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Laboratory tests of theories of strategic interaction

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Summary

Economic theories are widely used for understanding and predicting human behavior under the distinct given environments, and to provide advice for policy-making in issues that have significant influences on people's life. Therefore, testing these economic theories becomes one of the most important tasks for economists. Nevertheless, field observations on human decisions are simultaneously driven by different factors, some of which might be irrelevant for the question to be investigated. Carefully designed laboratory experiments, however, can well control the noises caused by such factors and facilitate clean tests of the economic theories.

In this thesis, we present three experimental studies, in which we use a series of laboratory experiments to test three theories of strategic interaction under different environments. These three studies focus on different research topics.

The first theory we test in this thesis is the famous Fehr-Schmidt's inequity aversion (IA) model. The model suggests that an individual's utility is not solely determined by his/her own income level, but also decreasing in the difference from others' incomes. The sensitivities to the income differences are represented by two idiosyncratic parameters, to distinguish the situations where the person earns more or less than others. Our results suggest stronger predictive power of the IA model than existing tests in the environment where direct reciprocity is absent. We also show that the IA parameters are quite robust to the inclusion of efficiency concerns and the stakes effects. However, previous estimates of the IA parameters may have overestimated the importance of inequity aversion.

The next research question we study in this thesis is focused on whether it is sometimes socially beneficial to conceal certain

information. We first build up a two-stage model. The perfect Bayesian equilibrium gives positive answer to the above question, which also seems to provide support to many policies in the real world. However, the up-following laboratory test rejected this prediction. Evidence from our experiment shows that the deviation from the equilibrium prediction may be driven by indirect reciprocity and bounded rationality.

The last study we present in Chapter 4 investigates whether easing firms' budget for R&D would enhance the total R&D investment in an industry. We model the situation as an all-pay auction with private information on firms' values (from winning the research contest) and budgets. Our theory suggests that removing firms' constraints by providing credit easing will generally increase the total investment in the industry. Our laboratory experiment tests the model in two distinct situations, which reflect two types of industries. The results support the general picture of our theory in both situations, but the individual investment behavior deviates from the theoretical prediction.

All in all, when testing theories, laboratory experiments provide not only a general conclusion on whether the tested theory is supported or not, but also a lot of insights on when and why a theory does (not) hold. This thesis presents three applications of such laboratory tests of theories of strategic interaction. These applications exhibit strong power of laboratory experiments on testing economic theories.

Samenvatting

Economische theorieën worden niet alleen toegepast om menselijk gedrag in uiteenlopende situaties te verklaren en te voorspellen maar ook om beleidsmakers richting te geven in het ontwikkelen van beleid dat potentieel enorm kan ingrijpen in het dagelijks leven van mensen. Het is daarom een essentiële taak voor economen om de geldigheid van deze economische theorieën te toetsen. Menselijk gedrag ‘in het veld’ wordt echter typisch simultaan door verschillende factoren beïnvloed, waarbij sommige factoren irrelevant zijn om antwoord te vinden op het onderhavige economische vraagstuk. Zorgvuldig ontworpen laboratoriumexperimenten kunnen controleren voor de ruis die zulke factoren veroorzaken en kunnen zo economische theorieën zuiver toetsen.

In dit proefschrift presenteren we drie onderzoeken waarin we laboratoriumexperimenten gebruiken om economische theorieën op het gebied van strategische interactie te toetsen. De onderzoeken concentreren zich op uiteenlopende onderwerpen.

De eerste theorie die we in dit proefschrift toetsen is het beroemde Fehr-Schmidt-model (FS-model) van ongelijkheidsaversie. Het model geeft aan dat het nut van een individu niet alleen wordt bepaald door zijn of haar eigen inkomensniveau maar afneemt naarmate er grotere verschillen zijn met het inkomen van anderen. De gevoeligheid voor inkomensverschillen wordt voor ieder individu door twee idiosyncratische parameters bepaald om zo onderscheid te maken tussen situaties waarin iemand meer of minder verdient dan anderen. Onze resultaten, verkregen in omstandigheden waar directe reciprociteit geen rol speelt, suggereren een sterkere voorspellende kracht van het FS-model dan waar bevindingen uit de bestaande literatuur op lijken te wijzen. We laten bovendien zien dat de FS-parameters behoorlijk robuust zijn als we rekening houden met mogelijke voorkeuren voor efficiëntie en de orde van grootte van de inkomens.

Daarnaast concluderen we dat voorgaande studies de omvang van ongelijkheidsaversie mogelijk hebben overschat.

De volgende onderzoeksvraag die in dit proefschrift aan de orde komt is of het sociaal wenselijk kan zijn om bepaalde informatie te verhullen. Om deze vraag te beantwoorden, zetten we eerst een twee-fasenspel op. Het perfect-Bayesiaanse evenwicht van dit spel beantwoordt de vraag bevestigend en ondersteunt zo veel beleid in de praktijk. Echter, onze laboratoriumtesten weerleggen deze voorspelling. Het verkregen bewijs laat zien dat indirecte reciprociteit en beperkte rationaliteit kunnen verklaren waarom het geobserveerde gedrag afwijkt van de evenwichtsvoorspelling.

Het laatste onderzoek bestudeert of bedrijven meer in R&D investeren als ze financieel ruimer in hun jasje zitten. We modelleren deze situatie als een iedereen-betaalt-veiling waarbij bedrijven privaat geïnformeerd zijn over hun waarde (van het winnen van de onderzoekswedstrijd) en hun budgetten. Onze theorie suggereert dat de totale omvang van de investeringen in R&D zal toenemen als bedrijven geen budgetbeperking meer hebben. Ons laboratoriumexperiment toetst de theorie in twee verschillende situaties die corresponderen met twee verschillende industrieën. De resultaten ondersteunen het algemene beeld van de theorie in beide situaties, maar laten tegelijkertijd zien dat op individueel niveau het investeringsgedrag systematisch afwijkt van de theoretische voorspelling.

Al met al laten laboratoriumexperimenten niet alleen zien of de getoetste theorie wordt ondersteund, maar ook onder welke omstandigheden een theorie geldig is en waarom, of waarom juist niet. Dit proefschrift presenteert drie laboratoriumtesten van theorieën die gedrag onder strategische interactie beschrijven. De resultaten bevestigen de kracht van laboratoriumexperimenten om economische theorieën diepgravend te toetsen.

The Tinbergen Institute is the Institute for Economic Research, which was founded in 1987 by the Faculties of Economics and Econometrics of the Erasmus University Rotterdam, University of Amsterdam and VU University Amsterdam. The Institute is named after the late Professor Jan Tinbergen, Dutch Nobel Prize laureate in economics in 1969. The Tinbergen Institute is located in Amsterdam and Rotterdam. The following books recently appeared in the Tinbergen Institute Research Series:

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