

Experimental Economics (Spring 2006), Graduate Course.
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Experimental economics is a grown, yet growing, field in economics and business administration. It provides a method to test theoretical predictions, to explore human behavior in specific economic environments, to help design institutions, to advise on policy and to search for patterns and regularities in economic wheeling and dealing.

This course will link issues of applied game theory, decision theory, industrial organization, markets, institutional design and macroeconomics with behavioral and experimental economics and (tentatively) with the still-fresh hybrid called Neuro-economics.

We expect that this course will help students to think that economics can be an experimental science and provide the students with a working knowledge of techniques for conducting laboratory experiments. Therefore students will be guided through a selection of experimental and behavioral economics literature with the aim that students search for interesting economic, psychological and behavioral research questions, which they address to answer with a feasible and original experimental design. These experiments will be run in class and the motivation and results are summarized as in a professional paper. Students will also participate as subjects in various replications of experiments from the literature, as in the proverbial cannibal dinner.

The course will be divided in two parts:

I. In the first part, we, the instructors, will present selected topics on experimental economics while the students will discuss and criticize our presentations as well as the recommended reading material. In addition students will replicate one classical experiment. In this first part, we will discuss questions like:

- Do people exploit their bargaining power?
- Should we graft fairness into game theory?
- Yes, people seem to free ride. A lot?
- "I think that you think that I think etc.". Is this how people reason?
- Does the winner's curse disappear with experience?
- How does actual decision making deviate from utility maximization?
- How can we model learning to describe observed behavior?
- What market arrangements facilitate market power?
- Does competitive theory predict well in double-auction markets?
- Is irrational exuberance in asset markets an experimental regularity?
- Is coordination easily efficient?
- What can those PET scans do for Economics?

II. During the second part of the course, every student (or a group of two) will design and run a novel experiment.

Course Requirements (see also detailed list of course requirement at the end)

- Reading list
- Replication and discussion of a classical experiment (in groups of two to four).
- Design, performance and presentation of an original experiment (alone or in groups of two)
- Paper (about 10-15 page).

The grade will be based on class participation (10%), performance as experimenter (10%), presentations (20%), and final paper (60%).

Course Outline – References

General Literature:

- Camerer, C., Loewenstein, G. "Behavioral Economics: Past, Present, Future"
Davis, D. and Holt, C. (1993). *Experimental Economics*. Princeton: Princeton University Press.
Friedman, D. and Sunder, S. (1994). *Experimental Methods - A Primer for Economists*.
Cambridge University Press.
Kagel, J. and Roth, A.E. (eds.) (1995). *Handbook of Experimental Economics*, Princeton:
Princeton University Press.
Siegel, S. and Castellan, N. (1988). *Nonparametric Statistics for Behavioral Science*. McGraw-Hill, Inc.

Introduction:

- *₁ Camerer, C. (1997). Progress in Behavioral Game Theory. *Journal Economic Perspectives*, vol 11, no 4, Fall, 167-188.
Roth, A. E. (1995), "Introduction to experimental economics", in Kagel, J., A. E. Roth, *The Handbook of Experimental Economics*, Princeton, 1-98.
Selten, R. (1997). Features of Experimentally Observed Bounded Rationality. EEA 97, Toulouse, Presidential Address.
Smith, V. (1982), "Microeconomic Systems as an Experimental Science", *American Economic Review*, December, 923-955.
Smith, V. (1987) "Experimental Methods in Economics", in J. Eatwell et al (eds), *The New Palgrave: A Dictionary of Economics*, New York.
Smith, V. (1992), *Experimental Methods in Economics*, UPF Working Paper, June.

Individual decision making:

- Camerer, Colin (1995) "Individual Decision Making", in Kagel, J. and A. E. Roth, *Handbook of Experimental Economics*, Princeton: Princeton University Press
Thaler, Richard H. "The Winners Curse", ch. 6 and 7, The Free Press 1992.
Hey, J. D. and Chris Orme, Investigating generalizations of expected utility theory using experimental data, *Econometrica*, 62:1291-1326.
Kahneman, D. and A. Tversky (1979), "Prospect theory: An analysis of decision making under risk, *Econometrica* 47:263-91
Starmer, C. (2000). Developments in non-expected utility theory: The hunt for a descriptive theory of choice under risk. *Journal of Economic Literature*. 38, 332-382.
Tversky A. and D Kahneman (1992), Advances in prospect theory: Cumulative representation of uncertainty, *Journal of Risk and Uncertainty* 5: 297-323.

₁ The readings that are marked with "*" in the course outline are included into the course package.

Coordination:

- *Camerer, C, *Coordination, Behavioral Game Theory*, Princeton University Press, 2003
Ochs, J. (1995). Coordination Problems. In Kagel, J., A. E. Roth, *The Handbook of Experimental Economics*, Princeton, p. 195-249.
Van Huyck, J., Battalio, R. and Beil, R. (1990). Tacit Coordination Games, Strategic Uncertainty and Coordination Failure. *American Economic Review* 80, 234-48.
Bornstein, G, Gneezy, U., and Nagel, R. (2002). The Effect of Intergroup Competition on Group Coordination. *Games and Economic Behavior*. Volume 41, October 2002, pp.1-25.
Heinemann, F., R. Nagel, and P. Ockenfels, The Theory of Global Games on Test: Experimental Analysis of Coordination Games with Public and Private Information, *Econometrica* 72 (5), 2004, pp. 1583-1599.

Levels of reasoning

- Bosch-Domènech, A., J. García -Montalvo, R. Nagel, A. Satorra (2002), One, Two, (Three), Infinity ...: Newspaper and Lab Beauty-Contest Experiments, *American Economic Review*

Dezember 2002, Vol 92 No.5, pp 1687-1701.

*Camerer, C., Teck-Hua Ho, Juin-Kuan Chong A cognitive hierarchy model of games..

<http://www.hss.caltech.edu/~camerer/qjefinal6.pdf>

Nagel, R. (1995). Unraveling in Guessing Games: An Experimental Study. *American Economic Review* 85,5, 1313-1326.

Nagel, R. (1998). A Survey on Beauty-Contest Experiments: Bounded Rationality and Learning. In *Games and Human Behavior, Essays in Honor of Amnon Rapoport*. Eds. D. Budescu, I. Erev, and R.Zwick. Publisher: Lawrence Erlbaum Associates, Inc., New Jersey.

Ho, T.H., K. Weigelt, and C. Camerer (1996), Iterated Dominance and Learning in Experimental Beauty Contest. Games, working Paper.

Sonsino, D. Erev, I. Gilat, S. and Shabtai, G.(1998). On the Likelihood of Repeated Zero-Sum Betting by Adaptive (Human) Agents, mimeo

Thaler, R. (1997). Giving Markets a Human Dimension. *Financial Times*, section Mastering Finance 6, June 16, 1997.

Public Goods:

Ledyard, John O. (1995). Public Goods: A Survey of Experimental Research. In Kagel, J., A. E. Roth, *The Handbook of Experimental Economics*, Princeton, p. 111-181.

*Fehr, E., and Gaechter S. Cooperation and Punishment in Public Goods Experiments, *American Economic Review* 90, (2000), 980-994

Isaac, R. M., K. McCue and C. Plott (1985), Public Goods Provision in an Experimental Environment, *Journal of Public Economics* 26, 51-74.

Isaak, R.M. and J. Walker (1988), Group Size Effects in Public Goods Provision: The voluntary Contributions Mechanism, *QJE*, 103, 179-99.

Bargaining:

Roth, A.E (1995). Bargaining Experiments. In Kagel, J., A. E. Roth, *The Handbook of Experimental Economics*. Princeton, 253-331.

Camerer, C. and Thaler, R. (1995). Anomalies: Ultimatums, Dictators, and Manners. *Journal of Economic Perspectives* 9 (2): 209-219.

Charness, G. (1997). Attribution and Reciprocity in a Simulated Labor Market: An Experimental Investigation. Working paper.

Fehr E. and E. Tougareva (1995). Do Competitive Markets with High Stakes Remove Reciprocal Fairness? Experimental Evidence from Russia, Working paper.

Roth, Alvin, Prasnikar, V., Okuno-Fujiwara, M. and Zamir, Shmuel (1991). Bargaining and Market Behavior in Jerusalem, Ljubljana, Pittsburgh, and Tokyo: Some experimental Evidence. *American Economic Review* 81, 1068-1095.

*Camerer, C. Behavioral Game Theory, chapter Bargaining.

Models of Fairness:

*Fehr, E., Klaus M., and Schmidt A. Theory of Fairness, Competition and Cooperation, *Quarterly Journal of Economics* 114, (1999), 817-868

Rabin, M. (1993). Incorporating Fairness into Game Theory and Economics. *American Economic Review*, 83(5), 1281-1302.

*Shaked A., The Rhetoric of Inequity Aversion (March 1, 2005).

<http://ssrn.com/abstract=675227>

Fehr, E., Schmidt K. The Rhetoric of Inequity Aversion – A Reply(March 2, 2005).

http://www.vwl.uni-muenchen.de/ls_schmidt/pamphlet/Shaked-Reply.pdf

*Shaked A., A Brief Response by A. Shaked to Fehr & Schmidt's Reply to Shaked's Pamphlet (March 8, 2005) <http://www.wiwi.uni-bonn.de/shaked/rhetoric/BRF.pdf>

Learning:

Camerer, C and Ho, T. (1998). "Experienced weighted Attraction Learning in Games: Estimates from Weak-Link Games." In *Games and Human Behavior, Essays in Honor of Amnon Rapoport*. Eds. D. Budescu, I. Erev, and R.Zwick. Publisher: Lawrence Erlbaum Associates, Inc., New

Jersey.

Erev, I. and Roth, A. (1998). On the need for Low Rationality, Cognitive Game Theory: Reinforcement Learning in Experimental Games with Unique Mixed Strategy Equilibria. *American Economic Review*.

Nagel, R. and F. Tang (1998). Experimental Results on the Centipede Game in Normal Form: An Investigation on Learning. *Journal of Mathematical Psychology* 42,(2), June/September 1998, S.256-384.

Stahl, D. (1996). Bounded Rational Rule Learning in Guessing Games. *Games and Economic Behavior*, 16(2), 303-330.

*Bereby-Meyer, Y., Roth, A. (2003) Learning in Noisy Games: Partial Reinforcement and the Sustainability of Cooperation, *working paper*

Auctions:

*Kagel, J. H. (1995). Auctions: A Survey of Experimental Research. In Kagel, J., A. E. Roth, The Handbook of Experimental Economics, Princeton, p. 501-557.

*Kagel, John H. and Levin, D. (1986). The Winner's Curse and Public Information in Common Value Auctions. *AER*, December, p. 894-920.

Harrison, G. (1989). Theory and Misbehavior in First Price Auctions. *AER* September, p.749-762.

Rust, J., J. H. Miller and R. Palmer (1992). Behavior of Trading Automata in a Computerized Double Auction Market. In D. Friedman and J. Rust (eds.) *The Double Auction Market: Institutions,*

Theories and Evidence, Addison-Wesley.

McCabe, K. A., S. J. Rassenti and V. L. Smith (1992). Designing a Uniform Price Double Auction. In D. Friedman and J. Rust (eds.) *The Double Auction Market: Institutions, Theories and Evidence*, Addison-Wesley.

Kagel, J. (1995). Cross-game Learning: Experimental Evidence from First-Price and English Common Value Auctions. *Economic Letters*,49.

Kagel, J. and Levin, D. (1993). Independent Private Value Auctions: Bidder Behavior in First, Second and Third Price Auctions with Varying Numbers of Bidders. *Economic Journal* 103. Relation between internet/field experiments and experimental economics

Camerer, C., L. Babcock, G. Loewenstein and R. Thaler (1997). Labor Supply Of New York City Cab Drivers: One Day At A Time, *Quarterly Journal of Economics*, 407-441.

* David H. Lucking-Reiley, J.A.List.(2000) "Demand Reduction in Multi-Unit Auctions: Evidence from a Sportscard Field Experiment". *American Economic Review*, American Economic Association, vol. 90(4), pages 961-972 (version of 1999 is included into the course package)

Kagel, John H. and A.E. Roth. "The dynamics of reorganization in matching markets: A laboratory experiment motivated by a natural experiment," *Quarterly Journal of Economics*, forthcoming.

Roth, A.E. and Axel Ockenfels. "Last Minute Bidding and the Rules for Ending Second-Price Auctions: Theory and Evidence from a Natural Experiment on the Internet" *American Economic Review*.

Dan Ariely, Axel Ockenfels and Alvin E. Roth An Experimental Analysis of Ending Rules in Internet Auctions. *The RAND Journal of Economics*, forthcoming.

Market and Industrial Organization:

*Holt, Charles A. (1995). Industrial Organization: A Survey of Laboratory Research. in Kagel, J., A.

E. Roth, *The Handbook of Experimental Economics*, Princeton, p. 349-435.

Gode, D. and S. Sunder (1993). Allocative Efficiency of Markets with ZI Traders. *Journal of Political Economy*, 119-37.

Holt, Charles A., L. Langan y Anne P. Villamil (1986). Market Power in Oral Double Auctions. *Economic Enquiry*, January 1986, p. 107-123.

Smith, V. (1982). Markets as Economizers of Information: Experimental Examination of the Hayek Hypothesis, *Economic Inquiry*, April, 165-179.

If you want to participate in an internet experiment related to market experiments see:

<http://eeps.caltech.edu/expt.html>

Asset Markets

Lei, Vivian, Charles N. Noussair and Charles R. Plott (2001), "Non-speculative Bubbles in Experimental Asset Markets: Lack of Common Knowledge of Rationality vs. Actual Irrationality", *Econometrica*, Vol 69, No. 4, 831-859.

Plott, Charles R. (2000) "Markets as Information Gathering Tools", *Southern Economic Journal*, 67 (1), 1-15.

Plott, C., Wit, J. Yang, W. (1997). Parimutuel Betting Markets as Information Aggregation Devices: Experimental Results. Caltech. Discussion paper, 986.

Porter, D. and Smith, V. (1994). Stock Market Bubbles in the Laboratory. *Applied Mathematical Finance* 1, 111-127.

Smith, Vernon L., Gerry L. Suchanek and Arlington W. Williams (1988), "Bubbles, Crashes, and Endogeneous expectations in Experimental Spot Asset Markets", *Econometrica* 56(6), 1119-52.

*Sunder, S. (1995). Experimental Asset Markets: a Survey. In Kagel, J., A. E. Roth, The Handbook of Experimental Economics, Princeton, p. 501-557.

Macroeconomic Experiments

*Duffy, J., E.O'N Fisher "Sunspots in the Laboratory" *American Economic Review*, forthcoming
Cabrales, A. Nagel, R. and Jose Rodriguez-Mora, "It is Hobbes and not Rousseau: An experiment on Social Insurance. Mimeo

*Capra, M., T Tanaka, C. Camerer, L. Munyan, V Sovero, L Wang, and C. Noussair, "The Impact of Simple Institutions in Experimental Economies with Poverty Traps" February 2005

If you want to participate in an internet experiment related to a macro economic problem please check <http://www.sfb504.uni-mannheim.de/ex/register> (Oliver Kirchkamp)

Neuro-economics

Adolphs, R. (2003), Investigating the cognitive neuroscience of social behavior, *Neuropsychologia* 42: 119-126.

Adolphs, R. (2003), Cognitive neuroscience of human social behavior, *Nature Reviews Neuroscience* 4, 165-178.

*Camerer, C. , G. Loewenstein, and D. Prelec, "Neuroeconomics: How neuroscience can inform economics" , *Journal of Economic Literature* , forthcoming 2005

*Nathalie Camille, Giorgio Coricelli, J. Sallet, Pradat-Diehl, P. J-R. Duhamel, A. Sirigu, "The Involvement of the Orbitofrontal Cortex in the Experience of Regret, *SCIENCE*, VOL 304 21 MAY 2004

*King-Casas B. Tomlin, D. Anen, C. Camerer, C.S. R. Quartz, P. Read Montague Getting to Know You: Reputation and Trust in a Two-Person Economic Exchange, *SCIENCE* VOL 308 APRIL 2005 83

McCabe, K., D. Houser, L. Ryan, V. Smith, and T. Trouard (2001) A functional imaging study of cooperation in two-person reciprocal exchange, *Proceedings of the National Academy of Sciences* 98: 11832-11835.

Moll, Jorge et al (2002), The neural correlates of moral sensitivity: a functional magnetic resonance imaging investigation of basis and moral emotions, *The Journal of Neurosciences* 22: 2730-2736

Montague, P. R. and G. S. Berns (2002), Neural economics and the biological substrates of valuation, *Neuron* 36: 265-264.

Smith, K. Dickhaut, J., K. McCabe and J.V. Pardo (2002), Neural substrates for choice under ambiguity, risk, gains and losses, *Management Science*, 48: 711-718.

Zak, P.J., Trust, *CAPCO Institute - The Journal of financial transformation* ,
<http://fac.cgu.edu/~zakp/publications/CAPCOTrust.pdf>.

Detailed Course Requirements

I. Reading of papers in references, class discussion.

II. Replication of a classical experiment.

- Choose an interesting experiment
- Make necessary changes of the original experiment, keeping in mind your time constraint of 20 minutes, that the numbers of players that will be participating may be different, that you don't run computer programs, etc.
- Recruit your own subjects (from your friends, from your TA-classes). Your classmates have to participate.
- Think of the incentives that you are going to be using to motivate your experimental subjects (be careful with prizes!).
- Write the instructions extremely careful. Do not use economic jargon as "utility function" and make sure that you are not pushing the subjects in any direction. Yet you might like to use a real world situation to imbed your instructions.
- Organize well your experiment. You might like to rehearse in advance all the moves, as in show biz. Make sure that you know where to seat each one of the subjects, whether you seat them at random or not, how to pick up or hand back decision sheets, etc. (see also Friedman and Sunder (1994), *Experimental Methods*.)

III. Experimental paper

1. Run your own experiment and present results in class.

(Your own experiment can be based on the one you replicated.)

2. Present your results in class

- Give motivation for your design.
- Present the experiment and its results
- Present the related literature
- Present your results and compare them with the original data
- Describe what went well and what went wrong in your experiment.
- Take care of the presentation of your data. You want to be clear and convincing. Select the main results to be presented graphically; the table and figures should be readable (large font sizes) and clearly labeled; use colors.

3. Write a paper (about 10-15 page) as they are written in professional journals that you read for this course. The paper should contain:

- Related literature
- Motivation of design
- Model and theoretic solution
- Design of experiment
- Results of experiments (summary statistic). Some statistical tests (proposal if you were to have enough data).
- Descriptive model for your data. The model can be verbal.
- Conclusion
- References
- Appendix with instructions and raw data
- Tables and Figures

Make clear what is your own idea and what you take from the literature!!

Time schedule

Wednesday Thursday

Lecture/Experiments Lecture/Experiments
Introduction Introduction
Individual decision Bosch ***Coordination***
Games with iterated dominance
levels of reasoning
Public goods
Bargaining Models of fairness
Learning
Rationality vs. adaptive behavior
Auctions Bosch
Internet experiments, field experiments Markets and
Organization Bosch
Macro experiments Neuroeconomics
(own experiment) (own experiment)
(own experiments) (own experiment)
Explication: Bold/italics: Class with replication experiment.

To find software and run experiments from here to there and back, the best site may be:
<http://veconlab.econ.virginia.edu/admin.htm>. We have run experiments with many subjects from
LeeX using Charlie Holt's site and the results have been impressive. A fast and reliable link.
If you link with the Economic Science Association (economicscience.org) you'll find links to most
of the main labs. Notice that the Association of economic experimenters is called "Economic
Science" association, a very appropriate name.

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