The Effects of News on Stock Prices in Experimental Markets

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Abstract

This study continues the existing line of research into the generation of asset price bubbles in experimental markets. It breaks new ground by examining the impact of news that traders receive during the experimental sessions. It examines whether positive news would increase the magnitude of bubble formation in an experimental market. The outcome of the experiment showed that there were significant differences between the mean trading prices resulting from positive and neutral news. In addition, the survey questions noted several differences in responses that hint at the motivations behind the behavior that caused the formation of the bubbles. These findings suggest that traders in experimental markets are more influenced by news than by rational calculations of fundamental value.
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Section I: Introduction

The 2008 financial crisis reminds us that asset bubbles are both hard to predict and hard to explain using traditional financial economics, which is dominated by the efficient market hypothesis (EMH). EMH argues that given information, market participants will act in such a way that market prices will very quickly reflect all information, so that the prices of financial assets should be correct. Critics of EMH find it hard to reconcile the large differences between inflated assets prices during the buildup stage of a bubble and the deflated prices when the bubble bursts. For example, Baker and Wurgler (2007) pointed out that mainstream financial theory has difficulty reconciling itself with bubbles such as “the Great Crash of 1929, the ’Tronics Boom of the early 1960s, the Go-Go Years of the late 1960s, the Nifty Fifty bubble of the early 1970s, the Black Monday crash of October 1987, and the Internet or Dot.com bubble of the 1990s” (Baker and Wurgler 2007, 129). Lawrence et al. (2007) noted that “anomalies such as high trading volume, high volatility, and stock market bubbles remain unexplained” by EMH (Lawrence et al. 2007, 161). Even a defender of EMH such as Ray Ball admitted some limitations of that hypothesis: “Information is modeled in the EMH as an objective commodity that has the same meaning for all investors. In reality, investors have different information and beliefs” (Ball 2009, 13).

Given the limitations of EMH, behavioral economics seems to provide a better theoretical apparatus with which to understand asset bubbles. In his book Irrational Exuberance, Shiller discussed a feedback theory of bubbles (Shiller 2005, 68-71). In a later book entitled Animal Spirits, Akerlof and Shiller examined how human psychology impacts the economy and why understanding the psychological motivations of individuals can affect the global economy. The five major “animal spirits” were called confidence, fairness, corruption and bad faith, the money
illusion, and stories. Of these five it seemed as if the effects stories could have would be more substantial than any of the others because the information that people use and act on could affect the way that they perceive the confidence, fairness, corruption, and the money illusion. While it seemed clear from historical evidence that the stories and media had contributed to bubbles in the past, the amount of research that had been done so far seemed less than adequate to explain its effects.

Surveying many previous experimental studies of stock markets, Porter and Smith (2003) found that stock market bubbles were very common in laboratory-based stock trading games. They found that subjects in the experiment had a tendency to have misconceptions that the price of the assets would raise, immediately hindering their ability to rationally forecast the changes a stock might make (Porter and Smith 2003, 11). They also found that participants in stock market experiments that had real life experience in trading were as likely to generate bubbles in the experiments as inexperienced students. Their study gave me hope that the results of my study, which includes only students as participants, would not be limited by their inexperience.

My goal was to try to see if positive news could cause large bubbles conditions with inflated stocks prices. In order to design this experiment I needed a previous experiment to model mine after. My model was the experiments used by Ackert et al.’s “Margin, Short Selling, and Lotteries in Experimental Asset Markets,” (2006) as that study showed that a bubble could be formed in an experimental market where no buying on margin or shortselling was allowed. It showed that over the course of the trading timeline the participants consistently overvalued their stocks at inflated prices until the last day when the prices began to settle back to the expected value. The experimental model they used seemed viable for what this experiment was trying to test. In addition, Ackert et al. provided more details about their experiments than other studies,
and upon request Ackert also graciously provided me with the instructions she gave participants in her experiments.

After surveying what could be expected from a laboratory run trading game, I turned to Chang et al. (2008) and Brandouy et al. (2003) to further examine how news and information had influenced trading in specific ways. In designing the news articles for this experiment the information gained from the Chang et al.’s experiment was important because their results showed that the source of the information could have a considerable effect on how the participants interpreted the news. This meant that including news releases with both analyst and management forecasts were of the utmost importance. Brandouy et al.’s experiment examined how asymmetric information would affect the behaviors of the participants within an experimental market. Their results showed that the presence of insiders and asymmetric information could cause considerable changes to the trading behavior and cause the traders in the experiment to imitate other traders. The news in our experiment was designed to be as elementary as possible so that asymmetric understanding of the news could be avoided and the fairness of the trading was basically equal.

Our study expands of the work of the experiments previously mentioned and also adds to them in several ways. In addition to being able to examine the difference between the bubbles created by positive and neutral news, survey questions were also given throughout the experiment and a final survey was given at the end. These surveys aim to gain insight into the motivations, strategies, and perceptions of the players in each session so that the reasons why certain decisions were made can be better understood.
This paper is organized as follows: Section II reviews each of the previous studies that have contributed to the design of the present study. Section III describes the experiments that were done in the present study and the way that it was conducted. Section IV discusses the experimental results, including the survey findings and data analyzed from the trading sessions. Section V recapitulates the major findings and suggests some further topics for future research.
Section II: Literature Review

A. Porter and Smith (2003)

Porter and Smith (2003) surveyed many experimental studies of stock markets. They also ran a number of experiments themselves and took a multitude of measurements in order to examine if the experience of traders can affect their behavior and their effect on the market. There were two generations of experimental stock market studies. The first generation employed the experimental markets without institutional details. The second generation employed experimental markets with institution details such as short selling, margin buying, brokerage fees, and informed traders.

Rational expectations models posit that when people have a general idea of the worth of financial asset such as a stock, the value is equal to the value of the dividends that the asset produces (Porter and Smith 2003, 7). Rational expectations models predict that if traders have common expectations, trades will occur at prices that are near the fundamental, or theoretical, value of the asset.

But that prediction has not been supported by past research. In fact, Porter and Smith pointed to Lee et al (1991), in which the behavior of closed-end mutual funds constituted a puzzle that challenged rational expectations models. They were interested in studying how the expectations of the investors can change and impact prices. However, because the stock market is dynamic and control over investor information and fundamental value is not plausible, they turned to the laboratory to find results. In a laboratory stock market it was noted that inexperienced traders commonly caused bubbles and crashes. Interestingly, they found that as the participants became more experienced the phenomenon disappeared and prices traded for the stocks typically close to the fundamental value of the stock (Porter and Smith 2003, 7).
Porter and Smith (2003) examined and reviewed 72 different laboratory experiments that dealt with fundamental pricing of stocks and how different tested factors could play a role in a market. The study yielded some interesting results and summarized the different outcomes that experimental stock markets had had before 2003.

The first two important effects that were found when examining experimental markets was that experience in experimental trading universally increased competency and that the more experience participants had in trading, the more likely they were to trade closer to the fundamental value of the asset. Another result showed that making public the dividend payments of an asset did not induce common expectation and did not lead to trading at fundamental value (Porter and Smith 2003, 9). They also found that subjects in the experiment had a tendency to develop expectations of rising prices early on in the experiments, and their forecasts showed an inability to predict price jumps and turning points (Porter and Smith 2003, 11).

The results found by first generation experiments have been challenged in more recent studies. In their experiments Porter and Smith found that short-selling did not actually reduce the effects of a bubble in a mock market (Porter and Smith 2003, 13). However their findings on how margin buying can affect the market were similar to more recent studies. They found that “Margin buying opportunities can cause a significant increase in the amplitude of bubbles” although the more experienced traders in the market were not as severely affected (Porter and Smith 2003, 13). And they found that, though the duration was not impacted, the addition of brokerage fees into an experiment could significantly lower the magnitude of the bubble.

Perhaps one of the most important questions about laboratory experiments is whether or not they can be generalized into the real world. Some of the studies that were reviewed by Porter and Smith examined how small business persons, mid-level corporate executives, and over the
counter market dealers would fare if placed in an experimental condition. This would be thought to be an experienced group of individuals because of the type of careers that they had. But the findings of this experiment show that these individuals were just as likely as other first time participants in experiments to produce bubbles (Porter and Smith 2003, 14). In addition, later evidence suggests that nothing changed even when a certain number of well informed and more experienced traders competed against participants who were first timers and were not informed. The informed and experienced participants were “swamped” by the actions of the other participants and were unable to stem the flow of the bubble forces that are present (Porter and Smith, 2003, 4).

This paper serves as a summary of the past experimental stock market studies. It was useful to see those results, for they aided in the experimental design of the present study. The paper has reported new findings that invite further investigation. For example, in the experiments in which the trades of the informed participants were swamped by the trades of the uninformed participants, there were three informed traders in a market with six or nine uninformed traders. Perhaps that proportion of informed versus uninformed traders mirrors the proportion in the real world, but one cannot wonder whether the results would be different if the experiments were conducted with an equal number of informed versus uninformed traders. But it is not the purpose of the present study to follow that line of investigation.

B. Ackert et al. (2006)

An experimental study done by Ackert et al. (2006) was perhaps the most important contributor to the experimental design done in the current experiment. Their experiment explored the veracity of a claim made by former Chairman of the Federal Reserve Alan Greenspan that occurred around the time of the internet stock bubble. His claim regarded the lottery effect,
which meant that market participants were willing to pay a premium price for a stock that had a promise of a very significant payment, although the chances of such a payment are small (Ackert et al. 2006, 419). They had observed in previous experiments that bubbles were possible in stock markets with standard assets, but extended this previous research by adding the second lottery stock to the market. It was also noted that their experiments were different from those of earlier generations of experimental stock markets in that they added the institutional features of borrowing and short-selling (Ackert et al. 2006, 420).

In order to explore this phenomenon they devised a market trading game. They used three different experimental designs in which the results of the standard stock and lottery stock could be compared. The dividend payments of Stocks A and B were manipulated so that the fundamental values of the two stocks were be equal. The experiments included trading groups that were seven to nine traders in size. The traders had 12 days to trade, with each trading period taking approximately 5 minutes each (Ackert et al. 2006, 424).

In the first design, participants were given a starting endowment of 100 borrowed dollars, and were told that at the conclusion of the game they would have to repay the 100 dollars. In this condition there was no short selling allowed. The second design was a restricted market design. In this design the participants were endowed with 40 dollars of cash, which was theirs to keep. This institutional design was meant to mimic a real-world situation in which there is no borrowing (buying on margin). In the second design there was also no short selling allowed. Finally in the third design short selling was allowed combined with the prohibition of short selling. Like the second design the participants in this condition received 40 dollars of cash to invest with. These three experimental designs are denoted by NSS/B, NSS/NB, and SS/NB in Table 1 of their paper. Four of their 13 experimental sessions were run with the NSS/B design;
five of them were run with the NSS/NB design; and four of them were run with the SS/NB design.

Before beginning the experiment Ackert et al., formed three propositions. Firstly, they theorized that the bubbles that were produced would be larger for the lottery assets than for the standard stock assets. Secondly, they proposed that not being allowed to buy on margin would reduce the intensity of the stock bubble (Ackert et al. 2006, 422). Lastly they hypothesized that allowing the traders in the third game to short-sell, combined with no buying on margin, would also dampen the effects of the bubble (Ackert et al. 2006, 422-423).

After completing 13 experiments they were able to compare the results of the three market designs. As was predicted in their original propositions, the first design produced bubble-like conditions where the average price that the stocks traded for was high above the fundamental value of the stock. In addition, the trading price of the lottery stock also had a higher trading price than that of the standard stock (Ackert et al. 2006, 428). This suggests that the first proposition was correct. The second design also revealed a high proportion of trades above the fundamental value of the stocks. However, in comparison with the first design, the second design noted no significant differences between the frequencies at which the two stocks’ traded at prices above fundamental value (Ackert et al. 2006, 430). Finally the third design, which allowed short-selling while prohibiting borrowing (buying on margin), showed no bubbles and even some trading below the fundamental value of the stocks (Ackert et al. 2006, 430).

The results of this experiment suggest that the first and third propositions are correct. The tests show that short-selling causes the stocks to trade at prices that are below the fundamental value of the stocks for at least half of the time (Ackert et al. 2006, 431). The first design also proves that the lottery stocks tend to be traded at higher prices, especially when buying on
margin is allowed. However, the second proposition did not receive empirical support from this experiment. They did not discuss why the combination of no short sales and no borrowing will not dampen price bubbles, but they noted that “When traders must finance asset purchases themselves (i.e., borrowing is not allowed), bubbles are not exacerbated for the lottery asset as compared to the standard asset, which is contrary to the first proposition” (Ackert et al. 2006, 430).

C. Brandouy et al. (2003)

Literature reviews that deal directly with the dissemination of news and media in the presence of a stock market situation are fairly limited. However, through analysis of similar behavioral economic experiments and the results that have been produced, information can be extrapolated and applied within a different context. One such study, while it may not seem intimately related to the subject of stories coming from the media, does contribute information on how the flow of information occurs within the stock market and how the dissemination of this information can affect the efficiency of trading within a particular market.

The study by Brandouy et al. (2003) explored how asymmetric information, imitative behavior, and communication within the market itself can all contribute to the observed prices within the stock market; it also investigated whether or not these prices are equal to what the expected value of these stocks should really be. One of the primary motivations of their experiment was to see if imitative behavior, particularly herd behavior with accompanying price bubbles and crashes, would arise from rumors and information within the stock market (Brandouy et al. 2003, 393-394). To examine how information impacted the trading that took place within these mock stock markets, the experimenters proposed several hypothesizes in
which they varied the asymmetric information in several different ways: whether the presence of insider trading was known or unknown, the degree of market power that the insiders had within the market, and whether information was allowed to flow freely between the different subject groups.

In total there were five different groups sessions involved in the trading. Session 1 was used to establish a baseline and every participant in the experiment received identical information, equal endowments, and was not allowed to communicate with one another. The results of the first section of the experiment revealed that, as hypothesized, there would be immediate market reactions following good and bad news. However, the habits of the traders seemed to suggest that there was a predominance of risk aversion strategy being used as prices still remained above expected value following bad news, and below expected value following good news. The results also suggested that the market was an efficient market (Brandouy et al. 2003, 405).

The second session of the experiment added the stipulation that inside traders would exist within the experiment. This meant that these traders would receive more information than the majority of the other traders, but their existence was unknown to the other participants in the group. The purpose of this part of the experiment was to see how the “naïve” traders operating under the assumption that information was not asymmetric would react. As expected, the results showed that the insiders were able to earn greater profits than the non-insiders. However, one interesting difference was that the underreaction to news that was noticed in the first session disappeared as there was a noticeable increase in price volatility in the second session. The suggested that “the observed price series contained some information that might have been detected by uninformed traders with greater sophistication,” (Brandouy et al. 2003, 407)
However, formal links of this theory were unable to be formed from the data collected (Brandouy et al. 2003, 407).

Sessions 3 and 4 were similar in both their aspects and their results. Session 3 added the stipulation that all of the traders would be aware that there were certain traders within the session that had insider information. The only distinction between Sessions 3 and 4 was that in the later the inside traders were also given a much larger endowment so that they would be able to have more power within the stock market. The results indicated that risk averse behavior was prevalent in both. These results mean that there is some imitative behavior going on within the experiment. “It appears that traders were less willing to act on evidence of high insider prices than to act on evidence of low insider prices.” (Brandouy et al. 2003, 410). This can be taken as evidence of a price gain was less important than the avoidance of a price fall to all participants in the experiment. This finding supports the hypothesis of a value function, first proposed by Kahneman and Tversky (1979) (see their Figure 3 and accompanying discussion on p. 279), which has since been called the prospect theory utility function.

The final session was Session 5. Its stipulations were that there was now free communication taking place between all of the traders. The endowment was returned to identical between insiders and non-insiders, and the presence of the insiders remained known. Perhaps the most interesting finding of this experiment was that the insiders were relatively unsuccessful in differentiating themselves from the rest of the uninformed insiders. They performed below average for their own personal scores and below average for the group (Brandouy et al. 2003, 413). This seems to suggest that the presence of rumors between traders and information noise that was passed by other traders. Brandouy et al. commented: “This suggests that the insiders were as confused by the informational noise as the other traders” (Brandouy et al. 2003, 413).
This presence of free communication seems to have caused a return to inefficient prices, despite the fact that no bubbles were formed in the experiment. (Brandouy et al. 2003, 413).

One of the major contributions of this experiment to new experiments is the free flow of information and the observation of it that takes place. Because it was instrumental in leading to inefficient pricing, this means inefficient pricing should be present in other experiments as well. Another important nugget to be gathered from this experiment was that there was a differential reaction to the presence of good and bad news. The present study, which seeks to examine the unique influences of good news in a market, have an experimental design that allows for testing to see if there is a differential impact of good and at least neutral news. Keep in mind that there is a difference in the subject of investigation: the present study simplifies this method to more fully examine the role of news in the formation of a bubble, whereas in the experiments of Brandouy et al. (2003) the known presence of insiders may have led to more risk aversive behavior because of a difference in the perception of fairness of the market setup.

To sum up, the Brandouy et al. (2003) study is important to the present study in the lesson it provided about the differential impact of different types of news. The concern of that study with herd behavior belongs to a line of research that is different from the concern of the present study on the formation of asset price bubbles.

D. Chang et al. (2008)

Another experimental study whose theory contributed to the formation of this experimental study was a study done by Chang et al. (2008), which analyzed the influence that management and analyst forecasting has on investor decision making. Both sources of information, analyst and management, are publicly-available forms of information that reduce
asymmetric information and allow the investors to see what the future of a company looks like. This experiment examines whether the investors perceive underlying motives in the provider of the information, and therefore may be more profoundly influenced by one type of provider than another. In addition, the researchers wanted to examine how good and bad new releases would impact the investor’s decision making processes (Chang et al. 2008, 48).

Using past research as a starting point, this experiment made several important predictions. First, the authors recognized that the disposition effect, built upon Kahneman and Tversky’s prospect theory, would likely play a role in the decisions that the participants made (Chang et al. 2008, 50). They predicted that, as seen in past experiments, participants would sell winning stocks too early, whereas they would hold on to stocks that were losing money for too long.

From this point they formed four important hypotheses concerning the perceptions of the different types of press releases. First they predicted that bad management forecasts would have a greater effect on investor decision than the good news forecasts. And secondly they predicted that bad news forecasts from management would increase investor confidence in the decision that they made when compared with the confidence displayed in good news forecasts (Chang et al. 2008, 53). They also made two predictions about perceptions in the analysts forecasting part of the experiment. They expected that unfavorable analyst forecasts would have a greater impact on decisions and also increase investor confidence when compared with the favorable forecast conditions (Chang et al. 2008, 55).

The experiment was done in a 2x2x2 between subjects group. The three independent variables tested were the current stock position, which was paper gain or loss and used to establish a baseline, management forecast, which was good or bad news, and analyst forecast,
which was favorable or unfavorable (Chang et al. 2008, 55). These independent variables were measured by the participants’ responses to two questions: whether they would hold or sell all of their stock, or how confident they felt in the soundness of their decision on a scale of 0 to 100, with 0 being the least confident and 100 being very sure that they made the correct decision (Chang et al. 2008, 56).

The experiment worked in three distinct parts. In the first part of the experiment the participants were given information about the future of a pharmaceutical company and then asked if they wanted to sell or hold their shares and how confident they were in their decision. There would be an ensuing paper gain or loss occurring in the following period. During next phase the participants received a good news or bad news release from management of the company and were asked the same two questions. In the third part the investors were given an analysts’ review of the management announcement as favorable or unfavorable (Chang et al. 2008, 56-57). After the participants responded to the last two questions they were given a short survey to collect demographic information.

The results of the experiment yielded interesting results regarding the implications of the source of the news. First, in the results of the management released news, it was found that “when bad news is provided, the disposition effect worsens and with good news it is reduced” (Chang et al. 2008, 60). This was expected; however in the second question examining confidence, the results seemed to disprove one of their hypotheses. Chang et al. had predicted that bad news would increase confidence, but the results showed the opposite, indicating that subjects were less confident in their decision when they received bad news (Chang et al. 2008, 60). The analysis of the effects of the analyst forecasts showed that favorable forecast caused investors to hold their shares whereas unfavorable ones caused the investors to sell their shares.
This suggests that the analyst forecast seemed to reduce the disposition effect further suggesting that information from an external source can influence investor’s perception of the news (Chang et al. 2008, 61-62). However, unfavorable news, like bad news in the management part of the experiment, caused confidence to fall instead of to increase as was predicted (Chang et al. 2008, 62). The results of this study helped us understand how investors use different types of information that they are provided with. It was observed that the disposition effect was worsened by bad news, and good news forecasts weakened its effects. In addition, analyst’s reviews were used differently, and unfavorable forecast had a stronger effect on decisions (Chang et al. 2008, 63). Finally confidence was universally hurt when the forecasts were bad or unfavorable.

Some of the most interesting observations made by Chang et al. were made in the concluding section of their paper when they discussed attribution theory: “Drawing on attribution theory, we predict that forecasts that are contrary to investors' expectations have a greater impact on their decisions” (Chang et al. 2008, 63). Attribution theory assumes that when people receive news, they are aware that the persons releasing the news may have their own interests to advance. If the news will enhance the interests of those who release it, the news recipients will tend to be skeptical of the news. In their discussion of attribution theory Chang et al. cited several studies, one of which was Mercer (2005). Chang et al. commented on Mercer’s study as follows: “Applying Mercer's interpretation of short term credibility consequences, when a bad news forecast is received, we expect investors to attribute the voluntary release of negative information to management's credibility since it is in conflict with their self-interested behaviour of increasing share price.” They added: “Therefore, investors will associate these forecasts with management credibility and award it more consideration when making decisions” (Chang et al. 2008, 52).
The same skepticism is applied to news released by analysts. Chang et al. cited studies arguing that analysts have incentives to provide more favorable reports of the companies they have analyzed than unfavorable ones. Chang et al. therefore wrote: “we expect investors to place greater reliance on unfavorable reports when making decisions” (Chang et al. 2008, 54). In other words, when bad news comes from analysts investors tend to believe it more than when good news comes from them.

The predictions of attribution theory are supported by the results of the Chang et al. experiments. The results show that in the case of unexpected bad news, the subjects were more likely to believe the bad news regardless of whether a manager or an analyst was communicating it. Another important part of their paper examines the reasons by investors may view analyst information as different from manager information. Chang et al. (2008, 53) allude to past experimental work in which investors view analysts as less biased sources of information. In my experiment, the news articles include forecasts by analysts and managers equally in both conditions. In spite of the greater impact of bad news found by Chang et al., only neutral and good news releases are used in the present study because its focus is the investigation of the role good news plays in the formation of bubbles. Chang et al. did not focus on bubbles.
Section III: Experimental Design

Participants

There were 27 participants in the experiment. Of the 27 participants, only five had any trading experience in trading in real life while 22 had no traded in the real market. The participants were all college students with a diverse representation of majors participating. Finally 15 of the 27 responded that they had taken an economics, accounting, business, or finance course while in college.

Materials

This experiment was conducted using a manual stock market trading game. Only simple tools are needed to make this game operational. First, all the participants in the experiment were given pens to record information throughout the course of the experiment. Because the trading was done personally and not electronically, calculators were put on the table so that participants would be able to calculate their totals and add their dividends earned at the end of each trading day. The table was large enough to accommodate all five of the traders participating in the experiment, all of whom were close enough that they could speak to one another. But they were not allowed to discuss their trading strategies with one another, and were only allowed to discuss past trades when they were referencing prices stocks had traded at on previous days.

In addition to these materials, there were several packets provided to the participants. The first packet was the consent forms. They were instructed to read it over and sign it on the following page. After they completed the consent forms they were given the instruction packets, trading sheets, trading sheet example, and survey packet. The instruction packet contained three pages of instructions that were read with the participants to ensure that they understand the rules
of the market. They were allowed to keep the packet throughout the experiment so that they could reference the rules and dividend payments.

The trading sheet example was a one page worksheet that gave the participants an example of how to use their own trading sheets to keep track of the trades they made and dividend payments over the course of the game. The trading sheet packet itself was made up of seven worksheets. This was one more worksheet than the number of days of trading so that participants could not anticipate the exact number of days in the game. The trading sheet (see Appendix 1) had a total of nine columns. The first column was mostly devoted to the description of trades. This was followed by a column for cash, to keep track of the cash total each player had after each trade. The next six columns consisted of three columns for recording the number of shares, the price, and the value of shares for Stocks A and B. The final column was a grand total column. In the first column, next to the word “Trade” players could write the word “buy” or “sell” depending on which action they took, adjust their cash balance, and then write the number of shares they bought or sold, the price they sold those shares for, and the value of those shares. At the bottom they could add their cash balance to their dividend payments in order to get their grand total cash position for the day.

The last packet that the players were given was the survey packet sheet. The survey packet sheet had two main types of surveys. The first was the intraday survey, which reviewed participants trading decisions throughout the course of the day. The second was the terminal survey, which asked for more general information and some demographic information at the end of the experiment. Each intraday survey contained the same 10 questions, and there were seven such surveys in the packet. Again, the seventh was not used but included so that the players could not predict the exact end of the game. All the questions in the intraday surveys were 1-5
scale questions. The terminal survey was twenty questions long. There was only one terminal survey, and it comprised 1-5 scale questions, several yes or no questions, and one write-in question.

The experimenter was also equipped with two important materials in order to make the experiment run faster. On two packets there was a collection of the news articles that would be read at the beginning of each day and halfway through each of the day’s trading sessions. All the news releases were numbered with the day on which they would be released. In the positive condition the order was neutral, positive, positive, neutral, positive, and positive. In the neutral press condition all the releases were neutral. On all days a second article was released halfway through the day. While the first articles were generally information about the economy as a whole, the second releases could be more specific, about both companies’ performances or the performance of a single company. The participants were not told what type of release they were getting but were told to interpret it for themselves. The neutral news tended to be ambiguous, vague, or uninformative, whereas positive news gave hints of growth or conditions that would lead to growth. The conductor of the experiment also had all the dividend payments calculated and was ready to announce them at the end of the day. The numbers were obtained from using Excel to randomly generate 100 numbers with values varying between 0 and 1, once for Stock A and another time for Stock B. These randomly generated values were classified into the three states of the world under which different dividends are paid (more details about dividends will be provided later). Of the 100 numbers generated, only the first six were used because there are only six days of trading.
**Design**

In this experiment the independent variable was the difference in the dominant type of news report received. There were two levels of the independent variable: the neutral news report, where the news was ambiguous, unrelated, or not useful; and the positive news report, where the information hinted that a company’s performance was good and chances of dividend payments were better. The independent variable was manipulated between the subjects, with one group receiving only neutral news and the second group receiving mostly positive news. The dependent variable within this experiment was the prices of Stocks A and B within the experiments. Other indicators in the surveys were used to help gain insight into how the news was affecting the participants’ decision making processes.

**Procedure**

This experiment was done in a small study room. When the participants entered the room, they were told to have a seat in one of the five positions around a table. They were told to find the consent forms amongst the papers they were given and read it over and sign it. After all the consent forms were completed they were collected, and participants were assigned a number to write on their trading sheet and survey packet. Next, the participants were asked to say their names aloud so that all the other participants would know it for later trading.

After the participants were done introducing themselves, the conductor of the experiment told them to take out their instructions and trading example sheet. The conductor read over the packet and answered any questions they had regarding the rules of the game. The conductor also reviewed how to keep track of trading transaction and money payments of the trading example sheet. The participants were informed that the first “day” of trading would be 6 minutes long, but that subsequent trading sessions would be shorter at 4 minutes. They were told that this was to
allow them to get an understanding of how to play the game during the first day. Before
beginning the game, the conductor reminded the participants that on the final trading day the
stocks would pay their final dividends and cease to exist afterwards. They were told that their
rank among the traders would be derived purely from their final cash balance at the end of the
final day.

At the beginning of each day the conductor would read aloud a news article. After the article
was read, a timer was started and participants were told they could begin to trade. Roughly
halfway through the day a second article, a better indicator of a company’s performance, was
read to the participants. After the second release the participants were left to trade. The
conductor warned them when there was 30 seconds left on the clock and at 10 seconds told them
to finalize any trades that were in the process of being made.

At the end of the period the conductor announced the dividend payments for Stock A and
Stock B. After that the participants were told to calculate their grand totals based on their cash
held and dividends earned and pass that total on to the next day. After completing this they were
told to pass down their trading sheets so that the conductor could make sure the correct amount
of money and stocks were in play. While the conductor was checking their trading sheets, they
were instructed to fill out the intraday survey sheet corresponding to the day that they were on.
This process continued for each of the six days.

When the 6th period ended and the intraday surveys were completed, the participants were
informed that they were finished trading. They were instructed to fill out the terminal survey.
The conductor collected the other various sheets from the participants while they filled out their
terminal surveys. When they completed their surveys the conductor announced the tentative
winner of the session and told that they would receive an email giving the final standings and
subsequent winner of the $100 lottery. The survey sheets were collected; the participants were thanked for participating and told that they were free to leave.
Section IV: Experimental Results

Empirical Results From Trading

The primary purpose of this experiment was to examine how positive news could impact the pricing of stocks in an experimental market. The results of the six sessions of the experiment have shown that there was a higher average trading price in the sessions that received mostly positive news. The average trading price in the neutral condition was 6.36. The average trading price in the positive news conditions was higher at an average rate of 8.50. The difference of 2.14 in the average price of a share of Stock A or Stock B shows that positive news did have a greater impact on the prices that the shares were traded for. It is important to note that while the positive news condition and neutral news conditions both contained six trading days, two of the six days in the positive news condition contained neutral news whereas all six days in the neutral condition contained only neutral news.

One of the major previous findings that this experiment tried to confirm was whether the stocks would trade at higher prices than the expected value of the stocks. The data in Table 1 captures the expected value price per share of both Stocks A and B, the average price of a stock on Days 1-6 in the positive news condition, and the average price of a stock on Days 1-6 in the neutral news condition. During the positive news sessions the neutral news always came on Days 1 and 4. Note in Figure 1 below how the average price of a stock traded on the first day was almost the same in both the positive and neutral condition. On Day 2, the first positive news day, the average price between the two conditions pricing begins to change. After Day 2 the difference between the price of Stock A and Stock B sold on the market in the two conditions does not fall below three dollars.
A statistical t-test for independent samples was run on the differences in trading prices for the two sessions. The difference between the two means showed that there was a significant difference (p<.01) in the price at which both of these conditions traded at.

Figure 1

Average Positive Price vs. Average Neutral Price

It was important to show that there was a significant difference between the positive and neutral news conditions because bubbles are normally formed in laboratory experiments. Work from Ackert et al. (2006) and Porter and Smith (2003) both showed that bubbles are phenomena that can be generated in an experimental setting. The significant difference between the two conditions where both prices are inflated suggests that positive news did have the impact that it was hypothesized to have. Positive news reinforced the tendency for asset prices to be inflated and makes bubbles more likely. The term *bubble* denotes that the prices are not just above fundamental value but substantially above fundamental value.

In the experiments conducted in this study, the fundamental value of the stocks is based on the expected dividends from holding those stocks. Strictly speaking, the fundamental value of
a stock is based on the present value of all future dividends, but in experimental studies there is a
tradition of ignoring present values and calculating the fundamental values from the sum of the
undiscounted expected dividends. This simplification can be justified by observing, in past
experiments and this one, that many of the participants may not be sophisticated enough to
recognize the time value of money. Also, given the short time of the experiments, the present
value of dividends to be received, say, six days from the present is likely to be very close to the
undiscounted value of those dividends.

Table 1 below provides the dividends that Stocks A and B are expected to pay with
various probabilities under the neutral news and positive news conditions. For example, Panel 1
shows that, under the neutral news condition, Stock A has a .48 probability of paying an
expected daily dividend of $.70, a .48 probability of paying a $1.10 dividend, and a .04
probability of paying a $1.40 dividend. The expected daily dividend for days on which neutral
news is released is thus (.48 x $.70) + (.48 x $.1.10) + (.04 x $.1.40) = $.92. Given that in the
experiments there are six trading days and the stocks will stop paying dividends after six days,
the fundamental value of Stock A on Day 0 is $.92 x 6 = $5.52. In the neutral news condition,
the expected daily dividend of Stock B is (.48 x $.00) + (.48 x $.25) + (.04 x $20.00) = $.92, so
that on Day 0 the fundamental value of Stock B is also $.92 x 6 = $5.52.

**Table 1: Dividends and Expected Value in Two News Conditions**

<table>
<thead>
<tr>
<th>Panel 1: Neutral News Dividend Probability and Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Neutral News</strong></td>
</tr>
<tr>
<td>Probability</td>
</tr>
<tr>
<td>Dividend Stock A</td>
</tr>
<tr>
<td>Dividend Stock B</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Expected Value</th>
<th>Day 1</th>
<th>Day 2</th>
<th>Day 3</th>
<th>Day 4</th>
<th>Day 5</th>
<th>Day 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stock A</td>
<td>5.52</td>
<td>4.60</td>
<td>3.68</td>
<td>2.76</td>
<td>1.84</td>
<td>0.92</td>
</tr>
</tbody>
</table>
Panel 2: Positive News Dividend Probability and Value

<table>
<thead>
<tr>
<th>Positive news</th>
<th>Probability</th>
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<th>.54</th>
<th>.06</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dividend Stock A</td>
<td>0.70</td>
<td>1.10</td>
<td>1.40</td>
<td></td>
</tr>
<tr>
<td>Dividend Stock B</td>
<td>0.00</td>
<td>0.25</td>
<td>20.00</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Expected Value</th>
<th>Day 1</th>
<th>Day 2</th>
<th>Day 3</th>
<th>Day 4</th>
<th>Day 5</th>
<th>Day 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stock A</td>
<td>5.52</td>
<td>4.79</td>
<td>3.83</td>
<td>2.76</td>
<td>1.92</td>
<td>0.96</td>
</tr>
<tr>
<td>Stock B</td>
<td>5.52</td>
<td>6.68</td>
<td>5.34</td>
<td>2.76</td>
<td>2.67</td>
<td>1.34</td>
</tr>
</tbody>
</table>

It is only from Panel 2 of Table 1, when we look at the different probabilities of the two stocks paying the same set of three possible dividends, that we see a difference in the expected daily dividends between Stocks A and B. Under the positive news condition, the expected daily dividend of Stock A on days on which good news has been released is (.40 x $.70) + (.54 x $.1.10) + (.06 x $1.40) = $0.958. Under the same condition, the expected daily dividend of Stock B is (.40 x $.00) + (.54 x $.25) + (.06 x $20.00) = $1.335. For the experiments, we assume that upon the release of good news, the participant expect that good news to last for the succeeding days, so that in calculating fundamental value they expect the daily dividend for Stock A to remain at $0.958 and the daily dividend for Stock B to remain at $1.335. For the positive news condition, positive news releases were given on Days 2, 3, 5, and 6. On Day 2, the participants expect to receive daily dividends of $0.958 for Stock A for Days 2, 3, 4, 5, and 6 (a total of five days), and their estimate of Stock A’s fundamental value should be $0.958 x 5 = $4.79. Similarly, on Day 2 the participants expect to receive daily dividends of $1.335 for Stock B for Days 2, 3, 4, 5, and 6, and their estimate of Stock B’s fundamental value should be $1.335 x 5 = $6.68. On Day 4, when a neutral instead of positive news release was given, the participants are assumed to revise their expectations and figure that they would receive $0.92 for
Days 4, 5, and 6 (a total of three days) for both Stocks A and B. Their estimate of fundamental value for both stocks on Day 4 is therefore $.92 \times 3 = $2.76. When a positive news release was given them on Day 5, they again revised their expectations and figured that they would receive daily dividends of $0.958 for Stock A and $1.335 for Stock B, and their estimates of fundamental value on Day 5 should be $0.958 \times 2$ (for Days 5 and 6) = $1.92 for Stock A and $1.335 \times 2 = $2.67 for Stock B. Table 1 Panel 2 above summarized the fundamental values of Stocks A and B that participants should estimate under the positive news condition.

The neutral condition had inflated prices; however the inflated prices were different for the stocks in the market. As seen in the dividend payout options listed above, there are differences in the payouts between Stocks A and B. However, in the neutral condition, the expected dividend payout of both of the stocks was exactly the same at .92 per day. Despite this being the same, Stock B the lottery stock, was more likely to be traded below or at the expected value in the neutral condition. In addition its average daily trading price was below the average daily trading price of Stock A in all six days. These results were compared with the No-Borrowing/No Short-selling (NSS/NB) design in Ackert’s experiment because none of our conditions had short-selling and the original funds were a cash endowment. These results are similar to the results that Ackert et al. got in their NSS/NB experimental design. They found that the average price deviation, average absolute price deviation, and average positive price deviation were all higher for the standard asset than for the lottery asset (Ackert et al. 428, 2008). The graph below compares the prices that both stocks were traded at and their respective deviances from the expected value of each stock.
Since the prices in the neutral condition compared neatly to previous experimental work done, we also looked at the differences in the positive condition. The positive condition was a little more tricky because the expected values of the stocks are not the same and do not decrease at a constant rate as they had in the neutral condition. As seen in Panel 2 above, the probabilities were changed so that there was a larger chance of the high payout options occurring on the positive news days. This means that the expected value of Stock B was actually higher than the expected value of Stock A on all but Days 1 and 4. However, despite this small advantage on Days 2, 3, 5, and 6, players still seemed to favor Stock A over Stock B. Stock B had less deviation from the expected value of the stock and was actually undervalued on Days 1 and 2 despite the news. These results, while still consistent with the findings of Ackert et al, pose some interesting theoretical questions. One reason for this result could be the strategy the players were using in the game. It seems as though in Days 1 and 2 the players may have felt that they could
win and compete by ordinary means. But as the game progressed and players become more desperate for a large dividend payout the price of Stock B begins to rise closer to Stock A.

The findings seem to suggest that the players, regardless of the news type present, still prefer the safety and security of Stock A to Stock B despite the chance for a massive lottery payout with Stock B. Kahneman and Tversky’s “prospect theory” may also provide a possible explanation for this difference. What they call the “certainty effect” seems to make stock A a more attractive option because of the fact that it will always pay a dividend (Kahneman and Tversky 1979, 267). Perhaps attribution theory and the disposition theory can be applied to the findings and inconsistencies found with Stock B. According to Chang et al. (2008) management and analyst forecasts can have some very serious influences on the way that the news is interpreted. In this experiment there was no “unfavorable” or bad news, but instead there were some unfavorable results in terms of what Stock B’s dividend payouts were. For example, in both of the conditions there were days when Stock B paid out $0 in dividends, while Stock A, even on neutral news days still paid out $0.70. Because the positive news was not yielding the favorable results the traders wanted for Stock B, the result was an incongruity that surprised the traders and caused the traders to be more willing to buy Stock A. In addition, because Stock A always paid out more than Stock B and the news were always congruent and credible; the traders seem to have felt it was a safer option that was worth paying more for. Because the management and analysts were both involved in the forecasts together there would be no difference observed due to the source of the information. The graph below shows a summary of the information discussed above.
The next step that was taken in the analysis of the data was to see how the excess price deviation occurred with all of the stocks in both conditions. This allowed a comparison to be made on the average excess price deviation that occurred throughout the trading day. Both Stocks A and B in the positive condition had much larger average excess price values than either of the stocks in the neutral condition. By Day 6 in the positive condition, the average excess price of Stock A was 13.81 dollars a share and the average excess price of Stock B was 11.99 dollars per share. However the Day 6 neutral condition yielded very different results: the Stock A average excess price was 6.28 dollars per share and the average excess price of Stock B was 4.37 dollars per share. Again, although there were inflated stock prices present in both conditions, the average excess price of both Stocks A and B was two to three times as much in the positive news condition.

One other difference in the two conditions worth noting is that the deviation between both neutral and positive Stock A and neutral and positive Stock B are relatively constant on Day
6. Stock A in the positive news condition (13.81) less the average price of Stock A in the neutral news condition (6.28) is 7.53. The difference of the two averages for Stock B is 11.99 (in the positive condition) and 4.37 (in the neutral condition) is 7.62. The effect of the news seems to have a constant effect on the sixth day. This relationship can be seen in Figure 4.

There is an interesting difference achieved here that was not present in the results of Ackert et al.’s experiment. In this experiment the deviation from the expected value is much larger than in the last day of Ackert’s experiment, where the traders seemed to have returned to expected value (Ackert et al., 2006, 429; see Figures 3 and 4). There are three possible explanations for this deviation. First, this experiment was shorter, lasting only six days. This meant that the participants had much less time to adjust to the game than Ackert’s participants did. Second, because this experiment had fewer days, what would be the final day was not disclosed until after it had ended. The decision not to disclose the last trading day to the participants makes the experiments in this study more realistic than those in the Ackert et al. study. In the real world, traders in most cases expect to continue to trade rather than to end trading by a preset date. And thirdly, this difference could be the result of the positive news that was given on the last day in the positive news condition. The graph below illustrates the relationship between Stocks A and B in both neutral and positive news conditions.
Intraday Survey Results

The intraday surveys served as a way to observe how the participants’ attitudes changed throughout the experiment and to occupy the participants so that the experimenters could correct any errors made in the trading that occurred on the previous day. The first three questions of the intraday surveys were general trading questions. Both the positive and neutral conditions were in agreement on Question 1 that the news was a factor in their investment decisions throughout the trading day. Also in both conditions it was found that the press releases did not increase the players’ desire to buy or sell stocks more in general.

Although the results suggest that the news itself did influence the participants’ decisions of whether to buy or sell more of a stock, Question 4 yielded interesting results about the asking price. As was shown by the graphs in the earlier section, the positive news condition traded at higher prices than the neutral condition. Question 4 asked “Did the press releases affect your asking price?” and the results to this question gave some interesting insight as can be seen below.
in Table 2. The positive condition was significantly different from the neutral condition in that the positive condition participants were more likely to raise their asking prices for stocks if they heard good news. This seems to fit very well heuristically even though the prices that the positive condition increased their values to were inflated beyond what the stocks expected value was in the positive news condition.

**Table 2 Question 4 t-test (Did the press releases affect your asking price?)**

<table>
<thead>
<tr>
<th></th>
<th>Neutral Condition</th>
<th>Positive Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>3.214286</td>
<td>3.615385</td>
</tr>
<tr>
<td>Variance</td>
<td>0.017007</td>
<td>0.00789</td>
</tr>
<tr>
<td>Observations</td>
<td>4</td>
<td>4</td>
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<tr>
<td>Hypothesized Mean Difference</td>
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<td></td>
</tr>
<tr>
<td>Df</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>t Stat</td>
<td>-5.08409</td>
<td></td>
</tr>
<tr>
<td>P(T&lt;=t) one-tail</td>
<td>0.001911</td>
<td></td>
</tr>
<tr>
<td>t Critical one-tail</td>
<td>2.015048</td>
<td></td>
</tr>
<tr>
<td>P(T&lt;=t) two-tail</td>
<td>0.003821</td>
<td></td>
</tr>
<tr>
<td>t Critical two-tail</td>
<td>2.570582</td>
<td></td>
</tr>
</tbody>
</table>

In addition to “stories,” there are four other main animal spirits, one of which is called confidence. Confidence is measured in Question 5 and basically asks the participants in both conditions if their confidence was affected by the news that was released on that day. In order to run a meaningful analysis on the two conditions, Days 1 and 4 were eliminated from the analysis. The responses to the question show that the participants in the positive news condition had significantly higher response levels of agreement throughout the positive news days than the participants in the neutral news condition did. The results were significant at the p=.05 level as can be seen below in Table 3.
Table 3 Question 5 t-test (Did the information affect your confidence in your decisions?)

<table>
<thead>
<tr>
<th></th>
<th>Neutral Condition</th>
<th>Positive Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>3.178571</td>
<td>3.730769</td>
</tr>
<tr>
<td>Variance</td>
<td>0.10034</td>
<td>0.080868</td>
</tr>
<tr>
<td>Observations</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Hypothesized Mean Difference</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Df</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>t Stat</td>
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</tr>
<tr>
<td>P(T&lt;=t) one-tail</td>
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<tr>
<td>t Critical one-tail</td>
<td>1.94318</td>
<td></td>
</tr>
<tr>
<td>P(T&lt;=t) two-tail</td>
<td>0.040969</td>
<td></td>
</tr>
<tr>
<td>t Critical two-tail</td>
<td>2.446912</td>
<td></td>
</tr>
</tbody>
</table>

Analysis of expectations and desires in the stock market can help experimenters to understand the motivations that drive people to act in a particular manner. Questions 7 and 8 attempted to deal with this issue. Both questions dealt with the prospect of rising prices for tomorrow. The players in the neutral condition were more hopeful that the prices of the stocks would be able to increase on the following day. The t-test was run and showed that this difference between the two conditions was significant at the p=.05 level as can be seen below in Table 4. The question was asked because it was thought that people in the neutral news condition would want stocks value to raise more because the news was not as favorable for them. This hypothesis seems to be supported by these results as the players in the positive condition were less likely to want price increases because the prices of their stocks had risen faster than the prices of stocks in the neutral news condition.
Table 4 Question 7 t-test (Are you hoping prices of stocks will increase tomorrow?)

<table>
<thead>
<tr>
<th></th>
<th>Neutral Condition</th>
<th>Positive Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>3.988095</td>
<td>3.602564</td>
</tr>
<tr>
<td>Variance</td>
<td>0.011054</td>
<td>0.074359</td>
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<tr>
<td>Observations</td>
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<td>6</td>
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<td></td>
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<tr>
<td>Df</td>
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<td></td>
</tr>
<tr>
<td>t Stat</td>
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</tr>
<tr>
<td>t Critical one-tail</td>
<td>1.94318</td>
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<tr>
<td>P(T&lt;=t) two-tail</td>
<td>0.017882</td>
<td></td>
</tr>
<tr>
<td>t Critical two-tail</td>
<td>2.446912</td>
<td></td>
</tr>
</tbody>
</table>

Question 9 dealt with how the press releases would impact the perception of risk in the experimental market. The question: “Did the news make you perceive Stock A or Stock B as less risky?” yielded differences in the responses for both the positive and neutral groups. The results were first run to include all 6 days of trading, and yielded no significant differences. But since the positive condition did include two days of neutral news, which were always Days 1 and 4, those responses for those two days were then eliminated. Once those responses were eliminated the t-test was re-run and the results were found to just be significant at the p=.05 level as can be seen below in Table 5. These results seem to suggest that the positive news conditions on Days 2, 3, 5, and 6 were able to cause the participants to always perceive the buying and selling decisions that they made pertaining to Stocks A and B as less risky than the participants in the neutral condition.
Table 5 Question 9 t-test (Did the news make you perceive Stock A or Stock B as less risky?)

<table>
<thead>
<tr>
<th></th>
<th>Neutral Condition</th>
<th>Positive Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
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<td>2.615385</td>
</tr>
<tr>
<td>Variance</td>
<td>0.025085</td>
<td>0.130178</td>
</tr>
<tr>
<td>Observations</td>
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<td>4</td>
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<tr>
<td>Hypothesized Mean</td>
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<td>0</td>
</tr>
<tr>
<td>df</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>t Stat</td>
<td>2.767934</td>
<td></td>
</tr>
<tr>
<td>P(T&lt;=t) one-tail</td>
<td>0.025219</td>
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</tr>
<tr>
<td>t Critical one-tail</td>
<td>2.131847</td>
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<tr>
<td>P(T&lt;=t) two-tail</td>
<td>0.050438</td>
<td></td>
</tr>
<tr>
<td>t Critical two-tail</td>
<td>2.776445</td>
<td></td>
</tr>
</tbody>
</table>

Question 10 dealt with fairness in the experiment. Fairness is an important part of the experiment to compare because according to Akerlof and Shillier, fairness is one of the five animal spirits. The question “The trading that took place yesterday seemed fair,” was included in order to ensure that the news releases given were not changing the subjects’ perception of the fairness of the game. Therefore, it was assumed that similar means would be collected from both the positive and neutral news groups for this question. The results show that there was very little difference in the perception of fairness in this experiment as the mean score for the groups was 3.46 and 3.48 respectively.

End of Survey Results

In addition to all of the other means by which data was collected in this experiment, we also used end of experiment survey to look into some of the psychological bubbles that may have contributed to producing the inflated stock prices. This survey consisted of 19 questions and t-tests were run on the results in order to see if there were any significant differences between the
mean responses for the two groups. The questions were aimed at seeing if the subjects of the experiment understood how the game was played, whether or not they could interpret the news as it was intended, and to try to gain insight into the way that the news might have impacted any of the strategies that the players were using.

The first question that is important to discuss is Question 10. Question 10 was “The news that I received from the press releases were?” This question was asked primarily as a control question in order to make sure that the people in both groups were able to apply the press releases from the article in a meaningful way. The mean score for the positive group was 3.33 and the mean score for the neutral group was 3.21. Although there wasn’t a significant difference between the two means scores here it is important to note that four of the 12 news releases in the positive condition included neutral news. Therefore the fact that it was slightly higher was a good estimation of the difference. Also none of the subjects in the positive condition gave a score lower than “3” or “neutral,” meaning that throughout the experiment they felt that there was no negative news given. It is important to note a few response irregularities in this question. Four of the participants in the neutral condition of this group deemed that the news was “positive.” In addition eight of the participants in the positive group session responded as neutral, while this is okay because they did receive several neutral news releases this may hint that the news had a certain level of ambiguity to it. These results seem to undermine the efficient market hypothesis in that they are problematic because “information to be gleaned from a particular financial ‘event’ is not objectively determinable and is in particular dependent on interpersonal dynamic operating between traders in the market,” (Glickman 1994, 347). Glickman’s point seemed to hold weight because of the ambiguity found in the subjects’ responses.
Another important pair of questions was Questions 7 and 11, which were both inserted to see if the participants were using the dividend sheets provided to analyze the value of both of the stocks in the market. Question 7 “I calculated the expected dividend payments for each stock” and Question 11: “I calculated the expected value for each stock” both operated on the premise that if the players were calculating these values and using the numbers, then there would be no bubbles formed in the experimental market. But bubbles did form in both markets even though larger deviation from the expected value was found in the positive condition. The mean scores from both the positive and neutral groups are shown to have little difference from one another; however, it seems as if heuristics is the source of the larger deviation in the positive condition. Instead of punching in all the numbers and calculating hard values, the participants heard good news, and also knew that good news increased the probability of higher dividend payouts. The results gathered in this experiment suggest that the people in the positive news condition made larger heuristical errors than the participants in the neutral news condition because of the news. Participants are likely to resort to heuristics because, as we have shown earlier, the computation of fundamental value of both stocks is not simple.

The next response set that yielded interesting findings was the response set for Question 13 “The press releases motivated you to only sell stock at higher prices.” The results for this section showed that the average response for the positive group condition was 3.16, while the average of the neutral group condition was much higher at a rate of 3.71. A t-test was run to analyze the differences between the two scores and be seen below in Table 6. For Question 13 a significant difference was only found at the p=.1 level. This means that the news release may have been working to influence the strategy that the different players used to compete in the trading game. These findings may suggest that in the positive news conditions, the traders were
not motivated to sell their stocks as much but would only sell them at higher prices, whereas the players in the neutral news condition had incentive to sell their stocks at the highest price they could get them for because of their uncertainty. Both groups were just as likely to “agree” that their primary objective was to maximize their cash holdings.

**Table 6 Question 13 t-test** (The press releases motivated you to only sell stock at higher prices.)

<table>
<thead>
<tr>
<th></th>
<th>Positive Condition</th>
<th>Neutral Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>3.166667</td>
<td>3.714286</td>
</tr>
<tr>
<td>Variance</td>
<td>0.69697</td>
<td>0.527473</td>
</tr>
<tr>
<td>Observations</td>
<td>12</td>
<td>14</td>
</tr>
<tr>
<td>Hypothesized Mean Difference</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Df</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>t Stat</td>
<td>-1.76967</td>
<td></td>
</tr>
<tr>
<td>P(T&lt;=t) one-tail</td>
<td>0.045321</td>
<td></td>
</tr>
<tr>
<td>t Critical one-tail</td>
<td>1.717144</td>
<td></td>
</tr>
<tr>
<td>P(T&lt;=t) two-tail</td>
<td>0.090643</td>
<td></td>
</tr>
<tr>
<td>t Critical two-tail</td>
<td>2.073873</td>
<td></td>
</tr>
</tbody>
</table>

Question 17’s objective was also to attempt to gain insight into how the traders played the game. Question 17 was “My strategy was to maximize my dividends.” Again the participants would circle their level of agreement with the statement. The results showed the largest mean difference for this question than for any other question asked in the experiment. The positive condition’s average was 2.58, whereas the response for the neutral condition was 3.64. These results are interesting because the positive group was close to disagreeing with the statement whereas the neutral group was closer to agreement. Again a t-test was run to examine if the contrast was significantly different. The results showed that there was a significant difference at the p=.05 level. This means that the players in the neutral news condition were more likely than
the players in the positive news condition to want to receive dividends. This could be because the price of the stock in neutral condition remained more stagnant than in the positive news condition. Because the prices rose more in the positive condition, the answers to these two significant strategy conditions seem to suggest that the players in the positive condition were willing to keep letting the values of the stocks rise. Interestingly enough, their responses to Question 4 “The press releases affected your confidence in the market by:” and Question 9 “I expected the value of my stocks to rise:” were not significantly higher than the mean responses to the neutral condition.

**Table 7 Question 17 t-test (My strategy was to maximize my dividends.)**

<table>
<thead>
<tr>
<th></th>
<th>Positive Condition</th>
<th>Neutral Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>2.583333</td>
<td>3.642857</td>
</tr>
<tr>
<td>Variance</td>
<td>0.992424</td>
<td>1.478022</td>
</tr>
<tr>
<td>Observations</td>
<td>12</td>
<td>14</td>
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<tr>
<td>Hypothesized Mean Difference</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Df</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>t Stat</td>
<td>-2.44182</td>
<td></td>
</tr>
<tr>
<td>P(T&lt;=t) one-tail</td>
<td>0.011179</td>
<td></td>
</tr>
<tr>
<td>t Critical one-tail</td>
<td>1.710882</td>
<td></td>
</tr>
<tr>
<td>P(T&lt;=t) two-tail</td>
<td>0.022358</td>
<td></td>
</tr>
<tr>
<td>t Critical two-tail</td>
<td>2.063899</td>
<td></td>
</tr>
</tbody>
</table>

The third question worth noting is Question 19: “The press releases motivated you to buy stocks at higher prices.” Question 19 serves as the antithesis to Question 17 in that both questions attempt to deal with rising prices and that players reactions to them. Although the t-test run for Question 19 was only marginally significant at the p=.1 (p=.108), it does have some important implications into the rationale differences between the two groups. The positive group’s mean answer was 3.41 while the neutral group’s mean answer was 2.85. These means
can be seen below in Table 8. If this data is analyzed with the data collected from Question 13, it helps to form a clearer picture of what the positive groups’ motivations were. They were not motivated to sell at a higher price but were motivated to buy at prices that were higher. This suggests that the participants in the positive group wanted to hold the stocks more as the prices rose, but if they did make a trade they would be willing to pay more for it because the news made them feel the stocks were of a higher value than the expected value would allow. This willingness to pay more for a stock as prices rose is conducive to bubble formation. These findings are also interesting because they contradict the disposition effect that was found in Chang et al., where the findings that stocks that performed well were often sold to soon. Instead the results seem to indicate that good news makes people more willing to hold their stocks, regardless of the price and possible performance.

**Table 8 Question 19 t-test (The press releases motivated you to buy stocks at higher prices.)**

<table>
<thead>
<tr>
<th></th>
<th>Positive Condition</th>
<th>Neutral Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>3.416667</td>
<td>2.857143</td>
</tr>
<tr>
<td>Variance</td>
<td>0.44697</td>
<td>1.054945</td>
</tr>
<tr>
<td>Observations</td>
<td>12</td>
<td>14</td>
</tr>
<tr>
<td>Hypothesized Mean Difference</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Df</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>t Stat</td>
<td>1.667432</td>
<td></td>
</tr>
<tr>
<td>P(T&lt;=t) one-tail</td>
<td>0.054495</td>
<td></td>
</tr>
<tr>
<td>t Critical one-tail</td>
<td>1.713872</td>
<td></td>
</tr>
<tr>
<td>P(T&lt;=t) two-tail</td>
<td>0.108989</td>
<td></td>
</tr>
<tr>
<td>t Critical two-tail</td>
<td>2.068658</td>
<td></td>
</tr>
</tbody>
</table>

One other factor that is usually discussed in trading is whether or not the investors are rational. Several questions in the end of experiment survey aimed at examining how the
participants regarded themselves. Questions 9, 11 and 12 all looked at the participants’ expectations and whether they were able to distinguish the difference between the real value of the stock and its trading value in the market. The responses to Question 9 had means of 3.75 and 4. Only one person, who answered with a 2, seemed to understand that the real value of the stocks was going to fall in the experiment. These results seem to suggest that the traders were not as rational as they professed to be. Question 11 asks the participant if they calculated the expected value for the stock. The means hovered around 3, suggesting that some may have been trying while other were merely using heuristics and estimations to guide their decision-making. Finally Question 12 examined whether the participants understood the difference between the expected value and market value. Again both groups had very high agreement means for this question. But despite their high levels of agreement with this question, the stocks traded at inflationary levels anyway. This suggests that either the participants were all acting irrationally, or that there were enough irrational participants in each session of trading for it to make sense to the traders to trade rationally at higher prices. Baker and Wurgler has found in their study that stocks whose fundamental value is difficult to calculate are most affected by sentiment, a measure of trader irrationality (Baker and Wurgler 2007, 149).

The rational interpretation was first suggested by Keynes in his beauty contest analogy in his *General Theory* (1973, 156):

> 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.

In his book *A Random Walk Down Wall Street* (2011), Burton Malkiel called Keynes’ theory the “castle-in-the-air theory” of investing. As Malkiel sees it, traders are concerned not with the price that correctly reflects the value of a stock but the price that it can be sold at: “An investment is worth a certain price to a buyer because she expects to sell it to someone else at a higher price. The investment, in other words, holds itself up by its own bootstraps. The new buyer in turn anticipates that future buyers will assign a still higher value” (Malkiel 2011, 34). This theory of investing is compatible with the behavior observed in the participants in the present study.
Section V: Conclusion

This experimental study contributes to our understanding of how investors react to news releases and information provided by the media. Our experimental results show that in the presence of positive news traders are willing to buy and sell stocks at inflated prices higher than expected value. By giving intraday and terminal surveys, we found several significant differences between the group receiving positive news and the group receiving neutral news that helps gain insight into the motivations of the players’ behavior. While the stocks were traded at higher prices in both conditions, the gap between the market value and the real value of the stocks had much higher differences in the positive news condition than in the neutral news condition. As was mentioned earlier, producing bubbles is not hard in a lab setting, but this difference between the two groups is what makes the findings interesting.

There are several major differences between this experiment and the experiments in the previous studies. First, the news releases, while based on the management and analyst findings in Chang et al., did not specify whether the source of the news came from management or analysts. This was to make the press release less artificial. Also there were significant modifications made to the structure of Ackert’s experimental design. Her original experimental design was set up to be run on a computer with 7-9 traders trading on a double auction program. Because it was done on a computer, the participants did not have to write much, and trades could be processed faster. My experiment was done by hand with paper and pencils. This meant that the calculations also had to be done by hand.

Her experiments originally had 12 days of trading and the experiment ran a little over an hour; about 30 minutes were used for instructions and the remainder for the trading. Because of
the surveys and conducting the trading by hand it was unrealistic for the experiment to have 12
days because it would have taken longer than 1 and a half hours to run. We cut the trading days
to six and lowered the trading groups to 4-6 because of the difficulty we had finding participants.
These two points are important to point out because less subjects per group means less stocks
available in the market and less days means that the players had less time to get acquainted with
the game and learn that they were trading at higher prices. Ackert’s research shows that when
bubbles were present, it was after the sixth day that they began to decrease back towards
expected value (Ackert et al. 2006, 429-430). More groups could not be run because of budget
constraints. However, despite this obstacles and differences we were able to achieve significant
findings in not only the trading behaviors, but also in the response sets from the surveys.

Further research should be done with real traders and with negative news. Using real
traders who are more critical over the information would make the findings of this experiment
more generalizable to the real world trading setting. In addition, this experiment was initially
supposed to include a negative news condition, but because of the constraints listed, only
positive and neutral conditions were used. It would be interesting to see if the negative news
would cause the traders to trade at prices below the expected value of the stocks. Other potential
subjects for future research could examine the findings that were achieved in the surveys that
were collected. We observed that the news releases seemed to influence the different types of
strategies that were used in the sessions. Future research should try to pinpoint why the news
releases affect the strategies used in such a profound way. One final note would be to try to
incorporate more of the other animal spirits into the work to see if they have any effects on one
another.
This research provides a foundation upon which more behavioral tests can be run. Budget and time constraints limited the sample size of participants that could be used, and it would be interesting to see more tests run and these findings duplicated.
Section VI: Appendixes

Appendix A.

Instructions

1. Introduction
   a. The nature of the session: This experiment is concerned with the economics of market decision making. We are going to simulate a market in which you will buy or sell shares of two different stocks in a set of trading periods called days. Your predictive abilities will enable you to generate profits. This will help you become the most profitable trader in the session and allow you to win the bonus prize money.
   b. What materials should you have: In addition to these instructions, please make sure that you have a consent form (which you should read and sign immediately), a price trading sheet, and a packet containing all the surveys you must take. Please follow along with these instructions while we go through the instructions with you. You may also have extra scrap paper, use a pen or pencil, and use a calculator if you like.

2. Market Setup and Trading Instructions
   a. Periods: Trading will be conducted by hand with the other brokers (student participants) whom you see around you. The periods vary in length, with the first period being the longest and the succeeding periods less long at 4 minutes a-piece. The experimenter will announce the beginning and end of each trading period. The experimenter will warn the participants when 30 seconds are left on the clock.
   b. Getting Started: You will be assigned a letter and a number to track your progress amongst other groups so that after the experiment so that your anonymity is ensured. The number you have been assigned is at the top of the survey packet that you have received
   c. Endowment: At the beginning of the first period every trader will be provided with the same endowment, which consists of $100 in imaginary cash and 2 shares each of stock A and B, which both traded at $5.52 at the close of the previous day. This endowment will be shown in theoretical dollars and stock certificates that you will be given. The person who accumulates the most money at the end of the final period will receive $10 Gift Card.
   d. Press Releases: At the beginning of each day, before trading begins, a news article will be read aloud by the experimenter, letting you know what is going on in the theoretical economy. Exactly halfway through the trading period, another article will be announced with any important updates about performance of a company or the economy as a whole. The first release will hint at the probable performance of one or both of the companies in a given day. The second news release will affect the
probabilities of the companies based on the type of news that is given. For example, a positive midday news release for company A will increase the probability that Company A will pay one of its higher yielding dividends. These dividend probabilities will be discussed further later on.

e. Trading: When trading starts in each period, you may sell part or all of your holdings of shares. You may alternatively use your cash endowment to purchase more shares. You may also decide to do no trading and hold on to the shares that you have at the start of period; doing so will limit your cash gain to the dividends received on the shares you are holding. The procedure that you need to use if you wish to conduct a trade is explained in the sections below.

f. Selling and buying shares: Sales of your share holdings will increase your cash balance by amount of the sale price but will reduce the dividends received on the shares you are holding. Similarly, purchases reduce your cash balance by the amount of the purchase price. Thus, you can gain or lose money on the purchase and sale of shares. Your position at the end of each day is the amount of cash you have (from both trades and dividends) and the market value of the shares of either stock remaining. These assets will carry over to the next day.

g. Tracking Prices: The other brokers who are willing to sell will communicate their asking price. Bidders will compete to get the stock that they are bidding for. The numbers will be written on the board or posted at the end of each period.

h. Dividends: At the end of each period, Stock A and Stock B will pay dividends. An experimenter will announce and write or post the values. For each stock, the amount of the dividend per share can be one of three values. The values will be randomly determined by the trading system. This will be discussed further below.

i. Calculating Dividends: At the end of each period, the actual dividend amount for each stock will be revealed. The total dividends that you will receive from each stock in a period are computed by multiplying the dividend per share of that stock by the number of shares of the stock that you hold at the end of the period. For example, if Stock A pays $0.70 in dividends on Day 1, and you have two shares of Stock A, then you earn $1.40 in dividends from it on Day 1.

j. Source of trading profits: As a result, your trading profits in a given period come from two sources---from (1) dividends, and (2) gains and losses from purchases.

k. Carry forward: The cash balance and shares that you have at the end of one period will be carried forward to the next period, during which you are again free to trade the shares. Notice, that because you can choose to do no trading, for each share you have in possession, you will earn in a period its dividend amount.

l. Final Period: At the end of the final period, the shares will pay their final dividends into your cash balance and then cease to exist (have a zero market value). Your final gain or loss will be equal to only your final cash balance.

3. Dividends and Company History
a. Stock A: Stock A is a blue chip stock company. A has been in business for over 50 years. It has a long and stable financial history. It is recognized by the Better Business Bureau and its shares publicly traded for the length of the company’s life. In addition, this company has also been stable with the amount of dividends that it pays. There are very few surprises when it comes to A, it has had a long history of stability and has always managed to adapt to the times and currents within the modern business world.

b. Stock B: Stock B is a new up and comer. Not much is known about the stability of this company. The owners and leadership are excited about where this new company is headed. They believe there is potential for huge gains in the near future. The company has just gone public and company leaders have has said that the only people who are more excited than them should be potential investors looking to make big returns. They have analyzed the market and think that their innovative attitude and products will make a major impact.

c. Dividend probability distributions:

<table>
<thead>
<tr>
<th>Probability (Neutral News)</th>
<th>Stock A’s dividend</th>
<th>Stock B’s dividend</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.48</td>
<td>0.70</td>
<td>0.00</td>
</tr>
<tr>
<td>0.48</td>
<td>1.10</td>
<td>0.25</td>
</tr>
<tr>
<td>0.04</td>
<td>1.40</td>
<td>20.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Probability (Positive News)</th>
<th>Stock A’s dividend</th>
<th>Stock B’s dividend</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.40</td>
<td>0.70</td>
<td>0.00</td>
</tr>
<tr>
<td>0.54</td>
<td>1.10</td>
<td>0.25</td>
</tr>
<tr>
<td>0.06</td>
<td>1.40</td>
<td>20.00</td>
</tr>
</tbody>
</table>


a. Possible actions: Other than abstaining from trading, you can do so by taking one or more of the following actions: (1) bid (specify a price at which you are willing to buy), (2) ask (specify a price at which you are willing to sell), (3) buy, and (4) sell. You will have to communicate with your fellow traders to make these actions happen.

b. Bid: If a player has a stock that you want, you may bid for that stock. If there is another broker who bids for that stock, the stock is sold to the highest bidder whose price equals or exceeds the asking price of the seller. You can submit a higher bid if you observe that someone else has submitted a bid price higher than your original bid price.

c. Ask: If you want to sell a stock, you may place an ask price at which you are willing to sell your stock. If more than one broker wants to sell the same stock, the stock is sold to the seller who has submitted the lowest price that is at least equal to the highest bid price. You can submit a lower bid if you observe that someone else has submitted an ask price lower than your original ask price.

d. Buy: Buying a stock means you will pay whatever the asking price for the stock.
e. Sell: A seller will announce an asking price for a stock. If there are bidding prices above the asking price, the seller should sell it at the highest bidding price. But if none of the bidding prices are high enough to match the asking price, the seller must either lower the price or withdraw the stock from the auction.

f. Final Period: At the end of the final period, the balance of your position will be calculated. While the stock’s value becomes zero on the final day, they still all pay dividends on the final day. While this process is completed, you are asked to complete the closing survey.
Appendix B.

Survey Questions

Instructions: Circle the answer that best matches your level of agreement. Day 1:
In the last day:

1. Did the press release affect your investing decisions during this day?
   1 Not At All  2 Somewhat  3 Neutral  4 A Little Bit  5 A Lot

2. Did the press releases cause you to want sell stocks more?
   1 Not At All  2 Somewhat  3 Neutral  4 A Little Bit  5 A Lot

3. Did the press releases cause you to want buy stocks more?
   1 Not At All  2 Somewhat  3 Neutral  4 A Little Bit  5 A Lot

4. Did the press releases affect your asking price?
   1 Decreased A Lot  2 Decreased  3 Neutral  4 Increased  5 Increased A Lot

5. Did the information affect your confidence in your decisions?
   1 Decreased A Lot  2 Decreased  3 Neutral  4 Increased  5 Increased A Lot

6. Did yesterday’s prices influence how you expected prices to move today?
   1 Not At All  2 Somewhat  3 Neutral  4 A Little Bit  5 A Lot

7. Are you hoping prices of stocks will increase tomorrow?
   1 Not At All  2 Somewhat  3 Neutral  4 A Little Bit  5 A Lot

8. Price increases today mean there will be more price increases tomorrow?
   1 Not At All  2 Somewhat  3 Neutral  4 A Little Bit  5 A Lot

9. Did news make you perceive Stock A or Stock B as less risky?
   1 Much Less Risky  2 Less Risky  3 Neutral  4 More Risky  5 Much More Risky

10. The trading that took place yesterday seemed fair.
    1 Not At All  2 Somewhat  3 Neutral  4 A Little Bit  5 Very Fair
Day 2:

11. Did the press release affect your investing decisions during this day?
   Not At All  Somewhat  Neutral  A Little Bit  A Lot
   1  2  3  4  5

12. Did the press releases cause you to want sell stocks more?
   Not At All  Somewhat  Neutral  A Little Bit  A Lot
   2  2  3  4  5

13. Did the press releases cause you to want buy stocks more?
   Not At All  Somewhat  Neutral  A Little Bit  A Lot
   1  2  3  4  5

14. Did the press releases affect your asking price?
   Decreased A Lot  Decreased  Neutral  Increased  Increased A Lot
   1  2  3  4  5

15. Did the information affect your confidence in your decisions?
   Decreased A Lot  Decreased  Neutral  Increased  Increased A Lot
   1  2  3  4  5

16. Did yesterday’s prices influence how you expected prices to move today?
   Not At All  Somewhat  Neutral  A Little Bit  A Lot
   1  2  3  4  5

17. Are you hoping prices of stocks will increase tomorrow?
   Not At All  Somewhat  Neutral  A Little Bit  A Lot
   1  2  3  4  5

18. Price increases today mean there will be more price increases tomorrow?
   Not At All  Somewhat  Neutral  A Little Bit  A Lot
   1  2  3  4  5

19. Did news make you perceive Stock A or Stock B as less risky?
   Much Less Risky  Less Risky  Neutral  More Risky  Much More Risky
   1  2  3  4  5

20. The trading that took place yesterday seemed fair.
   Not At All  Somewhat  Neutral  A Little Bit  Very Fair
   1  2  3  4  5
Day 3:

21. Did the press release affect your investing decisions during this day?
   1 Not At All   2 Somewhat   3 Neutral   4 A Little Bit   5 A Lot

22. Did the press releases cause you to want sell stocks more?
   3 Not At All   2 Somewhat   3 Neutral   4 A Little Bit   5 A Lot

23. Did the press releases cause you to want buy stocks more?
   1 Not At All   2 Somewhat   3 Neutral   4 A Little Bit   5 A Lot

24. Did the press releases affect your asking price?
   1 Decreased A Lot   2 Decreased   3 Neutral   4 Increased   5 Increased A Lot

25. Did the information affect your confidence in your decisions?
   1 Decreased A Lot   2 Decreased   3 Neutral   4 Increased   5 Increased A Lot

26. Did yesterday’s prices influence how you expected prices to move today?
   1 Not At All   2 Somewhat   3 Neutral   4 A Little Bit   5 A Lot

27. Are you hoping prices of stocks will increase tomorrow?
   1 Not At All   2 Somewhat   3 Neutral   4 A Little Bit   5 A Lot

28. Price increases today mean there will be more price increases tomorrow?
   1 Not At All   2 Somewhat   3 Neutral   4 A Little Bit   5 A Lot

29. Did news make you perceive Stock A or Stock B as less risky?
   1 Much Less Risky   2 Less Risky   3 Neutral   4 More Risky   5 Much More Risky

30. The trading that took place yesterday seemed fair.
   1 Not At All   2 Somewhat   3 Neutral   4 A Little Bit   5 Very Fair
In the last day:

31. Did the press release affect your investing decisions during this day?
   Not At All  2  3  4  5
   Not At All  Somewhat  Neutral  A Little Bit  A Lot

32. Did the press releases cause you to want sell stocks more?
   Not At All  2  3  4  5
   Not At All  Somewhat  Neutral  A Little Bit  A Lot

33. Did the press releases cause you to want buy stocks more?
   Not At All  2  3  4  5
   Not At All  Somewhat  Neutral  A Little Bit  A Lot

34. Did the press releases affect your asking price?
   Not At All  2  3  4  5
   Decreased A Lot  Decreased  Neutral  Increased  Increased A Lot

35. Did the information affect your confidence in your decisions?
   Not At All  2  3  4  5
   Decreased A Lot  Decreased  Neutral  Increased  Increased A Lot

36. Did yesterday’s prices influence how you expected prices to move today?
   Not At All  2  3  4  5
   Not At All  Somewhat  Neutral  A Little Bit  A Lot

37. Are you hoping prices of stocks will increase tomorrow?
   Not At All  2  3  4  5
   Not At All  Somewhat  Neutral  A Little Bit  A Lot

38. Price increases today mean there will be more price increases tomorrow?
   Not At All  2  3  4  5
   Not At All  Somewhat  Neutral  A Little Bit  A Lot

39. Did news make you perceive Stock A or Stock B as less risky?
   Much Less Risky  Less Risky  Neutral  More Risky  Much More Risky

40. The trading that took place yesterday seemed fair.
   Not At All  2  3  4  5
   Not At All  Somewhat  Neutral  A Little Bit  Very Fair
Instructions: Circle the answer that best matches your level of agreement.

In the last day:

41. Did the press release affect your investing decisions during this day?

42. Did the press releases cause you to want sell stocks more?

43. Did the press releases cause you to want buy stocks more?

44. Did the press releases affect your asking price?

45. Did the information affect your confidence in your decisions?

46. Did yesterday’s prices influence how you expected prices to move today?

47. Are you hoping prices of stocks will increase tomorrow?

48. Price increases today mean there will be more price increases tomorrow?

49. Did news make you perceive Stock A or Stock B as less risky?

50. The trading that took place yesterday seemed fair.
Instructions: Circle the answer that best matches your level of agreement.

In the last day:

51. Did the press release affect your investing decisions during this day?
   1 Not At All  2 Somewhat  3 Neutral  4 A Little Bit  5 A Lot

52. Did the press releases cause you to want sell stocks more?
   6 Not At All  2 Somewhat  3 Neutral  4 A Little Bit  5 A Lot

53. Did the press releases cause you to want buy stocks more?
   1 Not At All  2 Somewhat  3 Neutral  4 A Little Bit  5 A Lot

54. Did the press releases affect your asking price?
   1 Not At All  2 Decreased  3 Neutral  4 Increased  5 Increased A Lot

55. Did the information affect your confidence in your decisions?
   1 Not At All  2 Decreased  3 Neutral  4 Increased  5 Increased A Lot

56. Did yesterday’s prices influence how you expected prices to move today?
   1 Not At All  2 Somewhat  3 Neutral  4 A Little Bit  5 A Lot

57. Are you hoping prices of stocks will increase tomorrow?
   1 Not At All  2 Somewhat  3 Neutral  4 A Little Bit  5 A Lot

58. Price increases today mean there will be more price increases tomorrow?
   1 Not At All  2 Somewhat  3 Neutral  4 A Little Bit  5 A Lot

59. Did news make you perceive Stock A or Stock B as less risky?
   1 Not At All  2 Much Less Risky  3 Less Risky  4 Neutral  5 More Risky  6 Much More Risky

60. The trading that took place yesterday seemed fair.
   1 Not At All  2 Somewhat  3 Neutral  4 A Little Bit  5 Very Fair
End of Study Survey:

1. What is your current major? ____________________
2. Have you ever traded stocks before in real life? Yes  No
3. Did you think you would finish with more or less money then you began? More  Less
4. Circle your level of agreement with the following:
   4. The press releases affected your confidence in the stock market by:
      1  2  3  4  5
      Decreasing It  Slightly Decreasing It  Neutral  Slightly Increasing It  Increasing It

   5. The press releases affected your investing decisions during the trading days.
      1  2  3  4  5
      Strongly Disagree  Disagree  Neutral  Agree  Strongly Agree

   6. The news stories made me feel like I was taking less risk.
      1  2  3  4  5
      Strongly Disagree  Disagree  Neutral  Agree  Strongly Agree

   7. I calculated the expected dividend payments for each stock.
      1  2  3  4  5
      Strongly Disagree  Disagree  Neutral  Agree  Strongly Agree

   8. I traded for certain stocks following a press release about that company.
      1  2  3  4  5
      Strongly Disagree  Disagree  Neutral  Agree  Strongly Agree

   9. I expected the value of my stocks to rise.
      1  2  3  4  5
      Strongly Disagree  Disagree  Neutral  Agree  Strongly Agree

   10. The news that I received from press releases were:
       1  2  3  4  5
       Mostly Negative  Negative  Neutral  Positive  Mostly Positive

   11. I calculated the expected value for each stock.
        1  2  3  4  5
        Strongly Disagree  Disagree  Neutral  Agree  Strongly Agree
12. I was aware that the market price for the stock was not always its real value.

1  2  3  4  5
Strongly Disagree  Disagree  Neutral  Agree  Strongly Agree

13. The press releases motivated you to only sell stock at higher prices.

1  2  3  4  5
Strongly Disagree  Disagree  Neutral  Agree  Strongly Agree

14. I played the game to maximize my cash.

1  2  3  4  5
Strongly Disagree  Disagree  Neutral  Agree  Strongly Agree

15. I competed in the game to maximize my profit from selling.

1  2  3  4  5
Strongly Disagree  Disagree  Neutral  Agree  Strongly Agree

16. The press releases made me feel like I would have more to gain.

1  2  3  4  5
Strongly Disagree  Disagree  Neutral  Agree  Strongly Agree

17. My strategy was to maximize my dividends.

1  2  3  4  5
Strongly Disagree  Disagree  Neutral  Agree  Strongly Agree

18. I tried to minimize the risks that I took throughout the game.

1  2  3  4  5
Strongly Disagree  Disagree  Neutral  Agree  Strongly Agree

19. The press releases motivated you to buy stocks at higher prices.

1  2  3  4  5
Strongly Disagree  Disagree  Neutral  Agree  Strongly Agree
Appendix C.

Neutral Condition News Releases in Order (odd numbers are beginning of day while even numbers are midday news).

1. The government is talking about new plans to make changes concerning the budget.
2. Companies A and B are holding board meetings to discuss the future of their companies.
3. The unemployment figures just released indicate that there is no change in the growth of unemployment, but neither is it getting better.
4. Both Companies have declined to comment on the plans their company has stating it will be: “More of the same.”
5. People are spending the same as they had been as prices of food have stayed about the same.
6. The acquisition of a small privately held company by Company A has been applauded by some analysts and management, but criticized by others.
7. Government officials are discussing raising taxes.
8. Both major companies are quietly paying their taxes.
9. Expert analysts are uncertain if the trading day will yield losses or possibly gains.
10. Analysts are split on whether new policies in companies A and B will help or hurt the companies’ bottom lines.
11. Oil Prices have stayed relatively steady and may continue to do so.
12. Some management and analysts applaud that Company B has replaced some machinery in its plant, but others say that it was obsolete and needed to be replaced anyway.

Positive News Condition News Releases in Order (odd numbers are beginning of day while even numbers are midday news).

1. The government is talking about new plans to make changes concerning the budget.
2. Companies A and B are holding board meetings to discuss the future of their companies.
3. Politicians from both parties have come to an agreement on an important budget decision that should help cut taxes and reduce the federal debt.
4. Companies A and B all stand to increase their market shares and grow due to expansion overseas into untapped markets.
5. The economy is as strong as it has ever been, and it is only going to improve with the strong financial system supporting it.
6. Company A has built a new plant in order to meet increasing demand for its products.
7. Government officials are discussing raising taxes.
8. Both major companies are quietly paying their taxes.
9. Experts forecast that because of an increase in people’s incomes, people will spend more and companies will have higher profits.
10. The opening of oil reserves has led to cheaper fuel prices and transportation costs for both companies A and B.
11. Low rates on credit have made it easy to people to get loans to build for their futures.
12. Major innovations are in store at company B as it prepares to reveal a prototype they feel will revolutionize the way things are done in the business world.
Section VII: References


