



INFLUENCE OF INVESTOR SENTIMENT, CHARACTERISTICS, AND INFORMATION SEQUENCE ON STOCK INVESTMENT DECISION: EVIDENCE FROM THE TAIWANESE MARKET

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ABSTRACT

This research investigates the influence of sentiment, personal characteristics, and information sequence on the investing behaviour of non-professional investors' in the Taiwanese stock market. Utilising ANOVA and T-test methods on questionnaires, empirical results suggest that investor sentiment on picking stocks is affected by economic and financial market forecasts. Also, investors tend to overreact on both positive and negative information resulting in over- and under-valuation in stock prices, respectively. Regarding personal characteristics, optimistic investors are inclined to overreact to positive information, which is affected by their personal attitude and available economic forecasts. In considering the sequence of information presented to non-professional investors, this study supports the "recency effect" phenomenon, where the latest economic and financial market information affect their stock buying and selling behaviour. In general, this study observes that when information is encountered in different forms and order, investor sentiment, personal characteristics and recall cause significant discrepancies in investing decisions. This research suggests that investors should be aware of their subjective behavioural biases, and that objective and careful decisions have to be exercised in picking stocks to maximise gains and minimise losses.

JEL classification: G02, G1.

Keywords: Investor's sentiment; personal characteristics; optimism and pessimism; recency effect.

1. INTRODUCTION

Investor sentiments and expectations of the securities market have profound effects on price movements and valuations. As the globalisation of markets heightened, factors affecting stock market ups and downs become increasingly complicated. This phenomenon increases the uncertainty of the stock market, thereby increasing investment risks. These risks and uncertainties, most of which come from the investor's decisions, however, most of the time, do not often result from rational investment behaviour. Based on the efficient market hypothesis (EMH) of Fama (1970), investors generally believe that their attitudes are rational. Therefore, these

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investors theoretically consider all of the information about a specific company and then accurately determine the influence of such information in its valuation. In this case, the stock price must react quickly and thoroughly to such information to reflect the true value of the stock prices. Although EMH still acknowledges the existence of irrational investors in the stock market, the transactions in this market remain random and rational investors may conduct arbitrage trading. Therefore, the irrational behaviour of these investors does not have a systematic influence.

However, this is not always the case. While exploring the stock market, many scholars have gradually observed the prevalence of irrational behaviours when investors make their investment decisions and maximising portfolio returns. Optimising portfolio selection that takes into consideration financial markets' behaviour was first proposed by Shefrin and Statman (2000) through the behavioural portfolio theory (BPT). The theory proposes that investors build their portfolios based on their own belief, behaviour, and perceptions of the market performance. BPT utilises the foundation laid by Lopes's (1987) security-potential aspiration (SP/A) theory, and Thaler's (1985) mental accounting in determining the individual optimal portfolio of an investor. A more recent study of Lemmon and Portniaguina (2006) found that when investors hold optimistic attitudes toward future positive possibilities, they might ignore or overreact to positive or negative news, thereby overvaluing the stock. By contrast, when these investors are pessimistic, they may ignore or overreact to negative and positive news and undervalue their profits. Under the influence of emotional factors, the investor can easily form optimistic or pessimistic attitudes toward the information at hand, and such attitude will deviate the stock price of the company from its proper value. On the other hand, Pinsker (2007) found that a mix of positive and negative information can easily lead to sharp price movements, and even a large drop in stock prices because of the uncertainty coming from both sides of information. To reduce the risk that accompanies these fluctuations, the company gathers relevant information, and the evidence gathered are the basis of trade decisions.

Moreover, some investors continue to demonstrate irrational herd behaviour, which leads to highly volatile stock prices and brings more investment risks to the stock market (Hirshleifer, 2001). Given the insufficient investment experience of individual investors, these investors become highly susceptible to interferences from the external environment, which in turn drive these investors to make irrational investment decisions by joining the majority decision. Therefore, the subjective sentiments of investors cannot be easily captured.

Given that stocks may be affected by the decisions and emotions of outside investors, the degree of optimism and pessimism of investors must be simultaneously discussed. Positive and negative expectations may affect the attitudes of investors toward the market boom and indirectly affect their decision making. Kahneman and Tversky (1974) earlier showed that the financial information received and the related decisions will be affected by order of presentation, thereby leading to the sequence effect of bias. The tendency of individuals, at the time of receiving the mixed information, is to adjust their beliefs accordingly and lead to the initial effect (primacy effect). On the other hand, other investors when presented with different information will place higher importance on the information that is presented at a later time, thereby leading to the near effect (recency effect). These differences in attitude may be related to the amount and complexity of the information that requires reactions

from the subjects. Many scholars have attempted to understand how the previous discussion of the EMH cannot explain the anomaly in modern finance in which investor behaviour and psychology are ignored. This research gap can be addressed by considering psychological and sociological views in details.

This study focuses on the behaviour of investors in the Taiwanese stock market; and determines the importance of gauging the irrational behaviours of these investors. Taiwanese investors as part of the Asian region, according to Kim and Nofsinger (2008), suffer from cognitive biases that are at a different spectrum than their Western counterparts. Moreover, the financial market of Taiwan, even if it is relatively small compared to its Asian counterparts (i.e., China, South Korea, and Japan), is stable and liquid to a significant extent, because of its strong presence in the electronics industry (Jang et al., 2005). International trade has been the backbone of the economy, is one of the leading manufacturers of semiconductors in the globally and ranks as one of the leading exporters of electronic goods. Local and international traders are benefiting from the financial markets constantly going more internationally with strengthening financing from the stock, bond and capital markets. According to the Taiwan Stock Exchange report, the government is taking these initiatives for receiving membership in the World Trade Organisation and put the country as one of the important financial hubs in the Asia-Pacific region. Financial market players are more positive with the recent developments in Taiwan's stock market, and this study tries to measure this degree of optimism. Local traders' degree of optimism and pessimism result in a "psychological bias", which this current study aims to explore. In particular, the objectives of the study are as follows:

- a) determine if the investor's high positive (negative) sentiment generates excessive upward (downward) reaction, leading to overvalued (undervalued) stock prices;
- b) examine whether highly optimistic (pessimistic) investors in good economic condition create overreaction (underreaction) in the market leading to higher (lower) price adjustments; and
- c) understand how recency effect affects investors in using financial information in their stock investing decisions.

The rest of the paper is organised as follows: Section 2 reviews the related literature and formulates the hypotheses. Section 3 discusses the research design. Section 4 presents and analyses the empirical results. Finally, Section 5 concludes the study.

2. LITERATURE REVIEW AND HYPOTHESES FORMULATION

In modern finance, the market is generally considered efficient where investors make rational decisions, pursue maximum profits, and not let themselves be affected by their psychological tendencies. Stock prices can quickly and comprehensively respond to all the presented information to reflect the true value of these prices impartially. However, despite recognising the existence of irrational investors in the stock market and the randomness of transactions, the EMH posits that even rational investors in times of complex information environment show irrational behaviours based on biases of positive and negative expectations leading to overreaction and underreaction, respectively (Fama, 1970).

These reactions toward the financial market drive stock prices to deviate from their fair valuations. Lemmon and Portniaguina (2006) created a proxy for investor sentiment and found that when investors have higher sentiment indicators, they make their investments on behalf of overly optimistic expectations and then overreact to positive information and ignore negative information leading to an overvaluation of stocks (i.e., current stock price > intrinsic value). Conversely, when investors have lower sentiment indicators, they hold on to an overly pessimistic investment, which lead them to overreact to negative information and ignore positive information leading to an undervaluation of stock prices (i.e., current stock price < intrinsic value). These discussions lead the study to the following hypotheses:

H.1.a.: An investor's high positive sentiment generates an excessive positive reaction, leading to overvalued stock prices.

H.1.b.: An investor's high negative sentiment generates an excessive negative reaction, leading to undervalued stock prices.

Scheier and Carver (1985) proposed the term “dispositional optimism” to establish the basis for optimism and pessimism in an uncertain economic environment. Optimists expect that many positive things will happen to them and believe that the outcomes will benefit them, which is particularly true in good economic condition. In contrast, pessimists expect negative things to happen to them in the future, even in a good environment. In a related study, Schwarzer (1994) considered self-efficacy as an optimistic tendency, and explained that individuals with a high degree of confidence in a stable environment tend to take uncalculated moves. On the other hand, Taylor and Armor (1996) explained that an optimistic person would tend to overestimate the positive results and underestimate the negative consequences, which normally leads to overvaluation in the markets. Thus, the study forms the following hypotheses:

H.2.a.: Highly optimistic investors in good economic conditions create overreaction in the market, leading to higher price adjustments.

H.2.b.: Highly pessimistic investors in good economic conditions create underreaction in the market, leading to lower price adjustments.

An early study of Kahneman and Tversky (1974) stated that belief adjustment is a process that must be assessed, and people must evaluate previous information, before assessing upcoming evidence, which is called the initial value assessment. Subsequently, people in the process of evaluation will continue to receive new information and information to be assessed, and they generate the initial value as the basis. However, the study of Hogarth and Einhorn (1992) based on the belief-adjustment model, explained that decision-makers exhibit an order effect and that investors are likely to change the nature of decision as new information comes. The new information produces a higher degree of sensitivity and stock price re-appraisal, which produce an information recency effect. This study depends on this recent claim and formulates the hypothesis below:

H.3.: Information recency effect makes investors more biased with the latest information influencing their short-term stock investing decisions.

3. RESEARCH METHOD

The respondents of this study are a set of non-retail investors with considerable financial knowledge and senior accounting students of selected Taiwanese universities. Female respondents comprise 53.8% of the respondents, while 35-39 year-old have the highest percentage of 23.1%. The majority of the respondents have at least a college degree with 53.8%, while those with more than seven years of investing experience comprise 48.4%. For the other details of the respondents, kindly refer Table 1. This paper uses SPSS 20.0 statistical software for hypothesis verification, as well as ANOVA and *t*-test for testing “investor sentiment,” “optimism and pessimism,” and “recency effect” influencing stock price variations.

Table 1. Basic information of study respondents.

Categories	Variables	Number	Percent	Cumulative
Gender	Male	42	46.2%	46.2%
	Female	49	53.8%	100%
Age	under 20 years	1	1.1%	1.1%
	20~24 years	7	7.7%	8.8%
	25~29 years	18	19.8%	28.6%
	30~34 years	16	17.6%	46.2%
	35~39 years	21	23.1%	69.2%
	40~44 years	9	9.9%	79.1%
	45~49 years	13	14.3%	93.4%
	more than 50 years	6	6.6%	100%
Educational Attainment	High school	21	23.1%	23.1%
	College	49	53.8%	76.9%
	Graduate school	19	20.9%	97.8%
	Doctorate	2	2.2%	100%
Investment Experience	under 1 year	3	3.3%	3.3%
	1~3 years	9	9.9%	13.2%
	3~5 years	23	25.3%	38.5%
	5~7 years	12	13.2%	51.6%
	more than 7 years	44	48.4%	100%
Personal income (not including stock income)	under 200,000	2	2.2%	2.2%
	200,001~500,000	45	49.5%	51.6%
	500,001~1,000,000	35	38.5%	90.1%
	1,000,001~2,000,000	8	8.8%	98.9%
	more than 2,000,001	1	1.1%	100%

This study uses the Shih Hsin University research centre-based UBS/Paine Webber US investor optimism index established by the “Taiwanese sentiment index” as a reference design for the questionnaire. The questionnaires ask entries for optimism, and they can be classified into two levels, namely the excessive optimism of individuals and the overly optimistic environment in general. Previous literature refers to self-optimistic investors as those employing personal investment techniques where excessive positivity in stock performance exists (Glaser & Weber, 2004). On

the other hand, environmental optimism refers to the investors' expected performance of the stock market where the tendency to be overly positive with the investing environment is evident (Odean, 1999). Excessive optimism exists whether on a per individual basis or the overall environment, making investors overestimate the positive information resulting in overestimated stock valuations.

To measure optimism and pessimism using the questionnaire, this study uses a scale to obtain a subject's degree of positivity and negativity in relation to the stock market. Eight questions are asked: four questions are positive and the other four are negative.

For the information about the statements in the questionnaire, the study refers Pinsker's (2011) design. The survey uses two reaction modes, namely the gradual reaction (SbS) and final reaction (EoS), and uses two sequences, specifically negative and positive sequences after the first negative and positive sequences, respectively. The questionnaire contains four positive and four negative experimental situations related to the sequence information. This study also controls the nature and extent of influence of the information, consistent with the effect of positive or negative information.

In terms of investor sentiment, the subjects are asked to read the questions and provide the corresponding level of optimism for each scenario. In measuring the degree of optimism and pessimism, a total of nine problem descriptions were asked. Moreover, before the start of the experiment, the subjects were asked to read the relevant background information of a company, i.e., the number of outstanding shares, stock value, and its annual investing turnover, so that the participants can understand the size and investment information of the company. In the experiment, the subjects must read the information provided under various investing scenarios and should select a description according to their degree of optimism and pessimism, and the amount of positive and negative information. Finally, the subjects are asked to complete their basic information, including gender, age, and investment experience, for additional analysis.

To determine the individual investor's sentiment, this study uses a seven-point Likert scale: option 1 represents a "very pessimistic" attitude and has a score of 1 point; option 4 represents "neutral" and has a score of 4 points; and circle 7 represents a "very optimistic" attitude and has a score of 7 points. In the score calculation section, the scores will be used to obtain the Personality Index and Economic Index; these two indices are added to compute for the Overall Index to verify the hypothesis.

To decide on the individual investor's degree of environmental positivity and negativity, this paper also uses a seven-point Likert scale: option 1 indicates "strongly disagree" and has a score of 1 point; option 4 represents "neutral" and has a score of 4 points, and option 7 indicates "strongly agree" and has a score of 7 points. A higher score means an individual has an optimistic view of the investing environment, and a lower score means a greater inclination to be pessimistic.

To identify the order of positive and negative information order affecting investment decisions, this study follows Pinsker (2011). This paper presents two different sequences of investment decision information. On the first investment scenario, positive information will be initially presented and then followed by the negative information; in the second scenario, the reverse (negative first) set of information is presented. The study then tallies all these results to identify which information order has better weight.

4. EMPIRICAL RESULTS AND ANALYSIS

This study utilised questionnaires to survey professional institutional investors and accounting students with questions related to their positive and negative sentiments toward the stock market, optimism and pessimism in relation to economic conditions and degree of reaction with regards to the related financial and non-financial information being presented to them.

In this study, 100 questionnaires are distributed to investors; 88 paper questionnaires and 11 electronic questionnaires were recovered. Out of these questionnaires, six were disregarded because of incomplete data; thus, a total of 97 questionnaires are considered for further analysis.

Panel A in Table 2 shows that investors with high positive sentiment were rated at 4.34, while those with low sentiment is at 1.75. This means that the upward price adjustment for highly optimistic investor creates greater price adjustments than those investors with low positive sentiment ($4.34 > 1.75$). In addition, regardless of the variation analysis (Panel B, Panel C, or *T*-test), all tests show that the average price upward adjustment between the two sentiments exhibit significant differences ($F = 20.172, p < 0.01; t = 4.491, p < 0.01$). Therefore, the results support hypothesis H.1.a., which states that an investor's high positive sentiment generates an excessive positive reaction, leading to overvalued stock prices.

Table 2. Investor sentiment and positive information analysis.

Content Type: Positive News					
<i>Panel A: Narrative Statistics</i>					
Investor sentiment	Number	Average	Standard deviation	Standard error	
High investor sentiment	47	4.34	2.389	0.348	
Low investor sentiment	44	1.75	3.089	0.466	
<i>Panel B: Analysis of Variance</i>					
	Sum of squares	Degree of freedom	Mean sum of squares	<i>F</i> -test	Probability
Investor sentiment	152.494	1	152.494	20.172	0.000***
Mean error	672.803	89	7.560		
Total	825.297	90			
<i>Panel C: T-test</i>					
<i>T</i>	Degree of freedom	Mean difference	Standard error difference	Probability	
4.491	89	2.590	0.577	0.000***	

Note: ***, **, and * indicate significance levels of 1%, 5% and 10%, respectively.

In testing Hypothesis H.1.b., a negative overreaction is generated resulting in lower price adjustments. Through a one-way ANOVA, Panel A of Table 3 shows that the average high negative investor sentiment is -1.66 and low investor sentiment is -3.45 . This means that that the price adjustment for an investor with high negative sentiment creates greater price changes than those investors with lower negative sentiment ($-1.66 > -3.45$). In addition, regardless of variation analysis (Panel B, Panel C, or *T*-test), the average price downward adjustment of both high and low sentiments have significant differences ($F = 15.837, p < 0.01; t = 3.980, p < 0.01$). Therefore, the

results support hypothesis H.1.b. and prove that investor's with high negative sentiment creates an undue negative reaction, which leads to undervalued stock prices. Findings of the study are consistent with the initial discussion of Lemmon and Portniaguina (2006) stating that positive and negative reactions in the financial market create stock price deviations (i.e., overvalued and undervalued) from their intrinsic valuations.

Table 3. Investor sentiment and negative information analysis.

Content Type: Negative News					
<i>Panel A: Narrative Statistics</i>					
Investor sentiment	Number	Average	Standard deviation	Standard error	
High investor sentiment	47	-1.66	2.287	0.334	
Low investor sentiment	44	-3.45	1.994	0.301	
<i>Panel B: Analysis of Variance</i>					
	Sum of squares	Degree of freedom	Mean sum of squares	F-test	Probability
Investor sentiment	73.219	1	73.219	15.837	0.000***
Mean error	411.462	89	4.623		
Total	484.681	90			
<i>Panel C: T-test</i>					
T	Degree of freedom	Mean difference	Standard error	Probability	
3.980	89	1.795	0.451	0.000***	

Note: ***, **, and * indicate significance levels of 1%, 5% and 10%, respectively.

Panel A of Table 4 shows that in a good economic condition, highly optimistic investors have an average price adjustment of 4.81, while those investors with low optimism have an average price adjustment of 1.22. These results mean that investors with highly optimistic bias, especially in times of economic boom create upward price adjustments ($4.81 > 1.22$). In addition, ANOVA Panel B and Panel C show that the average number of *t*-tests indicate upward price adjustments, and have significant differences ($F = 30.625, p < 0.01$; $t = 5.534, p < 0.01$). Thus, the findings support the hypothesis H.2.a that very optimistic investors in times of good economic condition generate an overreaction in the market, which lead to higher price adjustments.

Panel A of Table 5 shows that highly pessimistic investors have an average price adjustment of -1.78 , while those with low-level pessimism have an average adjustment price of -3.00 . Thus, those investors with high pessimism even in an economic boom create negative expectations, and a downward price adjustment is evident ($-1.78 > -3.00$). ANOVA in Panel B and the *t*-test in Panel C show that the average price downward adjustment of faith ($F = 5.635, p < 0.05$; $t = 2.374, p < 0.05$), which confirms the initial findings of this paper, and explains that investor's pessimistic attitude towards information produces a negative overreaction, which leads to stock prices being undervalued consistent with hypothesis H.2.b. These results are consistent with Scheier and Carver (1985) in stating that optimistic investors expect that positive things will come along the way, and the outcomes will benefit them especially in good economic condition, which has an opposite effect on pessimistic investors.

Table 4. Degree of investor optimism in good economic environment.

Content Type: Positive News					
<i>Panel A: Narrative statistics</i>					
Investor sentiment	Number		Average	Standard deviation	Standard error
High optimism	32		4.81	2.442	0.432
High pessimism	32		1.22	2.744	0.485
<i>Panel B: Analysis of variance</i>					
	Sum of squares	Degree of freedom	Sum of mean squares	F-test	Probability
Investor sentiment	206.641	1	206.641	30.625	0.000***
Mean error	418.344	62	6.747		
Total	624.984	63			
<i>Panel C: T-test</i>					
T	Degree of freedom		Mean difference	Standard error	Probability
5.534	62		3.594	0.649	0.000***

Note: ***, **, and * indicate significance levels of 1%, 5% and 10%, respectively.

Table 5. Degree of investor pessimism in good economic environment.

Content Type: Negative News					
<i>Panel A: Narrative statistics</i>					
Investor sentiment	Investor sentiment	Investor sentiment	Investor sentiment	Investor sentiment	Investor sentiment
High investor sentiment, optimism	32	-1.78	2.433	0.430	
Low investor sentiment, pessimistic	32	-3.00	1.586	0.280	
<i>Panel B: Analysis of variance</i>					
	Sum of squares	Degree of freedom	Sum of mean squares	F-test	Probability
Investor sentiment	23.766	1	23.766	5.635	0.021**
Mean error	261.469	62	4.217		
Total	285.234	63			
<i>Panel C: T-test</i>					
T	Degree of freedom		Mean difference	Standard error	Probability
2.374	62		1.219	0.513	0.021**

Note: ***, ** and * indicate significance levels of 1%, 5% and 10%, respectively.

Regarding the information sequence utilised by investors, this study refers to Pinsker (2011) in terms of the research methods to measure the effect of the information variation order in investing decisions. Panel A in Table 6 shows that when the first order of the information is presented in the form of positive-negative sequence, the average is -1.01, which is equivalent to 5 currency units (i.e., Yuan) interval. Therefore, the downward price adjustment of sentiment has an average of 5.05 units making the stock price decreases to 89.95 Yuan, which is less than the reference price of 95 Yuan. Furthermore, when the information order is in the form of

negative-positive sequence, the average is 0.7, resulting in the average price upward adjustment has an average of 3.5 Yuan. This makes the stock price increases to 98.5 Yuan, which is higher than the reference price of 95 Yuan. The ANOVA result in Panel B and *T*-test in Panel C show that the average price adjustment between the two beliefs differs significantly ($F = 15.272$, $p < 0.01$; $t = 3.908$, $p < 0.01$). According to the abovementioned results, the average price last adjustment gives more weight on the information that appears behind the order (i.e., negative for the positive-negative sequence; and positive for the negative-positive sequence). This finding supports hypothesis H.3., which explains that investors are more biased with the latest information, and are often used to influence their stock investing decisions.

Table 6. Information variation order in investing decisions

<i>Panel A: Narrative statistics</i>					
Information order	Number	Average	Standard deviation	Standard error	
Positive to negative	91	-1.01	2.881	0.302	
Negative to positive	91	0.7	3.035	0.318	
<i>Panel B: Analysis of variance</i>					
Information order	Sum of squares	Degree of freedom	Mean sum of squares	<i>F</i> -test	Probability
Information order	133.714	1	133.714	15.272	0.000***
Mean error	1575.978	180	8.755		
Total	1709.692	181			
<i>Panel C: T-test</i>					
<i>T</i>	Degree of freedom	Mean difference	Standard error	Probability	
3.908	180	1.714	0.439	0.000***	

Note: ***, ** and * indicate significance levels of 1%, 5% and 10%, respectively.

5. CONCLUSIONS

This study is designed to investigate investor sentiment, optimism and pessimism, and the treatment of the order of information in relation to investor stock buying decisions. The research finds that investors with the high positive sentiment of the market produce disproportionate levels of positive reaction, which normally leads to overvaluation of stock prices. The opposite is also true that when investors express high negative sentiment, they tend to create excessive levels of negative reaction, thus, leading to an undervaluation of stocks. As Brown and Cliff (2004) put it, investor sentiment represents a subjective judgment that may predict the future direction of the market. In addition, traders view the future return on assets as easily affected by investor sentiment, which leads to overreaction or underreaction making stock prices to temporarily deviate from its intrinsic value. With regards to the degree of optimism and pessimism of investors, this research finds that extremely positive investors in times of good economic condition generate overreaction in the stock market leading to higher price adjustments.

On the other hand, highly pessimistic investors underreact in the market, which lead to lower price adjustments. Investor optimism and pessimism are measures of individual attitudes toward future expectations that are subjective personal expectations, aggravated by prospects of the future economic boom. Therefore, investor sentiment overreaction and underreaction are responses to the lack of information and a degree of self-confidence. For order information, the study uses information sequences that measure investor utilisation of available data for investing

decision. The research finds that the recency effect dominates investors' decision, wherein, they are more biased with the latest information and use this for their stock investing decisions. The findings of this study suggest that investors, whether professional or non-professional, should be aware of their subjective behavioural biases in making investment decisions, and that objective and careful decisions have to be exercised to maximise gains and minimise losses on portfolios and minimise over- and undervaluation of security prices.

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