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Essays on the disposition effect in a social environment

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To my family

Preface

This thesis is submitted in partial fulfillment of the requirements for the degree of *Doctor rerum politicarum* at the University of Paderborn. The research presented here was conducted at the University of Paderborn, under the supervision of professor Matthias Pelster.

This work was supported by the Vietnamese German University and the Grant 911 - Vietnamese Ministry of Education and Training (MOET).

The thesis is a collection of three papers. The papers are preceded by an introductory chapter that relates them to each other and provides background information and motivation for the work. I am the sole author of the first paper. The second paper and the third one are joint work with Matthias Pelster. The fourth paper is joint work with Max Suchanek.

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Liêu Minh Lý
Paderborn, November 9, 2021

List of Papers

Paper I

Minh-Lý Liêu. "Peer attention and the disposition effect". under review in: *International Journal of Finance and Economics*.

Paper II

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Paper IV

Max Suchanek and Minh-Lý Liêu (2021) "The disposition effect and admiration seeking". In *Review of Financial Economics*. DOI: https://doi.org/10.1002/rfe.1146

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Chapter 1

Introduction

Since the term "bounded rationality" was introduced by Herbert A. Simon (Simon, 1955, 1957), people have raised doubts about whether decisions are always rational. Bounded rationality theory states that the decisions of humans are not perfectly rational due to the lack of information, the limitation of cognitive ability, and time constraints. This theory triggered the reconsideration of the rationality assumption. Two decades later, a range of studies, most notably those by Daniel Kahneman and Amos Tversky (Kahneman et al., 1973, 1977; Tversky et al., 1974), provided evidence to support the existence of cognitive bias in economics. Since then, the research on economics has turned the page. In addition to providing evidence of the role of heuristics in decisions making, these studies also triggered a new strand of research explaining market phenomena through behavioral aspects. As a result, today, we accept that humans are not always as rational as previously described.

Today, behavioral finance is no longer considered an agnostic field and has become one of the key ingredients of modern finance research. In particular, the prospect theory of Kahneman et al., 1979 that visualizes how humans make decisions under risk, has become one of the most popular models for explaining and predicting the choices of humans. Similarly, heuristics and biases are a part of financial economics; for example, Tversky et al., 1974, in their study on three original heuristics—availability, representativeness, and anchoring and adjustment—provide important explanations for human biases. Because of these studies, we now know that humans' decisions are neither rational nor random. We sometimes behave irrationally and fall prey to biases, which are systematic and, often times, predictable (Kahneman et al., 1977). These insights from behavioral finance have found their way into almost all areas of finance. According to Baker et al. (2010), the research on behavioral finance could be divided into four main themes based on the decision-making process of individuals: (1) heuristics, (2) framing, (3) emotions, and (4) market impact. First, when people face a new problem, their brains tend to look for similar past situations or experiences to evaluate and resolve the current problem; i.e., they make use of heuristics. Heuristics help them make decisions faster based on past experiences by simplifying complex problems and creating mental shortcuts. In addition to heuristics, humans are also governed by frames. Tversky et al. (1989) show evidence of the way humans react to the different frames. For example, the difference in frames could lead to a difference in risk preference and loss preference (for more details, see Tversky et al., 1989). While heuristics and frames are intuitive and predictable, emotions are abstract and vary depending on individuals or personality traits. In recent years, this topic has received increasing attention, and many important contributions have been made (for

more details, see Zaleskiewicz et al., 2020). Finally, all of the impacts and biases at the individual level could impact the whole market. In particular, the biases of investors and institutes result in mispricing, momentum, and inefficiency.

Although each of the abovementioned strands of the literature provides important contributions to the understanding of the effect of human behavior on financial decisions, this work focuses on investor behavior. In particular, this work focuses on the disposition effect in social environments. Following the themes of Baker et al., 2010, this dissertation contributes three themes. In chapter 2, I add to the understanding of the influence of social attention on one of the popular biases of investors—the disposition effect. Then, chapters 3 and 4 contribute to the understanding of the role of frames in the disposition effect in a social context. Finally, in chapter 5, I indicate the effect of temperament on the disposition effect, again in a social setting. Thus, this dissertation provides comprehensive knowledge about three types of stimulants impacting the disposition effect in a social environment, namely, social stimulation, framing, and temperament. Why should a social environment be considered? As humans, although we always want to see ourselves as independent and unique individuals, we still live in close connection with those around us. Whether or not we want to admit it, we are still influenced by the behavior of those around us in terms of how we live, behave, and think. Parkinson, 1996 suggests that emotions are social because human emotions reflect their social relationships. Indeed, what others say and do are the things that affects us most. We may be nervous about what others think about us, get angry if someone criticizes us, be happy when being loved, and so on. Similarly, when we make decisions, we care what people think about them. Social effects can sometimes be obvious and other times be blurred, but this effect is especially noticeable when people are placed in an environment that is observable by everyone around them. This phenomenon is stated and explained by social facilitation theory[1].

Moreover, modern life changes dramatically impact the interaction mechanism. Online social interactions have become the mainstream form of interactions today. Online social networks have led to several important changes. First, these interactions extend beyond geography. People all over the world can participate and interact. This makes interactions on online social networks broader, faster, and more diverse. Second, the explosion of social media has changed the way people access information. In addition to official sources of information, such as newspapers and television, today, people can access information from the crowd through social networking sites such as Facebook, Instagram, and Twitter. Although online relationships and online interactions are considered virtual, their effects seem real and powerful. People gradually realize the impact of these social networks on their lives from many perspectives. Althoff et al., 2017 find that online social networks influence both online and offline user behaviors. Users become more active in both their online and offline activities, while they also

[1]Social Facilitation Theory is an enhanced theory that refers to the tendency of humans to behave and perform differently when being observed. This theory is drawn from many specific studies Cottrell et al., 1968; Paulhus et al., 2002; Triplett, 1898; Weiss et al., 1971 and offers three explanations, namely, mere presence, learned drive, and distraction or conflict.

become more susceptible to new events. Specifically, this susceptibility is related to their number of online edges (friends or followers). Pantic, 2014 reviews a range of studies that reveal the influence of online social networks on increased depression, decreased self-esteem, and social network addition. Interestingly, online social networks can increase the presence of social comparisons (Sabatini et al., 2016).

In behavioral economics and behavioral finance, there are many studies that demonstrate the impact of social effects. For example, Akar et al., 2018 discuss the role of peer effects and online consumption behavior. Particularly, online buyers who follow many users have a high tendency to buy online. Moreover, buyers who are close to other consumers engage in actual online purchasing behavior. Kuchler et al., 2020 review the impact of peer effects on household finance. In particular, buyers refer to purchase prices provide by peers as reference prices for the products/services that they intend to buy. Furthermore, home buyers accept a higher price than the reference price because they want to have a large house to keep up with their peers (Kuchler et al., 2020). Regarding financial decisions, Park et al., 2017 indicate that firms follow their industry peers and leaders in making financial decisions. Moreover, Bursztyn et al., 2014 affirm the role of social learning and social utility in investment decisions. Although the effects of online social networks and online social interactions have been investigated in the economics and finance literature, the understanding of these effects remains vague. Therefore, a detailed understanding of the role of social effects on behavioral biases is necessary.

Although investors are involved in many cognitive biases, the disposition effect is one of the most vigorous behavioral regularities documented in trading behavior studies (Kaustia, 2010). This work focuses on the disposition effect as defined by Shefrin et al., 1985 as a tendency to sell winning positions and the aversion to let go of losing positions. Two main works—Shefrin et al., 1985 and Weber et al., 1998—initiated a series of studies on this effect. While Shefrin et al., 1985 observe the disposition effect by aggregating the market data, Weber et al., 1998 conduct an experiment to provide evidence of the existence of this phenomenon. Notably, the disposition effect could reduce stock returns, lead to mispricing or even affect the trading volume of markets (Goetzmann et al., 2008). The disposition effect receives so much attention not only because of its effects but also because of its prevalence. While the disposition effect, at first, was identified in the stock market, the literature later found this phenomenon in many markets, such as those of mutual funds (Cici, 2012), IPO trading (Kaustia, 2004), futures (Choe et al., 2009), and warrants (C.-H. Chang, 2008) and those with various types of investors from households to financial institutions (Grinblatt et al., 2001). Thus, a better understanding of this effect would benefit investors, financial advisors, financial institutions and policy makers in many ways. On the one hand, they can limit the adverse impact of the disposition effect. On the other hand, this understanding can help them further understand market trading behavior. Because of the need to understand the disposition effect, the amount of research in this field is diverse (for more detail, see Zahera et al., 2019, Kaustia, 2010). In general, the literature on the disposition effect can be divided

into three main streams: (1) that establishing the existence of the disposition effect, (2) that determining the consequence of the disposition effect, and (3) that identifying the factors that impact the disposition effect.

The result from the first branch that focuses on confirming and providing evidence of the existence of the disposition effect could be called the foundation for the current research on this topic. The most popular study that could be cited is Shefrin et al., 1985, which is considered the first to define the term "disposition effect". While Shefrin et al., 1985 give indirect evidence of the disposition effect by aggregating the data, Odean, 1998 indicates that investors realize their profitable positions at a much higher rate than their unprofitable ones, explaining the mechanism of the disposition effect. After the first definition, a wide range of studies has tried to explain the existence of the disposition effect by many theories. Particularly, the disposition effect is induced by certain main elements, such as prospect theory (Kahneman et al., 1979), mental accounting (Thaler, 1999), self-control, pride seeking , and regret avoiding (Shefrin et al., 1985). For each of the above theories, there have been many studies conducted. For example, Odean, 1998 and Grinblatt et al., 2005 connect the disposition effect with prospect theory, while Grinblatt et al., 2005 indicate that mental accounting drives the disposition effect. Tenberge, 2009 confirms the role of regret in the disposition effect. Later, T. Y. Chang et al., 2016 suggest that cognitive dissonance could be the reason for the disposition effect. Some other causes of the disposition effect may be mean reversion (Da Costa Jr et al., 2008; Jiao, 2017; Odean, 1998) and stop loss (Feng et al., 2005; Kaustia, 2004).

When it comes to the consequences of the disposition effect, there are two main affected groups. From the investor perspective, the disposition effect may lead to decreased returns (Goetzmann et al., 2008; Grinblatt et al., 2005). Grinblatt et al., 2005 also find that the investors exhibiting the disposition effect are less sensitive to price changes. Moreover, the disposition effect could increase the transaction cost and taxes for investors who are in gain positions while increasing risk for investors who keep their losing positions. At the market level, investors suffering from the disposition effect are hesitant to sell off their losses. This causes stock prices in the market to fall less and more slowly than the actual decline. Similarly, rushing to sell stocks with increased prices causes share prices to rise less and more slowly than the actual price. This leads to inferior performance at the market level (Statman et al., 2006). Additionally, Frazzini, 2006 concludes that the disposition effect is related to an underreaction to such news. In the long term, the disposition effect influences the asset pricing of the market and even impacts its volatility and trading volume (Goetzmann et al., 2008; Statman et al., 2006).

While the studies in the two first streams are adequate, the number of studies in the third stream about the determinants that impact the disposition effect is still insufficient. Thus, not surprisingly, the number of studies in this stream has been rapidly increasing. Some studies connect the disposition effect with demographic factors such as gender (Da Costa Jr et al., 2008; Rau, 2014), age (Cheng et al., 2013), experience (Da Costa Jr et al., 2013), education (Silva et al., 2021), personality traits (Cecchini et al., 2019), culture (Breitmayer et

al., 2019), or ethnicity (Frino et al., 2015). Among the factors impacting the disposition effect, the increase in the number of social trading networks has opened a new pathway for research on the connection between social interaction and the disposition effect, including that on team investment decisions (Rau, 2015), peer pressure (Heimer, 2016), deciding on behalf of others (Hermann et al., 2017), or the fear of reputation loss (Pelster et al., 2018).

The impact of social interactions on investor behaviors and on the disposition effect has received increasingly more attention because online trading exchanges have dramatically changed the trading behavior of investors and more hard data on social interactions have become available. An increasing number of online trading platforms are allowing people to connect with each other easier via so-called social trading. Additionally, these trading networks put people into a transparent environment, where investors face both enormous information resource pressure and private information exposure. The popularity of social trading networks has become indisputable, as millions of people currently participate in investing on these sites. Thus, the effects from the social transparency of these markets are also unavoidable. Though these trading networks have become popular, the impacts of the social factors on investor behavior in general and on the disposition effect in particular remain unclear. Therefore, a better understanding of the influence of social interaction on the behavior of investors is important to better prepare for such influences.

Therefore, this work aims to solve a small part of this problem. Particularly, this work combines three studies with the aim of investigating how social exposure influences investor behavior. Specifically, the first study answers the question of how an investor behaves upon receiving attention (like/comment) for the first time on their social trading network. The second study investigates the difference in the trading behaviors of investors when applying different frames to the social context. Specifically, we perform an experiment in which two methods of ranking transaction performance are used. The results show that in the two different ranking methods, the trading behavior of investors also changes in the direction of ensuring a high position in the ranking to protect themselves to build their self-images in front of the observations of other group members. The data of the second paper have been made publicly available as part of the open science movement. Finally, the third study focuses on the influence of personality traits on trading behavior in a social context.

Thus, this work shows evidence of the effect of the social environment and suggests that social interactions could be a key factor leading to the differences in investor behavior. Social attention promotes the disposition effect in investors (Paper I). Social environments in modern markets appears not only in the form of social attention, but also in other forms, such as social comparisons. In fact, the difference in social comparisons could influence investor behavior, as is shown in Paper II. In Paper IV, the relationship between personality and the disposition effect in social environments is investigated. In particular, I have found no relationship between the dark triad traits of investors and the disposition effect. Hence, personality may not be as important in terms of its effect on the disposition effect as we expected.

This thesis contributes to the literature in various ways. First, it enriches the literature on the factors that impact the disposition effect. Specifically, this work points out two factors that exacerbate the disposition effect—social attention and social comparisons. Moreover, this work indicates that personality traits have no effect on the disposition effect.

Second, this work demonstrates the role of the social environment in investor behavior. The openness of the social trading markets boosts social interactions to a new level, and the decisions of investors are heavily influenced by information from and decisions by other investors. Thus, understanding this behavior in a social environment is essential. Moreover, this work adds to a possible explanation for the conflicts in current results based on social environments. Particularly, the first paper shows that likes/comments (social attention) actually increase the disposition effect, even with a nonmonetary initial setting. This conclusion provides an argument for the conflicting evidence in the literature, which may be caused by different monetary settings. The second paper provides another potential explanation with the social ranking settings. The specific ranking frames can deflect the behavior of investors due to their desire to achieve high rankings. However, this work also suggests a new issue that the prior studies in the traditional market may need to reconsider. Particularly, social trading markets have different mechanisms and different impacts on investors when compared to the traditional market. Thus, the result of prior studies in the traditional market cannot be applied in social trading markets. Additionally, an effect that exists in traditional markets may not exist in social trading markets, and vice versa, which also suggests that future studies be careful when comparing the research results.

For social trading platforms, although these platforms work toward the same goal of creating networks and environments for sharing information, they still differ in terms of their interfaces and trading features. This study suggests that differences in these interfaces can affect investor behaviors. Thus, platforms should consider how to improve the interface to best support investors. Specifically, the functions of copying and following investors on social trading platforms can be a distraction for the followed investors. These investors are at risk of a higher disposition effect. Therefore, these platforms should consider minimizing the potential impact of being followed on this group of investors to help them trade more objectively.

Additionally, investors should pay attention when using information from these social trading platforms because the way that information is displayed has a great influence on the trading behavior of investors. Popular investors, who have many follows on social trading platforms, should pay attention to the possibility of being affected by the disposition effect when receiving additional attention. Regulators also play an important role in mitigating the impacts of the disposition effect. Specifically, specifying standards in setting interfaces and applying regulations for how to present information are solutions that should be considered.

The details of each study are presented below.

1.1 Peer attention and the disposition effect

In the modern market, due to the combination of social networks and trading platforms, investors are now exposed to social factors in many ways. For example, through social trading platforms, portfolios, trading returns, and trades can be disclosed. Moreover, investors can follow or copy each other's trades. Exposure to social networks stimulates a variety of effects including the disposition effect. Although the literature related to these effects is rich, the relationship between of the disposition effect and social factors remains controversial. Specifically, there are two opposing tendencies in the conclusions about the impact of social factors on the disposition effect. One group indicates that the social factors help investors become more precautionary and therefore less impacted by the disposition effect (Gemayel et al., 2018; Lukas et al., 2017), while the other group supports the argument that social factors increase the disposition effect (Heimer, 2016; Pelster et al., 2018). This contradiction raises a particular question of why there is disagreement among these conclusions. What might cause such disagreement? Paper I focuses on studying one potential explanation for these diverging findings. Specifically, the main differences among the prior studies may involve monetary settings. I suggest that monetary incentives are one of the potential factors that lead to such controversial conclusions. I therefore proceeded to observe the effect of social attention on the disposition effect under the default of there being no monetary incentives.

Using the difference-in-differences approach on the trading data from a real social trading platform, I find a significant increase in the disposition effect when investors receive attention from their peers. This effect increases even more with the scale of such attention. Both holding on to losing positions longer and closing winning positions faster are the causes of this phenomenon. This finding could be explained by social facilitation theory. In the presence of others, investors want to achieve superior outcomes and limit their losses. This work also points out the differences in the monetary settings of prior research and argue that these difference could be a feasible explanation for the gap in the prior literature.

1.2 Framing and the disposition effect in a scopic regime

While the first paper argues that the diversity in the monetary setting of social trading platforms has led to disagreement in the current literature, we realize that social trading platforms are not only different in their monetary settings, but also in their frames. Thus, in the second paper, I investigate the influence of frames on trading behavior, together with a coauthor.

To do so, we conduct an experiment that includes two frames for the control and treatment groups, thereby which we can observe the impact of these frames on participants. In the lab environment, we can control for any unexpected external factors and observe the pure impact of this effect. Moreover, our research setting socially exposes participants by ranking them compared to other participants.

We find that the difference in the frame of ranking can boost the disposition effect of investors. Specifically, when setting a rating frame based on winning trades, participants are more prone to a disposition effect compared to the rating frame based on the profitability of trades. In other words, individuals alter their behaviors to optimize their social image under the given frame instead of optimizing their returns. This result demonstrates the sensitivity of investors to the frame and emphasizes the role of social interactions. Indeed, under the pressure of being ranked with others, participants focus on maintaining their self-image instead of optimizing their profits. In the other words, this work shows evidence of the impact of the frame on decision making in a transparent environment.

1.3 Studying the disposition effect in a scopic regime: Data from a laboratory experiment

This article introduces a dataset collected in a laboratory experiment that was published in a study titled "Framing and the disposition effect in a scopic regime". The main trading experiment is conducted based on the experiment of Weber et al., 1998. To simulate the social interaction environment, the experiments include two groups that are ranked based on different criteria. Additionally, participants can see their performance and orders in the ranking board. This dataset can be useful for comparing other studies of the disposition effect or meta-analyses on this topic. Otherwise, this dataset can be used to test the impact of the frame on decision making in a transparent environment.

1.4 The disposition effect and admiration seeking

Does the social context have the same impact on different investors? The decisions of investors are influenced not only by the social context but also by their personal characteristics. Therefore, how personality traits influence the trading behavior and admiration seeking of individuals is the main question of this part.

After working with the external factors, my last paper aims to identify the effects of the internal factors devoted to the trading behavior and admiration seeking of investors in the social context. We believe that the external factors could have different influences on different investors depending on their temperament. Investigating the role of personality traits, therefore, is the key to explaining the bias in the reaction of investors that could not be explained by the external factors. We conduct an experiment with a trading game and auction task to elicit the admiration seeking of participants. This trading task is placed in a social context and involves a leader board, which shows the rankings by the success of the participant during the trading game. Contemporaneously, we include a personality test to identify the relationship between their trading behavior and admiration seeking in three groups of personality traits including

dark triad traits[2], big-five traits, and honesty-humility traits. However, we cannot find a significant effect of these personality traits on both the disposition effect and admiration seeking.

This result could be explained by some factors. For example, it could be the case that the hypotheses are not correct. In the literature, discussions of the relationship between personality and behavioral biases have also reached conflicting conclusions. For example, Bashir et al., 2013 found different results for different study samples. Specifically, while there is a link between personality traits and overconfidence in a group of employees, the author could not find the same relationship across a group of students. The study of Bashir et al., 2013 also exemplified a potential second reason for the insignificant results that may be caused by the sample selection issue. Particularly, because of the special conditions in behavioral studies, in many cases, the hypotheses work on some samples but are not statistically significant in other groups of samples.

Principally, trading behavior is the same as other decisions made by humans that are sensitive and easily manipulated by many factors. Although each of the abovementioned studies makes a specific contribution to the literature, this work also affirms the sensitivity of trading behaviors in the open environment, where individuals are exposed to a large range of social factors. This work contributes a small part to the general understanding of individual investor behaviors under the exposure environment of social interactions. Moreover, in practice, this understanding could be applied to create a transparent market with less damage to investors.

The remainder of the dissertation presents the results of the three studies in Paper I, Paper II and Paper IV, respectively. Chapter Paper III presents the dataset of Section Paper II.

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[2]Dark triad refers to three specific negative personal traits, namely, Machiavellianism, narcissism, and psychopathy.

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