The Effect of Information Sources on Trust and Investment: Evidence from Economic Experimentation

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This study aims to provide evidence from an economic experiment that explores the effect of different financial information sources on people's trust and investment decisions. Research participants consisted of 128 individuals aged between 18 and 30. An experiment design divided participants into three treatment groups and a control group. The participants in each treatment group were assigned to receive different presentations of financial information, namely, an official styled fact sheet (T1), a post on social media (T2), and in-person advising (T3). The study measured the level of participants' trust and investment in each treatment and compared it with the control group. The findings demonstrated that participants in T1 trusted their information and made significant investment, while those in T2 did not trust and invest. The participants in T3 trusted their information but did not decide to invest. These results suggest that traditional channels remain essential in communicating financial information, and financial institutions must take this into account when considering their communication strategies .

Keywords: financial information, framing effect, investment decision, social media,
JEL index: D81; D91; G41

The development of the internet has brought significant changes in how people around the globe receive information, news, and knowledge. In the past, non-digital interactions, such as physical meetings, face-to-face encounters, telephone conversations, and letter exchanges, were main features of how people communicated. But recently, internet technology has become a prevalent method of communication. Internet-based information sources, like social media, are, therefore, prevalent in many aspects of social life, such as business commercials, public advertising, and social campaigns. For the past ten years, the number of social media users in the world has continued to increase. According to a Global Digital Report by We Are Social (2022), there were about 4.6 billion users in 2022 which is about three-times greater than the number in 2012. Browsing information on internet websites and social media can be useful. However, an overwhelming amount of information would blind users' discretion. Many social media users tend to be careless in considering their information. Chavanayan (2020) found that 80 per cent of research samples believed information from social media without questioning it, while only 20 per cent verify the information before accepting it. Moreover, addiction to social media could potentially cause low self-esteem and narcissism (Rahim et al., 2020).

The financial and banking sector is among the many industries that have adopted digital and internet technology to provide investment information to their clients and potential investors. This information was once disseminated through traditional means, such as face-to-face consultations and hard copies of factsheets, but now is accessible via various online channels. Investment information is particularly important because it shapes the actions of loss and gain. Rational investors consider the risk and return of each financial product, the fees charged by financial institutions, investment policies and market insights related to those products. Therefore, making an investment decision could be influenced by information that investors perceive (Sanchez-Galan, 2011), and requires them to assess the quality of information and the reputation of the holding institutions (c.f., Aaker & Jacobson, 1994, Chemmanur & Fulghieri, 1994). Nonetheless, it remains unclear whether different sources of financial information, online and offline, have varying effects on investors' decision-making.

Previous studies conducting experiments about investment decisions aimed to explore various setting of risk-taking behaviors. Bosman and Van (2001) conducted an experiment using a game to investigate participants' decisions of investment. Participants in baseline group made decisions under a moderate level of risk (there was no chance to lose all money). The participants in global group made decisions under a high level of risk (there was a chance to lose all money). The result showed that introducing the high-risk information depressed the average investment level and increased more variance of investments. This suggested some indication of emotional anxiety in investment. The participants in this experiment appeared to be risk-averse which challenged the standard outcome of loss aversion in prospect theory. Charness and Gneezy (2012) added a gender dimension to the investment experiment to verify the difference in risk-taking behavior between the sexes. Their result revealed a consistent pattern that female invested less, and thus was financially risk-averse than males.

There was an experiment investigating the relationship between investment decisions and trust by utilizing a space on social media. Bapna et al., (2017) introduced an economic game on a customized Facebook application. A game was a means to collect and generate quantifiable trust measures. The game was played in pairs with the first mover acting as the sender, and the other player as the receiver. The sender sent money to the receiver, and any amount sent was tripled without the sender knowing. The receiver then decided on the amount to be returned to the sender. The amount of money invested by senders and reciprocal return of receivers determined the level of trust. This game is clearly a replica of a real-world investment situation in which people consider the trust of their business partner before putting money into action. The results suggested that having mutual friends might not be an effective way to establish trust in digital world, while photo tagging and wall posting were indicative of trust, as they signified a strong offline connection. Although this study is beneficial in understanding trust, it is still limited as it focuses solely on social media as a platform of economic transaction.

We shift the topic of interest to the channels through which the financial information is conveyed. This study aims to explore how each channel determines the trust of recipients on the information and their size of investment. Specifically, this study examines three representative channels used in real-world situations. The first channel is a traditional source: an official information sheet published online by an authorized agency. The second channel is information presented by social media platforms, such as Facebook pages and TikTok clips. The last channel is receiving financial information in a face-to-face meeting in which a

financial advisor presents the information to recipients. These types of information are included in an experimental design to test and compare the trust and investment decisions of participants. Every channel presents the same information about a complex return mutual fund. Exploring the role of trust and investment in this experiment would hopefully set a milestone in understanding how information channels would influence people in the era of digital disruption.

Conceptual Framework

This section reviews the concept of risk, trust, and framing effect and identifies its contribution to the experimental design.

Risk

Risk refers to activities involving a possibility of losses and harm. Economic activities, especially investment, are not risk-free. Investment outcomes are uncertain due to the change of socio-economic factors and perhaps difficult to predict. For example, political unrest or crowding out of foreign direct investment could be risky factors that undermine the prospective return on investment. Many investors prefer low-risk investment as they could be more profitability (Chong, 2004).

The standard economic theory of risk, as conceptualized by Neuman and Morgenstern (1944), divides economic behavior in risky situations into three classifications of expected utility functions. Figure 1 shows the utility curves of risk-aversion, risk-neutral, and risk-lover. The green curve presents a risk-averse individual. Her marginal utility is diminishing towards more money/wealth which means that taking additional risk to win money adds to enjoyment less than losing hurts. Conversely, the brown curve presents a risk lover whose marginal utility increases at increasing rates. Taking risks to gain money is a favorable choice. The blue curve presents a risk-neutral person whose marginal utility is constant. This means that the person is indifferent to the weights of hurts from losing and satisfactions from gaining. The grey curve presents an unstable pattern of marginal utility. In addition to the standard economic model, behavioral economists have refocused the factor that determines risk preferences, by pointing to psychological factors that suggest that people tend to take risk to avoid losses rather than obtain a gain in equivalent values (Tversky & Kahneman, 1981).
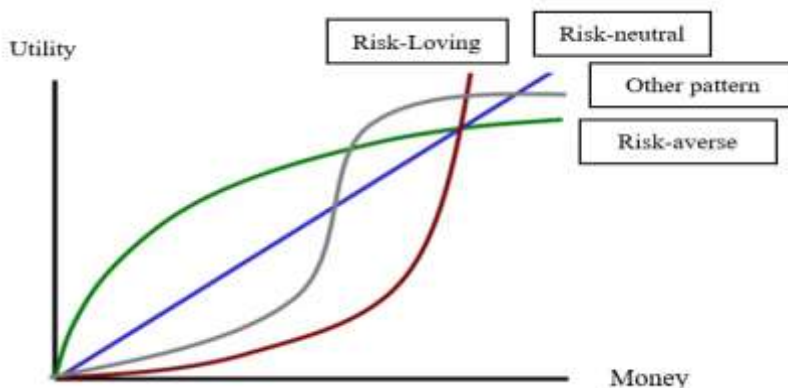

Figure 1. The categories of risk behaviors

The concept of risk is an important component of experimental design. This study measured the risk attitude of participants to determine its relationship to the level of investment made in an investment simulation game.

Trust

Economic transactions require trust in order to be settled. Trust creates mutual confidence between parties and without it would result the economic backwardness (Arrow, 1972). Trust is one of the important elements to civic society as it is associated with different results of economic prosperity and democratic performance (Putnam, et al., 1993). Therefore, it is plausible to say that trust definitely involves investment decisions as it influences the level of commitment in a relationship. Relationship commitment involves the readiness to allocate and devote financial, physical, or other related resources into a relationship (Morgan & Hunt, 1994). Moreover, individuals of a high social status possibly attract more trust than others (Glaeser et al., 2000). In situations where investors have incomplete information, they still make decisions based on the information they trust the most, even though its content may be questionable (Bikhchandani et al., 1992). There are many circumstances that investors delegate their decisions to financial consultants. They are likely to trust the advice from experts which sometimes overrides their own reasons (Christie & Huang, 1995).

The concept of trust is important. It indicates the reliance of financial information presented to the participants, with the aim of identifying which information sources exert the greatest influence.

Framing effect

The framing effect can be simply described by the example of a person buying a dress. This person may decide to buy a larger-sized dress when advised by the seller that the smaller size is not a good fit, even if she would usually opt for the smaller size. Therefore, people's buying decision is framed by information that causes them to make a decision otherwise to what they typically do. Furthermore, many psychological traits within the system 1 of Kahneman (2011), like heuristic biases, emotions, and shortsightedness, could entail errors in judging investment decisions.

Past evidence showed that the same situation could incentivize people differently based on which narrative framed it. He (2020) explored the effects of the same redistributive measure in two different settings, redistributing via tax and transfer system. The result indicated that participants had a higher work effort when framed by transfer system because they considered redistribution via taxation unfair. Moreover, individuals would prefer risk-loving options when the outcomes were framed with a losing scenario but favor the choice of risk-aversion when the equal outcomes were from with the gain scenario (Rabin, 1998). Cheng and Chiou (2008) conducted another study that discovered how the framing effect led to divergent investment choices among participants. The participants appeared to be more cautious in gain situations than they normally were. And the participants framed by loss situations were willing to take more risk than those in gain situations.

The participants of this study were asked to invest in framed situations. They were informed about associated risks and returns on a mutual fund. The level of investment observed in response to exposure to different financial information interventions reflected the cognitive bias of participants.

Method

This study conducted an experiment to verify and analyze the level test trust and investment. Three treatment groups were divided according to different sources of information, including an official factsheet, social media post, and in-person advising. The level of trust and investment across all treatment groups was estimated to assess statistical significance and verify the influence of each information intervention.

Design of Experiment

All experimental groups presented the same information to participants, but the styles of information representation in each group differed. The information of complex return mutual fund was used in this context because it captures the nature of risk in investment. The general strategy of a complex mutual fund includes investing in derivative contracts. When the fund manager incorrectly anticipates whether to take long or short contracts, it could lead to losses for the fund. The participants were instructed to decide the level at which they were willing to invest in their respective treatment groups. The following describes all of the experimental groups in the study.

Treatment Group 1 (T1): The participants were presented with a fact sheet information that is downloadable online. Its formatting style is the same as that presented on the websites of authorized financial institutions. The information includes descriptive data about the fund, its strategies, risks, and potential returns.

Treatment Group 2 (T2): The participants obtain the information in the form of Facebook post. The reason selecting Facebook as a channel is its prevalent use as a social media application, with 1.6 billion accounts worldwide (Matt, 2020).

Treatment Group 3 (T3): The participants in T3 were presented with information by a qualified financial advisor who held the IC Complex 1 license. The advisor conducted the session with an oral presentation, following the same sequence and content as that presented in T1 and T2.

The control group (C1) consisted of participants who were given a plain information on paper without knowing the original source, whether it was a fact sheet from an authorized website, a social media post, or advice from a financial advisor. This group was used as a counterfactual to those intervention groups (Roese, 1994).

The experiment starts by randomly assigning participants into three rooms. There is a researcher in every room to instruct the details and rules of the experiment. The participants then must complete a risk attitude questionnaire. After collecting all questionnaires, a presentation of complex mutual fund information lasting about 15 minutes takes place. Following the presentation, the researcher hands a trust-score questionnaire to participants to fill out.

In addition, the participants play an investment game where they must make investment decisions based on the information they receive, investing between 1 and 200 baht. The amount of their investment is recorded in the questionnaire. To simulate a risky investment situation, this experiment uses a draw-lot game. Participants randomly draw a ping-pong ball to determine whether they gain or lose. Inside the box, there are 10 balls - 5 white and 5 orange. Drawing a white ball results in a gain, while drawing an orange ball leads

to a loss. The ratio of losses to gains is 50:50. The participants are prohibited from being aware of each other's outcomes or gains. This investment game is a one-time occurrence, indicating that participants cannot repeat the process.

Data collection

We collected data from December 2021 to February 2022. The participants in this study were university students and early-career professionals aged between 18 and 30 years. A total of 128 participants took part in the experiment. The study was carried out at the Faculty of Economics, Khon Kaen University, Thailand. The experiment faced several obstacles during setup due to the COVID-19 pandemic. Despite the partial lockdown and restrictions imposed by Thai authorities on on-site activities, the researchers decided to collect data on-site to control the experiment's conditions and minimize any distractions to the participants. Unfortunately, some individuals declined invitations to participate due to the risk of infection. Consequently, the researchers had to conduct several smaller experiments gradually until they reached the total number of 128 participants, which was both statistically satisfying and feasible according to the research budget.

In this study, risk attitude and understanding were two main independent variables. We adopted the TSI risk profile questionnaire from the Thai Stock Exchange to collect the participants' risk attitude scores. The risk scores range between 11 and 33. An understanding score was measured by a separate questionnaire asking the participants to rate their understanding of the information on a scale of 1 to 10. In addition, trust and investment were dependent variables. Trust refers to the level of confidence participants have in the piece of financial information. Following the intervention, participants rated their scores (on a scale of 1-10) using the questionnaire. Investment corresponds to the monetary amount (in baht) that participants invested after receiving the information intervention.

Estimation

This study estimates two econometric models in parallel, with a dotted line in figure 2 separating the trust model on the left panel from the investment model on the right panel. The figure shows necessary variables in each model. Trust and investment models measure the reliability of different information sources, and the level of influence they had on participants in terms of investment decision. Both trust and investment are dependent variables resulting from the experimental process where financial information was provided first, followed by collecting trust score and amount of investment in a later step. Risk attitude and understanding level serve as independent variables in both models. The two models are formulated as ordinary least squares (OLS) equations:

$$\text{Trust score} = \beta_0+\beta_1\text{Risk-attitude}+ \beta_2\text{Understand}+\beta_3 T1+\beta_4 T2+\beta_5 T3+ u \qquad (1)$$
$$\text{Investment} = \beta_0+\beta_1\text{Risk-attitude}+\beta_2\text{Understand}+\beta_3 T1+\beta_4 T2+\beta_5 T3+u \qquad (2)$$

Where T1, T2, and T3 are dummy variables. T1. The dummy variables demonstrate the effects of various information sources in comparison to the non-intervention (control) group. Within these dummy variables, the value of 0 or 1 was assigned to indicate the participant status in each respective group. As in the first treatment group, the TI participants were assigned a 1 for their dummy variable (T1) and a 0 for all other dummy variables. u is an error term.

This experiment's hypothesis asserts that risk level and understanding are positively correlated with trust and investment. And, participants in different treatment groups have varying responses, reflected in their levels of trust and investment.
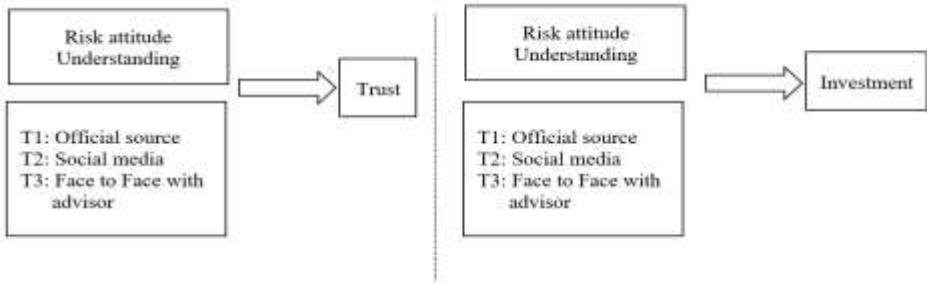
Figure 2. Variables in trust and investment models

Results

General Descriptive statistics

There are 128 participants in total, comprising 66 females and 62 males. They have quite a similar demographic character. T1 has 32 participants, with 16 females and 16 males. T2 has 33 participants, with 15 females and 18 males. T3 has 30 participants, with 15 females and 15 males. The control group has 33 participants, with 20 females and 13 males. The average age of all participants is 21 years old, with participants in T1, T2, T3, and the control group having average ages of 21, 21, 20, and 22 years old, respectively. Most participants (107) are undergoing undergraduate studies, with the remaining 21 having completed their undergraduate education.

Table 1-4 reports mean, maximum, minimum, and standard deviation values (SD.) of main variables of each experiment group. The average value of risk attitude is approximately 21. The average score of understanding across all experimental groups is about 6. Trust scores in T1 and T3 are higher than those of other groups. The highest level of investment is reported in T1, and the lowest is in the control group. Across all experiment groups, the average values of each variable were 7.25 for trust (SD. = 1.5), 129.91 for investment (SD. = 40.88), 21 for risk attitude (SD. = 3.1), and 6.29 for understanding (SD. = 1.2).

Table 1
Descriptive statistics of T1, N = 32

	Mean	Max.	Min.	SD.
Trust score	7.84	10	5	1.3
Investment	138.1	200	80	33.14
Risk attitude	21.22	27	15	2.92
Understanding	6.47	9	4	1.17

Table 2

Descriptive statistics of T2, N = 33

	Mean	Max.	Min.	SD.
Trust score	6.45	9	4	1.21
Investment	126.3	200	40	39.83
Risk attitude	20.97	28	15	3.26
Understanding	6.42	9	4	1.18

Table 3

Descriptive statistics of T3, N = 30

	Mean	Max.	Min.	SD.
Trust score	7.47	10	5	1.43
Investment	125.3	200	50	39.5
Risk attitude	20.9	27	16	2.96
Understanding	6	8	4	1.15

Table 4

Descriptive statistics of control group, N = 33

	Mean	Max.	Min.	SD.
Trust score	6.42	10	4	1.44
Investment	112.9	200	20	45.26
Risk attitude	20.73	26	14	3.17
Understanding	6.15	9	4	1.23

Trust model

Table 5 shows a combination of the estimations for cross-reference and robustness verification of the trust model. The statistical significance of variables across all models is consistent and there is no heteroskedasticity problem (see appendix).

Table 5

Estimation of trust model

	Model 1	Model 2	Model 3	Model 4
Risk attitude	0.076*	0.076*	0.085**	0.086**
	(0.051)	(0.061)	(0.04)	(0.041)
Understanding	0.152	0.117	0.178*	0.182*
	(0.132)	(0.262)	(0.095)	(0.093)
T1	1.333***	1.025***		
	(0.000)	(0.001)		
T2	-0.03		-0.817**	
	(0.929)		(0.006)	
T3	1.052***			0.638**
	(0.002)			(0.038)
Constant	3.905***	4.445***	4.446***	4.343***
	(0.000)	(0.000)	(0.000)	(0.001)

Note: ***p value<0.01, **p value<0.05, *p value<0.1

Table 5 reports that risk attitude is positively correlated with trust, but understanding is not statistically significant across models. T1 is statistically significant which means that the trust of participants in T1 is higher than that of control group. T2 shows a negative relationship with trust, with statistical significance only in model 3. These results could be interpreted that the financial information represented by social media would undermine the trust of participants. T3 is statistically significant. Its coefficient is positive which means that face-to-face advisor encourages trust of participants more than in those of counterfactual group.

Investment model

Table 6 displays the same model combinations as in table 5, except that its dependent variable is the level of investment. The models in the table present robustness verification. There is no significant difference in correlations among models. These investment models do not face the problem of heteroskedasticity (see Appendix).

Table 6
Estimation of investment model

	Model 1	Model 2	Model 3	Model 4
Risk Attitude	2.104*	2.147*	2.249**	2.257**
	(0.058)	(0.054)	(0.045)	(0.044)
Understanding	10.22***	10.197***	10.719***	10.837***
	(0.001)	(0.000)	(0.000)	(0.000)
T1	20.97**	13.229*		
	(0.03)	(0.096)		
T2	10.097		-1.384	
	(0.289)		(0.86)	
T3	13.64			3.617
	(0.161)			(0.658)
Constant	6.403	13.446	11.62	9.528
	(0.834)	(0.657)	(0.704)	(0.758)

Note: ***p value<0.01, **p value<0.05, *p value<0.1

Table 6 reports that risk attitude and understanding are statistically significant, indicating that participants would be more attentive to understand information when facing a gain-or-loss situation (an investment game of this experiment). Among all three interventions, only T1 displays a statistical significance. The positive value of its coefficient explains the marginal change in the model: participants who receive official information increase their level of investment compared to the counterfactual group.

Discussion

The results produce four key commentaries. One focuses on the general findings. The other three offers some insights to each treatment group.

First, the participants displayed a greater level of understanding of the information in the investment model than that in the trust model. This enhanced understanding of the investment model suggests that participants would be more considerate in the situation of loss and gain. Typically, people may not prioritize detailed comprehension when engaging in non-monetary matters. But when confronted with a risky situation, individuals tend to be more motivated to learn and understand to avoid losses or maximize gains. The participants in this

experiment were in a risky situation. Such a risky situation highlights the importance of understanding the information when undertaking a complicated task (Sprinkle, 2000).

Second, the participants in T1 trusted the information and invested significantly while the other treatments did not. This could be argued that official information is effective. The factsheets on mutual funds issued by financial institutions have been around for a long time despite the current period in which information from social media penetrates social life. One explanation is that they provide a sense of familiarity to its recipients. Therefore, people in T1 gained more confidence than information presented in a less-than-official format. Additionally, people are aware that official data must be thoroughly checked and regularly reviewed before being made public (Dejana & Kristina, 2016).

Third, it was found that a social media post (T2) did not encourage trust and investment, which may come as a surprise, considering the youth of the participants who are typically comfortable with social media. However, it could be argued that information presented through social media is likely to reduce trust in social networks, as these platforms are often used to steal personal data and perpetrate financial fraud (Pasieka et al., 2021).

Fourth, the participants trusted the information from advisor in T3 but did not invest. It is a common understanding that face-to-face meetings and activities could create trust between parties. But trust does not always motivate further actions, especially when dealing with risky situations. People may have a second thought and deter their advanced actions. This fear motivates individuals to take careful and sometimes precautionary measures when making decisions (Hassan et al., 2013). Moreover, T3 intervention is quite one-way-orientation. The participants listen and make decisions without a certain amount of time of self-reflection on the information. They may trust the information but are not confident enough to invest. This is not the same with T1 intervention where the participants have time to process the information and decide deliberately.

Conclusion

This study estimated how different information sources affected trust and investment decisions. Four experimental groups were conducted. One is a control group, and the other three were treated groups, namely: the official factsheet (T1), social media post (T2), and in-person advising (T3). The results obtained from three treatment groups were compared to those of the counterfactual (control) group to estimate the treatment effects.

The results reported that the participants in T1 and T3 trusted the information. The participants in T1 showed significant investments, while the participants in T3 did not. The participants in T2 did not trust and make any investments. The results implied the suspicious nature of information from social media. On the other hand, traditional information prevailed in this experiment: the participants tended to commit more trust and investment decisions than other information sources.

The researchers hope that this study will contribute to policymakers, especially at corporate level. While disseminating financial information through social media has become increasingly important because it can reach a number of audiences, the corporate should be active in promoting information via traditional means, such as authorized fact sheet and personal consulting. These traditional means, according to the experimental results, were

proven to be effective to induce trust between the corporate and its clients, which possibly leads to the decision to invest.

Future Recommendations

The future direction of research in this topic should expand the age range and sample size to increase statistical power and cover a broader range of social and demographic groups. This study only explored trust and investment decisions in a complex mutual fund, but in reality, there are many other financial products with various degrees of risk, such as derivatives and bonds. Different types of products might affect investment decisions and trust to different degrees. Therefore, expanding the range of products in future experiments is a favorable agenda.

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Appendix

Table 7

White test for heteroskedasticity of all trust models

	Chi^2	df	p-value
Model 1	17.2	14	0.2455
Model 2	14.74	8	0.0644
Model 3	8.49	8	0.3873
Model 4	8.91	8	0.3501

Note: p
value>0.05, fail to reject the null hypothesis of homoscedasticity

Table 8

White test for heteroskedasticity of all investment models

	Chi^2	df	p-value
Model 1	14.35	14	0.4238
Model 2	10.12	8	0.2568
Model 3	3.53	8	0.8968
Model 4	4.05	8	0.8528

Note: p value>0.05, fail to reject the null hypothesis of homoscedasticity