

Bubbling with Excitement: An Experiment

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We wish to thank the Xlab and the Coleman Fung Risk
Management Research Center for financial support.

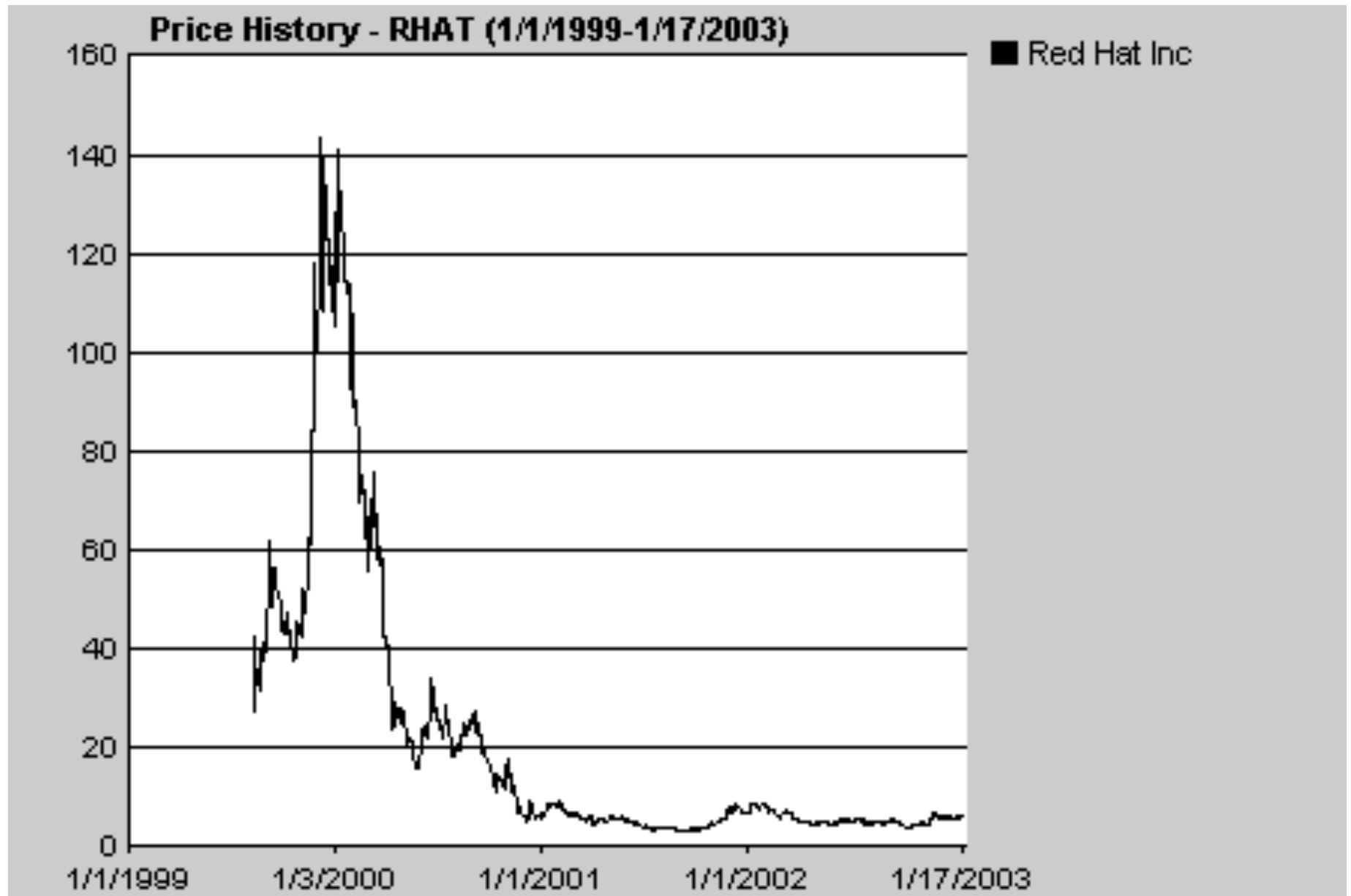
Red Hat Software

- Mar 1998 36 employees
- Aug 1999 IPO open @ \$14 close @ \$52
- Aug 1999 growing revenue, negative earnings
- Dec 10, 1999
 - 333 employees
 - \$286 stock price
 - \$19.7 billion market cap (~\$60 million per employee)

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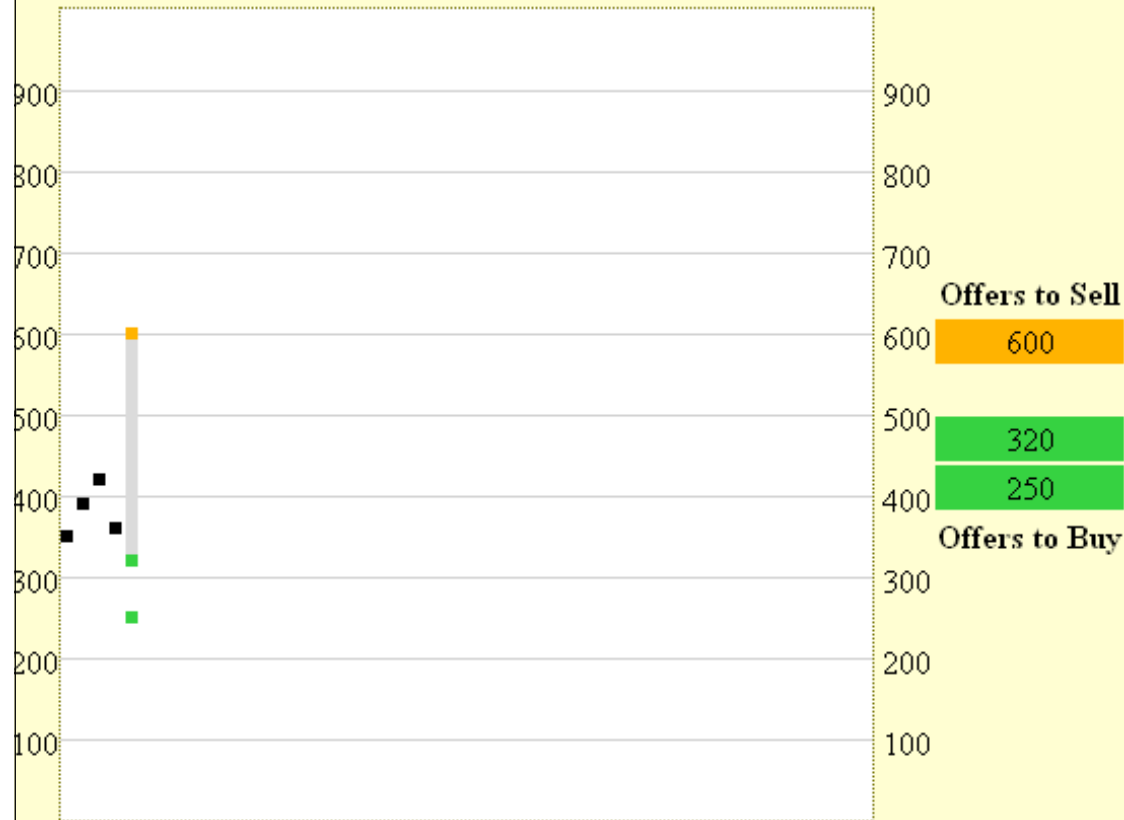
Investor Decision Making

- Preferences
 - Prospect theory
- Beliefs
 - overconfidence--trade too much
 - representativeness heuristic
 - availability bias--IPOs
 - recency bias--chase performance
- Limited attention
 - buying behavior of individuals
- Emotions
 - Regret
 - disposition effect, repurchases of stocks previously sold

Bubbles in Experimental Markets: Experimental Environment

- The basic experimental setup has the following features
 - 15 period asset
 - Dividend uncertainty
 - $\{0, 8, 28, 60\}$
 - Initial cash and shares
 - Double auction or call market trading mechanism

Current round: 2
Time Remaining: 0:20



Orders

Submit New Order

Immediate Order

Your Holdings

Cash	1084
Shares	3

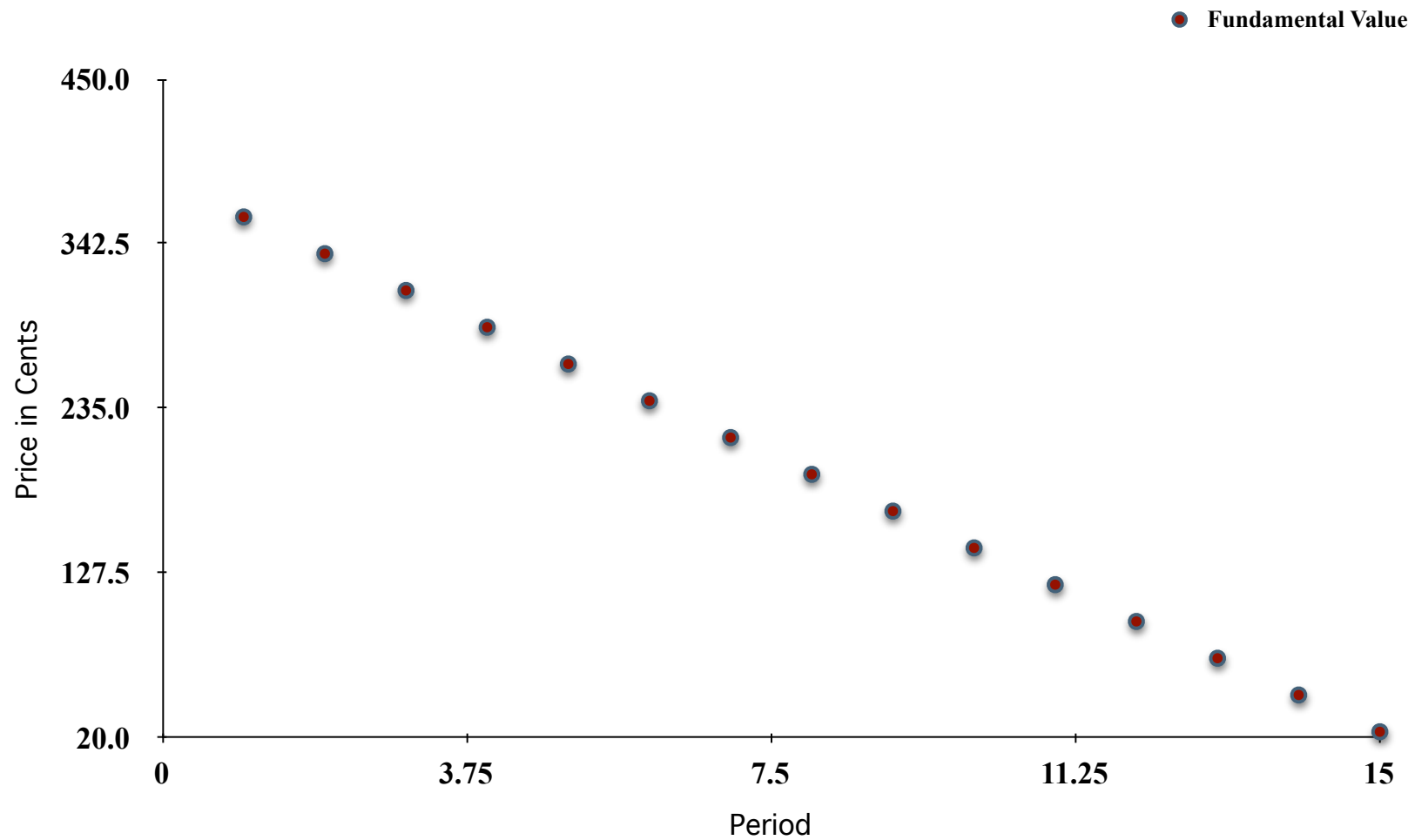
Information

Alert:

This is Round 2. At the end of each round, a share will pay the owner a dividend of either 0, 8, 28, or 60 cents, with equal chances.

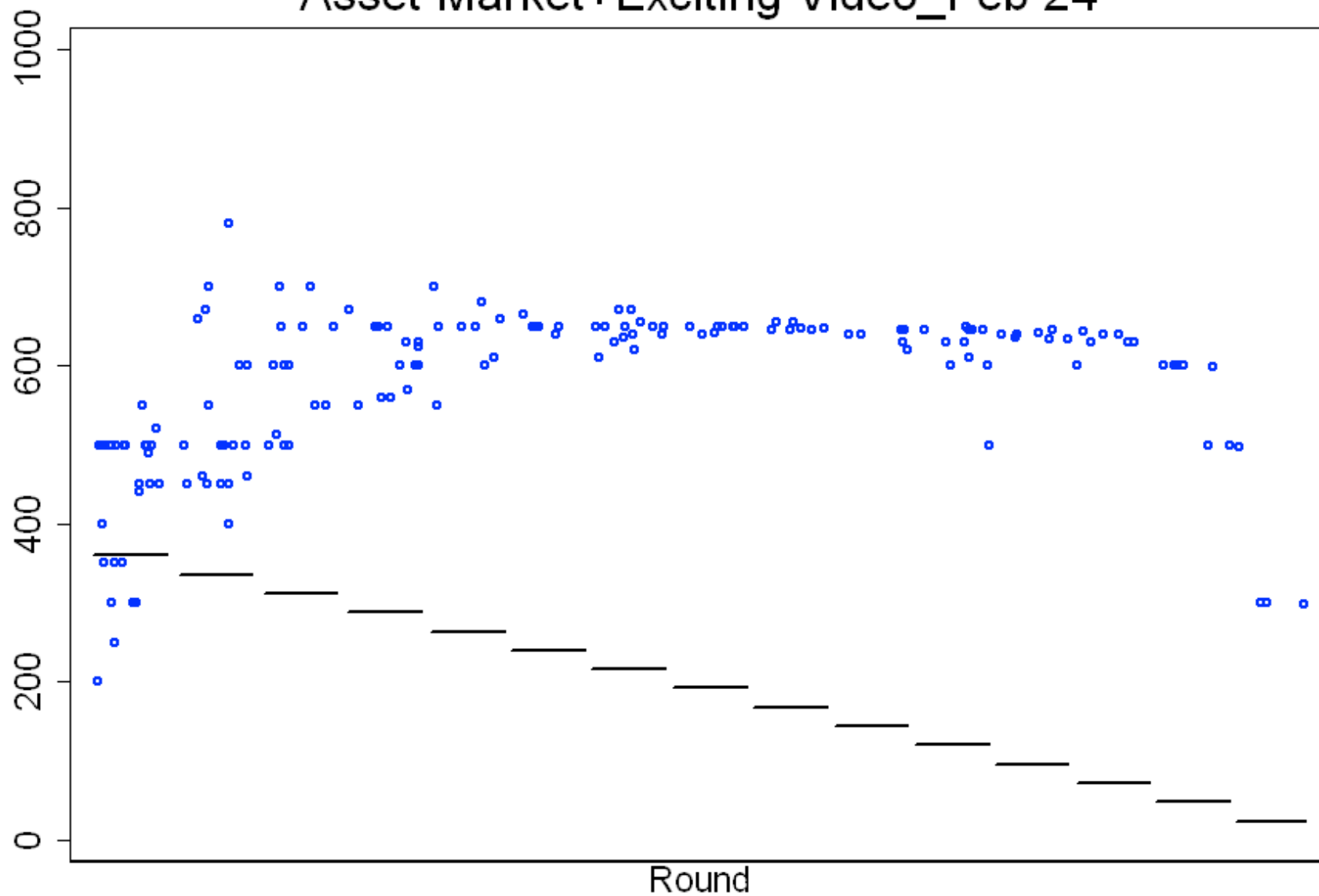
The average dividend value for the remaining rounds is $14 \times 24 = 336$ cents per share.

Fundamental Value Line

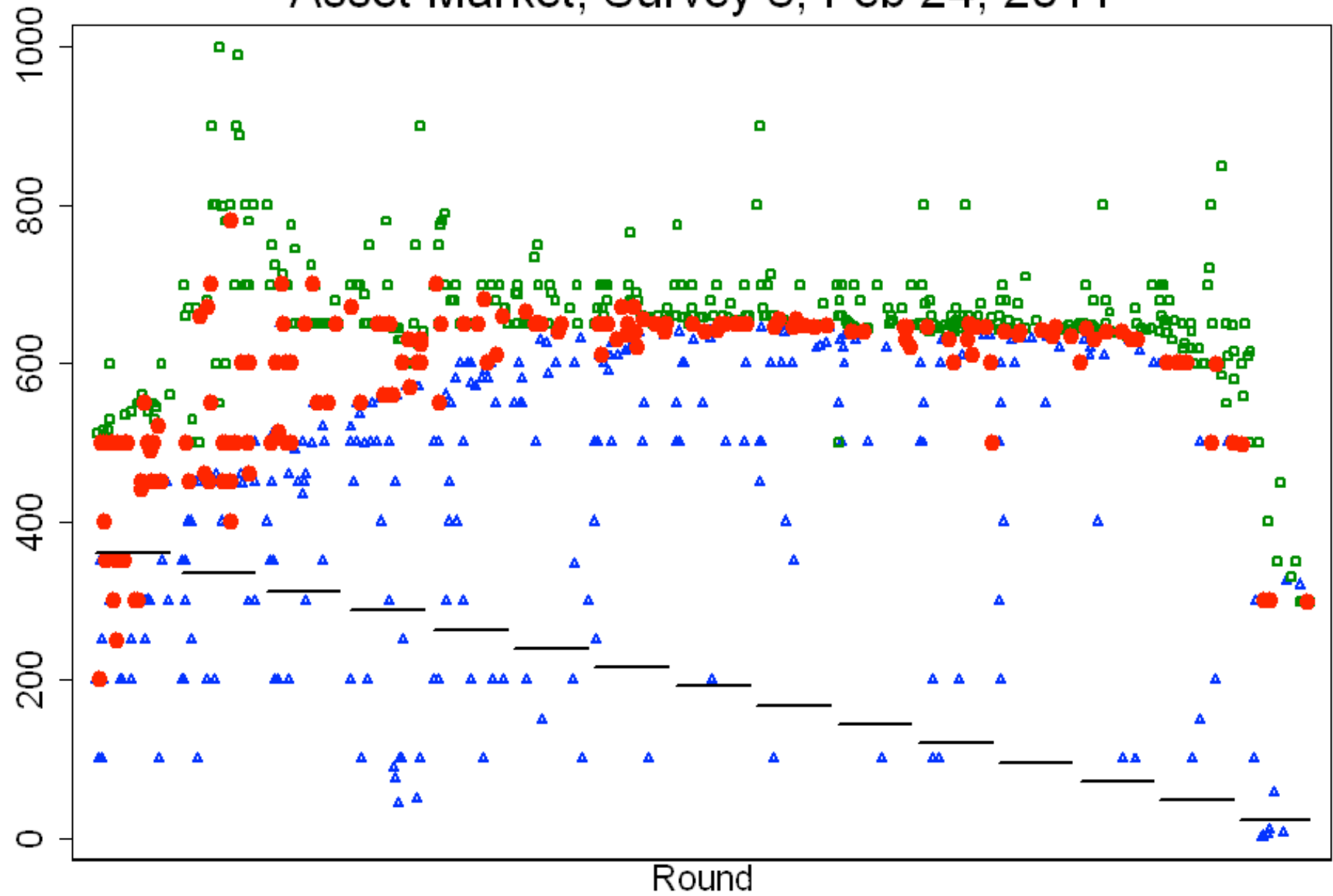


Courtesy of David Porter

Asset Market+Exciting Video_Feb 24



Asset Market, Survey 8, Feb 24, 2011



Related Research

- Smith, Suchanek, and Williams (Econometrica 1988) establish bubbles in experimental markets
- Caginalp, Porter, and Smith (Journal of Behavioral Finance, 2001) explore conditions leading to larger bubbles
 - Higher initial cash to share ratio (greater liquidity)
 - Dividend paid immediately (greater liquidity)
 - Closed order book
- Dufwenberg, Lindqvist, & Moore (AER 2005)
 - If even 1/3 of participants have had experience in the same experimental market setting, bubble are greatly diminished
- Greater bubbles with lottery like dividends (Ackert, Charupat, Church, and Deaves, 2006)
- Hussam, Porter, Smith (AER 2008)
 - A large shock to liquidity and increased lottery-like dividend “rekindle” bubbles with experience participants
- Lei, Noussair, & Plott (Econometrica 2001)
 - Bubbles even without possibility of speculation
 - Designated buyers & sellers
 - Active participation hypothesis

Related Research

- Bubbles with certain dividends (Porter & Smith, 1995)
- Markets with short selling
 - bubbles occur (King, Smith, Williams, and Van Boening, 1993),
 - bubbles diminished or eliminated (Haruvy and Noussair, 2004; Ackert, Charupat, Church, and Deaves, 2006)
- Greater bubbles when margin allowed (Ackert, Charupat, Church, & Deaves, 2006)
- Bubbles with non-undergraduate participants (e.g., Arizona executives)
- Do participants understand declining fundamental value? Kirchler, Huber, and Stöckl (2010)
- Bubbles with constant fundamental value Noussair and Ruffieux (2001)
- Greater bubbles with positive mood than neutral mood Lahav and Meer (2010)
 - 4 market simulations; 2 conditions

Emotions and Experiments

- Positive affect:
 - changes information processing by exacerbating decision biases and reliance on heuristics (Bless, Bohner, Schwarz, and Stack, 1990; Schwarz, 1990; Ruder and Bless, 2003)
 - impacts preferences by making people misattribute the incidental pleasantness and/or arousal to liking for the target event (Andrade and Ariely 2009; Pham 1998)
 - influences beliefs by making people form more optimistic assessments of everyday risks (Hogarth et al 2011; Johnson and Tversky 2003)
 - increase risk taking (Knutson et al 2005, Kuhnen and Knutson 2005, Isen and Patrick 1983; Isen and Geva 1987)
- Negative affect (fear) : can decrease risk-taking (Guiso, Sapienza, and Zingales, 2011)
 - When the national soccer team loses a World Cup match, the national stock market falls the next day. Edmans, Garcia, Norli (2006)

Videos

Experiment 1:

- Exciting/Positive <http://128.32.75.8/videos/watchexciting.asp>
- Scenes from action film
 - Unexciting/Neutral <http://128.32.75.8/videos/watchneutral.asp>
 - Scenes from historical documentary

Experiment 2:

- Exciting/Positive <http://128.32.75.8/videos/watchvideo.asp?video=1>
- Scenes from action film
 - Exciting/Fear <http://128.32.75.8/videos/watchvideo.asp?video=3>
- Scenes from horror film

Experiment 3:

- Exciting (“Knight & Day” or “Mr. and Mrs. Smith”)
- Sad (scenes from “I am Sam” or “The Champ”)

Videos

“Because the waiting is a bit long, we will play a video clip. Since we intend to use videos clips in another experiment, we've selected a few different video clips. You will be randomly assigned to one of them. After you've finished watching the clip, please answer a few questions about it. Note that the video is not related to your earnings today. So thank you in advance for helping out.”

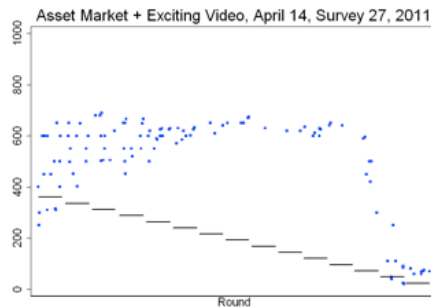
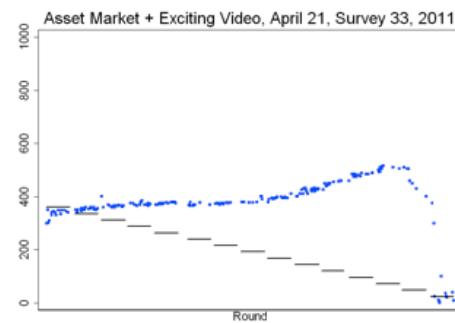
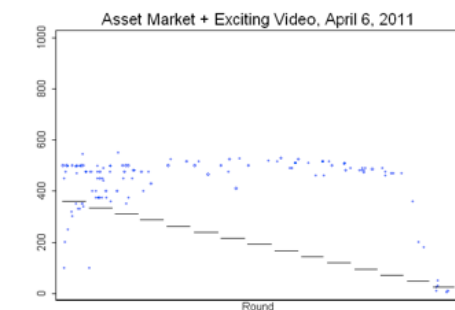
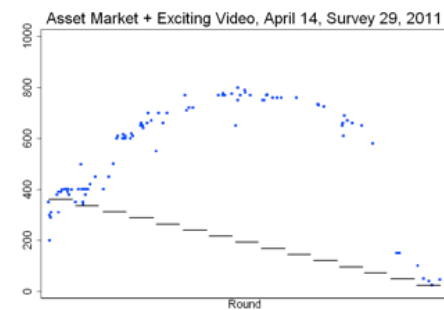
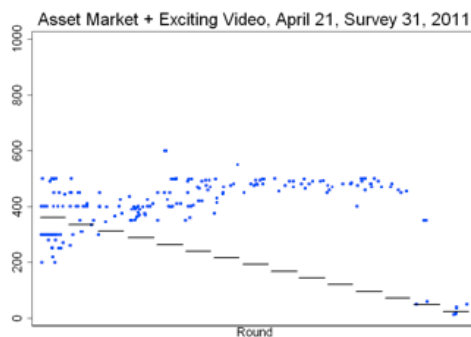
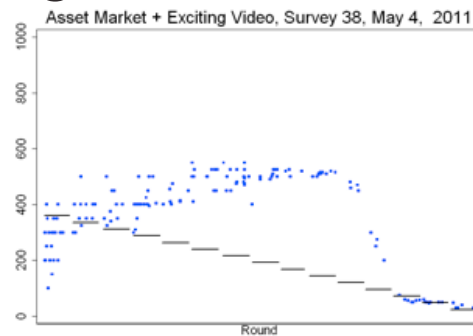
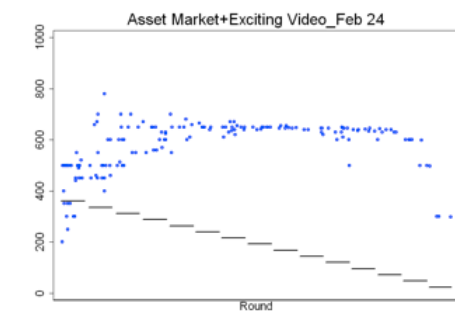
QUESTION USED IN STUDY 2

1. Please indicate (a) the emotional state that BEST describes what you've experienced while watching the video clip--only one option allowed. Then, indicate the intensity of the selected emotional experience.

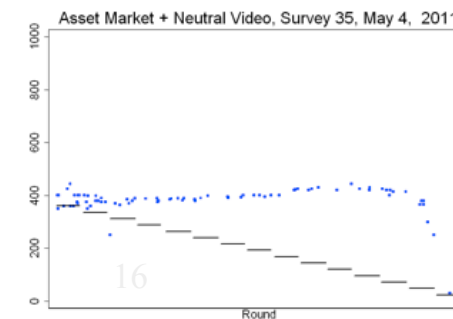
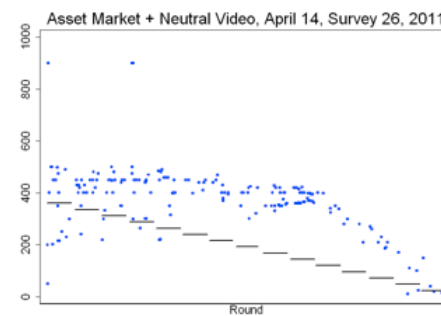
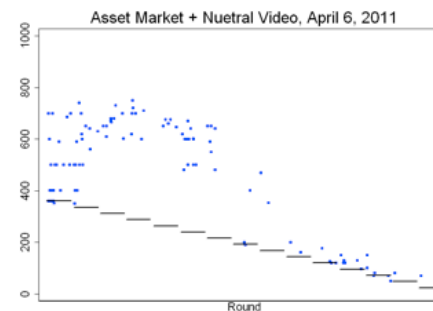
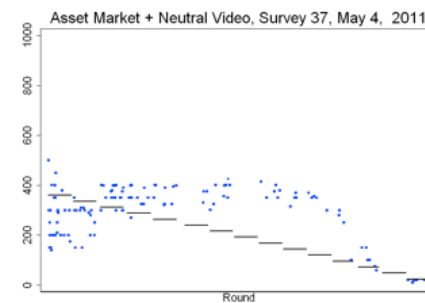
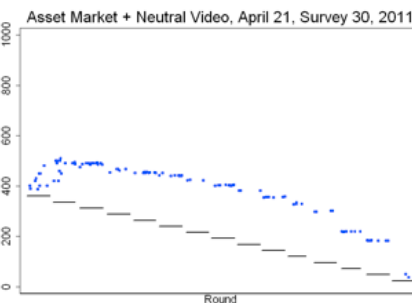
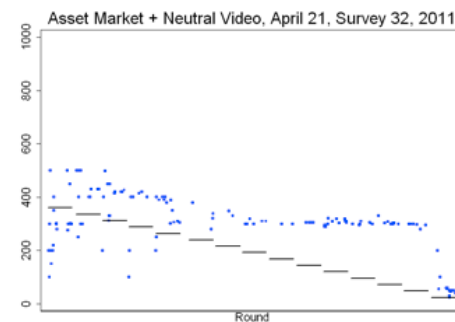
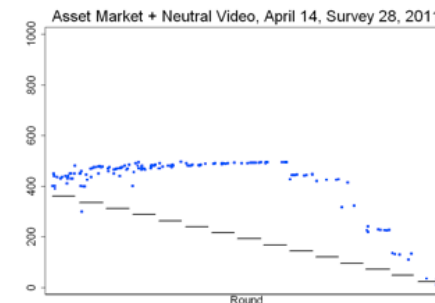
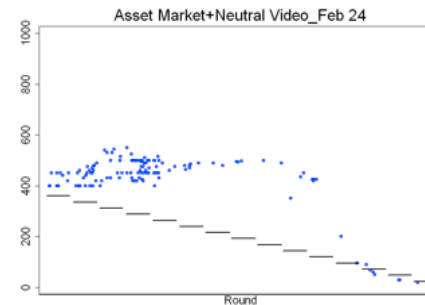
___Anxiety/Fear/Nervousness ___
(1=very little;9=very much)

___Excitement/Pleasure/Enthusiasm ___
(1=very little;9=very much)

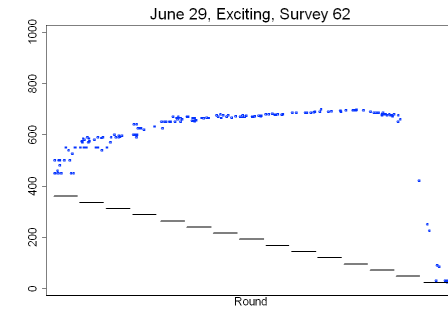
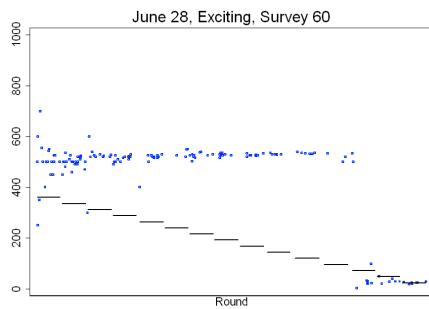
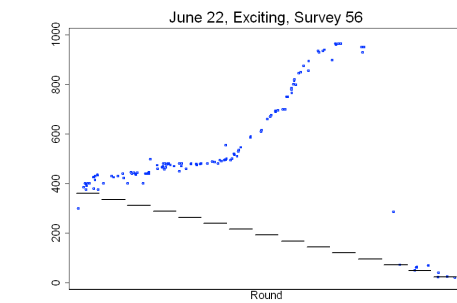
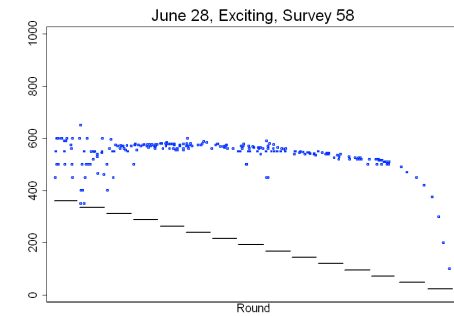
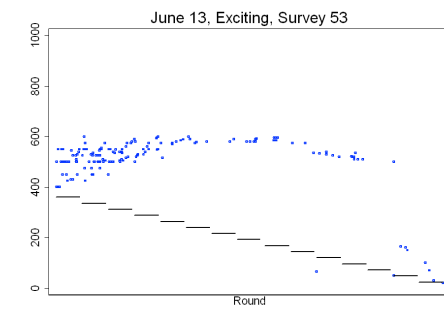
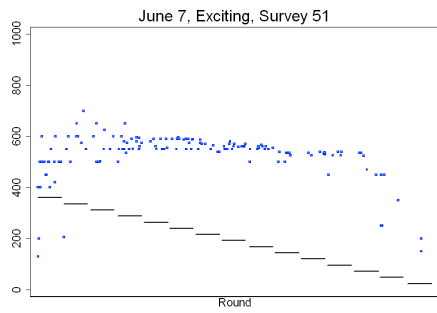
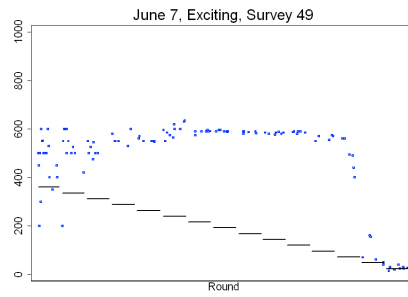
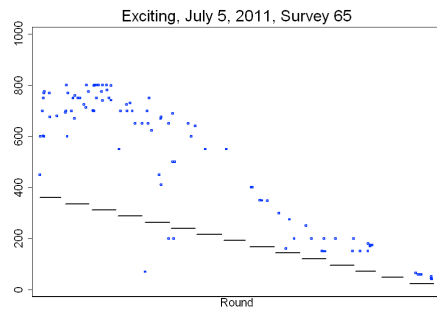
Exciting Video



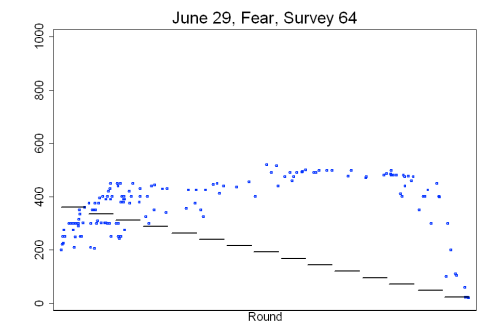
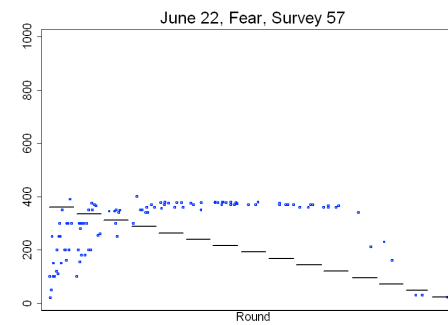
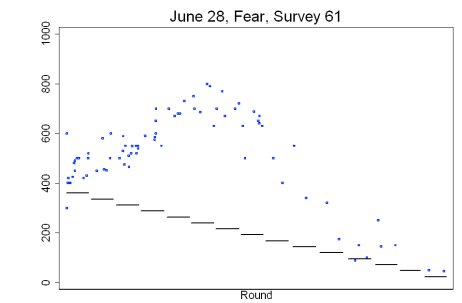
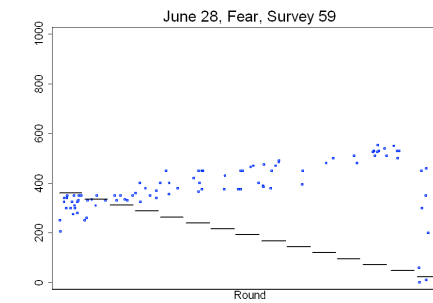
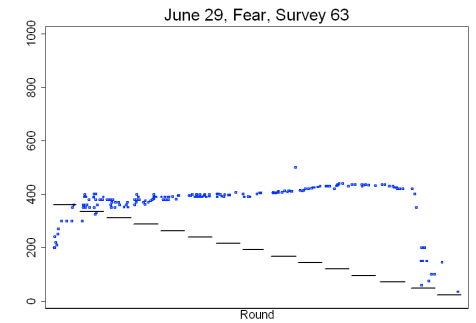
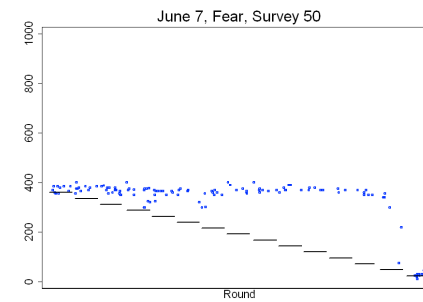
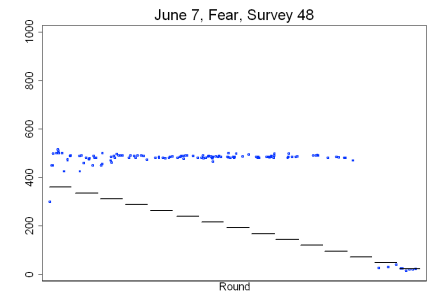
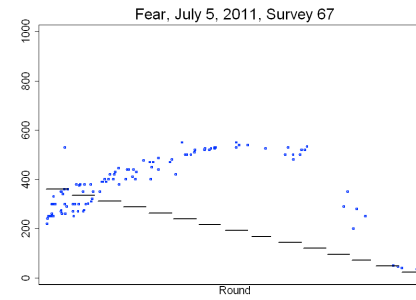
Neutral Video



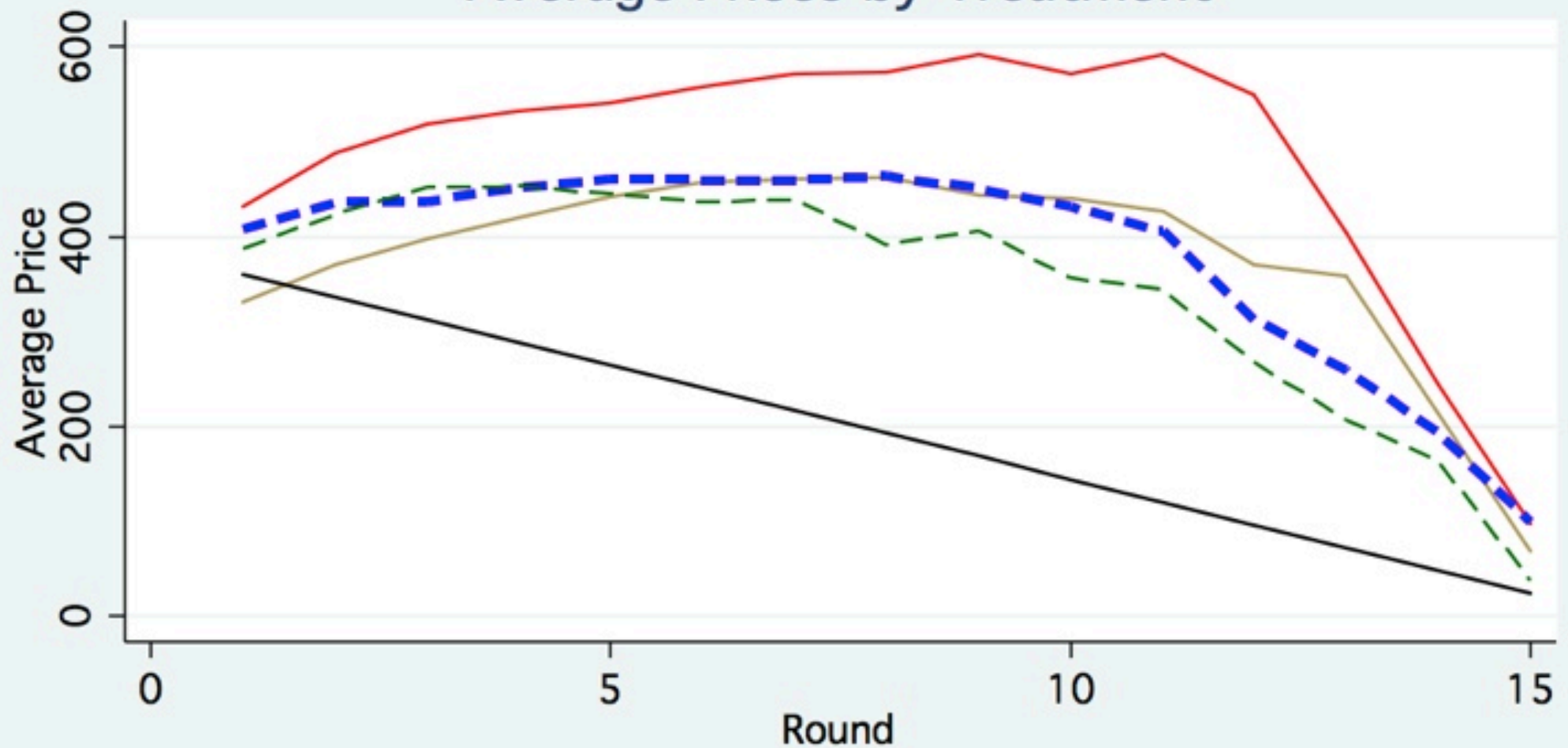
Exciting Video



Fear Video



Average Prices by Treatment



Treatment

- Excitement
- Sadness
- Fundamental Value
- Fear
- Neutral

Metrics:

$$\text{Magnitude} = \frac{1}{15} \sum_{r=1}^{15} (\bar{P}_r - f_r)$$

$$\text{Amplitude} = \max_{r \in (1, 15)} (\bar{P}_r - f_r)$$

where $\bar{P}_r$ is the average transaction price in round r and f_r is the fundamental value in round r (i.e., the expected of remaining dividends).

Tests:

Two-sample t test with equal variances

Two-sample Wilcoxon rank-sum (Mann-Whitney) test

Results

Panel A: Average Magnitude across Markets

Treatment	N	Mean	Standard Error
Excitement	24	285.4	17.3
Neutral	8	166.1	19.9
Fear	8	186.0	18.0
Sadness	8	197.8	26.0

Panel B: Average Amplitude across Markets

Treatment	N	Mean	Standard Error
Excitement	24	512.3	30.2
Neutral	8	314.7	43.9
Fear	8	382.0	30.1
Sadness	8	357.1	34.5

- Null: $\text{magnitude}(\text{exciting}) = \text{magnitude}(\text{neutral})$
 - t test : $t = 3.7, p < 0.001$
 - rank sum test: $z = 3.15, p < 0.002$
- Null: $\text{amplitude}(\text{exciting}) = \text{amplitude}(\text{neutral})$
 - t test: $t = 3.39, p < 0.01$
 - rank sum test: $z = 3.16, p < 0.01$
- Null: $\text{magnitude}(\text{exciting}) = \text{magnitude}(\text{fear})$
 - t test: $t = 3.11, p < 0.01$
 - rank sum test: $z = 2.87, p < 0.01$
- Null: $\text{amplitude}(\text{exciting}) = \text{amplitude}(\text{fear})$
 - t test: $t = 2.34, p < 0.02$
 - rank sum test: $z = 2.35, p < 0.02$
- Null: $\text{magnitude}(\text{exciting}) = \text{magnitude}(\text{sad})$
 - t test: $t = 2.61, p < 0.01$
 - rank sum test: $z = 2.50, p < 0.02$
- Null: $\text{amplitude}(\text{exciting}) = \text{amplitude}(\text{sad})$
 - t test: $t = 2.76, p < 0.01$
 - rank sum test: $z = 3.03, p < 0.01$

Mechanism(s)

- Does positive/excited mood make participation in market more fun?
- Does positive/excited mood increase overconfidence?
- Does positive/excited mood increase reliance on heuristics and extrapolation of past returns?
-

Conclusion

- Positive, high arousal affect leads to greater bubbles
- Potential feedback loop in affect and returns.