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CHAPTER 5: CONCLUSION

In this dissertation we examine the individual investor's disposition effect from a dynamic perspective, with a focus on investigating the key determinants of investors' capitulation decisions. We propose and experimentally test two explanations for investors' capitulation decision, namely (1) adaptation of the reference point, and (2) anticipated and experienced emotions. Both of these explanations are linked to bounded rationality and they have been suggested as explanations for the disposition effect in the literature. We expect that they may also explain investors' capitulation decisions. In the first part, Chapters 2 and 3, we study how adaptation of the reference point links to investors' capitulation decisions, and how differences in personality affect individuals' adaptation to financial losses. In the second part, Chapter 4, we analyze how anticipated and experienced emotions predict individual investor's selling decisions. In this final chapter we highlight the most important results and implications of each of the previous chapters and discuss how they relate to each other. We conclude with directions for future research.

5.1 Summary of the Main Research Findings

In Chapter 2 we study how individuals eventually come to the decision to capitulate their losing investments. We formulate a conceptual model that integrates prospect theory (Kahneman and Tversky 1979), adaptation level theory (Helson 1964) and expected utility model (e.g. von Neumann and Morgenstern 1944; Harless and Camerer 1994). This dynamic model predicts how the adaptation of reference point affects individuals' subjective values assigned to subsequent price change, which interact with their subjective expectations for future price movements, and eventually affect the individuals' subsequent investment decisions. We contribute to the literature by studying investors' capitulation decision in a

realistic dynamic setting. In accordance with the adaptation level theory by Helson (1964), we show that the larger the size of prior losses and the longer the time spent in a losing position predict a lower adapted reference point. Consistent with standard finance theory, our results indicate that negative expectations lead to a stronger tendency to capitulate a losing investment. More importantly, we find that the level of reference point adaptation and expectation for future price movements have an interaction effect on capitulation probabilities. This means that investors may be reluctant to sell their losing investment at the beginning. However, they adapt to the loss over time, and the extent of adaptation depends on the size of the loss and the time in a losing position. After controlling for the effect of subjective expectation, those investors who adapt little to prior losses are more likely to capitulate the losing investment than those who have adapted more to the prior losses.

Chapter 3 builds upon Chapter 2 and further examines adaptation of the reference point. We explore how personality might explain the differences in individuals' adaptation to losses. With the use of a questionnaire, we measure personality differences with the Big Five model of personality (Bishop et al. 2001; David and Suls 1999). Our findings indicate that individuals who score higher on agreeableness and intellect, and lower on conscientiousness adapt to losses to a larger extent. However, the Big Five personality traits do not have significant impact on adaptation to gains. Our results imply that the relation between personality traits and adaptation is domain-dependent: personality traits only predict adaptation to losses, but not to gains.

In Chapter 4 we test our second proposed explanation for the disposition effect: individual investor's anticipated and experienced emotions. Although anticipated regret and pride have been suggested as explanation for the disposition effect by Shefrin and Statman already in 1985, these emotions have not been tested empirically. Moreover, an individual's investment decision consists of a chain of decisions. Apart from anticipated emotions,

investors also experience emotional feedback from previous decisions. Therefore, to model the effects of emotions on investor's selling decisions in a dynamic setting, it is necessary to take both anticipated and experienced emotions into account. We find that higher experienced regret (pride) leads to a greater probability of selling a losing (winning) investment. As for anticipated emotions, our results indicate that higher anticipated regret leads to a smaller probability to sell a losing investment, but anticipated pride does not affect the probability to sell a winning investment. Thus, with regard to Shefrin and Statman's (1985) proposition that anticipated regret and pride explain the disposition effect, we find empirical support for the former but not the latter. Overall, our results show that emotions, whether experienced or anticipated, are influential on individuals' probabilities to sell their investments. Investors and practitioners should be aware that emotions are relevant factors in their decision-making process. See Table 5.1 for an overview.

Table 5.1
Overview of empirical studies in this thesis

Chapter 2	
<i>Focus</i>	Adaptation and Capitulation decisions
<i>Objectives</i>	To test how interaction between adaptation of reference point and expectation leads to capitulation decisions in the loss domain
<i>Theories</i>	Prospect theory, Adaptation level theory, expected utility model
<i>Key findings</i>	<ul style="list-style-type: none"> • The larger the size of prior losses and the longer the time spent in a losing position predict a lower adapted reference point • Negative expectations lead to a stronger tendency to capitulate a losing investment • After controlling for the effect of subjective expectation, those investors who adapt little to prior losses are more likely to capitulate the losing investment than those who have adapted more to the prior losses
Chapter 3	
<i>Focus</i>	Personality and Adaptation
<i>Objectives</i>	To examine the influence of the Big Five personality traits on individuals' adaptation of reference point
<i>Theories</i>	Big Five Personality Model, Prospect theory
<i>Key findings</i>	<ul style="list-style-type: none"> • Individuals with higher scores on <i>agreeableness</i> and <i>intellect</i>, and lower score on <i>conscientiousness</i> adapt to losses to a larger extent • The Big Five personality traits do not have significant impact on adaptation to gains

Chapter 4

<i>Focus</i>	Anticipated/ Experienced Emotions and Capitulation decisions
<i>Objectives</i>	To test how anticipated and experienced emotions (focus on regret and pride) affect individuals' probabilities to sell winning or losing investment
<i>Theories</i>	Appraisal theory of emotions, Regret regulation theory
<i>Key findings</i>	<ul style="list-style-type: none">• Higher experienced regret (pride) leads to a greater probability of selling a losing (winning) investment• Higher anticipated regret leads to a smaller probability to sell a losing investment, but anticipated pride does not affect the probability to sell a winning investment

5.2 Theoretical Contribution

In this dissertation, we have conducted three empirical studies related to investors' selling decisions. Therefore, we have grouped the discussion of the findings of this dissertation into three themes: adaptation of reference point, personality and coping, and emotions. In the following, we provide a discussion of the theoretical implications of this dissertation regarding these three themes.

5.2.1 Adaptation of Reference Point

In Chapter 2 we investigate how investors eventually come to the decision to sell their losing investments. Our study confirms previous findings and adds to knowledge about reference point adaptation. In particular, our empirical results are consistent with Arkes et al. (2008) that individuals adapt to losses. We provide additional insight into the separate effects of time spent in a losing position and the size of losses on reference point adaptation, by disentangling their unique influences. Consistent with Hardie et al. (1993), we find that the

temporal component is important in (financial) decision making, but we also find that the adapted reference point depends on the time spent in a losing position. That is, it takes time for investors to adapt, as much as is possible, to a financial loss.

Previous literature has tested subjective expectations and subjective value as two separate determinants of investors' hold/sell decisions. For instance, Lee et al. (2008) find that investors' subjective values attached to gains and losses affect their hold/sell decisions. We extend these findings by conducting the first investigation of the interaction effect between subjective expectations and subjective value on capitulation probability in a dynamic setting. In addition, we have proposed a novel way to model investors' subjective values of losses, by measuring their adaptation to losses.

DeBondt and Thaler (1985) find that portfolios of prior losing stocks outperform the portfolios of prior winning stocks over the next three years, which is known as the winner-loser effect. If prior losers on average outperform prior winners, then holding on to losing investments seem to be a good trading strategy. This would imply that those individuals who adapt more to their losses are better off than those who adapt less, because the more adapted investors are more likely to hold on to the losing investment till the price bounces back. However, this implication should be interpreted with some care. Our tests in this chapter are based on experimental data, therefore the decisions may differ from actual trading decisions in practice.

5.2.2 Personality and Coping

The behavioral finance literature has demonstrated that risk aversion, loss aversion, mental accounting (Kahneman and Tversky 1979; Shefrin and Statman 1985; Thaler 1985; Thaler and Johnson 1990), education level, professional occupations (Dhar and Zhu 2006) and IQ (Grinblatt, Keloharju, and Linnainmaa 2009) can all affect individuals' decisions. Our

results from Chapter 3 support previous studies (Dhar and Zhu 2006; Grinblatt, Keloharju, and Linnainmaa 2009) that heterogeneity among individuals can explain the variance in their financial decisions. We contribute to the literature by researching beyond socio-economical, demographical factors and cognitive capabilities, and test how personality traits relate to adaptation to losses. While our results confirm previous findings that individuals adapt faster to gains than to losses (Arkes et al. 2008). We also demonstrate the link between personality and adaptation. In particular, we find that differences in personality have significant impact on adaptation to losses, but not to gains.

Weber and Welfens (2008) propose that investors' probabilities to sell winning or losing investments seem to be stable personality traits, specifically, those investors who hold losers too long may not be the same investors who sell their winners too soon. Our experimental findings in this chapter are consistent with the proposition of Weber and Welfens (2008), but we provide empirical evidence that personality differences can also play a role in adaptation to financial losses.

5.2.3 *Emotions*

Emotions, either anticipated or experienced, play an important role in consumers' decision-making processes. In line with the findings in the field of marketing, Chapter 4 adds to the literature that anticipated and experienced emotions are also influential in the financial investment domain. First, regarding anticipated emotions, the results in Chapter 4 provide partial empirical support for the propositions offered by Shefrin and Statman (1985): anticipated regret causes people to hold on to losers, but anticipated pride does not seem to cause them to sell winners. Second, regarding experienced emotions, we acknowledge that investing requires a chain of decisions, so the emotions experienced as a result of prior outcomes should affect investors' decisions. However, studies that attempt to establish this

link are rare (Tsiros and Mittal 2000; Zeelenberg and Pieters 2004). We contribute to the literature by initially testing how anticipated and experienced emotions affect investors' decision simultaneously. Our findings show that even before an account is closed at a loss, investors already experience regret, which leads to a larger probability to sell the losing investment. These results are in support of the theoretical regret-matching procedure (Hart and Mas-Colell 2000). In addition, our findings are consistent with previous studies, that specific emotions have unique effects over and beyond the effect of general valence in predicting consumer behavior. While prior marketing studies on specific emotions versus general valence focus on riskless environments (e.g., Zeelenberg and Pieters 2004), we add to the literature by providing research evidence from a financial investment domain, which inherently consists of risky decisions.

5.3 Suggestions for Further Research

This dissertation contributes to the existing knowledge on the disposition effect by examining the dynamic process in which selling decisions are reached. We find that both (1) adaptation of reference point and (2) anticipated and experienced emotions affect individuals' probabilities to sell their investments. Nevertheless, our experimental findings raise new questions and highlights areas in which more research is needed.

One of the major new challenges for future research is to link the results in Chapter 2 with research and analysis of real trading data. In Chapter 2, we use an experimental setting to obtain our data on individual investment decisions; thus, future research is needed to test the generalizability of our model with real trading data. Combining the findings of the winner-loser effect (DeBondt and Thaler 1985) and our results in Chapter 2, it appears that holding on to a losing investment by adapting to the losses may be a favorable trading

strategy. Examining whether adapting to losses is a useful trading strategy in financial markets is the next logical step in this line of behavioral finance literature.

The process of adaptation might also have relevance for more non-financial aspects of consumer behavior. Adaptation may explain why consumers stay with service providers with declining levels of service quality, as this behavior resembles holding on to losing investments. If the decline of service quality is gradual, adaptation may partially explain inertia, next to avoidance of incurring switching costs (De Ruyter, Wetzels and Bloemer 1998). In future research, the dynamic experiments reported in this dissertation can be adjusted for assessing the suggested relevance of adaptation in a marketing setting.

In Chapter 3 we focused on personality and exclude other potential variables regarding individual differences. A next logical step for future research would be to explore other potential variables that may explain the variance in individual's adaptation levels of their reference point, such as self-esteem or aggressiveness. Future research should analyze how these variables regarding individual differences interact with each other and investigate their relative explanatory power over adaptation to financial losses and gains. Greater knowledge of how individual differences are related to adaptation of reference point can also increase our understanding of retail investors' decision-making processes, and help to explain the variances in retail investors' investment return.

Our experimental findings in Chapter 4 show that emotions, whether anticipated or experienced, affect individuals' selling probabilities. Future research should investigate how the implications derived from emotions research (e.g. regret avoidance) can be incorporated into economic models to provide better predictions of investors' financial decisions. Research on the emotion pride is relatively recent (Fredrickson 2001; Tracy and Robins 2007; Williams and DeSteno 2008), and far more research is needed to shed light on the roles that experienced pride and anticipated pride play in investors' decision-making processes.

Another important issue for future research in emotions concerns the conditions under which a valence-based or a specific emotion is more useful in understanding consumer behavior (Bagozzi et al. 2000; Zeelenberg and Pieters 2004). Our results on investment decision processes highlight the importance of this issue. In the loss domain, while valence-based emotion (dissatisfaction) leads to a smaller probability to sell, a specific emotion (regret) predicts a greater probability to sell. These opposite effects have not been identified in previous consumer research. A possible reason for these findings is that previous research has focused on a riskless non-dynamic setting. By contrast, our results are obtained in a risky and dynamic setting with multiple decision moments. In financial markets, a losing investment may bounce back in the future. The investment return is not determined until the point where the investment is sold. In such a dynamic risky setting, the directions of the effects of general valence and specific emotions seem to be different as compared to those in a riskless setting. Further investigation is needed regarding the effects of emotions in static versus dynamic and riskless versus risky settings.

Finally, we tested the effects of two specific emotions, regret and pride, on investors' selling decisions in Chapter 4. Other specific emotions could be considered in the sale of winning or losing investments as well; for example, shame and guilt. To gain insight into the roles of specific emotions in investment decision making, a broader set of emotions should be investigated in the future. We are confident that our current results provide a first step to the understanding of the disposition effect in a dynamic perspective.