Replication of

Coordination in the Presence of Asset Markets

by Kogan, S./Kwasnica, A.M./Weber, R.A. (2011)
in: The American Economic Review, 101(2), pp. 927–947.

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Kogan et al. test whether there are market communication effects in a "second-order statistic" coordination game, where portfolio incentive effects are absent, when there is a preplay asset market compared to when there is no such market. They find that a preplay market significantly diminishes output in the coordination game compared to the control treatment without a preceding asset market.

Hypothesis to bet on:

The presence of a preplay asset market lowers output in a "second-order statistic" coordination game (a comparison of group output of the insider groups in the MARKET treatment and the CONTROL treatment in Experiment 2).

Power Analysis

The original p-value is reported as $p < 0.01$; the exact p-value is $p = 0.000026$ based on a z-test of the regression coefficient (regression 1 in Table 8, the coefficient for "Market"; ordered probit regression with group random effects and Huber-White standard errors). The original sample size is 126 participants (54 in the CONTROL treatment and 72 in the MARKET treatment). To achieve 90% power the required sample size is 75 participants.

Sample

The sample for replication consists of 90 students (5 sessions à 18 subjects; 2 sessions for the CONTROL treatment, 3 sessions for the MARKET treatment) at the University of Innsbruck in Austria. To keep the population as close as possible to the original experiment, subjects with minimal prior exposure to coordination games but with experience in market experiments are selected.

Materials

For the coordination game, we use the material of the original experiment (programmed in z-Tree) which has been made available on the journal's webpage. The original market experiment has been conducted using a web-based trading platform developed at Penn State. Since this program is unsupported and undocumented for the most part, the asset market is rebuilt in z-Tree (Fischbacher, 2007), replicating the market design and implementation as closely as possible (based on several screenshots and information provided by the original authors). As the replication study is conducted in German, all materials from the original study are translated from English to German.

Procedure

We follow the procedure of the original article, with only slight but unavoidable deviations as outlined below. The following sum-

mary of the experimental procedure is therefore based on the section "A. Experimental Design" (pp. 932–935) in the original study.

We conduct two sessions for the CONTROL treatment and three sessions for MARKET treatment. Subjects intending to participate have to register for two sessions and will be randomly assigned to one of the treatments once registration has closed. Each session consists of 18 subjects, which are randomly assigned to either one of two small three-person groups or one of two large six-person groups. Assignments to groups remain unchanged for all periods conducted and every subject knows the group assignment and the size of their group as well as the other groups. Throughout the entire session, no communication between subjects is permitted and all instructions, choices, and information are transmitted via the computer terminal (z-Tree program). Each session consists of 8 periods, all identical in structure.

In the CONTROL treatment, subjects simply play a "second-order statistic" coordination game – i.e., the output is determined by the second-lowest input – without a preceding asset market. In the MARKET treatment, players participate in a two-stage game consisting of an asset market followed by the coordination game. Trading takes place anonymously over one of two double-auction markets, populated by a small and a large group each, i.e., 9 subjects. The liquidating values of the securities traded in the asset market depend upon the output in the subsequent coordination game, where the value in one market is determined by the output of a small group, and the value in the other market is determined by a large group.

After completing the experiment, subjects will be privately paid in cash based on the same incentives and using the same show-up fee ($6) as in the original study (average earnings in the original study were $13.18 per subject in the CONTROL treatment and $11.40 in the MARKET treatment).

Analysis

The analysis of the respective hypothesis will be performed exactly as in the original article. That is, the group output of the MARKET treatment is compared to the output of the CONTROL group without preceding asset market by employing an ordered probit regression with group random effects and Huber-White standard errors (regression 1 in Table 8, p. 943).

Differences from Original Study

The replication procedure is identical to that of the original study, with some unavoidable deviations. This replication will be performed at the University of Innsbruck, Austria, in 2015, on students from the University of Innsbruck, while the original data was gathered at the Laboratory for Economic Management and Auctions at Pennsylvania State University in University Park, USA, in 2006–2007, with subjects from the same lab. The experiment will be conducted in German and not in English as in the original study.

The paper studies a number of treatments differentiating between insiders and outsiders as well as different incentives of the market relative to the coordination game (MARKET L vs. MARKET H) in two different experiments. For replication, the focus is only on the comparison between insider groups and the control group in Experiment 2. (The second experiment in the original study only includes the MARKET L treatment as well.)

Replication Results

In the replication experiment, the average group output of insider groups is 2.688 in the MARKET treatment, compared to 3.688 in the CONTROL treatment. An ordered probit regression with group random effects and Huber-White standard errors yields an effect size of -2.534 which is statistically significant with a p-value of 0.001 (see Table 1). Thus, the presence of a preplay asset market significantly lowers the group output in a "second-order statis-

tic" coordination game in the replication experiments as well. In comparison to the effect size of -2.739 in the original study, the relative effect size of the replication experiment equals 92.52% $(-2.534/-2.739)$.

Unplanned Protocol Deviations

As noted above, the treatment MARKET has been conducted in zTree in the replication study since the web application used in the original study is no longer supported. For implementing the multiple asset environment, GIMS (Palan, 2015) in its latest version was employed and adapted to ensure that the functionality matches the software used by the original authors. However, due to the entirely different software solution, the trading screen differed quite substantially from the original study in terms of the graphical representation (see Figure 1). Apart from that the replication experiment has been conducted exactly the way as described above, without any deviations from the protocol.

Discussion

Given the criteria and procedure outlined above, the hypothesis of interest has been replicated at a significance level of $\alpha < 5\%$. The relative effect size equals 92.52% and the p-value of the hypothesis test is 0.001.

References

Palan, S. (2015): "GIMS-Software for asset market experiments", *Journal of Behavioral and Experimental Finance*, Vol. 5, pp. 1–14.

Table 1: Group output in the MARKET treatment relative to the CONTROL treatment in the original and replication experiments

	Original Study	***Replication Study***
1 if MARKET treatment	**−2.739*** **	**−2.534*** **
	(0.651)	(0.773)
Period	0.129**	0.180***
	(0.063)	(0.091)
Observations	160	112
Log Likelihood	−88.576	−86.649

Note: Ordered probit regressions with group random effects. Huber-White robust standard errors clustered by group are provided in parentheses.
*** Significant at the 1 percent level
** Significant at the 5 percent level
* Significant at the 10 percent level

Figure 1: Screenshot of the four-market trading environment of the market treatment in the replication experiment