

Primary submission: 16.02.2022 | Final acceptance: 20.04.2022

Do Investors Overreact to COVID-19 Outbreak? An Experimental Study Using Sequential Disclosures

Dedhy Sulistiawan¹, Yie Ke Feliana¹, Felizia Arni Rudiawarni¹, and Adriana Grigorescu²

ABSTRACT

This paper aims to investigate market participants' reactions to sequential information, presenting firm-specific news and market-wide information. Experimental study takes place in the COVID-19 pandemic era, as market-wide information representation. We also provide firm-specific information in the form of company fundamental information. The results show that participants, as representatives of retail investors, do not overreact to COVID-19. The recency effect dominates their decision-making. Neither firm-specific information nor market-wide information can eliminate the recency effect in decision making. Investors still provide valuations based on the latest information they receive. Another interesting finding in this study is that positive framing of information cannot mitigate the effects of bad news contained therein. Our findings contribute to the study of behavioral finance and corporate disclosure strategies. From the market participants' point of view, our results describe that investors' decisions are often not based on the information content but the latest information they received. From the company perspective, this research also contributes to the corporate disclosure strategy valued by investors based on how they disclose information to the public.

KEY WORDS:

COVID-19, sequential information, experiment, recency effect, market-wide information, firm-specific information

JEL Classification: A12, G41, C91

¹University of Surabaya, Indonesia

²National University of Political Studies and Public Administration, Romania

1. Introduction

The main purpose of this paper is to evaluate the impact of sequential information on investors' decision-making. The recency effect studies present evidence that sequential information stimulates stock overvaluation (or undervaluation) (Libby & Tan, 1999; Pinsker, 2007, 2011; Tuttle et al., 1997). People tend to pay gradually increasing attention to later evidence due to bounded rationality (Gandré, 2020). When the sequence of good (bad) news is presented after the series of bad (good) news, people tend to react more positive (negative). Our

study develops those studies using corporate announcements and Corona Virus Disease 2019 (COVID-19) news to represent bad news. The use of the COVID-19 issue enhances the context of stock investing in the pandemic era.

COVID-19 issue is really bad news that substantially affects firm operations. According to CNN (2020), this news began to go global in early January 2020. Even at the beginning of March 2020, a panic situation emerged in many countries after Italy and South Korea experienced outbreaks. Even in the United States, the National Basketball Association (NBA) match, a competition

Correspondence concerning this article should be addressed to:

Dedhy Sulistiawan, Jl. Raya Kalirungkut 60293, Surabaya, Indonesia.

E-mail: dedhy@staff.ubaya.ac.id

between the world's largest basketball teams, is delayed and reopens the matches, but the fans are forbidden to attend. Several governments around the world conduct lock-down policy. In our study, COVID-19 is the representation of bad news. It is market-wide information.

Our study also uses firm-specific information to complement market-wide information by using earnings and fundamental information. Earnings announcements and other fundamental information are important information in the stock market (Francis et al., 2002; Hribar & McInnis, 2012;).

In this study, we focus on presenting positive corporate news and negative news from the COVID-19 outbreak. Both of this information are distributed in the market and produce mixed-reaction. Most public firms announce their financial reports in March, while the COVID-19 outbreak spread throughout the world starting in March 2020. Those phenomena stimulate a research question. Using an experimental study, we expect to describe how joint information affect market participants decision when presenting sequentially.

This study complements the previous study regarding joint information. Flannery and Protopapadakis (2002) present that macroeconomic factors affect aggregate stock returns. Furthermore, Mian and Sankaraguruswamy's (2012) research found that investors react differently to good news and bad news of earnings announcement based on the market sentiment. The study of Chen et al. (2018) shows that investors react more to macroeconomic disclosures than firm-specific information. Macroeconomic news attracts investors' attention. In effect, market participants pay less attention to earnings information when there is important market-wide news than at other times. However, in total, investors' attention to earnings information and macroeconomics information is greater when there is an important macroeconomic news announcement. In this research, the COVID-19 outbreak is macroeconomics news which is very important for the whole world. This study combines this market-wide information with firm-specific information that the company carried out during the COVID-19 outbreaks. We investigate further by completing the information released regarding the market-wide and firm-specific information with how the information is presented, that is, sequential.

The discussion of sequential information is one of the important issues in our business and life. Outside

the stock market, sequential information will stimulate bias decisions. Juries in the court tend to be affected by sequential evidence (Furnham, 1986). Auditors are also stimulated by recent information than previous ones because of the order-effect bias (Ashton & Kennedy, 2002; Ashton & Ashton, 1998). Some scholars also provide evidence that information sequentially presented affects job recommendation (Chen et al., 2019) and clicking behavior (Murphy et al., 2006). This study seeks to analyze the impact of sequential information between the positive fundamental news and COVID-19 outbreak news in the stock market setting.

This paper is organized into four sections. The second part develops hypotheses, and the third section describes the research design, while the finding section shows and discusses the findings. The last section concludes the research findings and limitations.

2. Literature Review

Investing based on individual pieces of news may produce stock price movement. The good news (bad news) normally generates positive (negative) reaction. Ideally, people will have the same reaction when they receive the bundle of information. Based on the rational perspective, people who receive positive-negative and negative-positive information should produce the same reaction. The efficient market hypothesis supports that argument. However, our study refers to behavioral finance studies. We believe that human is not fully rational. The complexity and completeness of information in the stock market are problems for market participants because of human limitations in information processing.

Belief revision theory, presented by Hogarth and Einhorn (1992), conducts a discussion about inconsistent disclosures, both positive and negative, produce more belief revision when sent to decision-makers after disclosing the opposite sign. After receiving contrary evidence, people tend to experience an increased sensitivity level after recognizing the existing belief. After reviewing good news, a piece of bad news will cause the decision-maker to be more sensitive to the new evidence. The presentation of bad news is contrary information to what people have previously received. The amount of their belief revision is also increasing but in the opposite direction. The phenomenon of overreaction to the newest information is called recency effects.

In the stock market, earnings announcements and

other fundamental news are presented in step-by-step mode rather than distributed in a bundle of information. The news of COVID-19 is also distributed to the news portal and social media in a sequential presentation. In the stock market, investors receive the sequence of those disclosures differently. Good (bad) news followed by bad (good) news will produce belief revision from positive (negative) to negative (positive) reaction because the last information is more weighted than previous ones.

The stock markets always generate return volatility because different expectations of market participants produce different reactions. The bad news generates a stronger effect than the good news, especially in 2020 due to the COVID-19 pandemic that was perceived as a threat (KANTAR, 2020; Onyele & Nwadike, 2021). It reconfirms the Jegajeevan theory (2012) that the bad news compared with a good one is having a higher effect on the asymmetric volatility of the return.

The news influences the stock market and customer behavior, as the representative of retail investors. Gambetti et al. (2021) studied four aspects of the good and bad news on the market response. Even if there is no bias or negativity in media about economic events, the negative news is more persistent and sometimes more 'attractive' for the news providers due to the effects on the audience.

The COVID-19 pandemic was called after few months from its debut a 'health crisis' followed by uncertain news that an economic recession is expected. This 'neutral' news triggered customer behavior reconsideration during and after the COVID-19 pandemic. Customer behavior has been analyzed considering psychological, sociological, and economic approaches as the main pillars of the spending behavior and decision (Valaskova et al., 2015). Facing news like a COVID-19 pandemic makes consumer behavior change on a scale from small to tremendous, or at least will have a time of frozen until the news will complete the picture of the future (Jo et al., 2021). Mehta et al. (2020), based on the changes in spending preferences, comes to a conclusion, at least for India, that consumer behavior in crisis times is shifting from materialism to spiritualism. The question is, for how long will it last? European, Japanese and Korean are the most skeptical compared with the optimistic Chinese about economic recovery and reach a new normal life (Kohli et al., 2020). The mobility investment (Garibaldi et al., 2021) seems to have different shifts in different

countries, the pandemic news and the recession news effect in the investment-spending mindset. Those situations are not good for the business, including the stock market.

Our study develops the idea that we use joint information between firm-specific information and market-wide information. Before valuing firms using specific information, the understanding of market-wide is crucial. Based on the valuation procedure, analysts or investors should weigh more on market-wide information than firm-specific information. Previous studies have shown that macroeconomics or market-wide information attracts investors' attention because many investors apply a top-down approach in their investment selection strategies. The initial step is to determine the risk-return trade-off based on fundamental macroeconomic information. So, market processes information based on market-wide information over the firm-specific information (Chen et al., 2018). Besides, market-wide information reveals information about economic fundamentals and discount rates (Li et al., 2014; Savor & Wilson, 2013). This method makes it easier for investors to separate systematic information from firm-specific information contained in earnings news.

Discussing market-wide information and firm-specific information, Mian and Sankaraguruswami (2012) examine the market response related to earnings news and sentiment representing market-wide information. Mian and Sankaraguruswami (2012) show that investors react differently to earnings announcements depending on market sentiment at that time. Higher (lower) sentiment generates (lower) higher value relevance. Their results show that investors weigh higher market-wide information than firm-specific information. Their research is also supported by Seok, Cho and Ryu (2019).

The COVID-19 outbreak actually has a terrible impact on business. It should be more superior information than earnings announcements. However, because of the bias stimulated by the order of presentation, the latest information received tends to be considered more in the decision-making process. People overreact to the newest information.

The recency effect studies have already been discussed in several papers, i.e., Libby dan Tan (1999), Tuttle et al. (1997), Pinsker (2007, 2011), and Sulistiawan and Rudiawarni (2019), but this research develops the process by combining firm-specific and market-wide informa-

tion. Our paper also uses COVID-19 outbreak news to enhance the context of the study. We use fundamental information as positive news and COVID-19 information as the representation of bad news. Our alternate hypothesis is presented below.

H: Positive fundamental information followed by COVID-19 outbreak news produce a more negative reaction than COVID-19 outbreak news followed by positive fundamental information.

3. Data and Methodology

3.1. Data

Our study uses purposive sampling method. Participants were undergraduate students in the final semester of the business and economics faculties, considering they had obtained sufficient basic knowledge to conduct valuations. They are also representative of nonprofessional investors or noise traders. We use a randomized design to allocate participants into each experimental group.

To examine the hypothesis, we run three experiments to build robust evidence. In the first experiment, the participants were undergraduate students from a private university. In the second experiment, apart from being undergraduate students from a private university, the participants are also members of an investment club. In the third experiment, participants consisted of undergraduate students from a public university. All three experiments are independent.

We use different participants in each experiment to avoid maturity bias. The maturity bias that we anticipate in this study is a bias that occurs because the participants already know the experimental process before, so the results obtained are influenced by the psychological process they experienced from the previous experimental process and not due to the factors we investigated.

3.2. Methodology

Methodologically, our study differs from previous studies. There are several unique features of this experiment.

First, our study applies an online experiment, while previous studies used in-person laboratory experiments (Ashton & Kennedy, 2002; Pinsker, 2007; 2011). The limitation of the online experiment is the risk of the distraction of participants. The experiment is conducted three times for the duration of COVID-19 pandemic from

April 2020 until January 2021. The role of the experimenter to isolate the experiment situation is impossible to be reached. We recognize this limitation.

Second, it is implemented in Covid-19 pandemic situation, and we recognize it as market-wide issue. Third, we organized three experiments to produce robust results, while most studies of recency bias examine the hypothesis using only one or less than three experiment procedures (Ashton and Kennedy, 2002; Chen et al., 2019; Pinsker, 2007, 2011).

In all experiments, we divide participants into two groups. The first group receives good news (positive fundamental information) followed by bad news (COVID-19 news). Conversely, the second one receives good news after bad news. The task of both groups is to value the company after they receive each piece of information. In our experiment, our main attention is on participants' valuation after the sixth information.

As the final disclosure in the information order, the valuation after this sixth information captures the participants' decision-making process. Using the recency bias idea, participants who receive the same information will decide differently because of information order. As discussed in Tuttle et al. (1997), Pinsker (2007 and 2011), and Ashton and Kennedy (2022), participants who receive good news followed by bad news (+++---) tend to react to bad news. Conversely, participants tend to react to good news when receiving bad news followed by good news (---+++). After the sixth information, all participants from both groups have obtained all the same pieces of information, although receiving in a different order. Using a rational decision perspective, when both groups receive the same information, they react indifferently. However, when presented sequentially, we believe that the order information produces a recency effect (Pinsker, 2007, 2011).

The first experiment uses positive fundamental information to represent firm-specific information and COVID-19 outbreak as negative market-wide information. The statements of bad news are presented using positive framing to reduce the negative reaction of the participants. Group 1 (Group 2) receives +++--- (---+++). They give a score from 0 to 10 after receiving each piece of information. We use the score of the sixth information to measure the recency bias. Rationally, the same information produces the same valuation. However, we expect Group 2 tend to produce a higher valuation because they

focus on the good news. Although bad news is provided to participants using positive framing, we believe that the impact of bad news is more pronounced than the frame. The first experiment participants are the final year undergraduate students at a business school from a private university. One example of the good news, Group 1 receive this information, “the share price of FIDELIA Corp. will go higher as many analysts believe that the company offers excellent profit growth potential in the future.” One of the bad news presented using a positive frame stated, “the company lowered its revenue and net profit targets for this year. This decline was due to management's pessimism in dealing with public panic over the Covid-19. However, this pessimism could be an overreaction to the company's performance. Expectations that are too low are likely to result in positive surprises in the future”.

The second experiment is conducted by presenting COVID-19 using negative framing. The second experiment participants are the final year undergraduate business school students from a private university, and they are also members of the investment club. Duplicating the first experiment, they also receive information presented using the same format, +++--- or ---+ +++. In this case, the bad news is given to participants using the negative

frame. It is an example of the bad news used in the instrument for the second experiment, “The company lowered its revenue and net profit targets for this year. This decline was carried out due to management's pessimism in dealing with public panic over the Covid-19”. Like the first experiment, we still believe that participants weigh on the last information more than the previous one. Information +++--- (---+ +++) produce lower (higher) valuation.

The third experiment uses the same procedure as the second experiment, but the participants are students from different universities. They are the final year undergraduate students of the faculty of business and economics from a public university. Information is presented in Table 1.

Our online experiment is held to evaluate the impact of recency bias on sequential information of positive corporate news and COVID-19 outbreak as negative bad news. The use of final year bachelor students in business and economics is based on two reasons. First, they represent noise traders or retail investors. Second, some articles present evidence that no differences impact of sequential information between students and real stock traders (Pinsker, 2011; Tuttle et al., 1997).

Table 1
Groups of Experiment

	Group 1	Group 2
Experiment 1	Three positive fundamental information are followed by three negative information about the COVID-19 outbreak using positive framing	Three negative information about the COVID-19 outbreak using positive framing are followed by three positive fundamental information
Experiment 2	Three positive fundamental information are followed by three negative information about the COVID-19 outbreak using negative framing	Three negative information about the COVID-19 outbreak using negative framing are followed by three positive fundamental information
Experiment 3	Three positive fundamental information are followed by three negative information about the COVID-19 outbreak using negative framing	Three negative information about the COVID-19 outbreak using negative framing are followed by three positive fundamental information

In each experiment, participants must make a final decision after the sixth information by conducting a self-review. We also evaluate this impact on participant valuation, although it is not hypothesized.

The hypothesis was examined by comparing the two groups of participants' valuations on the sixth information (info6). We expect that $\text{info6}_{\text{group2}} > \text{info6}_{\text{group1}}$. We use both the independent sample t-test and unbalanced ANOVA. The dependent variable is the valuation of the sixth information. The independent variables are order information, sex, experience, understanding, and GPA. We expect all variables, except group, do not contribute to the participants' valuation. Although we use positive framing on bad news in the first experiment, we believe that participants still focus on the order of information rather than the content.

The other feature in this experiment is the use of firm-specific information in good news and market-wide information in bad news. This feature is unique for two reasons. First, although prospect theory (Kahneman and Tversky, 1979) states that bad news is reacted more than good news, our study believes that information order still produces more bias. Second, from the basic valuation perspective, market-wide information is more superior information than specific information because market information will affect the discount rate and its valuation.

4. Results and Discussion

We conduct three experiments using different situations to produce robust results.

4.1. Experiment 1

The first stage experimental procedure was carried out on April 6, 2020. The data presented in Table 2. Group 1 received good news followed by bad news (with positive framing). In contrast, Group 2 received bad news (with positive framing) followed by good news.

Table 2 presents descriptive data for experiment 1. The number of participants is 149. In this procedure, participants give an average rating of 5.2 per share. Respectively, the average info1, info2, info3, info4, info5, info6, and info 6 resulted in share price valuations of 5.11, 5.8., 5.36, 5.53, 5.96 and 5.59. Our main attention is on the sixth valuation of participants when they receive info6. When they weigh more current information than the previous one, Group 2 (Group 1) will produce a higher (lower) valuation.

The analysis of the participants' valuation between groups 1 and 2 is presented in Table 3. This test is an important step in differentiating the reaction of participants

in responding to the information provided. Group 1 received good news, namely positive news of firm-specific information, followed by bad news, which is information about the COVID-19 outbreak. Group 2 receives bad news followed by good news. If the treatment of information order is important to participants, it should impact the participants' decisions.

The ratings between Groups 1 and 2 were no different when receiving initial information. It is indicated by the t-test value of 0.127, and it is not statistically significant. It is a good starting point that shows that both groups have the same response to the same information. The two groups also have the same answer variance. In Table 3, when there is no similarity of variance, the t-test value uses the assumption of variance between different groups.

Based on the presentation of Info6 in Table 3, the response of Group 1 is 4.0946, while Group 2 is 7.08. The findings indicate that groups receiving the same information produce different judgment decisions. Both groups weigh the last information higher than the previous information. The hypothesis is supported. Group 1 receives good news, followed by bad news, and bad news is presented last. In contrast to Group 2, because bad news is followed by good news, participants tend to weigh good news. The valuation of Group 2 is higher than Group 1.

The key issue in experiment 1 is positive framing for the bad news. Even though the COVID19 news representing bad news has been wrapped with positive framing, recency effect still occurs. If positive framing is successful, the impact of recency bias should be reduced. However, participants' response in this experiment does not provide evidence that positive framing of bad news in a sequence of information eliminates recency effect.

Statistically, the mean of valuation between groups regarding gender, age, GPA, and experience did not differ significantly. Those results show that the valuation is not influenced by the participants' characteristics but rather because of the experiment's treatment.

The ANOVA test results in Table 4 present that what influences the participant's assessment decisions is information order, not gender, GPA, age or investment understanding and experience. These results give evidence that the recency effect dominates the valuation process even though bad news has been created using positive framing in the instrument.

Table 2*Descriptive Data: Experiment 1*

	N	Minimum	Maximum	Mean	Standard Deviation
Group	149	1.00	2.00	1.5034	0.50168
Info0	149	3.00	10.00	5.2349	0.79176
Info1	149	2.00	10.00	5.1141	1.72239
Info2	149	2.00	10.00	5.8054	1.86966
Info3	149	1.00	10.00	5.3691	2.18208
Info4	149	0.00	10.00	5.5369	1.82521
Info5	149	0.00	10.00	5.9664	1.89386
Info6	149	0.00	10.00	5.5973	2.29252
Review	149	1.00	10.00	5.6980	1.51882
Und	149	0.00	1.00	0.7718	0.42108
Sex	149	0.00	1.00	0.2550	0.43735
Age	149	19.00	24.00	20.4631	1.71450
GPA	149	1.90	3.99	3.1408	0.47352
Exp	149	0.00	1.00	0.2215	0.41664
Participants Information					
Group	1	74	Experience	No	116
	2	75		Yes	33
Sex	Female	111	Understanding	No	34
	Male	38		Yes	115

Note: Group 1(2) is participants who receive good (bad) news followed by bad (good) news.

Info0 is the participants' valuation using the beginning information. Both groups receive the same information.

Info1, info2, info3, info4, info5 dan info6 are participants' valuation using the first, second, third, fourth, fifth, and sixth information. Both groups receive different orders.

Review is participants' valuation after participants evaluate the sixth information.

Und is dummy variable of participants' understanding, 1 for understanding and 0, otherwise.

Sex is a categorical variable, 1 for male and 0 for female.

Age is participants' age.

GPA is participants' grade point average.

Exp is participants' experience in stock trading or investing, 1 for experience and 0 otherwise.

4.2. Experiment 2

The second experiment was carried out with the support of students who are members of the investment community. Participants of experiment 2 are undergraduate students from different study programs from experiment 1, but all participants of experiments 1 and 2 are from the same faculty at the same university. Descriptively, the results show that valuation based on different information sequences will produce different decisions. This second experiment was conducted to recheck the instrument's

rigidity without using positive framing for the bad news.

The valuation of Group 1 (2) is 3.8 (6.4) when they receive info6. The bad news is preferred in Group 1, whereas good news is more weighted in Group 2.

Our study also adds a feature related to self-review. After receiving info6, participants are required to do a final valuation with no additional information. This self-review made participants revise their valuation in the opposite direction from valuation info6, although group 2 is still higher than group 1. The visual appearance is

Table 3*Differences Test between Groups: Experiment 1*

Group	N	Mean	Standard deviation	Std. Error Mean	Equality of variance	t-value
Info0	1.00	74	5.2432	0.85705	0.09963	0.127
	2.00	75	5.2267	0.72733	0.08398	n.s
Info1	1.00	74	6.0811	1.45015	0.16858	8.186
	2.00	75	4.1600	1.41460	0.16334	***
Info2	1.00	74	6.7838	1.64083	0.19074	7.412
	2.00	75	4.8400	1.55997	0.18013	***
Info3	1.00	74	6.7297	1.91817	0.22298	9.601
	2.00	75	4.0267	1.48845	0.17187	***
Info4	1.00	74	4.7432	1.91648	0.22279	-5.817
	2.00	75	6.3200	1.33720	0.15441	***
Info5	1.00	74	4.9459	1.75867	0.20444	-7.719
	2.00	75	6.9733	1.43295	0.16546	***
Info6	1.00	74	4.0946	1.99430	0.23183	-10.462
	2.00	75	7.0800	1.44970	0.16740	***
Review	1.00	74	5.0270	1.65499	0.19239	-5.927
	2.00	75	6.3600	1.00861	0.11646	***
Und	1.00	74	0.7973	0.40476	0.04705	0.733
	2.00	75	0.7467	0.43785	0.05056	n.s
Sex	1.00	74	0.3108	0.46598	0.05417	1.552
	2.00	75	0.2000	0.40269	0.04650	n.s
Age	1.00	74	20.6892	0.79253	0.09213	1.608
	2.00	75	20.2400	2.27109	0.26224	n.s
GPA	1.00	74	3.0800	0.46284	0.05380	-1.564
	2.00	75	3.2008	0.47935	0.05535	n.s
Exp	1.00	74	0.2568	0.43983	0.05113	1.026
	2.00	75	0.1867	0.39227	0.04530	n.s

Note: Respectively, ***, **, *, represent statistical significance at the 1%, 5%, 10% levels.

n.s is insignificant.

Group 1 (2) is the group of participants who receive good (bad) news followed by bad (good) news. Both groups receive different orders.

Info0 is the participants' valuation using the beginning information. Both groups receive the same information.

Info1, info2, info3, info4, info5 dan info6 are participants' valuation using the first, second, third, fourth, fifth, and sixth information.

Review is participants' valuation after participants evaluate the sixth information.

Und is dummy variable of participants' understanding, 1 for understanding and 0, otherwise.

Sex is a categorical variable, 1 for male and 0 for female.

Age is participants' age.

GPA is participants' grade point average.

Exp is participants' experience in stock trading or investing, 1 for experience and 0 otherwise.

Table 4*ANOVA Test: Experiment 1*

Tests of Between-Subjects Effects						
Dependent Variable: Info6						
Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	
Corrected Model	342.806a	5	68.561	22.537	<0.01	
Intercept	117.653	1	117.653	38.674	<0.01	
Group	317.343	1	317.343	104.314	<0.01	
Sex	1.669	1	1.669	0.549	0.460	
Exp	4.110	1	4.110	1.351	0.247	
Und	1.806	1	1.806	0.594	0.442	
IPK	1.781	1	1.781	0.586	0.445	
Error	435.033	143	3.042			
Total	5446.000	149				
Corrected Total	777.839	148				

Note: Group 1 (2) is the group of participants who receive good (bad) news followed by bad (good) news. Both groups receive different orders.

Info6 is participants' valuation using the sixth information.

Und is dummy variable of participants' understanding, 1 for understanding and 0, otherwise.

Sex is a categorical variable, 1 for male and 0 for female.

GPA is participants' grade point average.

Exp is participants' experience in stock trading or investing, 1 for experience and 0 otherwise.

Table 5*Participants' Valuation based on Sequential Information: Experiment 2*

	Info0	Info1	Info2	Info3	Info4	Info5	Info6	Review
Group 1 (n=5)	5.2	5.8	6.2	6.4	4.6	4.4	3.8	5.6
Group 2 (n=5)	5.8	4.8	5	4.2	6.8	6.6	6.4	6

Note: Group 1 (2) is the group of participants who receive good (bad) news followed by bad (good) news. Both groups receive different orders.

Info0 is the participants' valuation using the beginning information. Both groups receive the same information.

Info1, info2, info3, info4, info5 dan info6 are participants' valuation using the first, second, third, fourth, fifth, and sixth information.

Review is participants' valuation after participants evaluate the sixth information.

presented in Figure 1 and Figure 2. In experiment 2, the result was only presented descriptively, considering the limited participants for each group.

4.2. Experiment 3

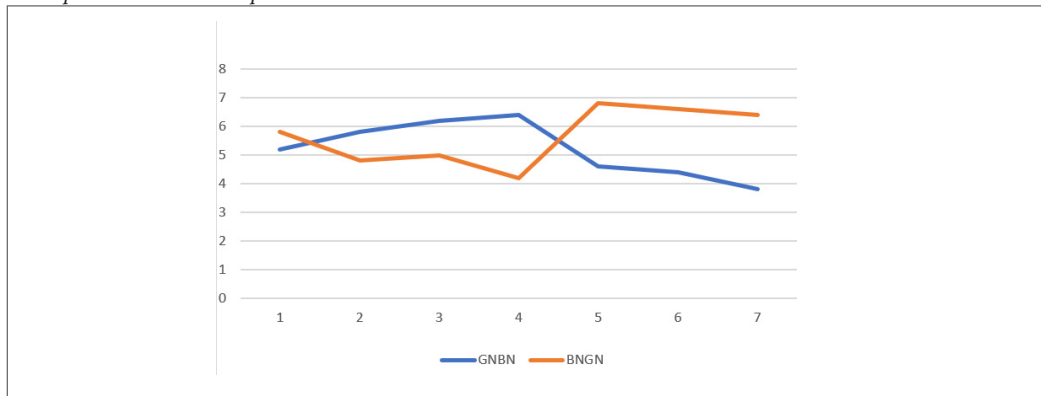
Experiment 3 was held on January 19, 2021. The participants were students of the accounting department from a public university. Experiment 3 is attended by 33 participants. Data descriptions are presented in Table 6.

They are divided into two groups, sixteen for Group 1 and seventeen for Group 2. Female (male) participants are 18 (15) persons.

Table 7 presents evidence that the valuation of Group 1 and 2 are statistically different when they receive info6. After evaluating good (bad) news followed by bad (good) news, the mean value of Group 1 (Group 2) is 4.6875 (6.1765).

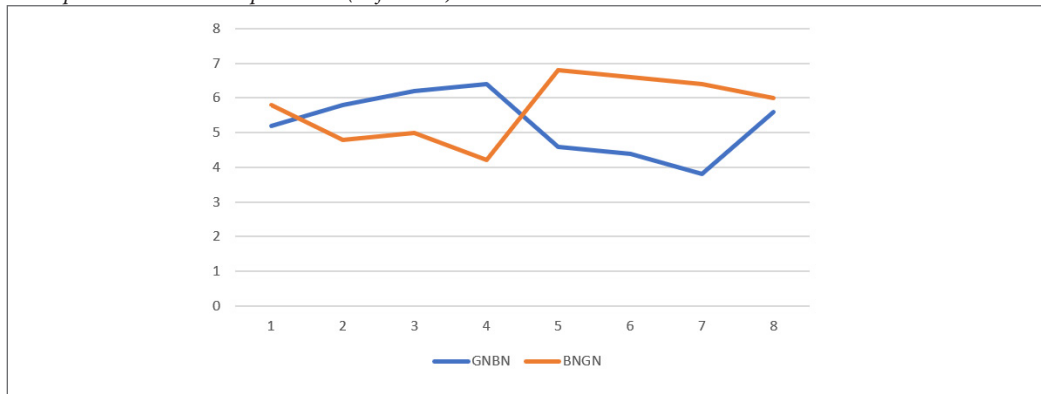
Table 8 shows that the information order influences

Figure 1
Participants' Valuation in Experiment 1



Note: GNBN is the sequential information of Group 1; BNGN is the sequential information of Group 2

Figure 2
Participants' Valuation in Experiment 2 (Self-review)



Note: GNBN is the sequential information of Group 1; BNGN is the sequential information of Group 2

Table 6*Descriptive Statistics: Experiment 3*

	N	Minimum	Maximum	Mean	Std. Deviation
Group	33	1.00	2.00	1.5152	0.50752
Info0	33	4.00	8.00	5.4545	0.83258
Info1	33	1.00	8.00	5.2121	1.65374
Info2	33	2.00	8.00	5.6970	1.48923
Info3	33	2.00	8.00	5.7576	1.58174
Info4	33	2.00	9.00	5.8182	1.48859
Info5	33	2.00	10.00	5.9091	1.70227
Info6	33	1.00	8.00	5.4545	1.58293
Review	33	4.00	8.00	5.9091	1.04174
Und	33	0.00	1.00	0.9697	0.17408
Sex	33	0.00	1.00	0.4545	0.50565
Age	33	19.00	23.00	21.1515	0.71244
GPA	33	3.00	3.93	3.5476	0.23476
Exp	33	0.00	1.00	0.1818	0.39167
Participants Information					
Group	1	16	Sex	0	18
	2	17		1	15

Table 7*Differences Test Between Groups: Experiment 3*

Group Statistics							
Group		N	Mean	Standard Deviation	Std. Error Mean	Equality of Variance	t-value
Info1	1.00	16	6.2500	1.39044	0.34761	Yes	4.380
	2.00	17	4.2353	1.25147	0.30353		***
Info2	1.00	16	6.7500	0.93095	0.23274	Yes	5.406
	2.00	17	4.7059	1.21268	0.29412		***
Info3	1.00	16	6.9375	0.92871	0.23218	Yes	6.034
	2.00	17	4.6471	1.22174	0.29632		***
Info4	1.00	16	5.4375	1.93111	0.48278	No	-1.418
	2.00	17	6.1765	0.80896	0.19620		t.s
Info5	1.00	16	4.8750	1.45488	0.36372	Yes	-4.159
	2.00	17	6.8824	1.31731	0.31949		***
Info6	1.00	16	4.6875	1.62147	0.40537	Yes	-3.025
	2.00	17	6.1765	1.18508	0.28742		***

Table 8

ANOVA Test: Experiment 3

Dependent Variable:	Info6				
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	25.522a	9	2.836	1.193	0.345
Intercept	0.104	1	0.104	0.044	0.836
GPA	1.888	1	1.888	0.795	0.382
Group	11.774	1	11.774	4.955	0.036
Sex	0.027	1	0.027	0.012	0.915
Info0	0.245	3	0.082	0.034	0.991
Group * Sex	0.872	1	0.872	0.367	0.551
Grup * Info0	0.505	1	0.505	0.212	0.649
Gender * Info0	0.439	1	0.439	0.185	0.671
Error	54.659	23	2.376		
Total	1062.000	33			
Corrected Total	80.182	32			

a. R Squared = 0.318 (Adjusted R Squared = 0.052)

the participant's decisions (Info6). Gender, GPA, and initial information do not influence the valuation (info6). Confirming experiment 1 and 2, the sequential information produces recency effect. Tests using interactions with other categorical variables have also been carried out, but they are not presented because they produce the same conclusions.

After carefully examining the results of experiments 1, 2 and 3, we conclude that the alternate hypothesis is supported. Participants, representing retail investors, rated lower (higher) when receiving sequential information that started with good (bad) news followed by bad (good) news. In other words, the disclosure of fundamental performance that represents good news followed by bad news from COVID19 outbreak news generates lower valuation and vice versa.

5. Discussion

The study of KPMG's (2020) findings drives us to conclude that the COVID-19 news, perceived as bad news, strongly influences spending-saving behavior. When COVID-19 is the main variable of many policies, it should be reacted more to firm-specific information. Our study provides a different perspective. Although COVID-19 is very bad news,

information order produces different reactions based on the last information presented when sequentially presented.

Experiments 1, 2 and 3 present that decision-makers tend to focus on the most recent information when receiving sequential information. Information presented +++--- (---++) produce undervaluation (overvaluation). Participants who receive good news followed by bad news will focus on the bad news. Conversely, on the information presented sequentially, participants who receive bad news followed by good news will focus on good news. The focus of their attention influent their valuation.

Covid-19 does not dominate participants' responses. When Covid-19, as bad news, was presented earlier, participants may understand that it is detrimental to the company but preferred to use good news in valuation. Participants focus on COVID-19 only if the information is presented last. Those findings give insight that no matter the information presented sequentially, the last information is more considered than the previous one.

After applying the first experiment, we find that a positive frame on bad news can not reduce the

recency bias. Domain loss is more dominant than the framing effect of a bad news statement. In experiment 2, we also provide evidence that more experienced nonprofessional investors are also not able to overcome the recency effect. To produce a robust experiment, we also examine the procedure using students from a public university, and the results are not different. Three experiments using different participants' backgrounds produce the same results.

In the experiment, the good news is fundamental information about the company's future earnings and ability to generate profits. The bad news is information about the COVID-19 outbreak and the consequences for the company. Good news represents unique company information. Bad news represents general market information.

These results have implications for the announcement presentation strategy and disclosure of fundamental company information to the public. If the company has both good and bad news, then presenting the bad news in the first sequence will maximize its value.

In auditing, a simple self-review technique can minimize the recency effect (Ashton & Kennedy, 2002). In self-review, participants are asked to make a final decision after making the latest information-based decision. Our experiments provide evidence that participants have revised their final valuation that reduces the recency bias, although the tendency is still to produce lower (higher) valuation when receiving good (bad) news followed by bad (good) news.

After carefully evaluating the results of Group 1 in experiment 1 and Group 2 in experiment 2, there are no differences between valuation using positive framing and negative framing. These findings indicate that the power of COVID-19 outbreak information as the representation of bad news is very strong. The reason, when participants received information of market-wide information, namely the COVID-19 outbreak, efforts to build positive framing of the negative event became difficult, especially when experiment 1 was carried out in April 2020 when the COVID-19 outbreak was still at its peak. Our experiment can be tested again when the pandemic ends. If it still gives the same result, it means

this framing is not really influenced by the situation or circumstances that are happening in the community.

Investment and stock market volatility are related to earnings opportunities and savings appetite. According to KPMG (2020), 36% consider savings the number one priority, since 43% feel insecure about their financial security and 33% are financially squeezed upon (Standish & Bossi, 2020). The European countries (Germany, Italy, France, and Spain) are spending less and about 50% are filling financially overwhelmed except Germany, which is comfortable. KPMG's (2020) findings drive us to conclude that the COVID-19 news, perceived as bad news, strongly influences spending-saving behavior.

One of the powers of the internet is producing massive and repeated information. We believe that most social media users (or individual investors) are experiencing bias because of sequential information presented to them. Our study provides experimental evidence of sequential information stimulating human decisions. When bad news or hoax information is distributed in markets or the internet, mostly noise traders or unprofessional investors overreact.

This study can be applied to the stock market and other business issues, including politics. When the public has to make their decisions, the strategy of presenting sequential disclosures is a crucial thing to do.

6. Conclusion

COVID-19 pandemic gives problems to many business sectors. This issue is substantial for business and investment decision-making. Our experiment evaluates the presentation of COVID-19 outbreak news using sequential information presentation. Our evidence shows investors did not overreact to the COVID-19 outbreak when the pandemic news was presented before positive fundamental news. Information order dominates the decision compared to the substance of the decision-maker itself. Investors do not overreact to news, but they focus on the last information than the previous one.

Although this study confirms the strength of the

recency effect on investment decisions, the magnitude of the reaction to the COVID19 outbreak was not higher than that of fundamental news. This finding is consistent with (1) the phenomenon of the Indonesian stock market that shows a positive return of stocks during the pandemic and (2) efforts to maintain social distance in society. The prices of big market capitalization tend to rise during the pandemic in 2020. In society, rules on maintaining distance and wearing masks are often not carried out with discipline. The governments have taken the COVID-19 issue seriously, but not all people do.

This study has implications for behavioral accounting studies. Specifically, this study discusses the decision bias caused by different information orders. The use of positive framing on bad news still produces the same results. Information order still dominates investors' decisions.

This study also contributes to a practical implication for strategic disclosure for the company. Understanding which information is more influential for investors, whether market-wide information or firm-specific information, is crucial for companies. Furthermore, companies need to set a strategy for disclosing firm-specific information to avoid adverse market reactions.

The studies of customer behavior in the COVID-19 pandemic are concentrated on the commodities spending changes because of the health crisis. They are highlighting several new characteristics. One of the most notable is the shift in online shopping. More attention is needed to explore the investment behavior prior to, during and after the COVID-19 pandemic. The study opens a window for further developments about the impact of the general bad/good news and good/bad news in the economic area.

The limitation of this study is the use of good and bad news. Good news is only used in firm-specific information and bad news is only used in the form of market-wide information. Mirroring this condition should also be important to be analyzed. Firms sometimes report below-target performance in a bullish market or very good economic conditions. In the post-COVID-19 period and the success of vaccines in the future, this could be the development of this study.

References

- Ashton, A. H., & Ashton, R. H. (1988). Sequential belief revision in auditing. *Accounting Review*, 623-641. <https://www.jstor.org/stable/247903>
- Ashton, R. H., & Kennedy, J. (2002). Eliminating recency with self-review: The case of auditors' 'going concern' judgments. *Journal of Behavioral Decision Making*, 15(3), 221-231. <https://doi.org/10.1002/bdm.412>
- Chen, L. H., Jiang, G. J., & Zhu, K. X. (2018). Total attention: The effect of macroeconomic news on market reaction to earnings news. *Journal of Banking & Finance*, 97, 142-156. <https://doi.org/10.1016/j.jbankfin.2018.10.004>
- Chen, R. C., Ai, Q., Jayasinghe, G., & Croft, W. B. (2019). Correcting for recency bias in job recommendation. In *Proceedings of the 28th ACM International Conference on Information and Knowledge Management* (pp. 2185-2188). <https://doi.org/10.1145/3357384.3358131>
- CNN. (2020). *Coronavirus outbreak timeline fast facts*. <https://edition.cnn.com/2020/02/06/health/wuhan-coronavirus-timeline-fast-facts/index.html>
- Flannery, M. J., & Protopapadakis, A. A. (2002). Macroeconomic factors do influence aggregate stock returns. *Review of Financial Studies*, 15(3), 751-782. <https://doi.org/10.1093/rfs/15.3.751>
- Furnham, A. (1986). The robustness of the recency effect: Studies using legal evidence. *The Journal of General Psychology*, 113(4), 351-357. <https://doi.org/10.1080/00221309.1986.9711045>
- Francis, J., Schipper, K., & Vincent, L. (2002). Earnings announcements and competing information. *Journal of Accounting and Economics*, 33(3), 313-342. [https://doi.org/10.1016/S0165-4101\(02\)00058-7](https://doi.org/10.1016/S0165-4101(02)00058-7)
- Gambetti, L., Maffei-Faccioli, N., & Zoi, I. S. (2021). Bad news, good news: Coverage and response asymmetries. http://pareto.uab.es/lgambetti/GMZ_11_2_21.pdf
- Gandr e, P. (2020). US stock prices and recency-biased learning in the run-up to the Global Financial Crisis and its aftermath. *Journal of International Money and Finance*, 104, 1-19. <https://doi.org/10.1016/j.jimonfin.2020.102165>
- Garibaldi, M., Hannon, E., Heineke, K., & Shao, E. (2021, March 4). *Mobility investments in the next normal*. McKinsey & Company. <https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/mobility-investments-in-the-next-normal>
- Hogarth, R. M., & Einhorn, H. J. (1992). Order effects

- in belief updating: The belief-adjustment model. *Cognitive psychology*, 24(1), 1-55. [https://doi.org/10.1016/0010-0285\(92\)90002-J](https://doi.org/10.1016/0010-0285(92)90002-J)
- Hribar, P., & McInnis, J. (2012). Investor sentiment and analysts' earnings forecast errors. *Management Science*, 58(2), 293-307. <https://doi.org/10.1287/mnsc.1110.1356>
- Jegajeevan, S. (2012). Return volatility and asymmetric news effect in Sri Lankan stock market. *Staff Studies*, 40(1), 37-57. <http://doi.org/10.4038/ss.v40i1.4680>
- Jo, H., Shin, E., & Kim, H. (2021). Changes in consumer behaviour in the post-COVID-19 era in Seoul, South Korea. *Sustainability* 2021, 13, 1-6. <https://dx.doi.org/10.3390/su13010136>
- Kahneman, D. & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica*, 47(2), 263-292. <https://doi.org/10.2307/1914185>
- KANTAR. (2020, June 11). *Understand consumer decision-making during COVID-19 and beyond*. <https://www.kantar.com/inspiration/coronavirus/understand-consumer-decision-making-during-covid-19-and-beyond>
- Kohli, S., Timelin, B., Fabius, V., & Moulvad Veranen, S. (2020). *How COVID-19 is changing consumer behavior – now and forever*. McKinsey & Company. <https://v.fastcdn.co/u/c81ab06a/53497572-0-how-covid-19-is-chan.pdf>
- KPMG. (2020). *Responding to consumer trends in the new reality. COVID-19 pulse survey*. KPMG International. <https://home.kpmg/xx/en/home/insights/2020/06/consumers-and-the-new-reality.html>
- Li, N., Richardson, S., & Tuna, I. (2014). Macro to micro: Country exposures, firm fundamentals and stock returns. *Journal of Accounting and Economics*, 58, 1–20. <https://doi.org/10.1016/j.jaccec.2014.04.005>
- Libby, R., & Tan, H. T. (1999). Analysts' reactions to warnings of negative earnings surprises. *Journal of Accounting Research*, 37(2), 415-435. <https://doi.org/10.2307/2491415>
- Mehta, S., Saxena, T., & Purohit, N. (2020). The new consumer behaviour paradigm amid COVID-19: Permanent or Transient? *Journal of Health Management*, 22(2), 291-301. <https://doi.org/10.1177/0972063420940834>
- Mian, G. M., & Sankaraguruswamy, S. (2012). Investor sentiment and stock market response to earnings news. *The Accounting Review*, 87(4), 1357-1384. <https://doi.org/10.2308/accr-50158>
- Murphy, J., Hofacker, C., & Mizerski, R. (2006). Primacy and recency effects on clicking behavior. *Journal of Computer-Mediated Communication*, 11(2), 522-535. <https://doi.org/10.1111/j.1083-6101.2006.00025.x>
- Onyele, O., & Nwadike, C. (2021). Modelling stock returns volatility and asymmetric news effect: A global perspective. *Financial Risk and Management Review*, 7(1), 1-15. <https://doi.org/10.18488/journal.89.2021.71.1.15>
- Pinsker, R. (2007). Long series of information and nonprofessional investors' belief revision. *Behavioral Research in Accounting*, 19 (1), 197-214. <https://doi.org/10.2308/bria.2007.19.1.197>
- Pinsker, R. (2011). Primacy or recency? A study of order effects when nonprofessional investors are provided a long series of disclosures. *Behavioral Research in Accounting*, 23(1), 161-183. <https://doi.org/10.2308/bria.2011.23.1.161>
- Quinn, S. (2020). *NBA to limit locker room access due to coronavirus; owners to discuss contingency plans for games, per reports*. CBS Sports. <https://www.cbssports.com/nba/news/nba-reportedly-sent-memo-to-teams-indicating-theyshould-prepare-to-possibly-play-games-in-empty-arenas/> 11
- Savor, P., & Wilson, M. (2013). How much do investors care about macroeconomic risk? Evidence from scheduled economic announcements. *Journal of Financial and Quantitative Analysis*, 48(2), 343–375. <https://www.jstor.org/stable/43303804>
- Seok, S. I., Cho, H., & Ryu, D. (2019). Firm-specific investor sentiment and the stock market response to earnings news. *The North American Journal of Economics and Finance*, 48, 221-240. <https://doi.org/10.1016/j.najef.2019.01.014>
- Sulistiawan, D., & Rudiawarni, F. A. (2019). Do stock investors need to discuss to reduce decision bias? *Investment Management and Financial Innovations*, 16(3), 1-9. [http://dx.doi.org/10.21511/imfi.16\(3\).2019.01](http://dx.doi.org/10.21511/imfi.16(3).2019.01)
- Tuttle, B., Coller, M., & Burton, F. G. (1997). An examination of market efficiency: Information order effects in a laboratory market. *Accounting, Organizations and Society*, 22(1), 89-103. [https://doi.org/10.1016/S0361-3682\(96\)00026-8](https://doi.org/10.1016/S0361-3682(96)00026-8)
- Valaskova, K., Kramarova, K., & Bartosova, V. (2015). Multi criteria models used in Slovak consumer market for business decision making. *Procedia Economics and Finance*, 26, 174–182. [https://doi.org/10.1016/s2212-5671\(15\)00913-2](https://doi.org/10.1016/s2212-5671(15)00913-2)