, 1976](#); [Camerer and Hogarth, 1999](#)). Compared to incentives outside the laboratory, laboratory incentives are often rather small, mostly because generating a sufficient number of observations may become very costly when using high stakes. If experimental participants receive a low monetary compensation in relation to the required effort or

time, or both, non-monetary determinants might (also) influence decisions (see [Smith, 1976](#)).¹

Given the widespread application of experimental finance for assessing policy interventions (e.g., [Hanke et al., 2010](#)) and the use of asset market experiments to understand market phenomena outside the laboratory, it is important to better understand whether and, if so, to what extent the stake size affects trading behavior in such experiments and whether an increase in the monetary stakes changes well-established regularities from experimental asset markets such as overpricing compared to the

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¹ There is a growing literature investigating the effects of systematic variations in stake size in economic experiments (e.g., [Andersen et al., 2011](#); [Gneezy and Rustichini, 2000](#); [Johansson-Stenman et al., 2005](#); [Kocher et al., 2008](#); [Smith and Walker, 1993](#)).

fundamental value (e.g., Kirchler et al., 2012; Palan, 2013; Smith et al., 1988). Interestingly, to the best of our knowledge, there is no paper that looks at a variation in stake sizes within the same experiment, holding subject pool and other determinants constant.

The objective of this paper is to investigate if and, potentially, how trading behavior is affected by an increase in the stake size. We implement the most prominent experimental asset market (a double auction market with a decreasing fundamental value of the asset). Since Smith et al. (1988), there has been lots of experimental evidence on this type of market (in slightly different versions), and its main determinants are well-understood. Our experiment features a condition with normal stakes and a condition with high stakes (five times the monetary incentives from the normal stakes), with random assignment to the two conditions.

There are several straightforward arguments why stake size could matter for asset market experiments in which trading occurs theoretically only due to different risk attitudes if one assumes perfectly rational behavior among traders. First, comparatively small monetary incentives (as often used in experiments) could be dominated by the fun of trading and speculating. Second, small monetary incentives could not be sufficient to induce traders to think hard enough about the consequences of the declining fundamental value of the assets for their long-run values. Third, small monetary stakes could affect the revealed risk attitudes and could make traders comparatively less risk averse or even risk seeking in their behaviors. The arguments would – with the exception of the last one whose impact is ambiguous in this respect – imply a greater tendency of overpricing and of creating price bubbles with small stakes in asset market experiments. Similarly, the number of trades could increase under small stakes because of the first two arguments.

There are a few existing experimental papers that are related to our research. Ackert et al. (2006) show that increasing the endowments of experimental participants leads to more risk-taking. They however do not investigate trading behavior in double auction markets but look at bidding for a risky prospect in sealed-bid auctions. Most closely related to our paper is probably the paper by Bossaerts and Plott (2004). They compare stake size differences and do not observe a significant effect of the monetary stakes on market outcomes. However, they compare American students with standard incentives and Bulgarian students with high incentives, which changes two potential determinants of market outcomes (stake size and subject pool) at once. As a consequence, they cannot address stake size effects separately.

2. Experimental design

Our setup featured a continuous double auction market with open order books (e.g., Eckel and Füllbrunn, 2015; Kirchler et al., 2012; Noussair and Tucker, 2013; Palan, 2013; Smith et al., 1988). This market has been used frequently in the experimental finance literature, and it is known for its tendency to lead to overpricing. Each market consisted of ten traders who could accept open offers to buy or sell shares of a single dividend-bearing asset with decreasing fundamental value over the course of ten periods, or create offers to sell or buy shares. In the beginning of the first period, each trader received an endowment of shares and experimental points; half of the traders received 20 shares and 3000 points, while the others received 60 shares and 1000 points, with random assignment to the two initial endowments. Each period lasted exactly 120 s, and a stochastic dividend, which paid either 10 points or zero with equal probability, was added to cash holdings at the end of each period. Short-selling and borrowing money were prohibited, and cash and asset holdings were transferred from period to period. Assets did not carry any

value apart from the stochastic dividend, and the dividend process was carefully explained to experimental participants.²

The experiment was conducted at the experimental laboratory of the University of Economics Ho Chi Minh City, Vietnam. We implemented two conditions that differ from each other only in the conversion rate between experimental points (i.e., cash in the experiment) and money (Vietnamese Đồng (VDN)). Average earnings in STANDARDSTAKES were calibrated to be similar to average earnings during normal experiments conducted at this particular laboratory. We set them to around VDN 200.000, which corresponds to a purchasing power of US-\$23.36 using the most recent PPP conversion data from the World Bank, and a show-up fee of VDN 40.000, corresponding to US-\$4.67.³ These incentives are (from a purchasing power standpoint) not only equivalent to experiments usually run at this particular laboratory, but are also in line with hourly rates in European or US laboratories. Earnings in HIGHSTAKES treatment were then *quintupled* relative to STANDARDSTAKES. In the experiment, one experimental point corresponded to VDN 50 or VDN 250, depending on the treatment. Hence, the HIGHSTAKES treatment provides very strong incentives for our pool of participants.

In total, we conducted six sessions with two markets in each session. The experiment was computerized using z-Tree (Fischbacher, 2007). This leaves us with six markets for STANDARDSTAKES and HIGHSTAKES each. Thus, in total, 120 subjects took part in the experiment—all students from the University of Economics Ho Chi Minh City: They received detailed written instructions (clearly mentioning the conversion rate) that were read aloud, and several helpers answered any remaining questions in private. Subjects were given a trial asset market to become familiar with the trading mechanism and the software. After the tenth period, subjects were asked to fill in a short questionnaire asking standard demographics and were then released from the laboratory, privately receiving their earnings in cash.

3. Results

In our analysis, we employ the commonly used measures (see, e.g., Stöckl et al., 2010; Kocher et al., 2016) for *mispricing* and *overpricing*: relative absolute deviation (RAD) and relative deviation (RD). RAD measures by how many percent prices are, on average, off the fundamental value, and RD indicates by how many percent prices are, on average, above the fundamental value. Since subjects within one market interact with each other and hence data from within a market do not fulfill the independence assumption, we conduct our statistical analysis on the most conservative level, namely the average market level. This leaves us with twelve strictly independent observations.

Table 1 provides an overview of all relevant variables on the level of the individual market and Fig. 1 displays the aggregate price movement in STANDARDSTAKES and HIGHSTAKES, respectively. Additionally, the solid line represents the expected fundamental value, i.e., the risk-neutral valuation of the asset. One can easily see a general tendency of asset underpricing in the first period compared to the fundamental value and later overpricing. The levels and trends are the same for both treatments. In STANDARDSTAKES, we observe an average RAD of 0.48 and an RD of 0.24. The levels are in line with mispricing and overpricing found in related

² We use exactly the same market setup as Kocher et al. (2016). Experimental instructions can be found in the online appendix.

³ 200,000 VDN approximately purchase two combo meals at McDonalds, a medium-priced bottle of wine or a monthly transportation pass in Ho Chi Minh City at the time of research.

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