

Bubbles in the Lab

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Definition

- *“A bubble may be defined loosely as a sharp rise the price of an asset ..., with the initial rise generating expectations of further rises and attracting new buyers – generally speculators interested in profits from trading in the asset rather than its use or earning capacity.”*

-- Charles Kindleberger, The New Palgrave

Can bubbles persist?

- Keynes (1936)
- “It might have been supposed that *competition between expert professionals*, possessing judgment and knowledge beyond that of the average private investor, would correct the vagaries of the ignorant individual left to himself.”
- Fama (1965)
“If there are many sophisticated traders in the market, they may cause these “bubbles” to burst before they really get under way.”

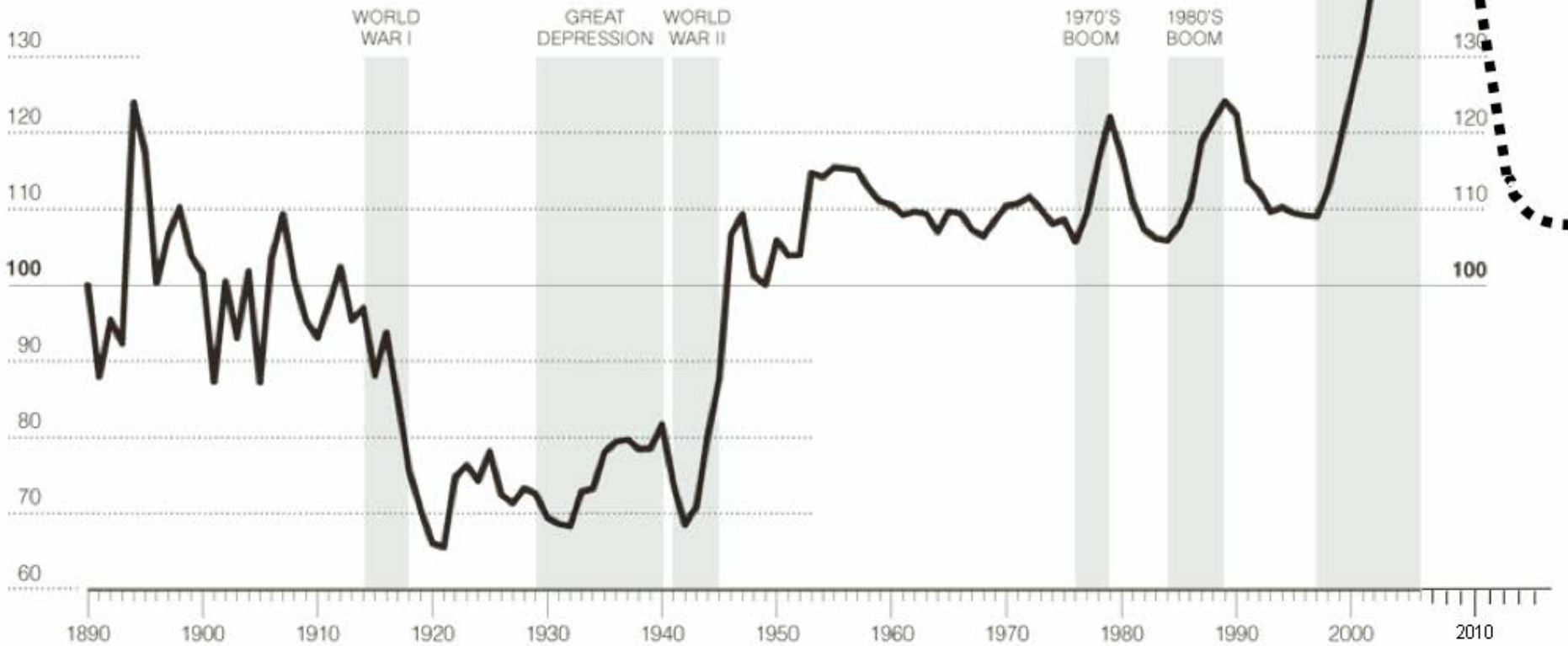
A History of Home Values

The Yale economist Robert J. Shiller created an index of American housing prices going back to 1890. It is based on sale prices of standard existing houses, not new construction, to track the value of housing as an investment over time. It presents housing values in consistent terms over 116 years, factoring out the effects of inflation.

The 1890 benchmark is 100 on the chart. If a standard house sold in 1890 for \$100,000 (inflation-adjusted to today's dollars), an equivalent standard house would have sold for \$66,000 in 1920 (66 on the index scale) and \$199,000 in 2006 (199 on the index scale, or 99 percent higher than 1890).

DECLINE AND RUN-UP Prices dropped as mass production techniques appeared early in the 20th century. Prices spiked with post-war housing demand.

BOOM TIMES Two gains in recent decades were followed by returns to levels consistent since the late 1950's. Since 1997, the index has risen about 83 percent.



Why a lab experiment?

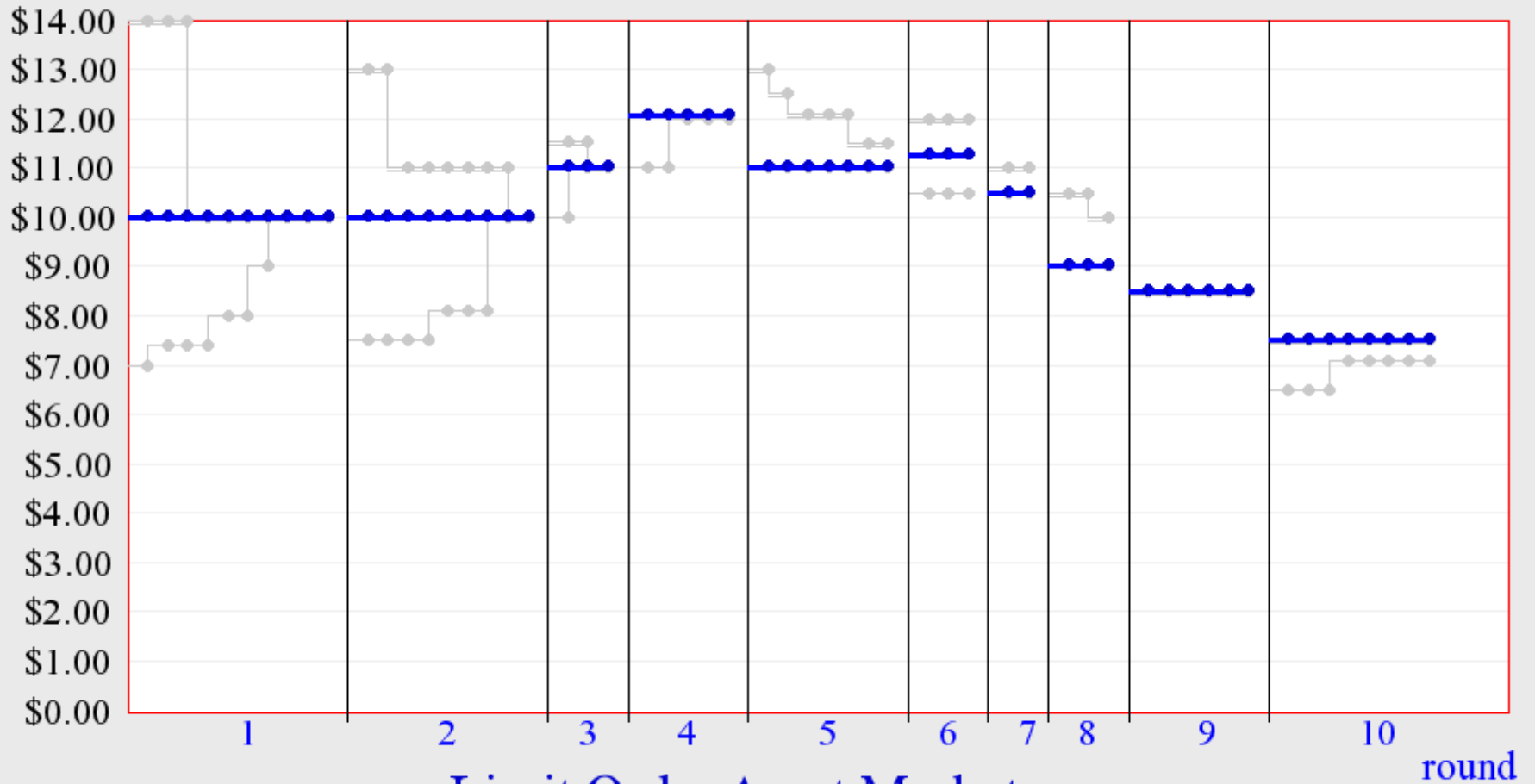
- Too many unknowns in the real world
- Control of important variables: Here:
 - Fundamental values (at least known to the experimenter)
 - Borrowing constraints are the same for all
 - Time horizon the same for all
 - Experience level of subjects can be made the same (repetition of the same market)
 - Controlled centralized market: here call market
 - Control of reason to buy/sell. In contrast e.g. in housing market, need for a house

What should you bid

- If all were perfectly rational?
- $P^*i=D$ why?
- What to bid when you know that the others are not understanding the theory?

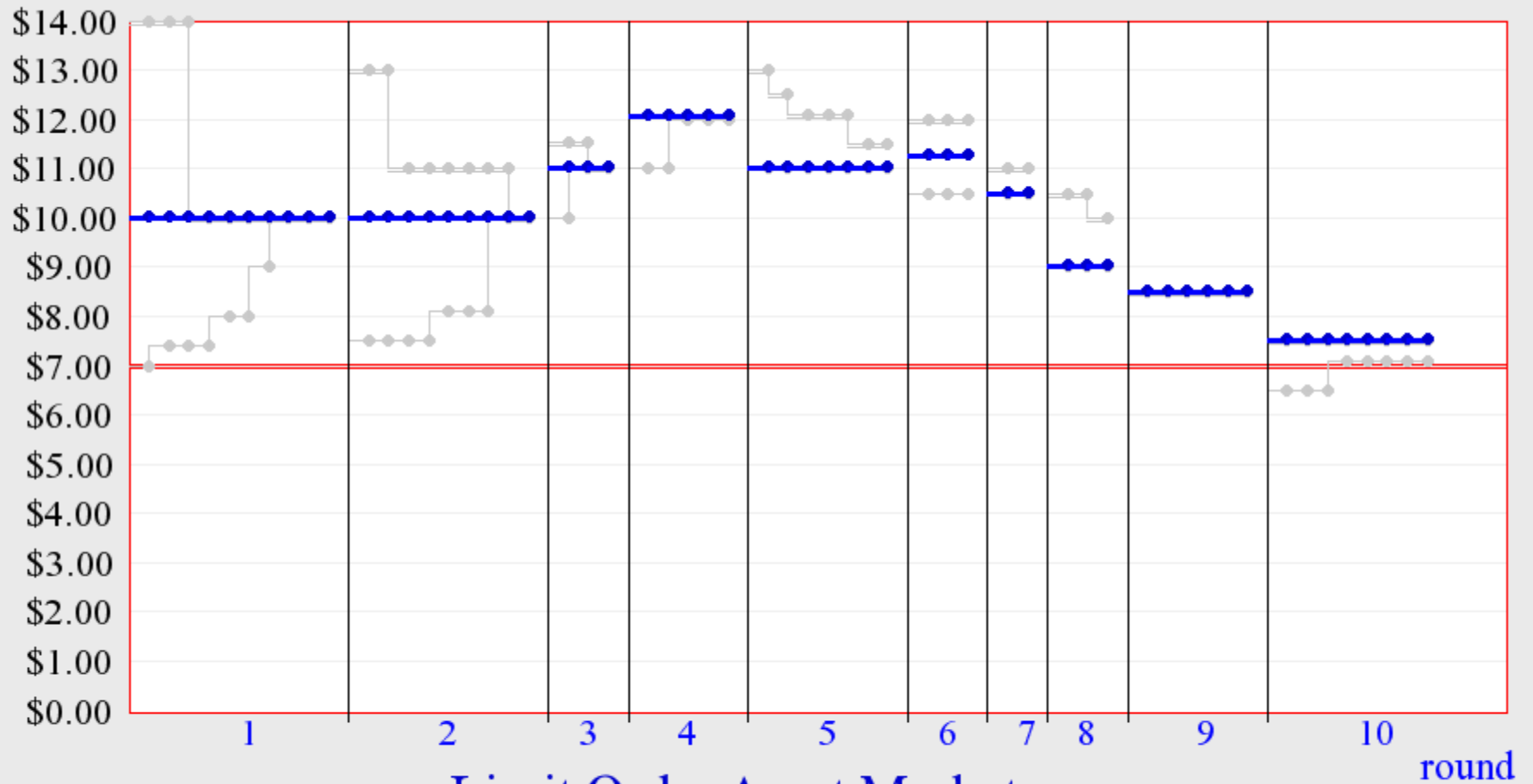
Are you different from others?

Data for 10 Participants



Limit Order Asset Market
prices bids asks

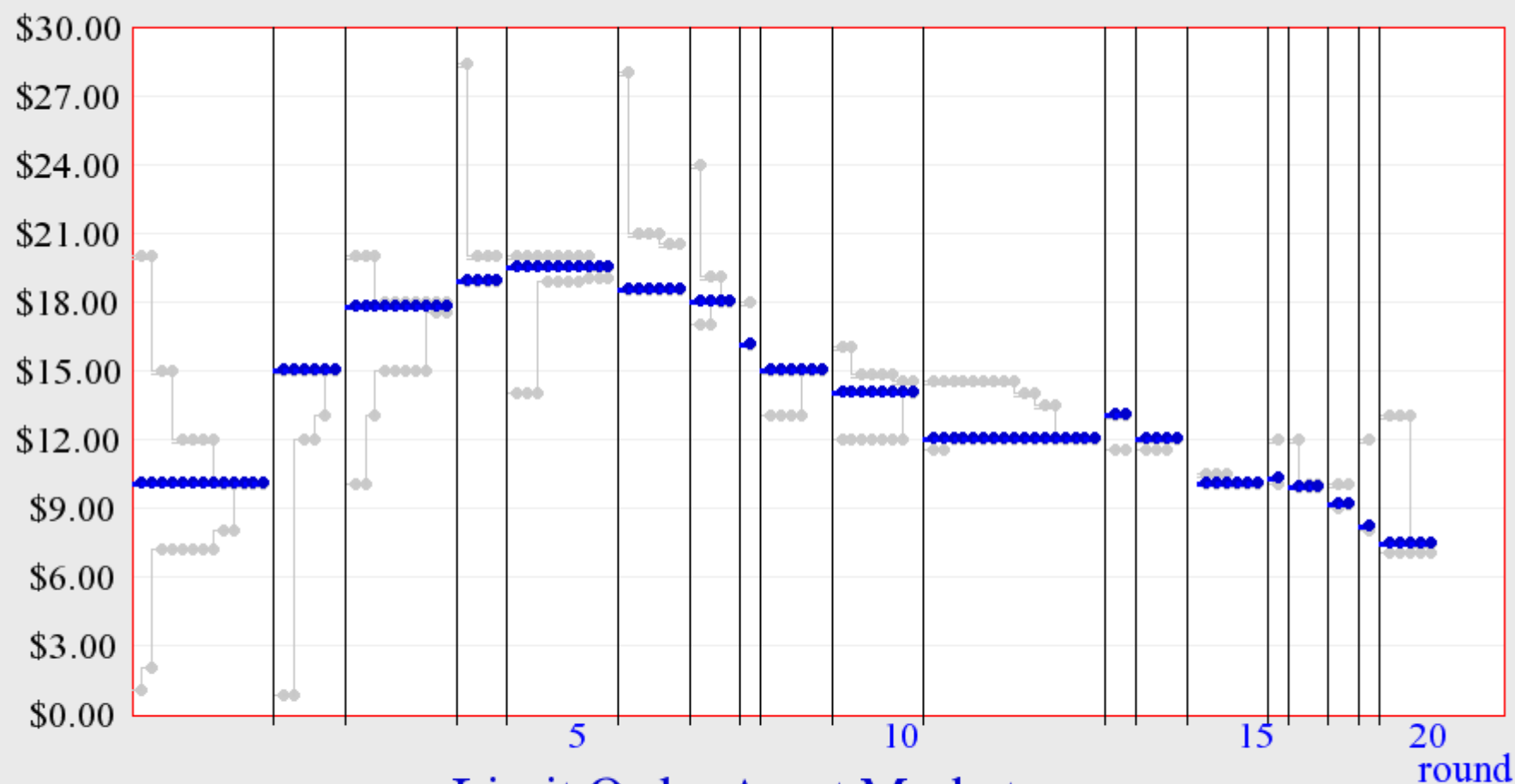
Data for 10 Participants



Limit Order Asset Market

prices bids asks present value

Data for 13 Participants

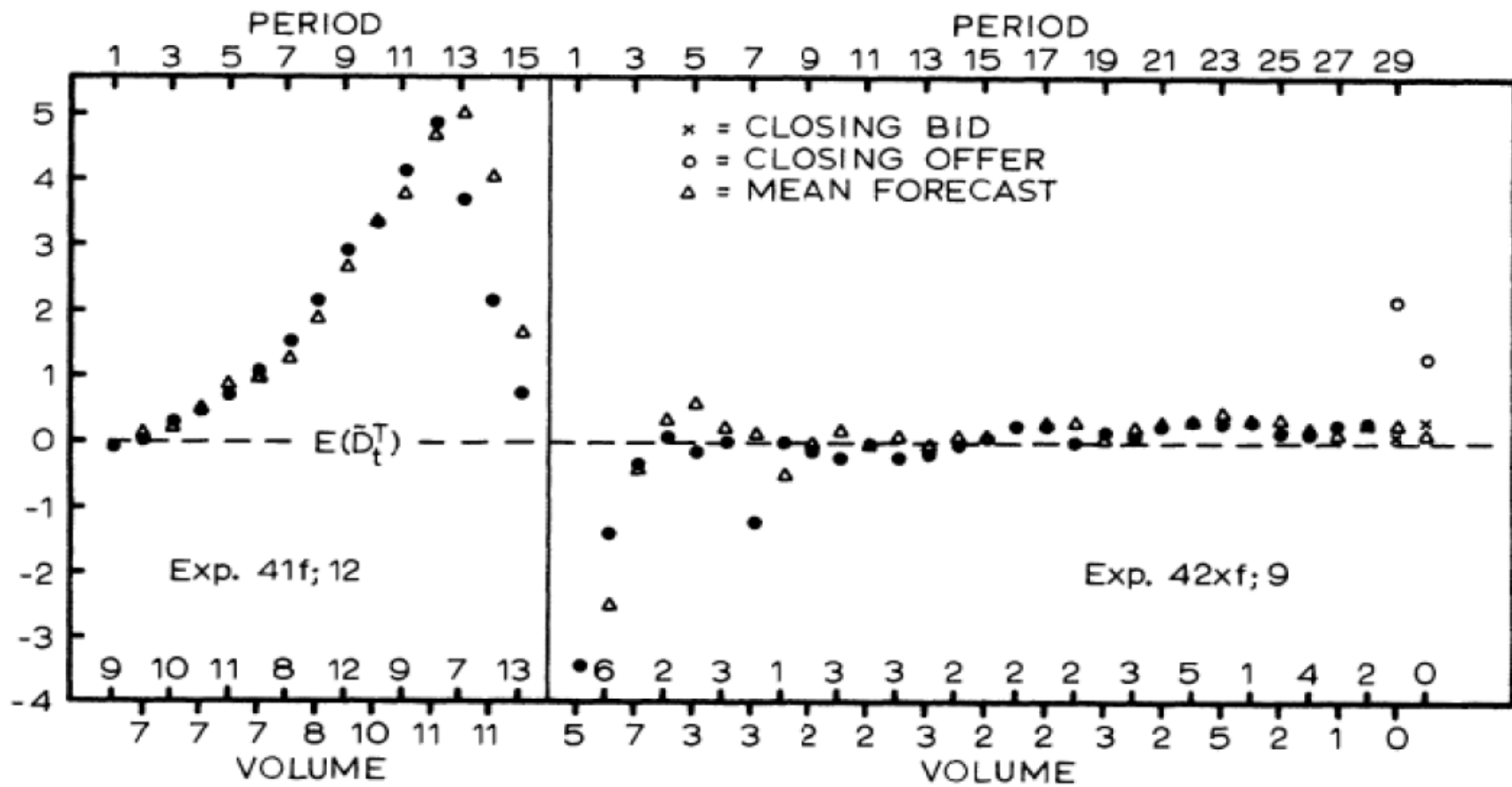


Limit Order Asset Market

prices bids asks

January 11 2013

Bubbles Often Disappear With Experienced Subjects (Two 15 Round Sessions)



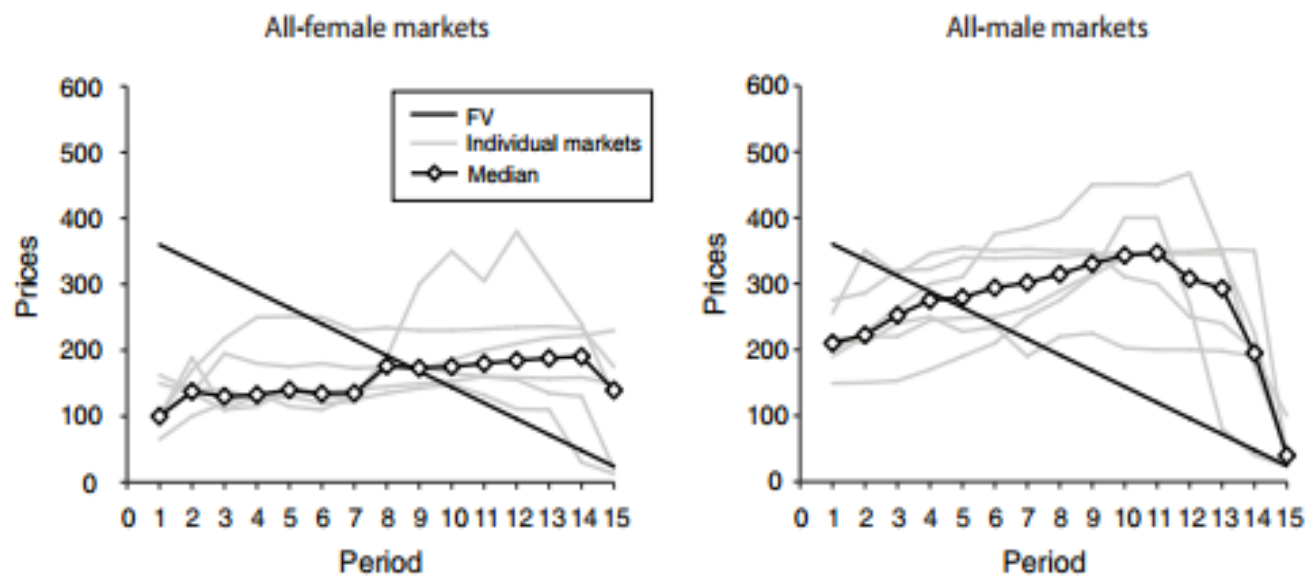


FIGURE 1. TIME SERIES OF MEDIAN TRANSACTION PRICES

Note: Median prices of individual markets (gray lines), fundamental value (FV, bold line), and average of median session prices (black line with diamonds) for each period.

Dufwenberg et al. AER 2005

- Design:
- 6 subjects play 10 periods of one market game;
 - the same market game with the same subjects is repeated again twice
 - In the fourth game 2 or 4 subjects are replaced by inexperienced subjects

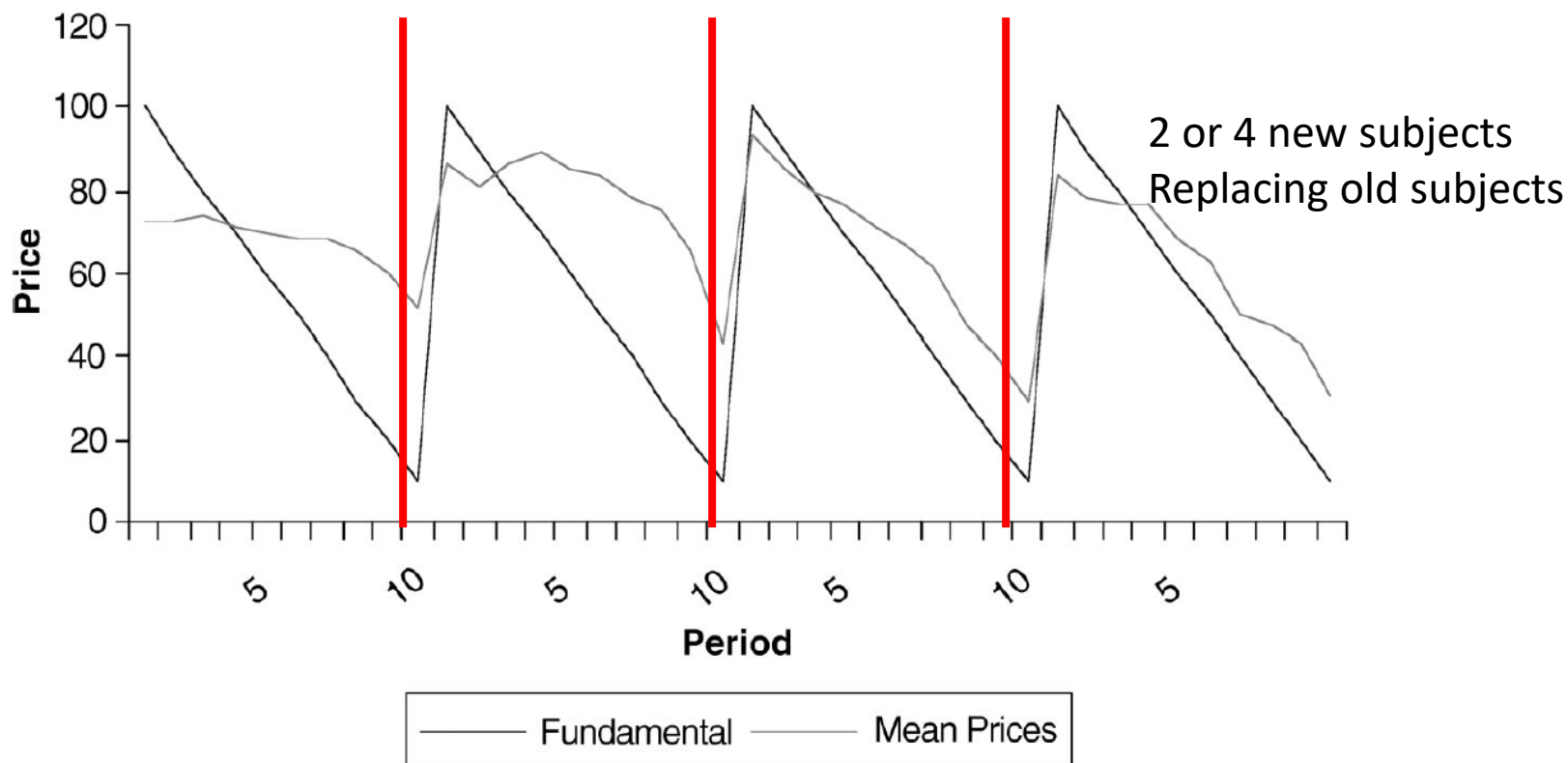
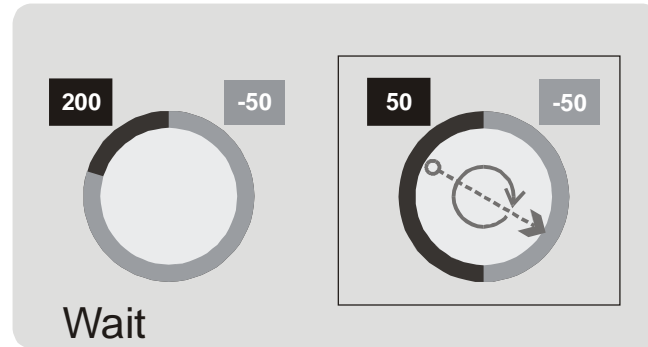


FIGURE 1. OBSERVED MEAN PRICES AND FUNDAMENTAL VALUES

Objective of design: Link between stimulus (model, rules), behavior, biological data (e.g. brain activity), to find out thought processes

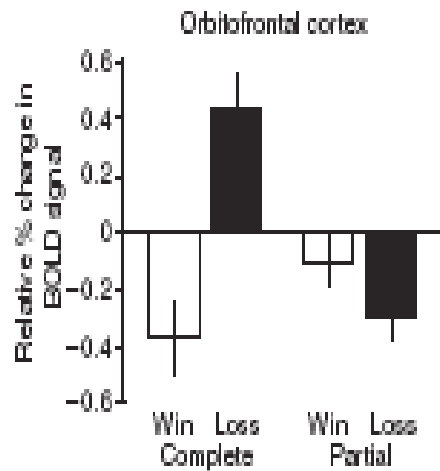
Stimulus



Behavior



e.g. inside scanner

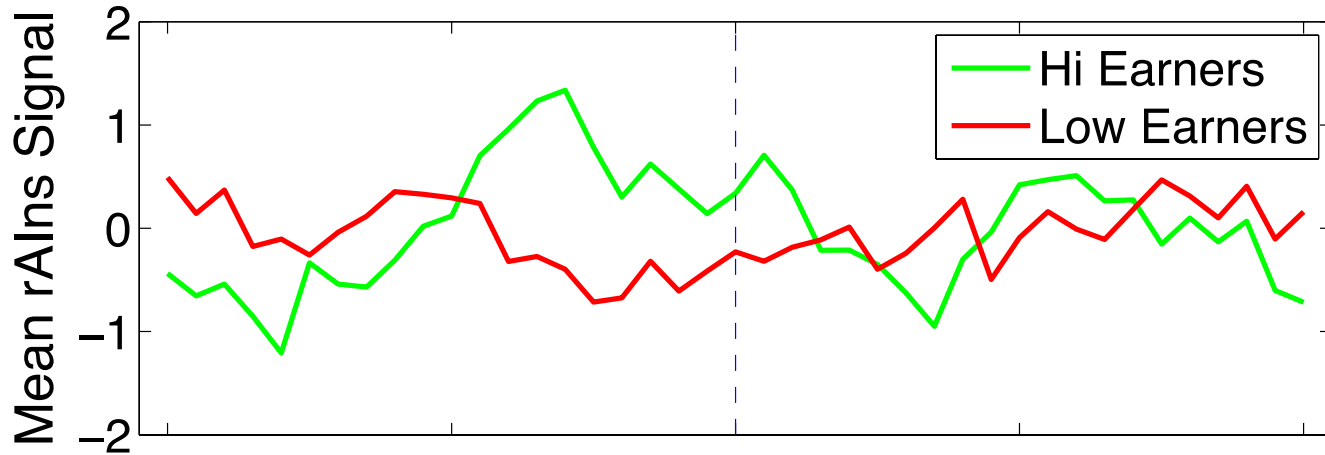


Economic/behavioral models

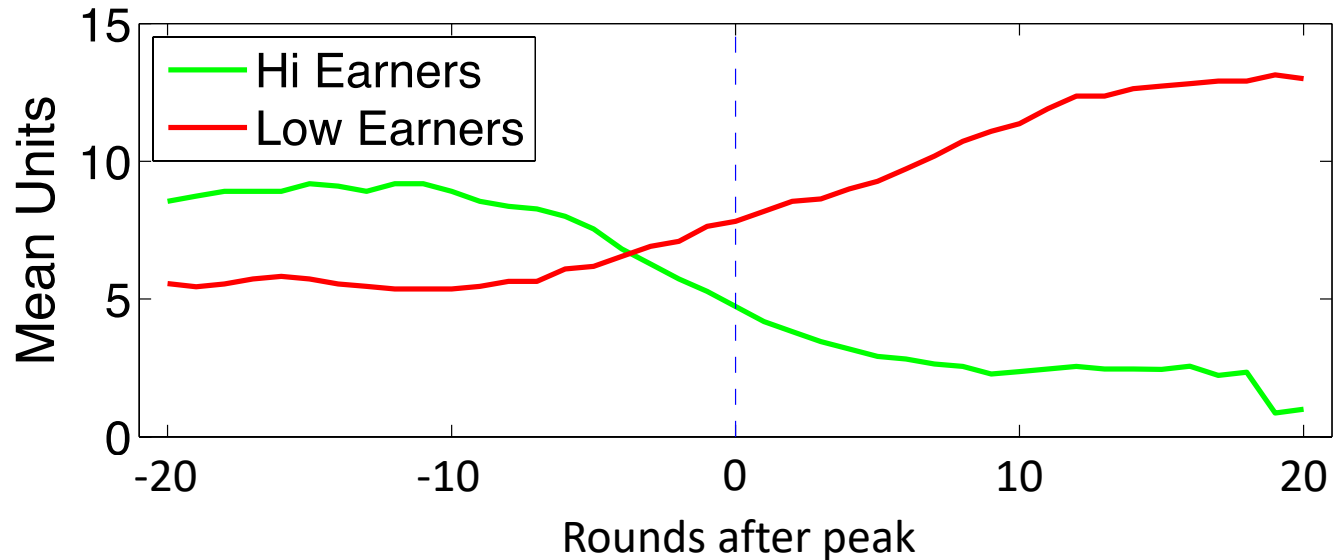
e.g.

- expected utility
- risk aversion
- risk loving
- regret models

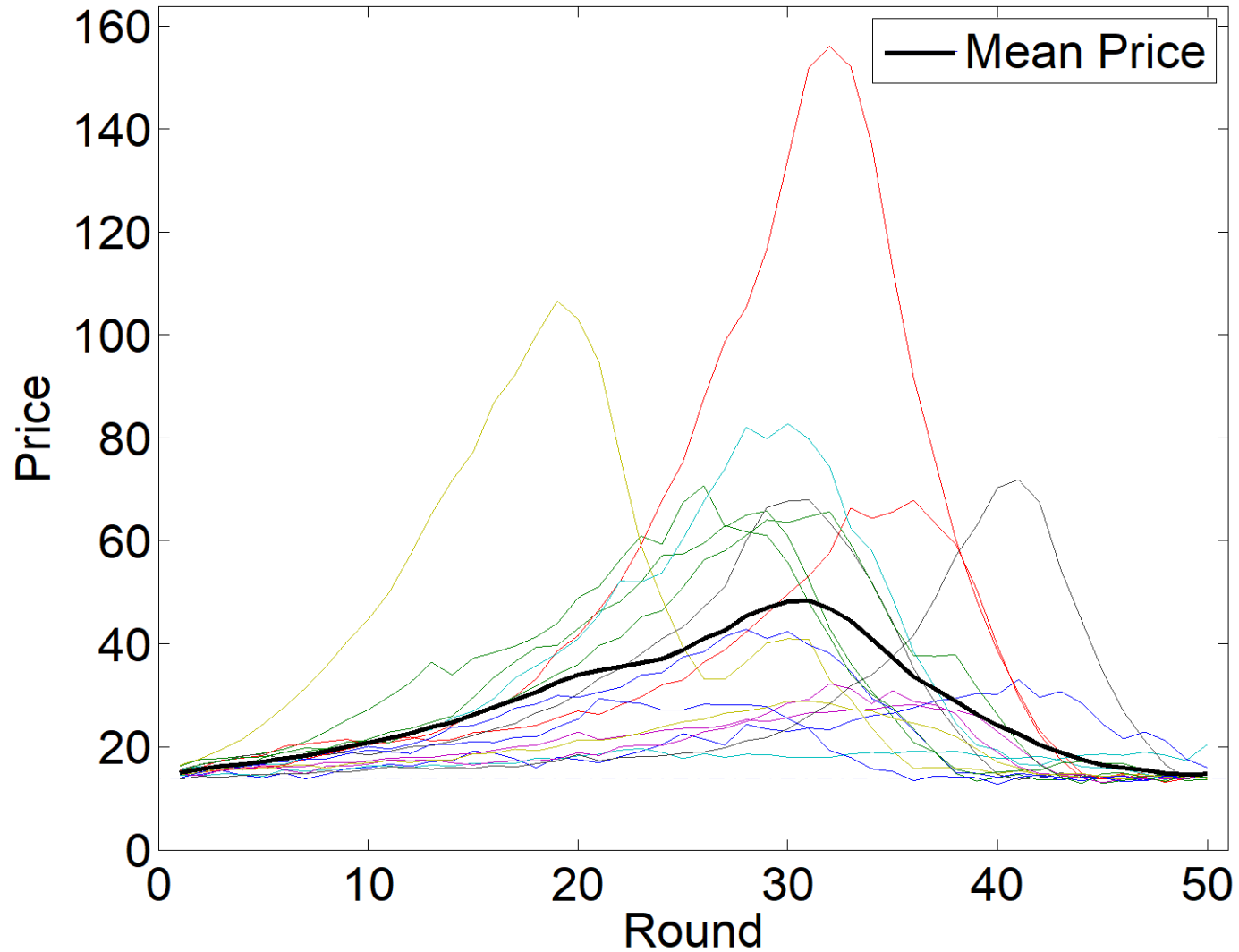
rAIns Activity (5-ma)



Trading Activity, Top & Bottom Quartile Earners



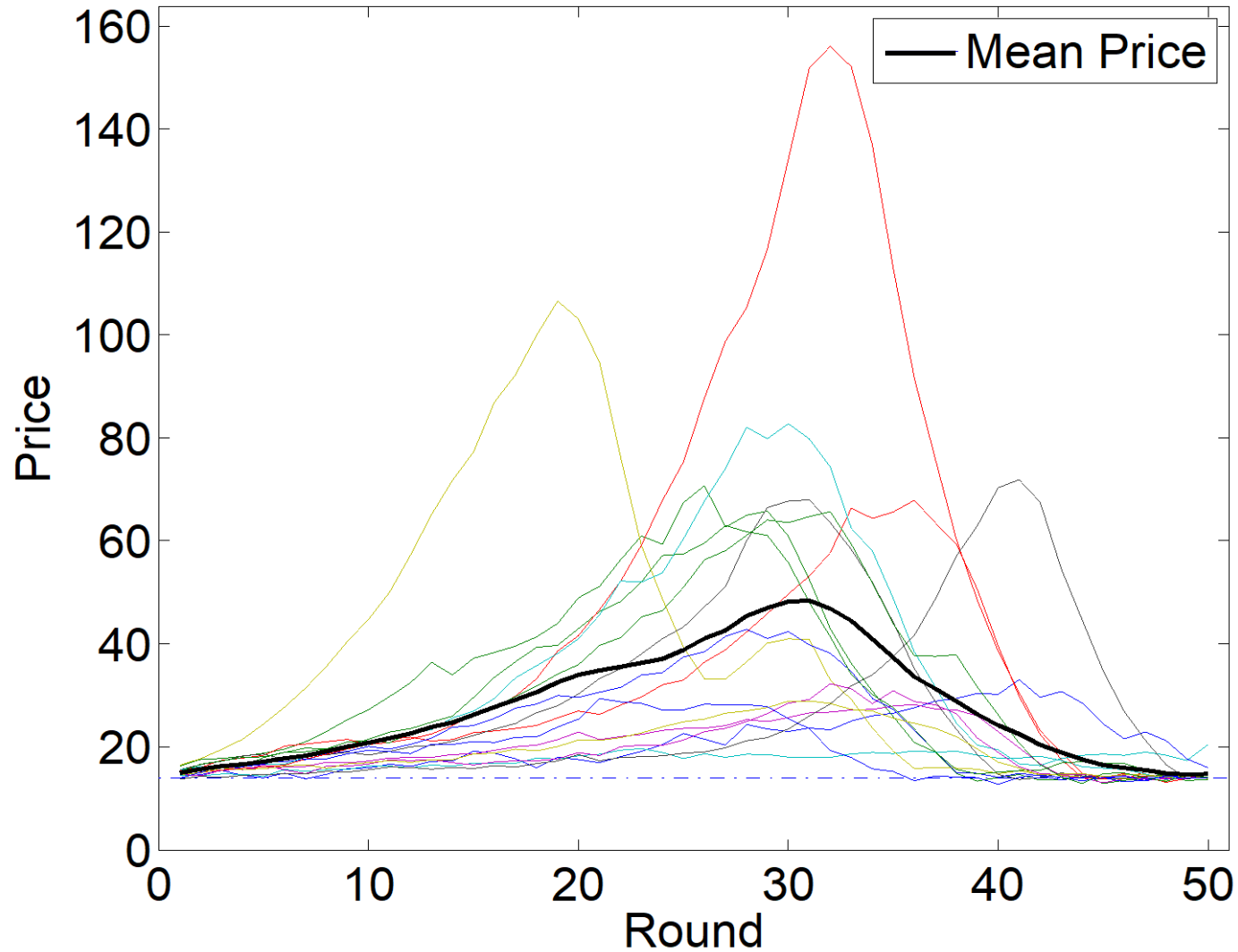
Market Prices, 16 Sessions



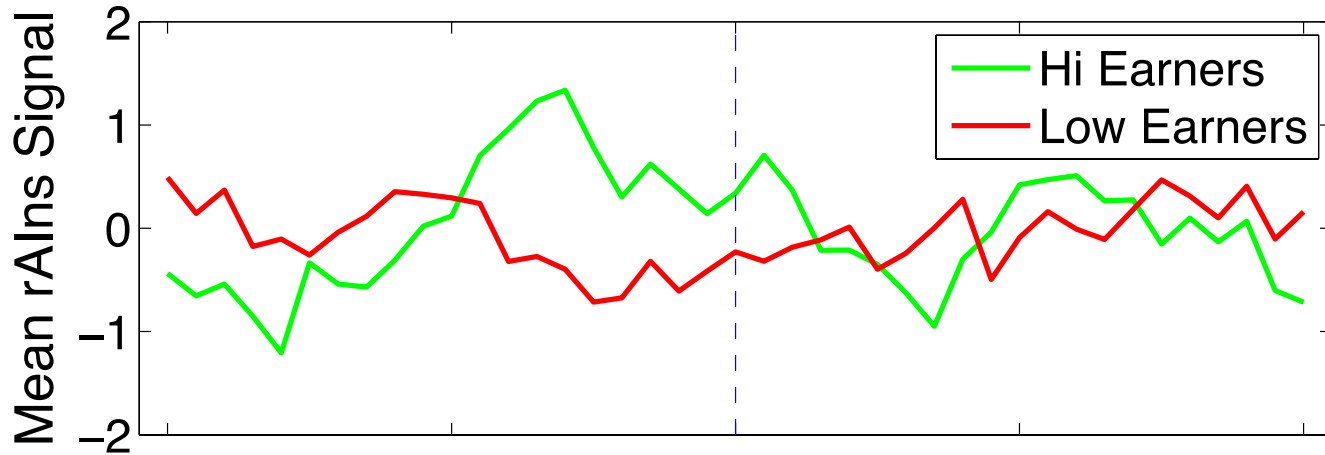
Discussion: Insula

- We find evidence for a neural “early warning” signal in the right anterior insula
- Insula activity associated with awareness of bodily states, pain, risk, gut feelings & emotion
- Suggests causal changes that increase insula activity could reduce bubbles

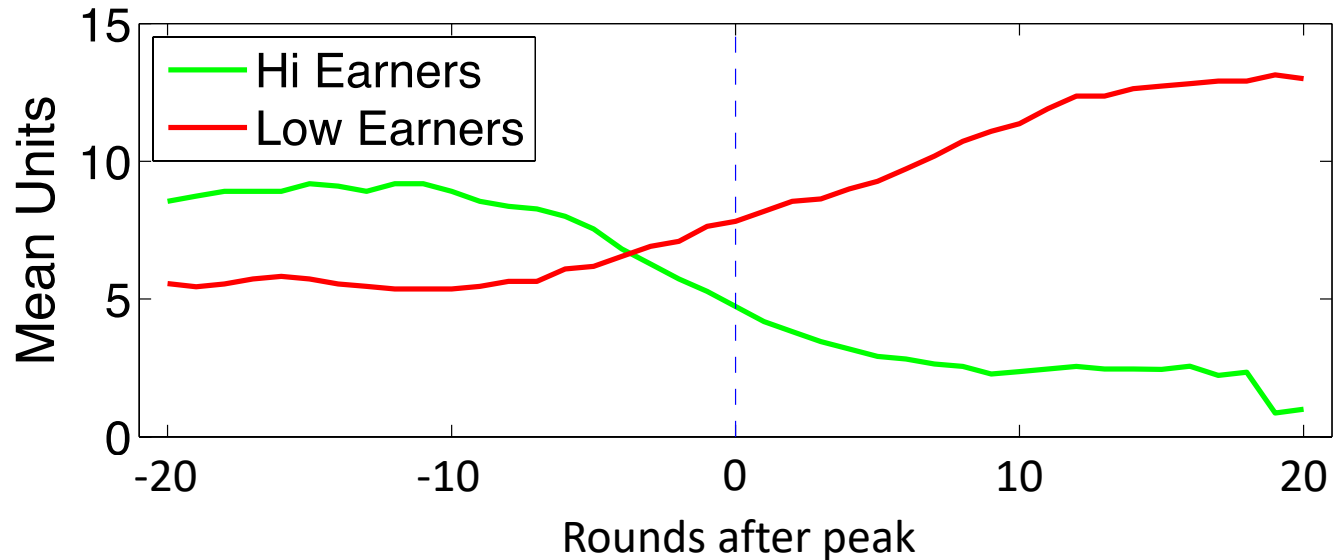
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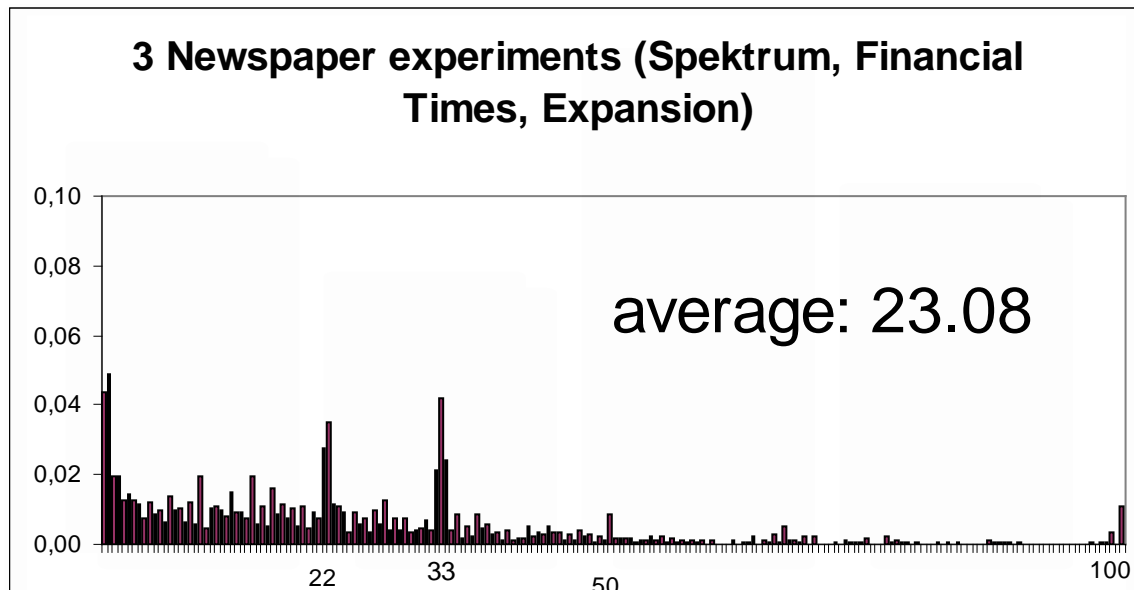
Rules of the original game

Choose a number between **0 and 100**. The winner is the person whose number is closest to **$2/3$ times the average of all chosen numbers**

Rules, theories, and data for the basic game

Rules

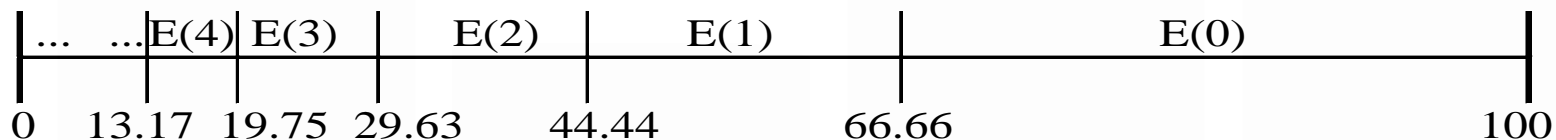
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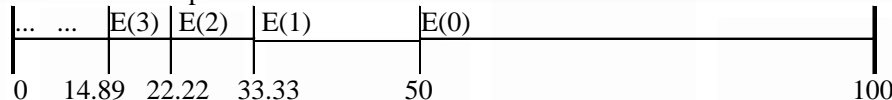
1. iterated elimination of dominated strategies

Equilibrium

← ITERATION

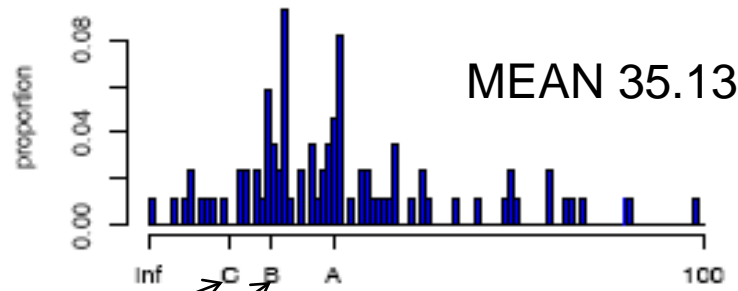


2. iterated best response

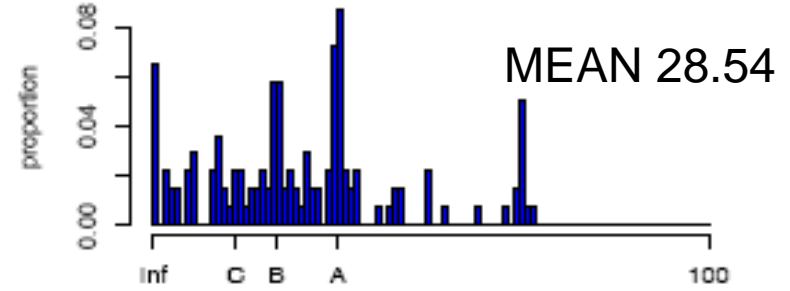


Main problem: starting point=level 0

Lab

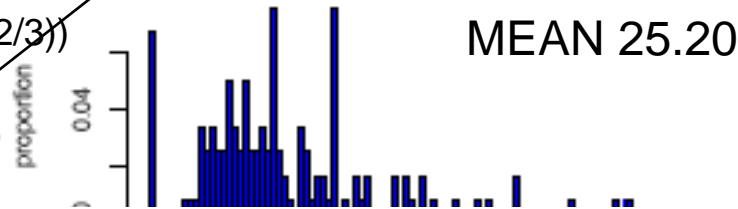


Class

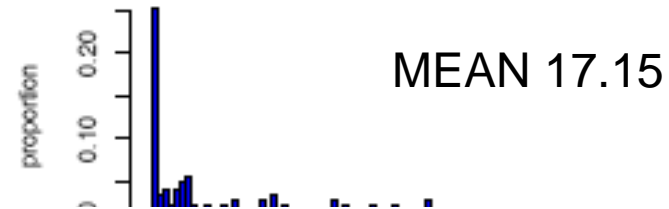


C=level 3
 (15=50*2/3*2/3*2/3)
 B=level 2
 (22=50*2/3*2/3)
 A=level 1
 (33=50*2/3)

Take-home

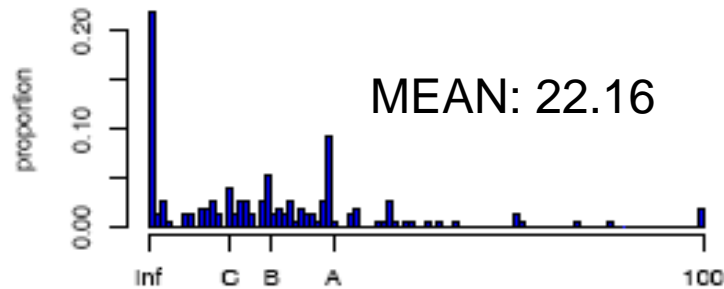


Theorists

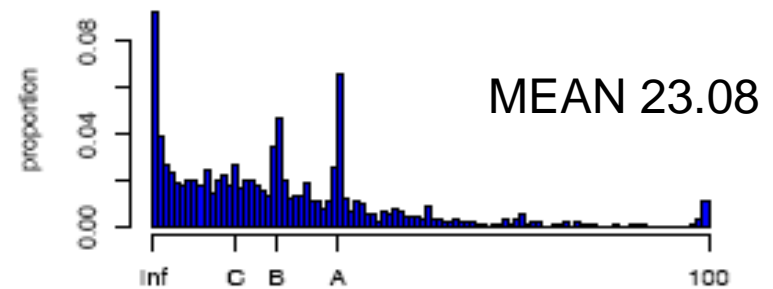


Interpretation: uncorrelated shocks in the head of subjects
 => Behavior far away from equilibrium (LEVEL k reasoning)

Internet

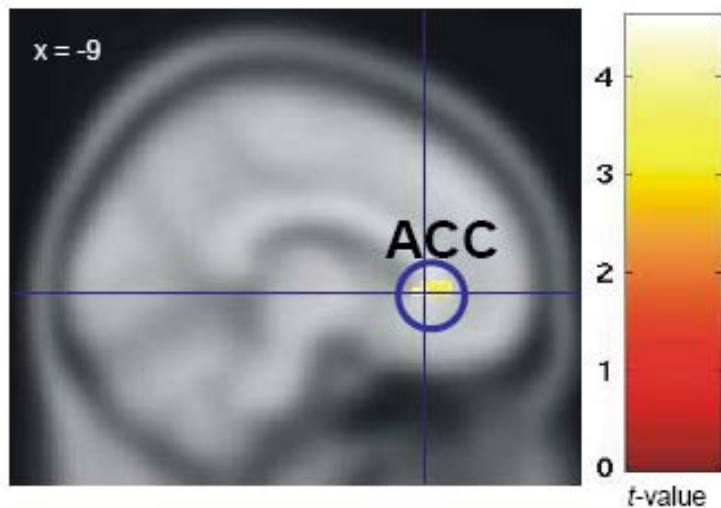


Newspaper



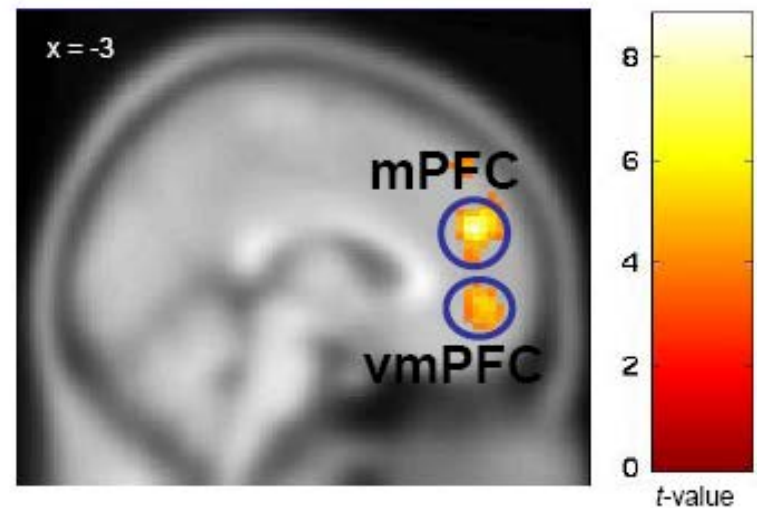
High vs. low level of reasoning

Low level of reasoning



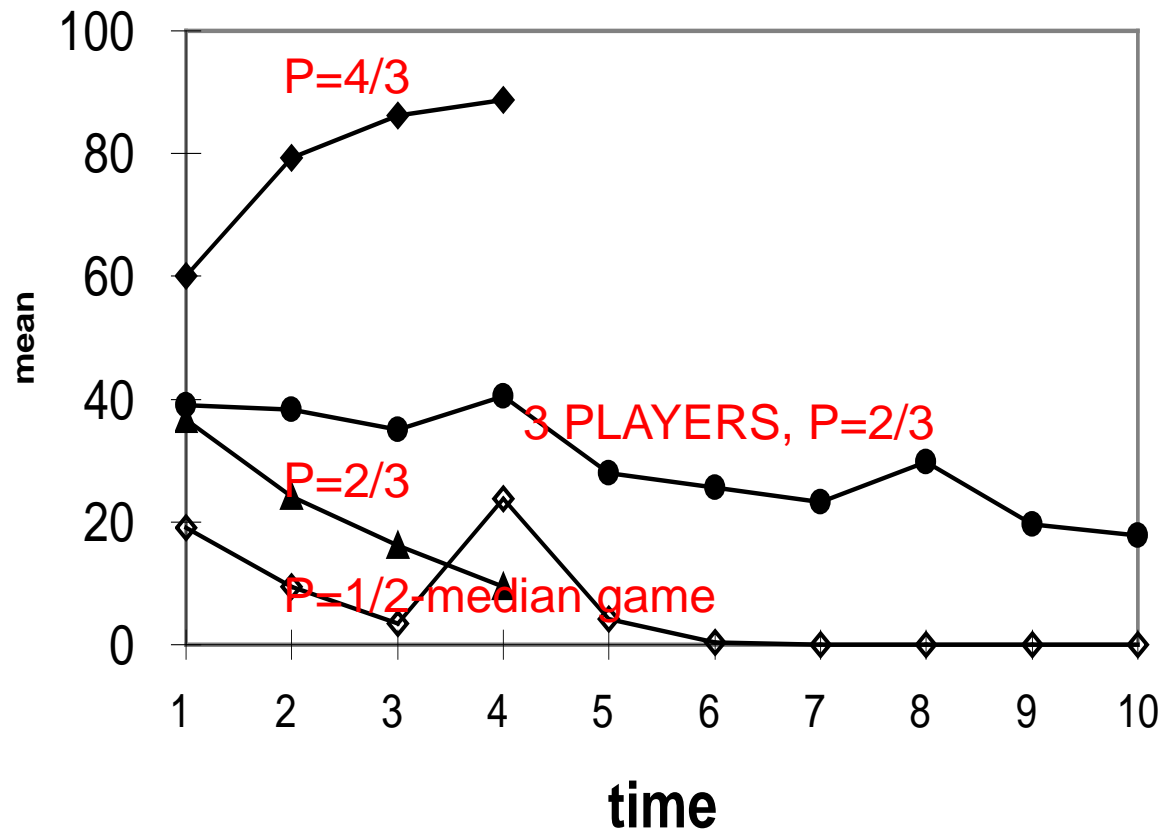
“CHOOSING 33”

High level of reasoning



“CHOOSING 22”

Mean behavior over time



Nagel 1995, Camerer, Ho AER 1998)

Beauty Contest Game

Or, to change the metaphor slightly, professional investment may be likened to those **newspaper competitions** in which the competitors have to pick out the six prettiest faces from a hundred photographs, the prize being awarded to the competitor whose choice most nearly corresponds to the average preferences of the competitors as a whole; so that each **competitor has to pick not those faces which he himself finds prettiest**, but those which he thinks likeliest to catch the fancy of the other competitors, all of whom are looking at the problem from the same point of view. It is not a case of choosing those which, to the best of one's judgment, **are really the prettiest, nor even those which average opinion genuinely thinks the prettiest.** We have reached the third degree where we devote our intelligences to anticipating what average opinion expects the average opinion to be. And there are some, I believe, who **practise the fourth, fifth and higher degrees.**

Keynes (1936, p. 156)