

Bubbling with Excitement: An Experiment

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Abstract

In an experimental setting, we study the role of emotions in markets. Our experimental market is modeled on those of Smith, Suchanek, and Williams (1988) and Caginalp, Porter, and Smith (2001). Participants play part in a laboratory market where they can trade a risky asset over a computer network. Prior to the market simulation, they watch short videos that are exciting and upbeat—chase scenes; neutral—segments from a historical documentary; fearful—scenes from a horror movie; or sad—scenes from a drama. Larger asset pricing bubbles develop in experimental markets run subsequent to the exciting videos relative to the other three conditions. The differences in the magnitude and amplitude of the bubbles are both economic and statistically significant.

From “tulipmania” of 1637 to the “irrational exuberance” of the late 1990s, popular accounts of investment bubbles emphasize the role of emotions, and, particularly, excitement. In these accounts, aroused emotional states distort better judgment. Sheeran and Spain (2004) write of “the hysteria to buy in the first place, which inflates the bubble so greatly, and the panic selling which bursts the bubble.” Most experimental studies of asset pricing bubbles, have, however, focused on non-emotional factors such as liquidity, experience, transparency, novelty of environment, and speculation (Caginalp, Porter, and Smith, 2001; Dufwenber, Lindqvist, and Moore, 2005, Hussam, Reshmaan, Porter, and Smith, 2008; Lei, Noussair, and Plott, 2001). This paper reports results from laboratory financial market experiments designed to study the role of emotions in asset-pricing bubbles.

In a series of 48 experimental markets, we orthogonally manipulate participants’ incidental emotional state with short videos, a commonly used procedure (Rottenberg, Ray, and Gross 2007) and known to impact financial and economic decision-making (Andrade and Ariely 2009). Precisely, a pleasant and arousing treatment (excitement) is compared to two different *unpleasant* and arousing treatments (fear and sadness), and to one unemotional treatment (neutral). After the incidental emotion induction, participants play part in a financial market simulation. Bubbles are measured and compared across the four conditions.

Within this paradigm, two hypotheses are contrasted. Since financial trading represents an important source of physiological arousal (Lo and Repin 2002), one hypothesis is that bubbles result, at least in part, from people’s undifferentiated search for sensation seeking (Zuckerman 1979). In this case, any highly arousing incidental experience (independent of valence or emotion specificity) would produce larger bubbles relative non-arousing ones. A second alternative is that the pleasantness associated with the arousing experience (excitement) is critical for investors to inflate the bubble. There is evidence supporting this possibility, although the findings focus on anticipatory feelings associated with future gains and losses (Kuhnen and Knutson 2005; Knutson et al. 2005).

Our results support the second hypothesis. Excitement leads to greater asset pricing bubbles in magnitude and amplitude relative to emotions that are also highly

arousing but unpleasant—fear and sadness—and relative to a neutral, unemotional condition.

The rest of this paper is organized as follows. In the next section we discuss related research. We describe our experimental design in Section II. We present results in Section III, followed by a discussion and concluding remarks.

I. Related Research

Bubbles in experimental asset markets were first documented by Smith, Suchanek, and Williams (1988). Subsequent studies have documented that bubbles are greater when traders are endowed with more cash relative to risky assets and when dividends are paid after each round of trading rather than at the end of trading and when traders can buy on margin (Caginalp, Porter, and Smith, 2001). Bubbles may be dampened or eliminated when short sell is allowed though this is not the case for all experimental designs (King, Smith, Williams, and Van Boening, 1993; Haruvy and Noussair, 2004; Ackert, Charupat, and Deaves, 2006). Bubbles are greater when the distribution of dividends is more lottery-like (Ackert, Charupat, and Deaves, 2006), but can arise even when dividends are non-stochastic (Porter and Smith, 1995). Bubbles are dampened or eliminated when some or all traders are experienced (Dufwenberg, Lindqvist, and Moore 2005) however, even experienced traders may generate bubbles when market parameters change (Hussam, Porter, and Smith, 2008).

One explanation as to why traders in experimental markets buy at above fundamental value is that they expect to be able to sell the asset at a yet higher price. However, Lei, Noussair, and Plott (2001), find that bubbles can arise in markets in which buyers cannot resell and, thus, speculation is not feasible. Schoenberg and Haruvy find greater bubbles when traders are given periodic performance information about the best performing trader. Kirchler, Huber, and Stöckl (2010) argue that bubbles arise in markets where the asset has a declining fundamental value because traders do not fully understand the process. Noussair and Ruffieux (2001), generate bubbles in markets with constant fundamental values. Lahav and Meer (2010) induce positive and neutral mood prior to experimental markets similar to those we run. Like us, they find greater bubbles after

inducing positive feelings. In contrast to us, they run only 4 market simulations manipulating the valence of affect from neutral to positive; we run 48 market simulations, manipulating valence from negative to neutral to positive and arousal from low to high.

Asset pricing bubbles may arise when naïve investors believe that the recent past is indicative of the future and buy an asset that has recently rapidly risen because they expect it to continue rising. This creates a feedback loop in which investors buy assets because prices are rising and prices rise because investors are buying. Even sophisticated investors may hold assets they think to be overvalued because they believe less sophisticated investors will drive prices yet higher. For example, Stanley Druckenmiller, the lead manager of Soros's Quantum Fund, believed in December 1999 that the explosion in technology stock prices had gone beyond reason, but, as he later explained, he "thought it was the eighth inning, and it was the ninth" (Norris, 2000).

Excitement and Bubbles

Positive feelings are often mentioned as potential contributors of bubbles. Anecdotal evidence suggest that excited people might disregard useful information, become too optimistic about the future, or enjoy too much the ride to get out of it "in time." Indeed, positive affect has been shown to (a) change information processing by exacerbating decision biases and reliance on heuristics (Bless, Bohner, Schwarz, and Stack, 1990; Schwarz, 1990; Ruder and Bless, 2003), (b) impact preferences by making people misattribute the incidental pleasantness and/or arousal to liking for the target event (Andrade and Ariely 2009; Pham 1998), and (c) vary beliefs by making people form more optimistic risk assessments (Hogarth et al 2011; Johnson and Tversky 1983). As a result, and often through a combination of changes in these three categories of psychological processes, there has been evidence that current positive affect or anticipatory excitement can, at least under certain circumstances, increase risk taking (Knutson et al 2005, Kuhnen and Knutson 2005, Isen and Patrick 1983). There is also evidence that some specific emotions—notably, fear—can produce opposite effects and decrease risk-taking (Andrade and Lee, 2011; Guiso, Sapienza, and Zingales, 2011; Lerner and Keltner, 2001).

We build on these previous findings to test the extent to which excitement (here defined as an intense and pleasant emotional experience) impacts asset-pricing bubbles. Although it is beyond the scope of the paper to pinpoint the exact underlying psychological process(es) that may lead excitement to inflate a bubble, we test whether undifferentiated arousal is a sufficient condition—a sensation seeking hypothesis (Zuckerman 1979)—or whether a pleasantly arousing experience is needed to produce the effect (Kuhnen and Knutson 2005; Knutson et al. 2005). As an ancillary assessment, our design also allows us to test if any of the incidental emotions—e.g., fear—can significantly reduce or even burst the bubble.

II. Experimental Design

We ran series of 48 experimental markets (9 participants per market; $n=432$). Participants were recruited from UC Berkeley's Xlab student subject pool. No participant took part in more than one experiment. Participants were paid a show-up fee and an additional performance based fee averaging \$15.

Our experimental market is modeled on those of Smith, Suchanek, and Williams (1988) and Caginalp, Porter, and Smith (2001). A security with a finite life of 15 rounds is traded in a continuous double auction. After each round of trading the asset pays a random dividend drawn from a uniform distribution with four potential outcomes of 0, 8, 28, and 60 cents. Thus the expected dividend in each period is 24 cents and the fundamental value of the asset—i.e., the expected value of remaining dividends—is \$3.60 prior to the first round of trading and declines by 24 cents each period. At the end of 15 rounds of trading the asset expires worthless. The distribution of dividends is known to all traders and the current fundamental value of the asset is displayed on each trader's computer screen.

Nine participants trade in each market. Three traders receive an initial endowment of \$18.00 plus 1 share of the risky asset; three traders receive \$14.40 plus 2 shares; three traders receive \$10.80 plus 3 shares. After completing three practice rounds of trading, participants are asked to watch a video lasting approximately 5 minutes while the experimenter prepares for the actual experiment. Participants are told, "Because the

waiting is a bit long, we will play a video clip. Since we intend to use video clips in another experiment, we've selected a few different video clips. 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.” After watching the video clip, participants answer two short questions about their emotional state and then begin the trading sessions.

In our first series of 16 experimental markets, participants in 8 markets watched an exciting and upbeat video clip involving a chase scene (excitement condition), while participants in the other 8 markets watched a clip from a slow paced historical documentary (neutral condition). In the second series of 16 markets, participants in 8 markets watched an exciting and upbeat video clip from a different movie also involving a chase scene (excitement condition), while participants in the other 8 markets watched a frightening scene from a horror movie (fear condition). In the third series of 16 markets, participants in 8 markets watched one of the two exciting video clips used in the first two series (excitement condition), while participants in the other 8 markets watched one of two video clips of sad scenes from dramas (sad condition). The reported emotional experience after the video clip(s) confirmed our expectations (see appendix).

III. Results

Figure 1 plots the average price in each round for the four treatments: excitement, neutral, fear, and sadness. In all but the last round of trading, the average prices are higher for the excitement treatment.

We analyze two metrics of asset pricing bubbles, magnitude and amplitude:

1. *Magnitude* measures the average difference in the price of the risky asset and its fundamental value across the fifteen rounds of trading. Magnitude is calculated as $Magnitude = \frac{1}{15} \sum_{r=1}^{15} (\bar{P}_r - f_r)$ where \bar{P}_r is the average transaction price in trading round r and f_r is the fundamental value (i.e., the expected value of remaining dividends) in trading round r .
2. *Amplitude* measures the maximum difference in the price of the risky asset and

its fundamental value across the fifteen rounds of trading. Amplitude is calculated as $Amplitude = \max_{r \in (1,15)} (\bar{P}_r - f_r)$ where \bar{P}_r is the average transaction price in trading round r and f_r is the fundamental value (i.e., the expected value of remaining dividends) in trading round r .

Table 1 Panel A reports the average magnitude of bubbles across markets for each treatment. The average magnitude of bubbles after participants watch the exciting videos (285), is much greater than the average magnitudes of bubbles following the neutral (166), fear (186), and sadness (198). We formally test for differences in magnitude and amplitude of bubbles under our treatments, with a two-sample t test with equal variances and with a two-sample Wilcoxon rank-sum (Mann-Whitney) test. For both tests, the magnitude of bubbles under the excitement treatment is great than that under the neutral, fear, and sadness treatments. We reject the null hypothesis $magnitude(excitement) \leq magnitude(neutral)$ with $t = 3.70$, $p < 0.001$ (t test) and $z = 3.15$, $p < 0.002$, (rank sum test). We reject the null hypothesis $magnitude(excitement) \leq magnitude(fear)$ with $t = 3.11$, $p < 0.01$ (t test) and $z = 2.87$, $p < 0.01$ (rank sum test). We reject the null hypothesis $magnitude(excitement) \leq magnitude(sadness)$ with $t = 2.61$, $p < 0.01$ (t test) and $z = 2.50$, $p < 0.02$ (rank sum test).

Table 1 Panel B reports the average amplitude of bubbles across markets for each treatment. The average magnitude of bubbles after participants watch the exciting videos (512), is much greater than the average magnitudes of bubbles following the neutral (314), fear (382), and sadness (357). We formally test for differences in magnitude and amplitude of bubbles under our treatments, with a two-sample t test with equal variances and with a two-sample Wilcoxon rank-sum (Mann-Whitney) test. For both tests, the amplitude of bubbles under the excitement treatment is great than that under the neutral, fear, and sadness treatments. We reject the null hypothesis $amplitude(excitement) = amplitude(neutral)$ with $t = 3.39$, $p < 0.01$ (t test) and $z = 3.16$, $p < 0.01$ (rank sum test). We reject the null hypothesis $amplitude(excitement) = amplitude(fear)$ with $t = 2.34$, $p < 0.02$ (t test) and $z = 2.35$, $p < 0.02$ (rank sum test). We reject the null hypothesis $amplitude(excitement) = amplitude(sadness)$ with $t = 2.76$, $p < 0.01$ (t test) and $z = 3.03$, $p < 0.01$ (rank sum test).

It is worth noting that fear, sadness and neutral treatments showed similar average levels of magnitude and amplitude. This effect is relatively surprising given that, as already pointed out, fear is known to produce risk-averse behavior. One potential explanation is rooted on people's ability to reappraise a given emotional experience. Fearful and highly arousing experiences can be easily reappraised depending on contextual cues (Dutton and Aron 1974, Jamieson et al., 2010) and recent evidence indicates that people can convert fear into excitement in financial settings, which in turn affects risk taking (Lee and Andrade, 2012). In our current set up, one alternative, therefore, is that what started as a fearful experience may have evolved to excitement as participants became more familiar with the market and confident about their skills. This rationale is consistent with the rather unique pattern of behavior observed among the participants in the fearful treatment, where the average price started lower than the neutral treatment in the first 4 rounds to then reverse and become higher than neutral in the subsequent rounds. No other condition displayed this reversal (see Figure 1). Future research could systematically address this possibility.

IV. Conclusion

Historical accounts suggest that rapid, unexpected increases in wealth during the appreciation phase of asset pricing bubbles can lead investors to experience intense, positive emotions. We document, in an experimental setting, that magnitude and amplitude of bubbles is greater when prior to trading traders experience high intensity, positive emotions than when they experience low intensity, neutral emotions, or high intensity, negative emotions. Thus rapidly rising prices may trigger the very emotions that lead to larger asset pricing bubbles.

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Table 1: Magnitude and Amplitude of Bubbles

Panel A reports the average magnitude of bubbles across market experiments by treatment. Magnitude is calculated as $Magnitude = \frac{1}{15} \sum_{r=1}^{15} (\bar{P}_r - f_r)$, where \bar{P}_r is the average transaction price in trading round r and f_r is the fundamental value (i.e., the expected value of remaining dividends) in trading round r . Panel B reports the average amplitude of bubbles across market experiments by treatment. Amplitude is calculated as $Amplitude = \max_{r \in \{1, 15\}} (\bar{P}_r - f_r)$.

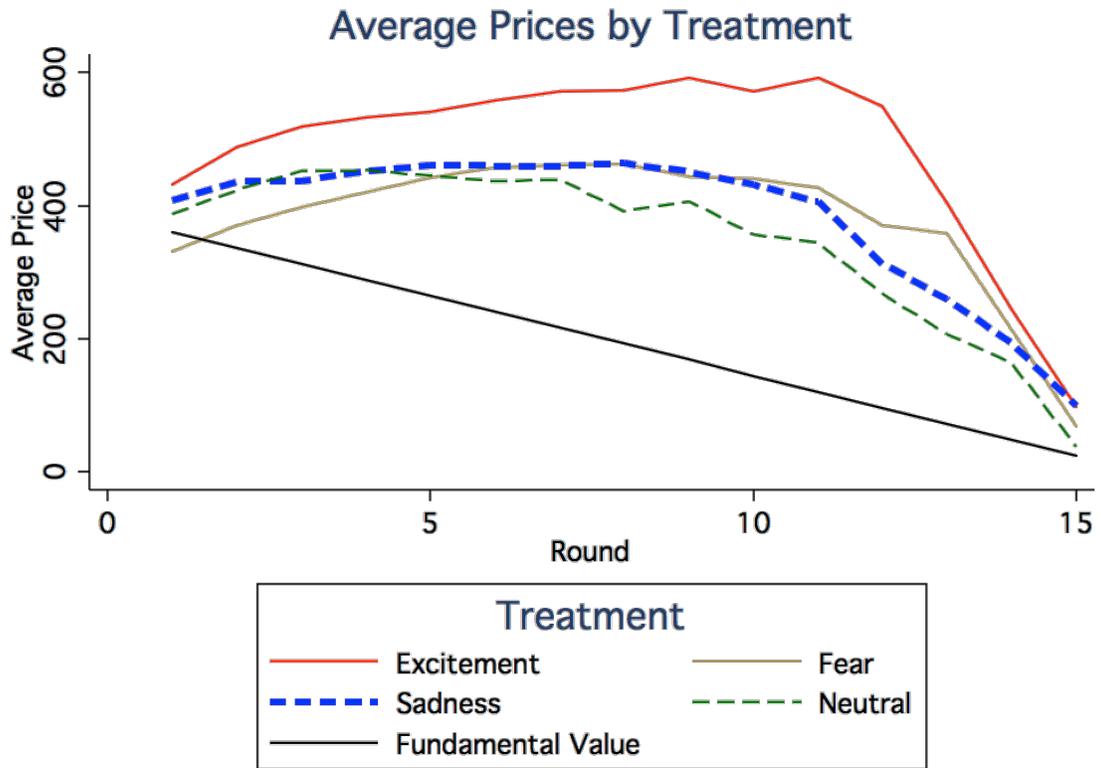
Panel A: Average Magnitude across Markets

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

Figure 1: Average Prices by Round for Each Treatment



Appendix

A. Instructions

This is an experiment in market decision making. You will be paid in checks for your participation at the end of the experiment. Different participants may earn different amounts. What you earn depends on your decisions and the decisions of others.

The experiment will take place through computer terminals at which you are seated. If you have any questions during experiment, raise your hand and a monitor will come by to answer your question.

I. The Situation

In this experiment, each participant will be given some **Cash** and **Shares** at the beginning.

When the experiment starts, you will participate in a market where **Shares** can be bought and sold between participants. You pay out of your Cash when you buy a share, and you get Cash when you sell a share.

The experiment is divided into **15** consecutive trading **Rounds**. Within each round, the market is open for trading Shares.

Shares will earn the owners a cash income called **Dividend**. At the end of EACH round, EACH share will pay the owner a dividend. The dividend per round can be **0, 8, 28 or 60 cents**, with equal chances. The dividends will be added to your cash amount immediately.

At the end of **15th** round, a final dividend will be paid to the owner. Once that dividend is paid, the shares will be worth nothing. Your earnings will be based on the amount of cash that you accumulate. You can accumulate cash by buying and selling shares, and/or by holding shares and collecting dividends.

Since $(0 + 8 + 28 + 60) \div 4 = 24$, the average dividend per round per share is 24 cents. That is, over many rounds, the average dividend per round tends to be 24 cents per share.

If you hold a share from round 1 to round 15, the share will pay you 15 dividends. The total dividend value you receive can be as low as 0 cents ($15 \times 0 = 0$). This would be the result if all 15 of the dividends are 0. The total can be as high as 900 cents ($15 \times 60 = 900$), if all 15 of the dividends are 60. Given that each possible dividend has an equal chance of occurring each round, the average total dividend value tends to be 360 cents ($15 \times 24 = 360$).

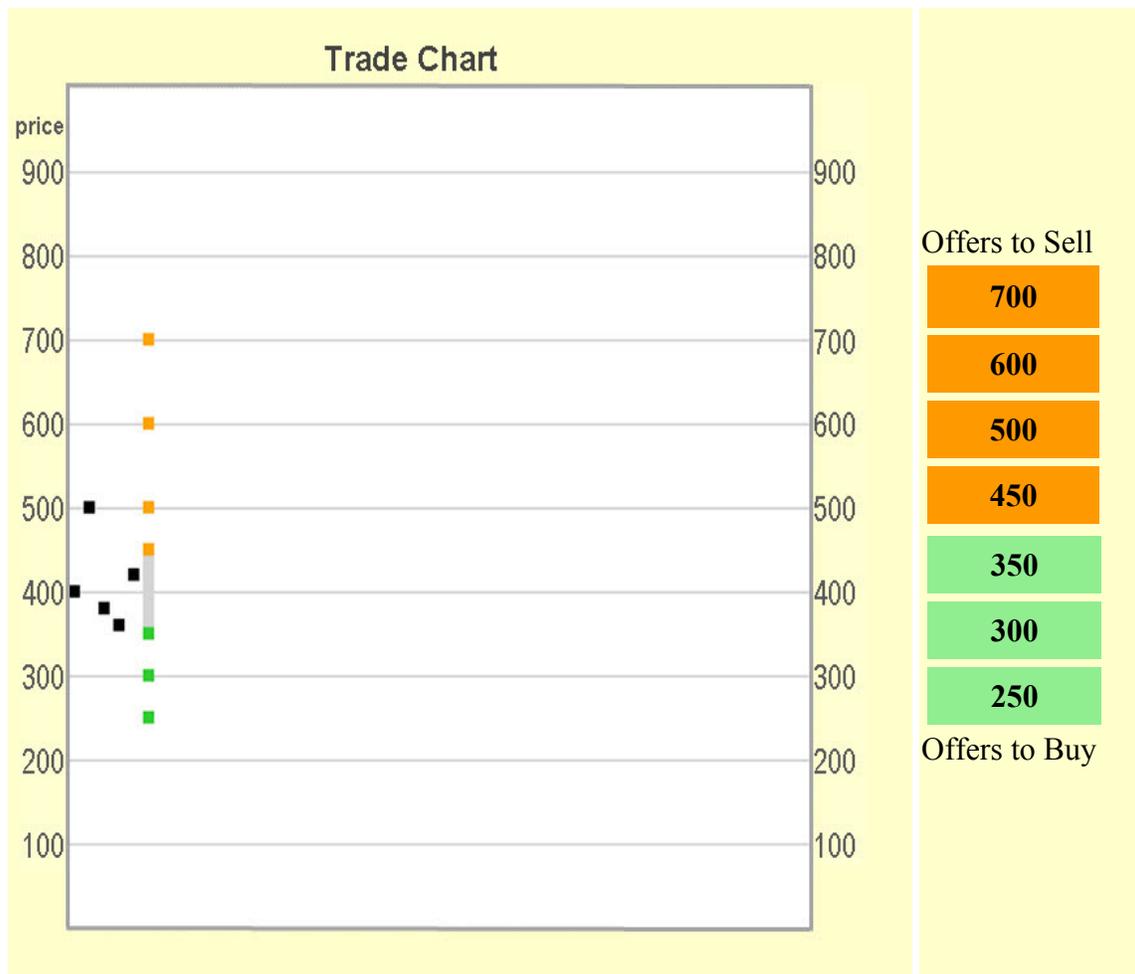
If you purchase a share in the 2nd round and hold it until the end of the 15th round, the average total dividend value will be 336 cents ($14 \times 24 = 336$), and the total dividend could be as low as 0 cents (14×0) and as high as 840 cents (14×60).

Similarly, if you hold a share for any number of rounds, n , the share may return a dividend of as little as 0 cents or as much as $n \times 60$ cents. The average dividend total tends to be $n \times 24$ cents.

When a round is over, your Cash and Shares will carry over to the next round.

II. How to Trade Shares?

Within each round, participants can buy or sell shares from one another by making offers to buy or to sell. First, let's see how offers are shown in the market.



Every time someone makes an offer to buy a share at a certain price, a **GREEN** dot will appear on the Trade Chart. Every time someone makes an offer to sell at a certain price, an **ORANGE** dot will appear on the Trade Chart. Once a trade is actually made, the trade

will be shown as a **BLACK** dot on the Trade Chart. For example, right now shown on the Trade Chart, five trades that have taken place are: 400, 500, 380, 360 and 420.

Next to the Trade Chart, the **Offers to Buy** will be listed in increasing order, while the **Offers to Sell** will be listed in decreasing order. For example, the Offers to Sell are now 700, 600, 500 and 450; and the Offers to Buy are now 350, 300 and 250.

Orders

Submit New Order	Buy	<input type="text"/>	Sell	<input type="text"/>
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Offers are made through "**Orders**" Section. To enter a new offer to buy, type your buying price next to "**Buy**" button on the "Submit New Order" row, and click "**Buy**" button to submit your offer.

To enter a new offer to sell, type your selling price next to "**Sell**" button on the "Submit New Order" row, and click "**Sell**" button to submit your offer.

Orders

Submit New Order	Buy	<input type="text"/>	Sell	<input type="text"/>
Immediate Order	Buy	450	Sell	350

In the "**Orders**" section, the second row is "**Immediate Order**", where you can accept existing offers in the market.

The "Buy" box shows you the lowest offer you can buy from at the point of time. For example, the price showing right now is 450. This indicates the best selling offer in the market is now 450. If you click on the "Buy" button next to it, you will immediately buy a share at the price of 450.

The "Sell" box shows you the highest offer you can sell to at the point of time. For example, the price showing right now is 350. This indicates the best buying offer in the market is now 350. If you click on the "Sell" button next to it, you will immediately sell a share at the price of 350.

Cancel Orders

Click on an order to Cancel it

500

Whenever you enter new offers to buy, or sell, you will have those offers appear as buttons under "**Cancel Orders**" section. By clicking on these buttons, you can take them out of the market. For example, it is showing right now that you have an offer at 500. If you click on the button, you withdraw your offer at the price.

III. Examples

Let's see an example of a trade below. Note that the prices here are arbitrarily chosen and are irrelevant to the actual prices that will happen in the experiment.

Suppose you have 3 shares and 1050 in Cash at the start of a round, and you make one transaction purchasing a share for 420 cents within the round. If the dividend for the round is 60 cents, then:

Your share holdings will increase from 3 to 4 units.

You will pay 420 out of your Cash holdings, and for the round you will receive a total dividend of $(60 \times 4 \text{ shares})=240$. Thus your cash will decrease by $(420-240)=180$ cents. Your new cash holding will be $(1050 - 180) = 870$ cents.

Another example:

Following the previous example, you now have 870 cash and 4 shares. Suppose in the next round you make two transactions. You sell one share for 300 and another share for 350. If the dividend for the round is 8, then:

Your share holdings will, decrease from 4 to 2 units.

You get $(300+350) = 650$ from your sales of 2 shares, and you will receive a total dividend of $(2 \text{ shares} \times 8)=16$. Your Cash holdings will increase by $(650+16) = 666$ cents. Your new cash holding will thus be $(870 + 666) = 1536$ cents.

IV. Practice Session

This experiment will last for **15 rounds**. Each round will last for 3 and half minutes.

Before the actual 15 rounds start, we will give you a **Practice Session**, during which you can practice making offers and making transactions.

When the Practice Session is over, it will take some time to re-initialize and configure the trading program. The preparation could take around 5 to 8 minutes.

[Below, we introduce why we would play video.]

[Same Video within treatment – Experiment Set 1 and Set 2]

Because the waiting is a bit long, we will play a **video** clip. We intend to use the video in another experiment and want to get some feedback from you. 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.

[Two Videos within treatment – Experiment Set 3]

Because the waiting is a bit long, we will play some **video** clips. Since we intend to use the videos 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.

V. Summary

1. You will be given an initial amount of Cash and Shares at the very beginning.
2. Each share pays the owner a dividend of either 0, 8, 28 or 60 cents at the end of EACH of the 15 trading rounds. The dividend amounts have the same chance of being drawn at the end of a round. Thus, the average dividend per round per share is 24 cents. Between rounds, you will be given some short time to review your holdings.
3. You can submit offers to BUY shares and offers to SELL shares.
4. You can make immediate trades by buying at the current lowest offer to sell or selling at the current highest offer to buy.
5. The market lasts for 15 rounds. At the end of round 15, there will be one last dividend payment. After that the share expires and is worth nothing to you.
6. We will give you a Practice Session whereby you become familiar with the trading program. After that we will re-initialize the program and get ready for the actual session.

The instructions are over. If you have any question, raise your hand and consult the monitor. Otherwise, click "Start", login with the "Account Name" on the note on your desk, and wait for the Practice Round.

Start

B. Video Survey Questions

The experiments were run in three sets. Each set consisted of 16 experiments. No participants took part in more than one experiment. In the first set, participants watched exciting positive valence, high intensity videos prior to the market in 8 experiments and neutral valence, low videos prior to 8 experiments. Exciting and neutral experiments were run in pairs on the same days. In the second set, participants watched exciting positive valence, high intensity videos prior to the market in 8 experiments and fear inducing negative valence, high intensity videos prior to 8 experiments. Exciting and fear inducing experiments were run in pairs on the same days. In the third set, participants watched exciting positive valence, high intensity videos prior to the market in 8 experiments and sad negative valence, high intensity videos prior to 8 experiments. Exciting and sad experiments were run in pairs on the same days.

After watching the videos, participants answered the following questions.

Experiment Set 1 (Neutral; Excitement)

1. How did this movie clip make you feel (from 1=very calm/relaxed to 9=very active/excited)

2. Do you think this clip is a nice filler task to be used in future experiments?

No Yes

Results:

Q1: Participants in the excitement treatment reported higher levels of excitement ($M = 6.28$, $SD = 6.29$ relative to participants in the neutral treatment ($M = 3.52$, $SD = 1.76$, $t=10.41$, $p < .0001$).

Q2: Participants in neutral condition—i.e., who watched the documentary— indicated the clip should be used as a filler task in future experiments more frequently (84.7%) than those in the excitement condition—i.e., who watched the chase/upbeat scene of a funny action movie (65.3%, $z = 2.69$, $p < .01$).

Experiment Set 2 (Fear; Exciting)

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)

2. Do you think this clip is a nice filler task to be used in future experiments?

No Yes

Results:

Q1: Most participants in the fear treatment (70.4%) indicated that fear best represented what they were feeling at the moment ($z = 3.43, p < .001$, compared to chance), whereas most participants in the excitement treatment (94.4%) indicated that excitement best represented what they were feeling at the moment ($z = 7.53, p < .0001$). As important, these two groups did not vary in level of intensity of the dominant emotional experience ($M_{\text{fear treatment}} = 6.06, SD = 1.79$ vs. $M_{\text{excitement treatment}} = 5.85, SD = 1.99$).

Q2: Finally, participants in the excitement treatment—i.e., who watched the chase/upbeat video clip—indicated the clip should be used as a filler task in future experiments more frequently (86.1%) than those in the fear treatment—i.e., who watched the horror movie—(31.0%; $z = 6.69, p < .0001$).

Experiment Set 3 (Sad Mixed; Exciting Mixed)

1. Please indicate 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.

__Sadness/Distress/Unhappiness __ (1=very little; 9=very much)

__Excitement/Pleasure/Enthusiasm __ (1=very little; 9=very much)

2. Do you think this clip is a nice filler task to be used in future experiments?

_No _Yes

Results:

Q1: Most participants in the sadness treatment (80.5%) indicated that sadness best represented what they were feeling at the moment ($z = 5.18, p < .0001$, compared to chance), whereas most participants in the excitement treatment (88.8%) indicated that excitement best represented what they were feeling at the moment ($z = 6.584, p < .0001$). As important, these two groups did not vary in level of intensity of the dominant emotional experience ($M_{\text{sadnesstreatment}} = 6.50, SD = 1.86$ vs. $M_{\text{excitement treatment}} = 5.94, SD = 1.91$).

Q2: Finally, participants in the excitement treatment—i.e., who watched one of the two chase/upbeat video clips—indicated the clip should be used as a filler task in future experiments more frequently (73.6%) than those in the sadness treatment—i.e., who watched one of two dramas—(43.1%; $z = 3.71, p < .001$).

C. Post-Experiment Survey

Feedback

(Please provide us some feedback on today's experiment. Thank you in advance!)

Q1: What is the purpose of the study?

Q2: What was your strategy in the experiment?

Q3: Did you ever buy shares at prices above the remaining average dividend value? If so, what is your reason?

Q4: Did you encounter any difficulty in the experiment