Conservatism and Endogenous Preferences

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An Experimental Approach

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Christina Manthei-Geh, M.Sc.

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Erstgutachter:	Prof. Dr. Wolfgang Schultze
Zweitgutachter:	Prof. Dr. Dr. h.c. mult. Adolf G. Coenenberg
Vorsitzende der mündlichen Prüfung:	Prof. Dr. Susanne Warning
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List of Abbreviations

ANOVA	Analysis of Variance
ASC	Accounting Standard Codification
ATL	anti-takeover law
BART	Balloon Analogue Risk Task
BDM	Becker, DeGroot, Marschak
CE	certainty equivalent
CEO	Chief Executive Officer
CF	Conceptual Framework
cf.	confer
CFO	Chief Financial Officer
CHF	Swiss Francs
DC	District of Columbia
DepVar	Dependent Variable
df	degrees of freedom
Diff	Difference
DOSPERT	domain-specific risk-taking
DP	Discussion Paper
e.g.	exempli gratia
ED	Exposure Draft
edn.	edition
eds.	editors
EFRAG	European Financial Reporting Advisory Group
et al.	et alii
etc.	et cetera
EU	expected utility
EUR	Euro
EUT	Expected Utility Theory
EV	expected value
EVS	expected value of subject's equity stake
FAS	Financial Accounting Standard(s)
FASB	Financial Accounting Standards Board
FEE	Federation of European Accountants
fMRI	functional Magnetic Resonance Imaging
GAAP	Generally Accepted Accounting Principles
H	Hypothesis
i.e.	id est
IAS	International Accounting Standard(s)
IASB	International Accounting Standards Board
IASC	International Accounting Standards Committee
IFRS	International Financial Reporting Standard(s)
IQR	Interquartile Range

JDM ..... Judgment and Decision Making
M ..... million
Max. ..... maximum
MBA ..... Master of Business Administration
Min. ..... minimum
MIT ..... Massachusetts Institute of Technology
MSE..... Mean Squared Error
NPD ..... new product development
NPV ..... net present value
p. ..... page
PDMA ..... Product Development & Management Association
PEQ ..... Post Experimental Questionnaire
pp. ..... pages
OLS ..... Ordinary Least Squares
R&D ..... research and development
RQ ..... research question
SEO ..... seasoned equity offering
SEU ..... subjective expected utility
St. ..... Sankt
Stat. ..... Statistic
Std. Dev. ..... Standard Deviation
Std. Err. ..... Standard Error
UK ..... United Kingdom
URL ..... Uniform Resource Locator
U.S. ..... United States
US GAAP ..... United States Generally Accepted Accounting Principles
VIF ..... Variance Inflation Factor
Vol. ..... Volume
vs. ..... versus
WTA ..... willingness to accept
WTP ..... willingness to pay

List of Variables and Symbols

ACCMETH1 ..... Dummy variable indicating if accounting method applied is considered relevant for economic evaluation of investment's profitability

ACCMETH2 ..... Dummy variable indicating if investment decision is based on the accounting method applied

AGE ..... Subjects' age (in years)

ANALYSISAR ..... Dummy variable for confidence in analyzing annual reports

CLEAR ..... Indication whether tasks were clearly stated (7-point Likert Scale)

CLUSTER ..... Subjects' major field of studies (categorical variable)

COMP ..... Indication whether scenarios were comprehensible (7-point Likert Scale)

CONS ..... Dummy variable for accounting method applied

EASY ..... Indication whether questions were easy to answer (7-point Likert Scale)

EXPFA1 ..... Dummy variable for prior consideration of annual reports

EXPFA2 ..... Dummy variable for experience in analyzing annual reports

GENDER ..... Dummy variable for gender

INVDEC ..... Dummy variable for investment decision

LAGAECHTER ..... Subjects' degree of loss aversion derived from subject's willingness to participate in six different mixed outcome lotteries

LARISK ..... Subjects' degree of loss aversion under risk as an aggregation of *LARISK50* and *LARISK200*

LARISK50 ..... Subjects' degree of loss aversion under risk calculated based on iterative changes in negative payment of mixed outcome prospect (50, 1/2; -50) necessary to match certainty equivalent of 0

LARISK200 ..... Subjects' degree of loss aversion under risk calculated based on iterative changes in negative payment of mixed outcome prospect (200, 1/2; -200) necessary to match certainty equivalent of 0

LATIME ..... Subjects' degree of loss aversion over time as an aggregation of *LATIME1* and *LATIME2*

LATIME1 ..... Subjects' degree of loss aversion over time calculated based on iterative changes in negative payment of two-payment prospect (-200, 1 year; 200) necessary to match present equivalent of 0

LATIME2 ..... Subjects' degree of loss aversion over time calculated based on iterative changes in negative payment of two-payment prospect (-50, 1 year; 50) necessary to match present equivalent of 0

LATIME3 ..... Subjects' degree of loss aversion over time calculated based on iterative changes in negative payment of two-payment prospect (200, 1 year; -200) necessary to match present equivalent of 0

LATIME4 ..... Subjects' degree of loss aversion over time calculated based on iterative changes in negative payment of two-payment prospect (50, 1 year; -50) necessary to match present equivalent of 0

LATIMESOON ..... Subjects' degree of loss aversion over time as an aggregation of *LATIME3* and *LATIME4*

LATIMETOTAL ..... Subjects' degree of loss aversion over time as an aggregation of *LATIME1, LATIME2, LATIME3*, and *LATIME4*

LAWANG ..... Subjects' degree of loss aversion as an aggregation of *LAWANG1* and *LAWANG2*

LAWANG1 ..... Subjects' degree of loss aversion based on a gain/loss ratio of a mixed outcome lottery (loss fixed at EUR (CHF) 25; minimum gain indicated by subject)

LAWANG2 ..... Subjects' degree of loss aversion based on a gain/loss ratio of a mixed outcome lottery (loss outcome fixed at EUR (CHF) 100; minimum gain indicated by subject)

LOSS ..... Dummy variable for prior project outcome

MASTER ..... Dummy variable for subjects' level of studies

MCQ1 ..... Dummy variable for correct answer to manipulation check question 1

MCQ2 ..... Dummy variable for correct answer to manipulation check question 2

MOTIV ..... Indication whether subjects were willing to answer all questions truthfully (7-point Likert Scale)

NATION ..... Subject's nationality (categorical variable)

PREF ..... Indication of strength of preference for investment option chosen (7-point Likert Scale)

PROFEXP ..... Subject's professional experience (in years)

RAFIN ..... Indication of subjects' risk attitude in financial situations (7-point Likert Scale)

RAGAIN ..... Subject's risk aversion in gain settings

RAGEN ..... Indication of subjects' risk attitude in general (7-point Likert Scale)

RAGENFIN ..... Subject's risk attitude as an aggregation of *RAGEN* and *RAFIN*

RAGNEEZY ..... Subject's risk attitude based on willingness to invest in a mixed outcome lottery

RALOSS ..... Subject's risk aversion in loss settings

RAMIXED ..... Subject's risk aversion in mixed settings

RAND ..... Dummy variable indicating randomness of investment decision

RATOTAL ..... Subject's risk aversion as the aggregation of *RAGAIN*, *RALOSS*, and *RAMIXED*

RAWEBER1 ..... Indication of subject's willingness to invest in a moderately growing investment fund (7-point Likert Scale)

RAWEBER2 ..... Indication of subject's willingness to invest in a very risky share (7-point Likert Scale)

RAWEBER3 ..... Indication of subject's willingness to invest in a conservative share (7-point Likert Scale)
RAWEBER4 ..... Indication of subject's willingness to invest in government bonds (7-point Likert Scale)
SHARESC ..... Dummy variable indicating current share ownership
SHARESF ..... Dummy variable of planned future share ownership
SHARESP ..... Dummy variable indicating prior share ownership
TG ..... Treatment Group (categorical variable)
WTADEV ..... Deviation of subject's equity stake valuation from the rational economic share value
WTA10DEV ..... Deviation of subject's equity stake valuation from the rational economic share value (R&D project 1, t=0)
WTA20DEV ..... Deviation of subject's equity stake valuation from the rational economic share value (R&D project 2, t=2)
WTA30DEV ..... Deviation of subject's equity stake valuation from the rational economic share value (R&D project 3, t=0)
WTA40DEV ..... Deviation of subject's equity stake valuation from the rational economic share value (R&D project 4, t=2)
WTA50DEV ..... Deviation of subject's equity stake valuation from the rational economic share value (R&D project 5, t=0)
WTA60DEV ..... Deviation of subject's equity stake valuation from the rational economic share value (R&D project 6, t=2)
WTA70DEV ..... Deviation of subject's equity stake valuation from the rational economic share value (R&D project 7, t=0)
WTA80DEV ..... Deviation of subject's equity stake valuation from the rational economic share value (R&D project 8, t=2)

e ..... Euler's number
g ..... indicator of gain context
G ..... certainty or present equivalent in gain settings
i ..... index representing + and -
j ..... index representing r and t
l ..... indicator of loss context
L ..... certainty or present equivalent in loss settings
M ..... independent primary moderator variable
N ..... number of observations
p ..... probability
r ..... indicator of risk setting
R^2 ..... coefficient of determination
s ..... subjective estimate
t ..... time period, indicator of time setting
u ..... utility
v ..... subjective value
V ..... prospect value

W ..... independent secondary moderator variable
x ..... possible prospect outcome 1
X ..... independent focal predictor variable
y ..... possible prospect outcome 2
$\hat{y}$ ..... latent dependent variable
Y ..... dependent variable

β ..... regression coefficient
ε ..... error term
λ ..... loss aversion parameter
μ ..... utility parameter in risk contexts
π ..... decision weight
σ_i ..... standard deviation of prospect i
τ^+ ..... discount parameter for gains
τ^- ..... discount parameter for losses
U ..... utility function
ν ..... utility parameter in time contexts
w^+ ..... probability weight in gain contexts
w^- ..... probability weight in loss contexts
χ^2 ..... Chi-square Statistic

% ..... percent
$ ..... Dollar (experimental currency)

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1. Introduction

Literature suggests that individuals have endogenous preferences for accounting conservatism as compared to neutrality due to intrinsic loss aversion. However, no empirical evidence for this claim exists. This thesis provides first experimental insights on individuals' endogenous preferences for conservative compared to neutral accounting. Results show that in a judgment context based on innate loss aversion, individuals value conservatism more highly than neutrality in accounting. The thesis further investigates if individuals also show explicit preferences for conservative vs. neutral accounting by implementing a choice setting. Results provide evidence that individuals prefer conservative to neutral accounting when presented with both options. The study contributes to the ongoing discussion on accounting conservatism by establishing that a disregard for peoples' endogenous preferences for conservatism associated with neutral accounting can have detrimental economic consequences, such as a lower willingness to invest.

The following chapter presents the motivation and the objective of this thesis.

1.1 Motivation and Objective

This thesis investigates whether individuals have endogenous preferences for conservatism compared to neutrality in accounting due to intrinsic loss aversion. Prior literature rationalizes that conservative accounting is a prudent reaction to uncertainty demanded by the firm's stakeholders (Watts, 2003a). Recent literature argues that individuals have endogenous preferences for conservatism in accounting (Hirshleifer and Teoh, 2009; Nagar et al., 2016). Accounting conservatism is characterized by demanding higher verification requirements for gains than losses (Watts, 2003a), resulting in a more timely recognition of losses than gains (Basu, 1997). Future losses are anticipated when they are probable, whereas future gains are only recognized when realized. By considering potential future losses up-front, users of accounting information are protected from future disappointment, thereby accounting for individuals' intrinsic loss aversion (Hirshleifer and Teoh, 2009). This study examines individuals' endogenous preferences for conservatism and the consequences of a possible mismatch between accounting methods and individuals' preferences. Based on loss aversion (Kahneman and Tversky, 1979), the underlying expectation is that conservatism results in investors evaluating a company's performance more favorably relative to neutral, that is, non-conservative accounting.

Although being a fundamental accounting concept, conservatism has increasingly become a controversial issue. Literature argues that the asymmetric treatment of gains and losses is beneficial for bondholders due to increased contract efficiency (e.g., Watts, 2003a; Kothari et al., 2010), as well as for shareholders due to constraining earnings management and thereby providing more reliable information to users (e.g., Francis et al., 2013; García Lara et al., 2014). However, opponents find that conservatism results in biased information, concealing true performance. In recent years, standard setters have followed this critical view and currently give preference to neutral accounting (IASB, 2010, CF; IASB, 2015, CF ED) with the objective of providing accounting information that is more useful to users, leading to a symmetric treatment of gains and losses.

Until recently, conservatism has mostly been examined from an agency-theoretic or decision usefulness perspective. Nagar et al. (2016) analyze conservatism from an evolutionary point of view and argue that conservatism originated from humans' psychological bias of intrinsic loss aversion that developed through human evolution. Research has found that even very young children (Harbaugh et al., 2001) as well as primates (Chen et al., 2006) show loss aversion. This bias is considered to be deeply rooted in human beings and seems to be rather innate than learned (Chen et al., 2006). If loss aversion is innate, people are not necessarily aware of being biased by this phenomenon. Consequently, users of accounting information who dislike being disappointed may find conservatism attractive without being aware of the fact and the reason for it (Hirshleifer and Teoh, 2009).

This study applies the case of the accounting for research and development (R&D) expenditures as an example for variants of different degrees of conservatism. Immediate expensing of R&D expenditures is a typical example for conservative accounting (Beaver and Ryan, 2005). Capitalizing R&D[1] expenditures, on the other hand, represents neutral accounting by symmetrically matching the investment outlay with the future benefits derived from the investment. Other examples of conservative accounting would be the accounting for provisions or the impairment of assets.

Rationally, applying conservative or neutral accounting does not make a difference in overall results, but it influences the timing of loss recognition. In the short-run, conservatism and neutrality frame a situation differently. The immediate expensing of R&D expenditures separates the initial investment from future project outcomes. Thus, in a conservative setting,

[1] It is important to underline that the IFRS only allow for capitalization of development expenditures and forbid capitalization of research expenditures. Nevertheless, in this thesis, in the interest of a good and fluent readability, the abbreviation R&D is used in contexts actually only referring to development expenditures.

individuals do not face a loss in later periods when the project is unsuccessful. Because potential losses are anticipated, future disappointments are avoided. In contrast, in the neutral setting there is no negative impact on profits at inception but in later periods when the potential loss is realized. The neutral setting thus creates disappointment that is avoided in the conservative setting.

Literature provides evidence that due to limited cognitive capacity individuals process information in the form in which it is presented without reframing it (Slovic, 1972; Payne, 1982). Framing, that is presenting logically identical concepts or situations differently (e.g., formulated as gains vs. losses), can impact users' judgments and decisions (e.g., Tversky and Kahneman, 1981; Kühberger, 1998; Levin et al., 1998). According to Prospect Theory (Kahneman and Tversky, 1979), individuals are more hurt by losses than they are thrilled by equivalent-sized gains relative to the relevant reference point. Losing a certain amount of money nearly hurts twice as much as gaining the same amount of money provides pleasure (Tversky and Kahneman, 1991; 1992). If conservatism helps avoiding such loss experiences, individuals should show a preference for conservative relative to neutral accounting. This thesis provides a novel experiment to investigate if (1) individuals do have such preferences and if (2) they actively prefer to invest in firms that apply conservative accounting.

Hirshleifer and Teoh (2009, p. 1075) suggest for future research 'to perform field or laboratory experimental testing to see whether and when people have an irrational preference for conservative reporting'. This thesis follows this suggestion and aims at providing insights on individuals' endogenous preferences for conservative accounting. The corresponding experimental study was conducted at the University of Augsburg, Germany and the University of St. Gallen, Switzerland from January to March 2017. The study's main results, its implications, and contribution are presented in the next chapter.

1.2 Main Results and Contribution

In the experiment, subjects are in their investor role. They are endowed with an equity stake in a company that they are subsequently allowed to hold or sell at any time. The company conducts R&D projects that influence its future performance (equity) and hence also the value of subjects' equity stake. The experiment consists of a 2x2 between-subjects design which manipulates the accounting method applied for R&D expenditures (neutral vs. conservative accounting) as well as R&D projects' outcome (success vs. failure). R&D expenditures are either capitalized or expensed and the probability of R&D project success or failure is 0.5 respectively. Subjects are randomly distributed to one of four treatment groups. Unconscious

preferences are operationalized by eliciting subjects' evaluation of firm performance via a second price auction procedure adapted from Becker et al. (1964). This auction procedure measures subjects' willingness to accept (WTA) a buy offer for their equity stake. By comparing investors' WTA across treatment groups their differential willingness to invest in the firm is evaluated. To examine if individuals also show explicit conscious preferences for conservatism relative to neutrality in accounting, the study switches to a within-subjects design to let subjects make an investment choice between both accounting methods. Subjects' deliberate choice between the conservative and the neutral investment option provides data regarding individuals' explicit conscious preferences for one or the other accounting method. Combining a between- with a within-subjects design is one method to shed more light on subjects' unintentional biases (corresponding to what is understood in this study as 'unconscious' preferences) and subjects' intentional judgments (called 'conscious' preferences in this study) (Kahneman and Tversky, 1996; Libby et al., 2002).

Results support the expectations: individuals show both unconscious and conscious preferences for conservative relative to neutral accounting – especially after prior loss experiences. Subjects are willing to sell their shares at lower prices under neutral than under conservative accounting. Individuals with higher levels of loss aversion more strongly prefer conservative relative to neutral accounting compared to subjects' with lower levels of loss aversion. The results are consistent with the interpretation that loss aversion causes investors to have a lower willingness to invest in the neutral accounting condition. Conservatism seems to better address individuals' loss aversion. Mentally processing potential losses is more comfortable under conservative than under neutral accounting.

This thesis addresses a call for more research on 'whether and when people have an irrational preference for conservative reporting' (Hirshleifer and Teoh, 2009, p. 1075). While several rational explanations for conservatism have been proposed (e.g., Watts, 2003a), psychological bias has not yet been analyzed. This thesis addresses this gap in the literature by providing first experimental evidence for investors' endogenous preferences for conservative relative to neutral accounting.

Understanding individuals' endogenous preferences and its related effects is important in assessing the costs and benefits of conservatism from a behavioral, evolutionary and endogenous perspective and informs the debate on the role of conservatism in financial accounting and reporting. The study's results show that it is important to consider endogenous psychological factors in the discussion on the usefulness of accounting conservatism relative to

neutrality in accounting because intrinsic and unconscious human coding can have substantial influence on individuals' perception of and reaction to different accounting methods. From a manager's or company's point of view it can often be economically more efficient to defer losses to the future due to discounting effects. To the contrary, from an investor's point of view, considering losses up-front better addresses individuals' intrinsic loss aversion. The study contributes to the ongoing discussion on conservative vs. neutral accounting by highlighting that disregarding peoples' endogenous preferences for conservatism can have negative economic consequences, such as investors' lower willingness to invest in firms applying neutral accounting.

This thesis also contributes to the literature on R&D accounting. There is an ongoing debate about the usefulness of capitalizing intangible (R&D) investments. For example, individuals' judgment performance when using information on intangibles expenditures for predicting future profits is shown to be more accurate in the capitalizing than in the expense condition (Luft and Shields, 2001). This study's results suggest that from an individual's endogenous preference perspective expensing is more beneficial than capitalizing R&D expenditures regarding individuals' investment decisions – contrary to the trend in current standard setting.

By applying different instruments for measuring loss aversion and risk attitudes that are commonly used in research, this study further contributes to prior literature examining these instruments' validity. It is documented that correlations between the loss aversion measures applied are low and mostly even insignificant. Correlations of risk aversion measures are mostly significant but correlation coefficients are at low levels. Based on this study's results, the respective instruments do not seem to consistently capture the same concepts and hence their application can lead to divergent and even opposing results.

1.3 Structure

The remainder of this thesis is organized as follows. Section 2 presents a literature review on prior insights on benefits and costs of conservatism and neutrality in accounting from a financial statement user's as well as from a company's perspective. The literature review further comprises current research that argumentatively links individuals' endogenous preferences for conservatism in accounting to the co-development of human evolution and record keeping. The literature review builds the basis for identifying existing research gaps. Section 2 ends with the derivation of research questions that are addressed in this thesis and points out the contribution of this thesis to previous findings.

Section 3 presents the hypotheses development. Loss aversion is considered the nucleus of individuals' endogenous preferences for conservatism in accounting. Chapter 3 first provides an overview of psychological behavioral phenomena that are all strongly related to or even directly stem from individuals' loss aversion before afterwards drawing on literature that provides evidence that loss aversion is endogenous to every human being. The chapter ends with arguing how and why conservatism better addresses individuals' loss aversion than neutrality in accounting. Based on these deliberations the hypotheses are derived and the corresponding research model is developed.

Section 4 addresses the experimental study that has been conducted to collect data for testing the hypotheses derived. In a first step, the general use of experiments as a method of data collection in accounting is briefly described by focusing on specific strengths and characteristics of this data collection method. In a second step, the experiment conducted in this thesis is presented in detail by explaining how the constructs that build the research model are operationalized. Finally, the implementation of the experiment is described.

Section 5 documents the study's results. First, pre-test results are presented, before afterwards describing the main study's results. This section further contains robustness check analyses and also addresses potential limitations of the experiment which should be considered when interpreting the study's results.

This thesis ends with section 6 that presents a conclusion on the study's main findings and implications and points out directions for future research.

2. Literature Review on Accounting Conservatism and Derivation of Research Questions

This chapter first provides an overview of the concept of accounting conservatism and outlines how prior conceptual papers as well as empirical studies evaluate its usefulness in financial reporting. In a second step, this chapter differentiates conservative from neutral accounting and summarizes the ongoing debate on the tradeoff between both concepts. The last part of this chapter relates to prior literature arguing that individuals have endogenous preferences for conservatism in accounting. The section closes by presenting the research questions that are derived from research gaps identified from the literature review.

2.1 Conservatism in Accounting

The concept of conservatism is deeply rooted in financial reporting standards and practice and serves as a tool to enhance efficient capital allocation (Basu, 1997). Its impact and implications have received major attention in prior accounting research. Several rational explanations for conservatism in accounting have been proposed (e.g., Watts, 2003a), whereas human psychological bias has not yet been considered in depth. This study focuses on evaluating accounting conservatism from an individual investor's endogenous preferences perspective. The following literature review first concentrates on previous insights on 'rational' benefits and costs of conservative accounting for equity and debt market participants before, in a second step, presenting literature related to individuals' endogenous preferences for conservatism in accounting, which is the point of interest of this study.

2.1.1 Definition of Accounting Conservatism

As pointed out by Basu (1997), the concept of conservatism has influenced accounting theory and practice for hundreds of years and can be traced back at least to the 15th century. Since then, it is deeply rooted in financial reporting standards affecting recognition and measurement of a company's assets and liabilities with the aim to contribute to an efficient capital allocation. Despite its long history and an extensive body of research, up to now, no common definition of accounting conservatism exists (Givoly and Hayn, 2000; Rajan et al., 2007). Several researchers refer to accounting conservatism as an on average understatement of book values relative to the corresponding market values when characterizing accounting conservatism (e.g., Feltham and Ohlson, 1996; Zhang, 2000; Beaver and Ryan, 2005). According to this approach, conservatism thus relates to the existence of an 'expected unrecorded goodwill' (Beaver and Ryan, 2005, p. 269). Other researchers characterize conservatism as an asymmetrical treatment

of gains and losses (e.g., Basu, 1997; Watts, 2003a). These researchers argue that in a conservative accounting system the verification requirements for gains are higher than for losses. Following this line of argumentation, Basu (1997, p. 4) states that conservatism captures the 'accountants' tendency to require a higher degree of verification for recognizing good news than bad news in financial statements'. Financial statements hence capture bad earnings news earlier than good earnings news. This understanding of accounting conservatism focuses on timeliness in loss recognition.

Ball and Shivakumar (2005) point out that these two characterizations of conservatism are related but yet distinct. The authors state that both definitions describe accounting conservatism as a reporting bias: The first definition comprises an 'accounting bias toward reporting low book values of stockholder equity' and the second definition 'is an equivalent bias *conditional on firms experiencing contemporaneous economic losses*[2]' (Ball and Shivakumar, 2005, p. 89). Departing from these two related but different approaches, conservatism in its entirety is commonly described as accounting tendencies that result in downwardly biased accounting net asset values relative to the corresponding economic net asset values. The underlying rationale is 'the old and conservative rule of accounting and business practice [that companies should] anticipate no profits and provide for all probable losses' (Bliss, 1924, p. 110). Overall, conservatism results in reporting the lowest possible value for assets and revenues and the highest possible value for liabilities and expenses (Watts and Zimmerman, 1986; Riahi-Belkaoui, 2004).

This thesis addresses conservatism in its entirety mainly focusing on the fact that conservatism considers potential gains and potential losses asymmetrically.

2.1.2 Types of Accounting Conservatism

Initially, conservatism was considered an accounting concept that results in prudent financial numbers (e.g., Watts and Zimmerman, 1986; Beaver, 1998; Watts, 2003a) without differentiating between different degrees of conservative accounting. More recently,

[2] The cited paper applies the italic font which has been kept unchanged for citation purposes.

researchers commonly distinguish between two types of accounting conservatism: *unconditional* and *conditional* conservatism[3] (e.g., Beaver and Ryan, 2005).

Under unconditional conservatism, accounting results in the creation of 'accounting slack' (Beaver and Ryan, 2005, p. 270) and hence unrecorded goodwill at the inception of assets and liabilities since losses are recognized more timely than gains leading to an understatement of net assets (Penman and Zhang, 2002). Unconditional conservatism materializes in recognition and initial measurement rules that predetermine assets (liabilities) to be carried out at a lower (higher) book value of equity relative to the present value of future cash inflows (outflows) in subsequent periods. An extreme form of unconditional conservatism leads to recognizing investments as expenses rather than as assets (Pope and Walker, 2003). Unconditional conservatism thus biases accounting numbers irrespective of current news and can be described as an ex-ante conservative behavior (Pope and Walker, 2003). One example for unconditional conservatism taken from accounting practice is the accelerated depreciation method (e.g., declining balance method). It is important to underline that the economic depreciation itself is not unconditional conservative because it matches an actual loss of value. The conservative behavior is the accelerated depreciation method leading to declining depreciation amounts over the respective asset's useful life. Other examples are immediately expensing the costs of internally generated intangible assets and applying historical cost accounting for positive net present value projects (Beaver and Ryan, 2005).

In contrast, conditional conservatism refers to an asymmetric recognition of economic developments conditional on current news, with bad news being recognized more quickly as losses than good news as gains. In the case of conditional conservatism 'the reduction in accounting income reflects a contemporaneous economic loss' (Ball and Shivakumar, 2005, p. 90) which is not the case when expensing early or when understating book value independent of bad news. Thus, conditional conservatism is an ex-post behavior. One example of conditional conservatism is the impairment approach for long-lived tangible or intangible assets which are written off upon bad news. In fact, the impairment itself is not conditional conservative but the fact that assets are not symmetrically written up upon good news (Beaver and Ryan, 2005).

[3] Researchers apply different terms for the two types of conservatism. If conservatism is triggered via a mechanical rule without any accounting discretion it is defined as unconditional (Beaver and Ryan, 2005), news-independent (Chandra et al., 2004), ex ante (Pope and Walker, 2003) or balance sheet conservatism (Ball et al., 2000). The notions of conditional, news-dependent, ex post or income statement conservatism imply that the accounting treatment is discretionary and a reaction to changing external or internal factors ('news'). These different terms refer to the same concepts. For clarity and readability purposes, the notions unconditional and conditional conservatism are applied in this thesis.

Although the two types of conservative accounting are closely linked, a trade-off exists: the application of unconditional conservatism precludes applying conditional conservatism (Pope and Walker, 2003; Ball and Shivakumar, 2005; Qiang, 2007). Pope and Walker (2003) explain that if a company applies unconditional conservatism by, for example, immediately expensing the costs of internally generated intangible assets, there is neither the possibility of impairment testing nor recognizing the assets' economic values in accounting income. In this case, an application of conditional conservatism is thus not possible. They find supportive evidence that companies with higher levels of unconditional conservatism show relatively lower asymmetric timeliness in earnings and lower sensitivity of earnings to bad news, that is, they show lower levels of conditional conservatism. Beaver and Ryan (2005) see a sequential relation of unconditional and conditional conservatism. They argue that unconditional conservatism generates unrecorded goodwill and limits the application of conditional conservatism until bad news lead to using up the created slack. Under this perspective, unconditional conservatism is determined at the generation of assets and liabilities and thus precedes conditional conservatism (Beaver and Ryan, 2005). Ball et al. (2000) reason that conditional conservatism (income conservatism) implies unconditional conservatism (balance sheet conservatism) but this does not hold vice-versa. They explain their reasoning by an example taken from code-law companies: these companies tend to report conservative book values of assets and liabilities but at the same time, they tend to 'boost income in bad years' (Ball et al., 2000, p. 20). This bad year approach thus diminishes the asymmetry of potential gains and losses that would be reflected in accounting income under unconditional conservatism and illustrates that unconditional conservatism does not necessarily imply conditional conservatism.

According to Ball et al. (2008), it is important to analyze the two types of conservatism separately because they can have different effects and implications. Relatedly, Qiang (2007) shows that the setting under investigation influences which type of conservatism comes into play. Nevertheless, separating unconditional and conditional conservatism is difficult (Beaver and Ryan, 2005; Ryan, 2006). Empirical measures that clearly distinguish between the two forms of conservatism are rare (Ryan, 2006). Both types of conservatism lead to an understatement of net assets. Hence, a conservatism measure[4] such as the market-to-book ratio rather captures overall conservatism than differentiates between the two types (e.g., Roychowdhury and Watts, 2007). Ball and Shivakumar (2005, p. 91) state that these apparent

[4] For insights on empirical measures commonly applied for conservatism and the measures' construct validity, cf., e.g., Wang et al. (2009).

difficulties to differentiate between the two types help 'explain why conservatism is a controversial property of accounting, despite its long-standing influence on practice'.

This thesis relates to accounting methods for R&D expenditures set out in IAS 38 to differentiate between conservative and neutral accounting. IAS 38 prescribes the accounting treatment for intangible assets. In case an asset is identified as an intangible, i.e., 'a non-monetary asset without physical substance' (IAS 38.8), its related expenditures are recognized as expenses, unless it is probable that the intangible asset generates future benefits and its costs can be reliably measured (IAS 38.21). The standard prescribes that the costs related to the generation of an internally generated intangible asset must be classified as belonging to a research or a development phase (IAS 38.52). All expenditures that arise in the research phase are recognized as expenses while expenditures arising in the development phase that fulfill specified criteria linked to future economic benefits from the asset are recognized as the cost of the intangible asset (IAS 38.54-71). This is contrary to US GAAP that prescribes immediate expensing of research and development expenditures (ASC 730-10-25-1). Based on the prescriptions specified in IAS 38, expensing or capitalizing development expenditures is depending on information (as, e.g., the probability of future benefits generated through the asset). In case managerial judgment regarding the fulfillment of the specified criteria is not influenced by earnings management purposes but truthfully made, both accounting treatments contain information making it difficult to directly assign them to the two types of conservative accounting (also see chapter 4.2.2.1).

2.1.3 Benefits and Costs of Accounting Conservatism for Financial Statement Users

In general, financial reporting is designed and shaped within the aim to enhance efficient capital allocation (Kothari et al., 2010). Against this background, (international) financial reporting and standard setting serves two different functions. On the one hand, it aims at providing decision useful information to financial statement users in order to facilitate the evaluation of investments' return potentials (valuation or informational function of financial reporting). From a valuation perspective, the main function of accounting thus is to enhance investment decision making. On the other hand, financial reporting should enable users to monitor the use of their invested capital (stewardship function of financial reporting) (Beyer et al., 2010). From a contracting perspective, accounting information should thus primarily serve to facilitate the evaluation of the efficiency and effectiveness of a company's contracts (e.g., debt or management compensation contracts). Conservatism in accounting, being one accounting

concept incorporated in international financial reporting standards, should hence provide valuation relevant information and enhance contract efficiency.

When looking at benefits and costs of accounting conservatism it is important to have in mind that financial reporting addresses different groups of users (e.g., creditors, debtors and analysts amongst others) which have heterogeneous informational requirements (Riahi-Belkaoui, 2004; Beyer et al., 2010; Kothari et al., 2010; Coenenberg et al., 2016). It is thus very unlikely that conservatism, its consequences and implications, are judged equally across different decision contexts. Each stakeholder has his own view on the 'quality' of a company's financial reporting: creditors, for instance, primarily demand information that is relevant for contracting purposes whereas investors demand information that is relevant for the evaluation of investment opportunities (Beyer et al., 2010; Ruch and Taylor, 2015).

It is examined and controversially debated in literature to what extent conservatism enhances both the stewardship (contracting) and the informational (valuation) function of financial reporting (e.g., Watts, 2003a, b; Ruch and Taylor, 2015).[5] Watts (2003a) defines conservatism as asymmetric verification requirements for gains and losses and does not explicitly address the two different types. Other researchers attach greater importance to different shades of conservative accounting and argue that depending on the context (e.g., considered criteria of earnings quality) one type of conservatism can be more beneficial than the other (e.g., Ball and Shivakumar, 2005). Ruch and Taylor (2015) provide a review of related studies on how conservatism affects financial statements and their users. The following chapters build on and further extend their literature review by focusing on benefits and costs of conservative accounting for financial statement users from a stewardship as well as from an informational perspective.

2.1.3.1 Stewardship Perspective

Following the nexus of contracts theory, several researchers define a company as a collection of contracts between agents (e.g., Jensen and Meckling, 1976; Sunder, 1997). From this perspective, conservatism is considered as being an accounting tool to enable and ameliorate the generation of contracts and enhance contract efficiency within a company. The idea is that certain types of contracts, as debt contracts and executive compensation contracts, result in

[5] Literature also investigates further reasons for the existence of conservatism in accounting that are not directly related to the two reporting functions. Watts (2003a, b) adds the following aspects: conservatism is useful in cases of shareholder litigation, it fulfills certain tax purposes, and it serves accounting regulators by enhancing investor confidence in the reliability of financial reports. For more insights on conservatism's legal and political determinants, also see, e.g., Habib (2007).

asymmetric payoffs to the contracting parties (i.e., borrowers and lenders or managers and owners respectively) due to information asymmetries as well as the separation of ownership and control potentially leading to divergent interests between agents (Jensen and Meckling, 1976; Eisenhardt, 1989). Therefore, contracting parties demand a timely recognition of financial information that most strongly affect their own interests and goals (Healy and Palepu, 2001; Watts, 2003a). In this context, conservatism serves as a tool to mitigate agency problems (Watts, 2003a, b; LaFond and Roychowdhury, 2008). The next two chapters explain the use of conservatism in debt contract as well as executive compensation contract settings in more detail.

2.1.3.1.1 Debt Contracts

One type of company contracts that could lead to asymmetric payoffs to contracting parties are debt contracts. If lenders provide funds to a borrowing company they bear the risk that the manager expropriates the value of the investment by, e.g., paying out dividends or investing in high risk projects reducing the likelihood 'that there will be sufficient resources available to fully repay existing or lower priority debt in the event of financial distress, benefiting the entrepreneur' (Healy and Palepu, 2001, p. 409). Debt contracts serve to assure repayment of funds to the lender. To enhance debt contracting efficiency, accounting information should be relevant for creditors' lending decisions and mitigate information asymmetries between borrowers and lenders. Information asymmetries between debt-contracting parties influence the debt-contracts' design (e.g., Leland and Pyle, 1977; Aghion and Bolton, 1992; Holmstrom and Tirole, 1997). Debt-contracting literature shows that lenders anticipate agency problems and demand higher levels of (especially conditional) conservatism as a precondition to lending (Kim and Pevzner, 2010; Kothari et al., 2010). As Watts (2003a) argues, the concept of timelier loss recognition fits lenders informational needs: debtors' losses are more relevant to creditors than debtors' gains. This is the case because lenders' claims are restricted to the amount of credit given plus the corresponding stipulated interest payment. Lenders do not participate in borrowers' gains but they fear contract violation in case of borrowers' losses. Zhang (2008) documents that borrowers' conservatism serves lenders as default-risk alarm because conservatism leads to timelier loss recognition and accelerated debt covenant violation by the debtor. In this case, lenders can more quickly exercise their contractual rights and protect the credit amount provided to the borrower by limiting or influencing managerial activities.

A variety of prior studies provides evidence that conservatism is beneficial in borrower-lender contract settings because it decreases information asymmetries between these parties (cf., e.g., Ahmed et al., 2002; Beatty et al., 2008; Wittenberg-Moerman, 2008; Zhang, 2008; Göx and

Wagenhofer, 2010; Nikolaev, 2010; García Lara et al. 2016). Ahmed et al. (2002) highlight that in a debt-contracting setting conservatism can restrict wealth transfers from bondholders to shareholders. They find that companies applying conservatism benefit from lower cost of debt as, in their opinion, bondholders reward restrained dividend overpayment. Relatedly, Brockman et al. (2015) find that conservatism can mitigate lender and shareholder asset substitution conflicts by reducing managerial incentives to invest in risky negative net present value (NPV) projects.[6] Thus, from a creditor's perspective, conservatism serves as a mechanism to reduce the risk of asset substitution and bondholders' risk of credit default. Creditors seem to demand conservatism in accounting to 'protect' the loans they grant to borrowers.

Cheng et al. (2017) find evidence that second-generation state anti-takeover laws (ATLs) are negatively associated with conditional conservatism. According to their interpretation of this finding, ATLs are a mechanism to mitigate shareholder-debtholder agency conflicts lowering the debtholders' demand for conservatism. This reasoning suggests that corporate governance mechanisms can substitute positive effects induced by conservatism thereby lowering creditors' demand for conservative accounting.

However, other researchers question the usefulness of conservatism for debt contracting efficiency. They reflect on the fact that conservatism can restrain managers from investing in risky projects even if they are highly promising regarding profitability (Roychowdhury, 2010). Kravet (2014) provides evidence that under more conservatism managers prefer less risky acquisitions and restrain from riskier but still positive NPV acquisitions even if their profitability increases. The authors reason that debt-covenant violation risks drive this behavior. Conservatism can hence result in managerial underinvestment being detrimental to a company's stakeholders.

Other researchers as Gigler et al. (2009) criticize conservatism for not serving as an efficient default-risk-alarm but rather leading to low signals in times of economic downturns and uncertainty. The authors argue that under conservatism, due to timely loss recognition and delayed gain recognition, the disclosure of gains will occur less frequently than the disclosure of losses. If a gain is disclosed the information content will be higher than in the loss case because the higher verifiability standards for gains than losses relates to a high probability of actual occurrence of the respective gain. In contrast, loss disclosures appear more frequently. Due to lower verifiability standards for losses than gains, the information content should be

[6] See chapter 2.1.3.1.2 for more insights on conservatism restraining managers from investing in negative NPV projects.

lower because the probability that the loss actually appears is also lower. One problem the authors mention is that if conservatism also leads to low signals in times of economic upturns, as it is suggested by timely loss recognition, the probability of false default-risk-alarms would increase leading to inefficient contracting.

According to Ball et al. (2008), in debt contracting settings, it is important to differentiate between the existing two types of conservative accounting. Ball and Shivakumar (2005) argue that unconditional conservatism introduces a bias of unknown magnitude in accounting numbers. The authors explain that if companies report ex ante low book values of equity, rational financial reporting users would consider this accounting bias. These users would 'realize that assets are unconditionally understated, and would set leverage covenants appropriately' (Ball et al., 2008, p. 194). If the accounting bias, however, is not recognized, unconditional conservatism can lead investors to make 'erroneous' decisions (Jenkins et al., 2009, p. 1044). Ball and Shivakumar (2005) reason that only conditional conservatism can ameliorate contracting efficiency by limiting managerial aggressive reporting when economic losses occur and timely triggering debt covenant violations. Unconditional reporting is judged as 'contracting-neutral at best' (Ball et al., 2008, p. 194).

2.1.3.1.2 Executive Compensation Contracts

Another type of company contracts potentially resulting in asymmetric payoffs to the contracting parties are executive compensation contracts. In this context, the demand for conservatism stems from the aim to align capital providers' and executives' interests. Prior research shows that the design of compensation contracts influences managers' incentives (e.g., Healy, 1985; Lambert et al., 1991) and can induce managers to make investment decisions, which are in their own interest (e.g., increasing their amount of compensation) but not in line with the interests of a company's capital providers (e.g., receiving interest or dividend payments). If management compensation is for example dependent on earnings figures managers have incentives to apply earnings management to hit the earnings level defined in the compensation contract. By demanding higher verification requirements for gains than losses, conservatism can limit managers' ability and reduce managers' incentives to bias accounting information upward (Ball, 2001; Watts, 2003a). Conservatism thus mitigates inappropriately high managerial compensation (Watts, 2003a) as well as unfavorable effects of negative NPV projects (Ball, 2001). Ball (2001, p. 139) explains that due to the fact that conservatism considers potential losses upfront 'there is no incremental income penalty to actual abandonment' of failure projects decreasing incentives to prolong them. Conservatism

thus enables capital providers to more easily identify negative NPV projects and hinders managerial overinvestment.

Agency literature (e.g., Jensen and Meckling, 1976) argues that managerial risk taking behavior can induce a shareholder - bondholder conflict when managers are prone to invest in riskier projects with negative NPVs. Ball and Shivakumar (2005) reason that managers are less likely to invest in negative NPV projects serving as 'trophy' acquisitions when conservatism is applied and losses have to be recognized timely, hence within managers' own tenure period. On the contrary, if losses can be deferred to future periods and thus passed on to subsequent managers, current managers are more prone to invest in negative NPV projects (Ball and Shivakumar, 2005). Furthermore, such loss deferral to future periods incentivizes managers to continue investing in ex-post negative NPV projects. They thus avoid reporting losses due to project abandonment during their own tenure period (Ball and Shivakumar, 2005). Iyengar and Zampelli (2010) find that conservative accounting increases the sensitivity of executive compensation to accounting performance (i.e., earnings changes) because conservatism restrains the probability of managerial earnings manipulation improving the reliability of accounting performance measures. This allows companies to design compensation contracts that link managerial compensation more strongly to accounting performance.

In summary, although prior arguments and findings are mixed, the prevalent reasoning in literature is that in a contracting setting, from a financial statement users' perspective, benefits of accounting conservatism outweigh its costs. Especially lenders benefit from conservatism because it serves as a default-risk alarm in debt contract settings and reduces managerial earnings management (e.g., overinvestment in negative NPV projects) in compensation contract settings.

The next chapter discusses benefits and costs of conservative accounting from an informational perspective. The corresponding insights are related to those provided by research focusing on the stewardship perspective.

2.1.3.2 Informational Perspective

Literature investigates if conservatism not only provides benefits to creditors (see the previous chapter) but also to equity-holders. Researchers examine conservatism from an informational valuation perspective complementing the more established contracting based explanation. The focus is to examine whether conservative accounting provides decision useful information to investors. First, prior insights on the impact of conservatism on information asymmetries

between investors and managers are presented, before second, presenting literature on the impact of conservative accounting on value relevance of accounting information provided to (potential) investors.

2.1.3.2.1 Information Asymmetries

From an investor's perspective, decision useful reporting information enhances and facilitates valuation of investment opportunities (Beyer et al., 2010). Information asymmetries between company in- and outsiders reduce decision usefulness of accounting information for (potential) investors. This is for example the case when managers withhold valuation relevant information with the aim to avoid that potential investors restrain from investing in the respective company or that current investors sell their company stake. Agency conflicts are hence not only observable between managers and creditors but also between managers and equity capital providers. Under this perspective, informational benefits of accounting conservatism mainly stem from reduced information asymmetries between informed and uninformed parties (Kim and Pevzner, 2010).

Based on private information, managers are tempted to overstate financial performance to maximize their own wealth to the detriment of shareholders (LaFond and Watts, 2008). LaFond and Watts (2008) describe conservatism as a governance mechanism helping to reduce managerial earnings management by implementing higher verification requirements for gains than losses leading to an increase in firm value. They find empirical evidence that information asymmetry is significantly positively associated with conditional conservatism. Following their interpretation, equity market participants demand conservatism in accounting to alleviate the negative effects of information asymmetries. Complementarily, García Lara et al. (2014) provide evidence that conservatism reduces information asymmetries between firm insiders and outsiders via limiting earnings management. Conservatism thus seems to mitigate managerial benefits derived from earnings management. Chen et al. (2007) develop a theoretical model showing that conservative reporting can reduce incentives for earnings management and hence reduces managerial biases in accounting information and disclosures. Guay and Verrecchia (2007) theorize that if managers commit to and credibly apply conditional conservatism they report negative realizations in a timely manner. According to the authors, managers also have strategic incentives (e.g., compensation related) to provide good news in time. Based on disclosure literature, people value a company at a discount in situations of uncertainty. Full disclosure can mitigate the applied valuation discount. A conservative reporting system coerces a timely recognition of bad news and induces managers to disclose positive realizations.

Conservatism can thus lead to full information disclosure resulting in higher firm prices. Hui et al. (2009) find a negative relation between conservatism and voluntary disclosure of financial information represented by the number of quantitative management earnings forecasts. They provide evidence that conservative accounting leads to a decrease in need to preempt bad news by voluntary disclosure (i.e., issuing a forecast). The authors state that their results lead to the assumption that conservatism can serve as a substitute of management forecasts by reducing information asymmetries in the market. Kim and Pevzner (2010) empirically confirm that higher levels of conditional conservatism are associated with lower levels of future negative news. The authors further analyze if the market perceives this relation as economically meaningful, in the sense that 'the market rewards more conservative firms with more positive (less negative) reaction to good (bad) news earnings announcements' (Kim and Pevzner, 2010, p. 312). However, they provide but only weak evidence for this prediction.

Further literature finds that conservatism can mitigate negative market reactions to economically bad news by alleviating information asymmetries. Francis et al. (2013) investigate the impact of both types of accounting conservatism on shareholder value. Investigating the financial crisis of the years 2007 and onwards, the authors empirically show that firms following a more conservative way of accounting prior to the crisis suffered less from losses in firm value than firms applying less conservative accounting methods (Francis et al., 2013). The authors reason that information asymmetry between firm insiders and firm outsiders is especially high in times of a financial crisis because managers engage more in earnings management in situations of financial distress. Conservatism constrains managerial earnings management and thus leads to more reliable information for firm outsiders resulting in less value losses during periods of financial crisis. Accordingly, Jenkins et al. (2009) reason that the demand for accounting conservatism is higher during periods of economic recession due to an increasing uncertainty about future outcomes.

Constrained earnings management in turn is beneficial for earnings quality. Prior research applies Basu's (1997) measure of timely loss recognition to test for earnings quality[7] (e.g., Ball and Shivakumar, 2005). The Basu (1997) measure incorporates that economic losses are recognized timelier in financial reporting than economic gains. Timeliness of loss recognition (conservatism) is considered an attribute of earnings quality. In a survey study by Dichev et al. (2013), 59.28% of a subject sample of 169 CFOs think that the result from conservative recognition of assets and liabilities represents an important feature of high quality earnings.

[7] For more insights on the influence of conservatism on earnings quality, cf. Dechow et al. (2010).

Only 13.77% disagree to this statement. This is valid for both types of conservative accounting. 'One CFO emphasizes the traditional understanding of conservatism as a shield against uncertainty: "conservative accounting is the way to go because you have less of a worry when the market turns against you. You are better insulated against the unknown"' (Dichev et al., 2013, p. 15).

Even though prior literature provides evidence that conservatism restricts earnings management (e.g., LaFond and Watts, 2008; Francis et al., 2013), there is conflicting evidence showing that conservatism is also applied for earnings management purposes. This is illustrated hereafter by referring to R&D accounting[8]. Under IAS 38, the capitalization of R&D expenditures is mandatory when certain criteria are met that jointly confirm the R&D project's or product's economic and technological feasibility.[9] The application of these criteria demands managerial judgment and leaves space for discretion. On the one hand, discretion in accounting standards can reduce information asymmetry between managers and outside investors but on the other, it can also foster managerial opportunism (Healy and Palepu, 1993; 2001). In the context of capitalization of investments in intangibles there exists a trade-off between relevance and reliability of accounting information. Debt-contracts or management compensation contracts can generate incentives to commit earnings management via capitalizing R&D expenditures too early (cf. chapter 2.1.3.1). Markarian et al. (2008) find that managers use the capitalization of R&D expenditures for income smoothing purposes, thereby reducing earnings volatility. This finding shows that capitalization of R&D expenditures relates to earnings management purposes. Nevertheless, at the same time, it can enhance decision usefulness of the reported information by reducing the volatility of earnings thereby contributing to an increase in the predictability of future earnings. Dinh et al. (2016) document that R&D capitalization strongly relates to benchmark beating purposes, representing another type of earnings management. Their findings suggest that market participants associate capitalizing R&D with earnings management, leading to the application of valuation discounts.

When earnings management is involved, the usefulness of reported information can decrease due to reduced reliability of the information provided. Correspondingly, researchers and standard setters favored expensing of R&D (i.e., unconditional conservatism) for a long time, because R&D activity and its future benefits are subject to high uncertainty. Kothari et al. (2002) confirm higher variability of earnings generated through R&D investments compared to

[8] R&D accounting also provides the setting for the experiment conducted in this thesis (cf. chapter 4.2.2).
[9] See chapter 4.2.2.1 for more details on R&D accounting under IFRS.

investments in property, plant and equipment. Based on their findings, the authors relate to the relevance-reliability trade-off in capitalizing R&D and argue that one could question the suitability of R&D expenditures for classifying as an asset due to the high uncertainty of future benefits. Amir et al. (2007) find confirming evidence that investments in R&D more strongly contribute to earnings variability than investments in physical assets – at least in R&D intensive industries. Dichev and Tang (2009) analyse the relation between earnings' volatility and earnings' predictability. Based on a prior paper (Dichev and Tang, 2008), they argue that poor matching of revenues and expenses increases earnings' volatility. The authors further state that 'poor matching is also associated with poor earnings predictability because the matching noise in reported earnings obscures the underlying economic relation that governs the evolution of earnings over successive periods' (Dichev and Tang, 2009, p. 162). In a R&D context, poor matching on the one hand could stem from mechanically expensing R&D although the expenditures actually qualify as assets or on the other from earnings management behaviour independent of the type of conservatism involved.

Prior literature hence shows that conditional conservatism can serve as opportunistic earnings management via, e.g., capitalizing R&D expenditures for income smoothing or benchmark beating purposes. Unconditional conservatism has equal potential to support earnings management behavior because it can lead to reserves on the balance sheet (e.g., allowance for doubtful accounts) that can easily be converted into earnings when earnings targets have to be met (Jackson and Liu, 2010). Jackson and Liu (2010) argue that (stricter) limits of the amount by which firms are allowed to understate net assets may decrease this type of earnings management. The role of conservatism in limiting vs. enhancing earnings management and hence in affecting information asymmetries is thus unclear and context-dependent.

Independent from earnings management, researchers criticize that the verification asymmetry for gains and losses applied under conservatism results in a persistent understatement of a firm's balance sheet net assets. As described by Watts (2003a, p. 208), the effect of understating net asset values is one of the major objections to conservatism because it 'can lead to overstatement of earnings in future periods by causing an understatement of future expenses'. Conservatism thus lowers information-quality (Penman and Zhang, 2002) and increases information asymmetry. Stakeholders may draw false conclusions from downwardly biased financial information. Conservatism thus results in inefficient decision making, inefficient resource allocation and reduced firm value (e.g., Penman and Zhang, 2002; Lev et al., 2005; Guay and Verrecchia, 2006). One could argue that conservatism increases information asymmetries

because future positive firm prospects are concealed when accelerating bad news recognition and delaying good news recognition. Consistent with this reasoning, in the survey study conducted by Dichev et al. (2013), CFOs also question the usefulness of conservative accounting. One CFO stated that conservative accounting can lead to company misevaluation by investors: 'in the absence of enough disclosure about conservative accounting, investors will undervalue our company as they cannot distinguish poor earnings from conservative earnings' (Dichev et al., 2013, p. 15).

This statement suggests that information disclosure plays an important role in supporting the usefulness of conservative reporting. Related literature argues that in a conservative accounting setting good news are often provided through other communication channels as, e.g., conference calls or press releases (Guay and Verecchia, 2007). Hence, to provide decision useful information to investors, managers could disclose them voluntarily when a timely recognition of gains in financial statements is not allowed due to a conservative accounting regime. In case of supportive voluntary disclosure, conservatism would again contribute to reduced information asymmetries.

Nagar et al. (2016) theorize that in settings with lower information asymmetries the demand for conservative accounting should be lower. Kim et al. (2013) examine seasoned equity offerings (SEOs) and find that companies applying more conservatism have higher SEO announcement returns. Artiach and Clarkson (2014) document an inverse relation between conservatism and cost of equity capital that declines if the company's information environment improves. These insights imply that investors value conservatism more in cases of higher information asymmetries. Francis et al. (2013) show that the impact of conservatism on firm value is more prominent for companies with poorer corporate governance and higher information risk. Literature examining the relation between different governance mechanisms and conservative accounting further supports the assumption that the demand for conservatism decreases with decreasing information asymmetry. Ball and Shivakumar (2005) find that conservatism is less prevalent in private companies. They reason that in the case of private firms the market does not extensively demand conservatism in accounting because information asymmetries are rather reduced by private communication than through financial reporting. Consistently, LaFond and Watts (2008) provide evidence that conservatism is more prevalent in companies with higher information asymmetries, being mainly the case for public firms. Conservatism has also been found to be prevalent in companies with lower managerial ownership because lower managerial ownership increases the agency conflict between managers and shareholders

(LaFond and Roychowdhury, 2008). The negative relation between managerial ownership and accounting conservatism suggests that corporate governance mechanisms and conservatism substitute each other. In contrast, García Lara et al. (2009) argue that adequate corporate governance mechanisms serve to better monitor a company's management and are rather supported than substituted by conservative accounting. Stronger corporate governance should demand accelerated bad news recognition in earnings, i.e., an increase in conditional conservatism. The authors find confirming evidence. Although the empirical findings are contradictive, they consistently indicate that from an informational perspective conservatism seems to serve as a governance tool to monitor the respective company.

2.1.3.2.2 Value Relevance

From a valuation perspective, decision usefulness of accounting information is not only enhanced by reduced information asymmetries but also by increased relevance of the information provided. According to the IASB, relevance of accounting information is characterized by its predictive and/or confirmatory value (IASB, 2010, CF). The information provided should thus serve either to predict future outcomes or to reflect and confirm or change prior information or assumptions. Based on Basu (1997), the value relevance of conservatism is commonly examined by regressing accounting income on stock returns. It has been shown that conditional conservative information (earnings) has greater value relevance when news is bad than when it is good. A timely loss recognition leads to a stronger association between losses and stock returns as compared to gains. In times of good news, the value relevance of conditionally conservative earnings is weaker as gains are only recognized when they effectively occur.

Unconditional conservatism is criticized for decreasing the value relevance of accounting information due to the up-front mismatch of costs and revenues. Researchers reason that by mechanically applying unconditional conservatism, companies deprive financial reporting users of value relevant information. This is found to be the case for immediately expensing R&D expenditures. Lev and Zarowin (1999) argue that capitalizing R&D expenditures, representing an example of conditional conservatism, allows a better matching of costs and possible future returns, leading to reported earnings that better reflect a company's performance, thus providing more information to shareholders. Capitalizing compared to expensing R&D expenditures allows managers to inform investors about expected future benefits of the respective project (Oswald and Zarowin, 2007). It offers the possibility to signal private information to accounting information users (Lev and Zarowin, 1999). Several studies

confirm value relevance of capitalized development expenditures (e.g., Lev and Sougiannis, 1996; Lev, 2001; Healy et al., 2002; Ahmed and Falk, 2006). It is even suggested to capitalize 'all intangible investments with attributable benefits which have passed certain prespecified technological feasibility tests' (Lev and Zarowin, 1999, p. 377).

Findings by Luft and Shields (2001) support the assumption that the capitalization (i.e., conditional conservative) approach enhances decision usefulness of accounting information. In an experiment with M.B.A. and undergraduate students, the authors investigate the effect of capitalizing vs. expensing investments in quality improvement programs on the accuracy of individuals' earnings forecasts. The authors found that individuals are not able to see through the dynamics of these investments. Subjects' earnings predictions were more accurate, more consistent and of more consensus in the capitalization than in the expense condition. Even after having learned the expense-return relation via a learning data set, individuals were not able to allocate the expenses in intangibles with their future returns appropriately. These findings suggest that from a user perspective capitalizing intangibles' expenditures instead of expensing them improves the explanatory power of the accounting information provided.

On the one hand, unconditional conservatism might lower accounting discretion and thereby enhance the reliability of the information provided. On the other hand, limited discretion might lead to limited timeliness and reduced relevance of the information provided due to a mismatch of revenues and expenses insufficiently reflecting a company's underlying economics. Empirical evidence is mixed. In their empirical analysis on the association between unconditional conservatism and value relevance, Balachandran and Mohanram (2011) do not find evidence that unconditional conservatism reduces value relevance of accounting information.

Bandyopadhyay et al. (2010) examine the impact of conservative accounting on current earnings' ability to predict future cash flows versus future earnings (i.e., earnings' persistence). Their study provides insights on how conservatism is linked to a trade-off between relevant and reliable accounting information. Consistent with Kim and Kross (2005), earnings are considered as relevant if they have predictive value for forecasting future cash flows. Based on Richardson et al. (2005), earnings persistence is considered as a proxy for reliability of accounting information. If accounting accruals are biased by measurement error, this bias will translate into measurement error in the earnings measurement process leading to a lower association between current and future earnings (Bandyopadhyay et al., 2010). Consistent with

prior findings by Kim and Kross (2005) and Richardson et al. (2005), Bandyopadhyay et al. (2010) argue that conditional conservatism enhances cash flow predictability, which means that conditional conservative information is value relevant. At the same time, conditional conservatism is assumed to decrease earnings predictability, which is a sign for lower reliability of conditional conservative accounting information due to measurement error. In contrast, unconditional conservatism is commonly considered to enhance reliability of accounting information. While their reasoning focuses on conditional conservatism, the authors admit that in their empirical analyses they are not able to clearly separate conditional from unconditional conservatism. Hence, their results presumably capture the effects of both types of conservatism. In summary, Bandyopadhyay et al. (2010) find that, on the one hand, conservatism contributes to a decrease in earnings usefulness due to its negative impact on accounting information reliability, but, on the other hand, it leads to an increase in the relevance of accounting information.

Related literature confirms the negative association between conditional conservatism and earnings persistence (Chen et al., 2014). Richardson et al. (2005) further show that less reliable accruals contribute to lower earnings persistence. A decrease in earnings persistence can have economic consequences. Investors are not able to anticipate this effect leading to securities mispricing. Based on these findings, opponents criticize conservatism for contributing to a decrease in earnings usefulness due to its conflicting effects on earnings persistence and future cash flow predictability.

In summary, prior literature provides mixed evidence on the value relevance of conservative accounting information. In general, the overview on benefits and costs of conservatism for financial statement users shows that the usefulness of conservative accounting strongly depends on the type of conservatism applied, the setting and the respective users' requirements. As Ruch and Taylor (2015) assume, the different operationalization of conservative accounting applied in empirical studies could also be responsible for the mixed and partially conflicting results. Nevertheless, the literature on conservatism provides several reasons why this concept is deeply rooted in financial accounting. If financial statement users benefit from accounting conservatism, they will probably acknowledge its application, which in turn benefits the companies applying conservative accounting themselves as is described in the next chapter.

2.1.4 Economic Effects of Accounting Conservatism for Financial Statement Preparers

Several researchers find that the use of conservatism influences companies' cost of equity and debt capital. As has been explained earlier, conservatism can mitigate information asymmetries

by limiting earnings management leading to more reliable information disclosure (cf. chapter 2.1.3.2.1). If investors perceive a reduced information risk, they may acknowledge the application of conservative accounting by providing capital at a lower cost. The required rate of return on the invested equity capital should hence be lower. Several authors empirically confirm a negative relation between conditional conservatism and cost of equity capital (e.g., García Lara et al., 2011; Artiach and Clarkson, 2014; García Lara et al., 2014). Other papers find mixed results. Chan et al. (2009) provide confirming evidence for unconditional conservatism leading to a decrease in cost of equity capital but find opposite results for conditional conservatism. The authors reason that conditional conservatism provides more managerial discretion and hence more space for earnings management leading to higher cost of equity capital. Biddle et al. (2016) also document that conditional conservatism is positively related to cost of equity capital. They argue that conditional conservatism results in greater precision about bad news decreasing expected payoffs and hence increasing cost of equity capital. They further reason that conditional conservatism can increase information asymmetry among analysts and investors by 'inducing unexpected negative information shocks' (Biddle et al., 2016, p. 70) also leading to higher cost of equity capital. They provide evidence that the positive relation between conditional conservatism and cost of equity capital can be mitigated by governance mechanisms as the introduction of the Sarbanes-Oxley Act in 2002 whose regulations decreased information asymmetries between parties.

As explained earlier, Ahmed et al. (2002) document that conservatism mitigates agency conflicts between bondholders and shareholders by limiting disproportionate dividend payments to shareholders. They show that this mechanism leads to lower cost of debt. Regarding agency conflicts between borrowers and lenders, Zhang (2008) finds that conservatism serves lenders by accelerating signals of debt covenant violation. In this context, lenders acknowledge the application of conservatism by offering lower interest rates, thus lower cost of debt. Brockman et al. (2015) document a positive association between CEO compensation risk and borrowing costs. If CEO compensation is at high risk, CEOs will more easily engage in risk-seeking behavior, as, for instance, investing in high risk projects. This behavior could increase the problem of asset substitution between debtholders and shareholders. The application of conservative accounting reduces the positive relation between CEO compensation risk and cost of debt because conservatism reduces managerial overinvestment in negative NPV projects and is thus perceived 'as a risk-reducing mechanism' by lenders (Brockman et al., 2015, p. 204).

Prior literature further shows that conservatism can result in inefficient analyst forecasting and company mispricing, which negatively affects the reporting company itself because in these cases stakeholders commonly demand higher cost of capital. García Lara et al. (2014) find that increases in conservatism that lead to decreases in information asymmetries are associated with more accurate and less dispersed analyst forecasts and more analyst following. Li (2008) shows that unconditional conservatism decreases analyst forecast errors in the case of good or mild bad news cases whereas it increases forecast errors in settings of extreme bad news. Mensah et al. (2004) find evidence that unconditional conservatism increases the absolute value of analyst forecast error and dispersion. Results are weaker when applying alternative conservatism measures (e.g., level of prior period accruals) which more likely capture conditional conservatism. Other studies find that analysts make optimistically biased and hence inefficient forecasts based on conditionally conservative information (e.g., Pae and Thornton, 2010; Louis et al., 2014). As shown by Louis et al. (2014), especially unsophisticated analysts are subject to this optimistic bias due to a lack of understanding of accounting conservatism and its impact on earnings. Literature reasons that a positive relation between (conditional) conservatism and analyst forecast error presumably stems from the fact that conservatism can increase information asymmetry and generate divergent opinions between capital market participants (Biddle et al., 2016).

Conservatism also influences firms' investment efficiency. Ahmed and Duellmann (2011) reason that if conservatism reduces managerial incentives to invest in negative NPV projects, companies applying conservative accounting should show higher future profitability. They find confirming evidence. Accordingly, García Lara et al. (2016) provide evidence that conservatism induces prudent and discourages risky investments, which decreases the investment related risk of insolvency. In this context, conservatism addresses creditors' requirements facilitating a company's access to debt and simultaneously enhances firms' investment efficiency.

In summary, conservatism not only provides benefits and costs for financial statement users but also for the reporting company itself. Although conservatism is still deeply rooted in international financial accounting standards and has been shown to provide benefits to different parties, nowadays, the concept is put under question. Conservative earnings behavior in one year can lead to non-conservative earnings behavior in following years (Beaver, 1998), biasing accounting information. Relatedly, researchers as Lev et al. (2005), Guay and Verrecchia (2006) and Gigler et al. (2009) criticize conservatism to cause inefficient investment decisions

by financial statement users. Standard setters want financial reports to provide decision useful information to all stakeholders, especially 'potential investors, lenders and other creditors' (IASB, 2010, CF OB2). The IASB shares the view that conservatism leads to downwardly biased reporting and conceals true performance conflicting with their aim to provide neutral decision useful information through the IFRS (IASB, 2008, CF ED BC2.21). 'Today, the emphasis on objective and fair presentation and the primacy of the investor as user has lessened the reliance on conservatism' (Riahi-Belkaoui, 2004, p. 227). Standard setters have given preference to neutral accounting rules. Accounting neutrality aims at providing an unbiased, symmetric view of a company's current net assets. This concept is presented in more detail in the next chapter.

2.2 Neutrality of Accounting Information

Financial reporting under IFRS aims at offering decision useful information to financial reporting users to enable them to make adequate decisions about 'providing resources to the entity' (IASB, 2010, CF OB2). International standard setters specify certain qualitative criteria that are necessary to ensure decision usefulness of the information reported in the Conceptual Framework to the IFRS (IASB, 2010, CF Chapter 3). Neutrality of the information provided represents one of these requirements (IASB, 2010, CF QC12; IASB, 2015, CF ED 2.15).

The concept of neutrality demands accounting information to be objective and free from subjective biases. Under neutrality, the information is in no way, neither regarding selection of the information nor regarding its presentation, manipulated or biased to influence users' information perceptions or their behavior (IASB, 2010, CF QC14). 'Neutrality, in this context, refers to the absence of bias in the presentation of accounting information or reports' (Riahi-Belkaoui, 2004, p. 231). However, neutrality does not mean that the information does not have any influence on addresses' judgment and decision making behavior because only in the case neutral information changes addressees' decisions the information is relevant: 'relevant financial information is, by definition, capable of making a difference in users' decisions' (IASB, 2010, CF QC14). The crucial point is that this change in behavior is not deliberately influenced by the reporting entity.

Neutrality combined with the enhancing qualitative characteristic 'timeliness' of accounting information (IASB, 2010, CF QC29; IASB, 2015, CF ED 2.32) implies symmetric timely recognition of gains and losses. Symmetric accounting aims at correctly estimating current performance. Assets and liabilities hence neither should be overvalued nor undervalued (IASB, 2015, CF ED 2.18) as it could be the case under conservative accounting. Fair value accounting

for financial instruments (cf. IAS 39) is an example of neutral accounting. The fair value is 'the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date' (IASB, 2011, IFRS 13, Appendix A). Book values are written down if assets lose value and written up if asset value increases. Thus, theoretically, neutral (i.e., fair value) accounting reflects the true current economic value of the respective financial asset or liability.

From a conceptual point of view, neutral accounting should lead to a correct estimation of current performance by recognizing gains and losses symmetrically. As stated by Ball and Shivakumar (2005), a timely recognition of both economic gains and losses implies a higher association between book and market values. Neutral accounting aims at shrinking the gap between book and market values to enhance relevance and decision usefulness of accounting information, being the main argument supporting the application of fair value accounting compared to historical cost accounting (Hitz, 2007; Barth, 2014). As explained earlier, conservatism, in contrast to neutrality, treats gains and losses asymmetrically by considering potential losses up-front potentially leading to downwardly biased accounting information. Following this logic, the opposite of conservative accounting would be 'progressive' accounting. In this case, potential gains would be realized up-front whereas losses would only be considered when they occur.

Accounting information can be relevant to the capital market in different ways: researchers commonly distinguish between valuation relevance and forecasting relevance of accounting information (e.g., Lindemann, 2006). Prior research documents that fair value estimates of financial instruments are value relevant to investors for valuing companies' and especially banks' equity (e.g., Barth, 1994; Eccher et al., 1996; Nelson, 1996; Graham et. al., 2003; Ahmed et al., 2006; Song et al., 2010). Fair values are hence associated with stock prices. Financial instruments have been one of the first asset categories accounted for at fair value under national standards and the IFRS due to the availability of market prices for this asset type. Therefore, fair value research has put a focus on financial instruments and the banking sector. The application of fair value accounting for non-financial assets is still more restricted in financial standards but continues to expand. Prior research related to non-financial assets also provides evidence for value relevance of asset measurement at fair value (e.g., Barth and Clinch, 1998; Aboody et al., 1999; Paik, 2009). Besides value relevance, several studies also document forecasting relevance (i.e., predictive ability) of fair value information in the banking sector (e.g., Park et al., 1999; Evans et al., 2014; Bratten et al., 2016). However, prior literature also

shows that fair value accounting can cause volatility in performance indicators due to, e.g., managerial discretion and market volatility (e.g., Hodder et al., 2006; Song, 2015) reducing accounting information's usefulness for company valuation and forecasting purposes.

Hence, neutral accounting also entails weaknesses. Symmetric accounting can lead to the recognition of unrealized gains and losses. It can only produce neutral and objective accounting information under the condition that the particular asset or liability is valued objectively. However, existing scope for discretion in fair value as an example of neutral accounting can provoke biased information and hence distort its reliability. This could be the case when market values are missing (i.e., level 1 or level 2 fair values) and cost or capital-value oriented methods build the basis for the valuation of an asset or liability at fair value (i.e., level 3 fair values).[10] These valuation methods can include subjective biases when an estimation of, e.g., tax rates or future cash flows by managers is necessary. If fair values are not based on market values they are hardly verifiable (e.g., Holthausen and Watts, 2001; Barth, 2007). Fair value accounting thus offers opportunities for opportunistic behavior (Holthausen and Watts, 2001; Nissim, 2003; Ramanna, 2008; Ramanna and Watts, 2012). Song et al. (2010) as well as Goh et al. (2015) provide evidence that mark-to-market fair values (level 1 and level 2 fair values) have a higher value relevance than mark-to-model fair values (level 3 fair values). This suggests that the perceived reliability of level 1 and level 2 fair values is higher compared to level 3 fair values. However, the value relevance of level 3 fair values increases with increasing corporate governance mechanisms such as, e.g., board independence (Song et al., 2010).

In summary, prior literature shows that although neutral accounting can enhance relevance of accounting information, it simultaneously can decrease its reliability due to measurement uncertainties. Despite the described weaknesses and the trade-off between relevance and reliability in fair value accounting, the current trend in standard setting focuses on neutral accounting. This trend has already become apparent during the last 30 years with the balance sheet orientation of international standard setters (Dichev, 2008). Dichev (2008) explains that the central element of the balance sheet based approach in financial reporting (as opposed to the income statement approach) is a proper valuation of assets and liabilities. Earnings are hence determined by changes in asset value over a certain period. Fair value is considered as an extreme form of the balance sheet based approach followed by international standard setters (Dichev, 2008). The current standard setting focus on neutral accounting also manifests itself

[10] See IFRS 13 for details on the specifications for measurement at fair value and the so-called three-level fair value hierarchy (IASB, 2011, IFRS 13.72-73).

in the specification of the qualitative characteristics of accounting information that changed during the revision process of the conceptual framework to the IFRS. In an older version of the framework (IASB, 1989) prudence (often used interchangeably with conservatism) and neutrality have both been argued to be qualitative characteristics of decision useful information. To address the trade-off between prudence and neutrality, the IASB removed prudence from the framework in 2010. This decision gave rise to intense criticism. In response to these critiques, the IASB reintegrated prudence in the exposure draft to the newest revision of the conceptual framework from 2015 (IASB, 2015, CF ED 2.18). The next chapter describes these developments and presents the current debate on prudent (conservative) versus neutral accounting from an IFRS framework perspective in more detail.

2.3 Current Debate on Conservative vs. Neutral Accounting from an IFRS Framework Perspective

The IFRS conceptual framework serves as a conceptual basis for international accounting standards. In the 2015 exposure draft of the revised conceptual framework, the IASB describes the framework as a 'practical tool that assists the International Accounting Standards Board (IASB) to develop Standards that are based on consistent concepts' (IASB, 2015, CF ED, p. 6). Thus, the framework should help the IASB to target and consistently follow specified concepts when developing new and revising existing accounting standards. The framework also constitutes an interpretation and guiding aid for preparers of financial reports when applying the IFRS (IASB, 2010, CF). Overall, the framework is considered an important cornerstone for high quality financial reporting and standard setting (Financial Reporting Council, 2014).

The underlying qualitative characteristics of decision useful accounting information form one part of the framework. Within the revision process of the framework, the qualitative characteristics have changed over time. In the ancient conceptual framework from 1989 that got under the responsibility of the IASB in 2001, two primary fundamental qualitative characteristics of reporting information were specified: 'relevance' and 'reliability' (IASB, 2001, CF 26, 31). In this version of the framework, 'prudence' and 'neutrality' were explicitly mentioned as reliability enhancing characteristics (IASB, 2001, CF 36, 37). In 2010, IASB and FASB presented a revised joint Conceptual Framework for Financial Reporting and introduced 'relevance' and 'faithful representation' as the two fundamental principles of decision useful accounting information (IASB, 2010, CF QC4). Relevant information is defined as information able to change addressees' decisions (IASB, 2010, CF QC6). To achieve a faithful representation, information should be 'complete', 'neutral' and 'free from error'

(IASB, 2010, CF QC12). ‘Comparability’, ‘verifiability’, ‘timeliness’ and ‘understandability’ are classified as enhancing characteristics that are required to ensure decision usefulness of financial reporting information (IASB, 2010, CF QC19).

In 2010, reliability was replaced by the qualitative characteristic faithful representation. According to the IASB, faithful representation includes the intent and meaning of reliability. That is why this fundamental principle, although not named explicitly, is argued to be nevertheless still considered (IASB, 2006, CF DP BC2.28). A further far-reaching change applied in 2010 was the removal of prudence from the framework. In the ancient framework from 1989, prudence was defined as ‘the inclusion of a degree of caution in the exercise of the judgments needed in making the estimates required under conditions of uncertainty, such that assets or income are not overstated and liabilities or expenses are not understated’ (IASB, 2001, CF 37). As a result, reported information should be prudent in situations of uncertainty as well as neutral in the sense that assets and liabilities are neither over- nor undervalued. Furthermore, prudence should lead to an appropriate consideration of uncertainty to enhance the reliability of accounting information. Following this logic, prudence does not lead to or favor a deliberate up-front undervaluation of net assets (as it could be the case when applying conservatism, cf. chapter 2.1.1). As stated by EFRAG (2013) a common understanding of prudence is consistent to conservative accounting: gains should only be recognized when realized whereas potential losses should be considered immediately when they become apparent. The terms conservatism and prudence have commonly been used interchangeably (Barker, 2015). Hence, conservatism is one way to cope with uncertainty and does not necessarily imply a deliberate undervaluation of assets or overvaluation of liabilities. Nevertheless, departing from the definition of prudence in the framework from 1989, ‘conservatism is not a qualitative characteristic of accounting information’ (Barth, 2008, p. 1167).

Although prudence does not mean to deliberately undervalue assets or overvalue liabilities, international standard setters think that it is probable that prudence will lead to biased information in situations of uncertainty if an asymmetric treatment of gains and losses is applied. The IASB states that a ‘biased understatement of assets (or overstatement of liabilities) in one period frequently leads to overstating financial performance in later periods – a result that cannot be described as prudent. This is inconsistent with neutrality, which encompasses freedom from bias’ (IASB, 2008, CF ED BC2.21). Hans Hoogervorst (2012), the chairman of the IASB, argues that prudence (in the sense of conservatism) could even induce earnings management by generating hidden reserves that can easily be reversed for income smoothing

purposes, e.g., in times of an economic downturn. Standard setters seem to focus on the informational (valuation) perspective of accounting information to support efficient resource allocation whereas the stewardship perspective is neglected (Göx and Wagenhofer, 2010). Against this background, neutral accounting is said to provide information that is more useful to stakeholders and that better increases accounting transparency compared to prudent accounting. To address the tradeoff between neutrality and prudence as qualitative characteristics of reporting information, IASB and FASB eliminated prudence from their joint conceptual framework in 2010.

The removal of prudence from the framework gave rise to intense criticism from research and practice (Crump, 2013). This critique builds on the reasoning that prudence is related to conservative accounting in situations of uncertainty (considering potential losses up-front is considered a prudent behavior). Researchers theorize that if conservatism would only be beneficial for (debt) contracting purposes, there would be no need to integrate conservatism in financial statements because financial statement users could adjust neutral accounting statements for debt contracting purposes via, e.g., debt covenants (e.g., Kothari et al., 2010). However, it has been shown that conservatism is also beneficial from an informational perspective via, e.g., increased investment efficiency (e.g., García Lara et al., 2016; cf. chapter 2.1.3.2). This evidence speaks against eliminating prudence in the sense of conservatism from accounting frameworks due to potential undesired economic consequences (García Lara et al., 2014; 2016).

Further literature provides hints that instead of distorting information, conservatism (prudence) can also enhance neutrality of accounting information. This is the case when an unknown bias introduced by managers (i.e., managers' opportunism) applying neutral accounting is offset by a known bias introduced by conservative accounting (Chen et al., 2007; Gao, 2013). 'Surprisingly, adding one type of bias can reduce the other so much that the total equilibrium amount of noise in the accounting system is diminished' (Chen et al., 2007, p. 560). As Gao (2013) argues even if neutrality is the optimal characteristic of financial reports from a decision usefulness perspective, the optimal accounting rule to enhance neutral financial reporting is conservative against the background of managerial opportunism. Researchers criticize the IASB for not having sufficiently considered economic reasons for the existence of prudence (conservatism) (especially from bondholders' point of view) when having removed it from the framework (e.g., Beinsen and Wagenhofer, 2013; Financial Reporting Council, 2014; Gebhardt et al., 2014). European politicians have even threatened the IASB with stopping funding by the

European Union if the board does not reintegrate prudence into the framework (Wagenhofer, 2014). Conversely, Barth (2008) argues that the conservative bias in financial reports mainly stems from the fact that accounting standards have not yet been released from their traditional bias and are still inconsistent with the framework: 'Conservative bias is not the result of attempts to achieve an objective of conservatism in the framework' (Barth, 2008, p. 1167).

The IASB initially did not depart from their decision to eliminate prudence from the framework and claimed that prudence remains vital and visible in the different standards (Hoogervorst, 2012). Opponents argue that exactly for this reason it is important to reintegrate prudence in the framework which serves as a conceptual basis for consistent standards and should contain all applied concepts (e.g., Beinsen and Wagenhofer, 2013; Gebhardt et al., 2014). In response to an increasing number of critiques, the IASB changed its view and reintegrated prudence in the exposure draft of the revised conceptual framework from May 2015 – but the definition of prudence changed (Wagenhofer, 2014). This time, standard setters conceptually link prudence to neutrality instead of highlighting the trade-off between these concepts: 'Neutrality is supported by the exercise of prudence. Prudence is the exercise of caution when making judgments under conditions of uncertainty' (IASB, 2015, CF ED 2.18). In situations of judgment under uncertainty, users should thus apply cautious prudence, which is considered to support neutrality of accounting information. Nevertheless, standard setters still judge the concept of asymmetric prudence as not being compatible with neutral accounting. Asymmetric prudence is still excluded from the framework because it leads to current under- or overvaluation of assets and liabilities to the benefit of future performance (IASB, 2015, CF ED 2.18).

Comment letters addressing the 2015 exposure draft relate to arguments that have already been put forward in answer to the removal of prudence from the framework in 2010. Some parties support the argumentation by the IASB that only cautious prudence should be reintegrated in the framework to support neutrality while asymmetric prudence needs to be excluded for biasing information downward. Other parties argue that also asymmetric prudence should be part of the framework due to its embeddedness in the standards as well as its positive economic effects (from both a stewardship and an informational perspective, e.g., diminishing managerial optimism and limiting earnings management).[11] The IASB currently works on their final

[11] The IASB provides a brief summary of the feedback they received regarding the 2015 exposure draft of the revised conceptual framework (IASB, 2016a) as well as a more detailed summary of comments especially received on the topic of "prudence" (IASB, 2016b). All comment letters are available on the IFRS homepage (IASB, 2016c).

version of the revised conceptual framework. It remains to be seen if this final version can satisfy all parties.

In summary, the discussion on conservatism versus neutrality in accounting is still ongoing. It remains unclear if the different parties will ever conclude about one concept clearly outperforming the other. As stated by Whittington (2008), it is probably necessary to select the appropriate concept situationally. Applying one universal measurement method appears 'fruitless' (Whittington, 2008, p. 139). When looking at the most widely discussed arguments pro and contra conservatism or neutrality in accounting, it is striking that the discussed arguments mainly or even only relate to 'external' factors as, e.g., contracting purposes and valuation issues. This could be explained by the fact that the currently ruling constellation of institutional settings or the arrangement of contracts demand a certain way of reporting (neutral versus conservative) to be efficient and to enhance social welfare. However, accounting rules and regulations do not only stem from institutional settings. 'Businesses chose conservative accounting in a time before a centralized authority set formal standards for accounting practices, which suggests that conservatism was derived from repeated transactions and functioned as a norm of behavior among business firms' (Dickhaut, 2009, p. 1705).

Being evolutionary stable strategies, many concepts governing today date back to long ago and developed through human evolution. As argued in prior research, also conservatism seems to be an evolutionary stable strategy based on brain functions and individuals' endogenous preferences (Dickhaut, 2009; Nagar et al., 2016). Up to now, researchers have hardly considered such 'intrinsic' factors in the debate on conservatism vs. neutrality in accounting even though individuals might have endogenous preferences for neutral or conservative accounting (which can be unconscious). This thesis aims to enrich the current debate by analyzing individuals' endogenous preferences for conservative vs. neutral accounting in an experimental study. The corresponding stream of literature providing a theoretical basis for this study is presented in the next chapter.

2.4 Individuals' Endogenous Preferences for Conservatism in Accounting

Literature linking the development of accounting standards to human behavioral biases, especially loss aversion, provides hints for individuals having an intrinsic preference for conservatism. Hirshleifer and Teoh (2009) theorize that people dislike being disappointed and thus find conservatism appealing because it reduces the probability of future negative surprises. This chapter deals with individuals' endogenous preferences for conservatism in accounting based on the psychological attraction approach developed by Hirshleifer and Teoh (2009).

As explained in chapter 2.1.2, the capital market literature on conservatism differentiates between unconditional and conditional conservatism with unconditional conservatism being the stronger type of conservative accounting. In contrast, literature on individuals' endogenous preferences for conservatism in accounting does not explicitly differentiate between the two existing types. These studies rather consider conservatism as an accounting concept that is a prudent reaction to uncertainty characterized by an asymmetric treatment of gains and losses (e.g., Hirshleifer and Teoh, 2009; Nagar et al., 2016). The asymmetric treatment of gains and losses is the corner stone addressing individuals' loss aversion and generating individuals' endogenous preferences for conservative accounting (Hirshleifer and Teoh, 2009). Both forms of accounting conservatism treat gains and losses asymmetrically and lead to an understatement of current net assets to the benefit of future performance in times of uncertainty (Watts, 2003a). Therefore, literature on human endogenous preferences for conservatism considers the concept in its entirety. The same approach is followed in the up-coming chapters by focusing on conservatism as a whole being a prudent reaction to uncertainty (Sunder, 1997; Watts, 2003a; Raith, 2009) without further distinguishing between the two existing types.

2.4.1 Conservatism explained by the Psychological Attraction Approach

Thinking about accounting concepts, the question arises if accounting rules are always created based on rational deliberations. Hirshleifer and Teoh (2009) doubt perfect rationality behind the development of accounting rules and introduce the 'psychological attraction approach' to accounting and disclosure rules: 'The psychological attraction approach holds that heuristics and biases in judgments and decisions have shaped and continue to shape accounting rules and policy' (Hirshleifer and Teoh, 2009, p. 1067). The approach to consider psychological phenomena when analyzing the development of existing as well as new accounting rules adds to and does not necessarily replace positive accounting research as the authors themselves underline in their paper.

Analyzing accounting conservatism from a psychological attraction approach perspective, Hirshleifer and Teoh (2009) explain its attractiveness with the fact that people do not like being disappointed or negatively surprised. Accounting measurement and recognition requires making forecasts of the future. The fact that assets are defined as future benefits already shows that each asset is an estimation of the future. Under conservatism, accounting numbers are biased in a way not to disappoint as the following brief example illustrates. In accounting, forecasts often play a role in situations of uncertainty. This could for example be the case when looking at the capitalization of R&D expenditures. The IAS 38 criteria for capitalizing R&D

expenditures leave space for discretion and demand forecasts of the future. A positive development of a R&D project can hardly be guaranteed, but it can be predicted. Nevertheless, the risk of failure, which would materialize in form of asset impairment, remains present. Conservative reporting in the form of expensing instead of capitalizing R&D expenditures reduces the risk of future disappointment because potential future losses are considered upfront and impairments are avoided.[12] People who do not like being disappointed thus 'should find the principle of conservative reporting attractive' (Hirshleifer and Teoh, 2009, p. 1074). Hirshleifer and Teoh (2009) state that individuals do not necessarily know why they find conservatism appealing. Preference for conservatism can hence be an unconscious phenomenon.

Kirschenheiter and Ramakrishnan (2012) develop a theoretical model showing that it is individuals' intrinsic characteristic 'prudence' that demands conservatism – independent of individuals' risk aversion. They define accounting systems as conditionally conservative 'if they produce finer information at lower earnings levels'. Conditionally liberal accounting systems, in contrast, 'produce finer information at higher earnings levels' (Kirschenheiter and Ramakrishnan, 2012, p. 3). The authors measure prudence as the decision maker's sensitivity to risk expressed by his saving decisions. Their main results are that prudent decision makers prefer conservative accounting systems while less prudent decision makers prefer liberal accounting systems (Kirschenheiter and Ramakrishnan, 2012). Furthermore, the authors find that risk aversion alone cannot explain the demand for conservatism. The important driver seems to be prudence.

This evidence contributes to the psychological attraction approach. Individuals' endogenous characteristics as loss aversion and prudence seem to drive their demand for conservative accounting. This reasoning is supported by literature that deals with the development of accounting concepts from a human evolution perspective. This stream of literature is presented in the following chapter.

2.4.2 Conservatism as a Result of Human Evolution

Accounting rules and regulations do not appear from nowhere but are manufactured. The development of accounting and its concepts comes along with the evolution of human beings and their social structures (Basu and Waymire, 2006). Human evolution is characterized by the development of evolutionary stable behavioral strategies that are superior over mutant strategies and prevailed until today (Smith and Price, 1973; Nagar et al., 2016). The functioning of the

[12] See chapter 3.4 for an extended version of the example on R&D accounting serving to illustrate how conservatism addresses individuals' loss aversion.

human brain influences these stable strategies. As described by Kahneman (2012), the human brain applies two different ways of thinking: 'fast and slow'. Kahneman (2012) refers to these two ways of thinking as System 1 and System 2 of the brain. In System 1, the human brain reacts to situations or problems with subconscious emotions as for example fear as a primary automatic and quick response. This System works with very little to no further mental effort or voluntary control. These more basic emotions elicited in System 1 transform into feelings that pass over to System 2. In System 2, these feelings as well as other situational aspects are processed in a slower, more conscious and rational way to solve the problem faced or to react to situational circumstances. Evolution has apparently selected this brain structure and its functioning that is still present today (Nagar et al., 2016). Hence, these brain systems influenced individuals' preferences for resources and their corresponding behavior in the past and nowadays affect human behavior in modern (financial) markets (Kahneman, 2012).

Conservatism is one accounting concept that resulted from and co-developed with human evolution and prevailed until today. In the following two subchapters, first, insights on individuals' endogenous preferences for conservative accounting gained from prior literature on record keeping and human brain behavior are described before, in a second step, presenting game theory based reflections on an evolutionary risk basis for individuals' preferences for conservative accounting.

2.4.2.1 Record Keeping and Human Brain Behavior

Basu and Waymire (2006) link the development of record keeping and accounting to human evolution. They theorize 'recordkeeping is a culturally evolved institution that enables complex economic interaction and plays an integral and pervasive role in human evolution. More specifically, [the authors] hypothesize that systematic recordkeeping outside an individual brain is a necessary condition for the emergence of extended economic cooperation that ultimately leads to complex human societies, markets, and economic organizations' (Basu and Waymire, 2006, p. 202). As reasoned by the authors, the capacity limit of the human brain for memorizing and tracking transactions, as, e.g., the exchange of goods led to the development of external tools facilitating an institutionalized memory of past exchanges. The authors advance the view that accounting represents one of these external tools that has co-evolved and still continues to co-evolve with the development of the human brain as well as institutions like law systems.

Basu and Waymire's (2006) view of causality between current accounting regulations and companies' structures differs from the traditional perspective that stakeholders demand certain accounting rules based on stewardship and valuation needs (cf. chapter 2.1.3; e.g., Watts and

Zimmerman, 1986; Christensen and Demski, 2003). Basu and Waymire (2006) rather assume a two-way causality in the sense that not only users demand specific accounting rules for, e.g., stewardship purposes (e.g., Watts, 2003a) but also modern-life accounting only exists in its current form due to record keeping techniques developed through human evolution. When humans started living in groups and later on built agricultural settlements, trade and economic exchange increased. To enable coordination of trade and exchange of goods within these groups, economic institutions like record keeping evolved and persisted until today serving as tools that enhance human welfare. Modern civilization still builds on these institutions developed in the past that are not stable but culturally evolving over time (Basu and Waymire, 2006).

Dickhaut et al. (2010) extend the reasoning by Basu and Waymire (2006) and relate the evolution of accounting principles especially to the evolution of the human brain. They theorize that the way the human brain evaluates (past) economic exchange influenced the development of certain accounting principles that have particularly been created in the aim to enhance such evaluation of (past) transactions. The authors analyze parallels between accounting principles and human brain behavior in situations of economic decision making. They define accounting principles as 'guides to behavior that are substantially broader than norms. Principles can be either designed or inferred from evolved practices; [the authors'] primary focus concerns evolved accounting principles that result from human action but not necessarily human design' (Dickhaut et al., 2010, p. 232). Waymire (2014) takes a similar view. He states that 'ultimate causation' for accounting principles stems from human evolution and hence fundamental human behavior (Waymire, 2014, p. 2015). This fundamental behavior manifests itself in social norms (e.g., fairness) that developed through human evolution and turned out to be evolutionary stable strategies for enhancing social welfare. Accounting is considered as having been created in accordance with humans' moral conduct as a tool to support exchange transactions and hence increase social welfare (Dickhaut et al., 2010; Waymire, 2014).

One example of the theorized link between accounting principles and human brain functions is the concept of conservatism (Dickhaut et al., 2010). Conservative reporting leads to a timelier recognition of losses compared to gains (Basu, 1997), that is, gains and losses are treated asymmetrically. The human brain seems to be more sensitive to potential losses than gains. Kahneman and Tversky (1979) analyze human decision making behavior under uncertainty and bring together their findings in a behavioral model called Prospect Theory.[13] They provide

[13] Prospect Theory is presented in more detail in chapter 3.1.2.

evidence that in situations of decision making under uncertainty losses loom larger than gains. Losing a certain amount of money creates much more harm than gaining the same amount of money creates pleasure. Neuroscience research provides the opportunity to examine brain functioning in situations of economic decision making and hence enables researchers to shed more light on the development and functioning of accounting (Waymire, 2014). Research in the field of neuroeconomics and especially neuroaccounting indicates that the human brain function and the concept of conservatism have similar patterns. Relatedly, several neurological studies show that the human brain responds differently to financial gains and losses. Breiter et al. (2001) investigate human neural responses related to anticipation and experience of monetary gains and losses via functional magnetic resonance imaging (fMRI). The authors found a differential neural activity regarding gains and losses. In a gain context, the predominant neural responses to the stimuli were observed in the right brain hemisphere whereas in a loss context, predominant neural responses were located in the left brain hemisphere. Relatedly, Knutson et al. (2003) provide evidence that monetary gains and losses are processed differently by the brain. Using fMRI, the authors find that monetarily rewarding outcomes trigger activation of the mesial prefrontal cortex while conditions involving potential monetary losses do not. Tom et al. (2007) also apply fMRI technique and find that brain areas, which show increasing activity as potential monetary gains increase show decreasing activity in loss situations. The authors additionally examine if individuals' degree of loss aversion is correlated with individuals' neural responses to gains and losses and find that greater behavioral loss aversion is associated with greater neural sensitivity to both gains and losses. Further analyses revealed that the decrease in brain activity for increasing losses is steeper than the increase in brain activity for increasing gains. Relatedly, the authors provide insights on individual differences in behavioral loss aversion being driven primarily by individual differences in neural sensitivity to potential losses.

The finding that the human brain processes gains and losses differently in the sense that brain sensitivity for losses is higher than for gains supports the assumption that the concept of conservatism considering gains and losses asymmetrically has an evolutionary basis (Dickhaut, 2009; Nagar et al., 2016). Linking the theory on the co-development of accounting principles and human evolution to insights from human decision making under uncertainty based on Prospect Theory and findings from neuroscience research, Nagar et al. (2016) provide a theoretical model generating an evolutionary risk basis for explaining individuals' endogenous preferences for conservatism in accounting. The next chapter presents their reasoning.

2.4.2.2 An Evolutionary Risk Basis for an Endogenous Demand for Conservatism

As stated by Cosmides and Tooby (1997), the way the human brain processes information today emerged from natural selection processes through human evolution. Apparently, the current brain functioning was an evolutionary stable strategy for solving information-processing problems people faced during past human history. Referring to recent neurological insights on human brain's differential processing of gains and losses (cf. chapter 2.4.2.1), Nagar et al. (2016) argue that individuals have endogenous preferences for an asymmetrical treatment of gains and losses in accounting. According to the authors, these endogenous preferences for conservatism have been created and formed through evolutionary processes in the context of resource and risk allocation in economies. The authors state that human preferences in today's resource allocation settings (e.g., financial resource allocation) emerged from evolutionary resource procurement gambles. Conservatism is perceived as an evolutionary stable strategy for supporting a more efficient resource allocation in the economy. This reasoning is in line with Basu and Waymire (2006) and Dickhaut (2010) who argue that a two-way causality between accounting concepts and its users exists (cf. chapter 2.4.2.1).

Nagar et al. (2016) develop a theoretical model to substantiate their assumptions on individuals' endogenous preferences for conservative accounting. They generate endogenous preferences for conservatism by modeling individuals' risk attitudes around an individual reference point in a basic gain-loss game. Individuals' demand for asymmetric verification requirements for gains and losses (thus their demand for conservatism) represents an equilibrium outcome. The authors' model consists of a non-cooperative 'evolutionary resource procurement and survival game' (Nagar et al., 2016, p. 5) in which a 'producer' produces an output (he hunts a prey) that a 'stealer' might try to steal. The authors model different scenarios depending on each counterpart's strength (tough vs. weak). Each party has to decide whether to fight for the output or not. The outcome of the fight depends on the parties' strengths. The authors theorize that independent of the stealer the producer's production function is concave when considering production effort. In other words, the marginal utility of additional production effort decreases. For this reason, the producer is risk-averse in gain contexts. He prefers smaller sure gains to greater but uncertain gains in all-or-nothing gain gambles. After having hunted a prey, the producer might face a stealer who aims at stealing the produced output. In case both counterparts do not have (reliable) information about each other (i.e., they are in a situation of uncertainty), the model predicts the initiation of an all-out fight. The authors explain that a producer who offers to share the good with the stealer would be perceived as weak and the stealer would fight for the entire good. That is why a producer will directly engage in an all-out

fight to protect his good. He prefers taking the risk of greater losses over accepting a sure but smaller loss in all-or-nothing loss gambles. The producer hence treats potential gains and losses asymmetrically.[14]

Prospect Theory (Kahneman and Tversky, 1979) models decision making under uncertainty and builds on experimental evidence that people are risk averse in gain situations and risk seeking in loss situations. It posits that an individual's value function is steeper in loss than in gain contexts. This means that losing a certain amount of money generates much more displeasure than gaining the same amount of money yields pleasure. Loss aversion hence decreases risk seeking in gain contexts and increases risk seeking in loss contexts (Kahneman and Tversky, 1979). As argued by Nagar et al. (2016), these behavioral patterns stem from evolutionary behavioral selection processes.

In their procurement game model, Nagar et al. (2016) consider the distribution of information. Both producer and stealer must decide whether to fight for the good without knowing the type of their counterpart (tough vs. weak), thus being in an uncertain situation. If both parties do not have information on the respective counterpart, they will initiate an all-out fight. The authors argue that a fight always produces socially wasteful costs for both parties. A possibility to prevent such fights and thus avoid wasteful fight costs would be to reduce information asymmetry between the two counterparts. If each party receives concrete and reliable signals about the counterpart's type, a fight could be avoided because, for example, a weak stealer would not attack a tough producer and a weak producer would leave the good to a tough stealer up-front. Hence, if information asymmetries between counterparties are reduced the preference for wasteful all-or-nothing fights in loss contexts is mitigated.

The authors apply the above described deliberations to accounting. They define accounting as 'one natural institution that ameliorates information asymmetry in resource games by enabling credible information transfers' (Nagar et al., 2016, p. 15). The concept of conservatism is depicted as a form of information aggregation in reporting that facilitates decision making. By treating gains and losses asymmetrically via considering potential losses upfront, the reliability of accounting information could increase (cf. chapter 2.1.3) and the probability of future disappointment is reduced (cf. chapter 2.4.1). According to Nagar et al. (2016), all individuals who use reporting information (e.g., for valuation purposes) influence the structure of the reported information via their endogenous risk preferences. The organization of information

[14] Nagar et al. (2016) further explain that the producer's preference structures are also valid for the stealer and hence role independent.

thus depends on the endogenously demanded asymmetrical treatment for gains and losses. Being endogenous, the preferences' occurrence for an asymmetric treatment of gains and losses depends on the context. It can be influenced by exogenous factors as informational settings, e.g., the level of information asymmetry and the degree of reliability of other information provided. According to Nagar et al. (2016), the demand for conservatism will be higher in situations of high information asymmetry and low information reliability than in conditions of low information asymmetry and high information reliability. The authors underline that 'information asymmetry patterns are a crucial driver of endogenous preference' (Nagar et al., 2016, p. 4). The information-based explanation for the demand of conservatism shows that the more uncertain a situation is (e.g., due to unreliable or missing information) the higher is the endogenously derived demand for conservatism.

The above described insights from prior literature speak to the assumption that individuals do have endogenous preferences for conservatism in accounting and that this endogenous demand generated higher reporting verifiability requirements for gains than losses in accounting. Nevertheless, this has not been tested empirically yet. In the next chapter, specific research gaps are identified to afterwards derive corresponding research questions. This section closes by highlighting the contribution of this work.

2.5 Research Questions and Contribution

The aim of this research project is to contribute to prior literature on the usefulness of conservatism in accounting as well as to the corresponding discussion in standard setting. In this chapter, the literature on conservatism in accounting presented above is briefly summarized to identify research gaps that build the basis for this study's research questions.

Conservatism in accounting is defined as an asymmetric treatment of gains and losses. Potential future losses are anticipated while gains are not. In contrast, neutrality treats gains and losses symmetrically, as it is, for example, the case under fair value accounting. Prior literature has offered various explanations for the existence of conservatism in accounting (cf. chapter 2.1.3). From a stewardship perspective, conservatism has been shown to enhance efficient contracting. From a valuation perspective, it can reduce information asymmetries between managers and shareholders and provide value relevant accounting information. Due to its beneficial effects for stakeholders, conservatism can also benefit the company itself, through, e.g., lower cost of capital.

Despite its benefits, conservatism has also been subject to criticism (cf. chapter 2.1.3). Conservative accounting can lead to inefficient contracting as it might generate low signals in economic upturns and hence stimulate false default-risk alarm. Furthermore, it can reduce managerial investment in risky but positive NPV projects. Additionally, conservatism might lead to an increase in information asymmetries. In particular, it is criticized for concealing a company's true performance leading stakeholders to draw false conclusions. Thus, conservatism can lead to inefficient decision making and inefficient resource allocation.

Following this latter view, standard setters have given preference to neutrality in accounting in recent years. Due to a tradeoff between neutral and prudent accounting information, prudence has been removed from their framework in 2010. Although the IASB reintegrated the term prudence in the current exposure draft of the revised conceptual framework due to intense criticism after its removal, the notion of asymmetric prudence in the sense of conservatism is still excluded (IASB, 2015, CF ED). Now prudence is defined as supporting neutral accounting rather than distorting it.

Nevertheless, the concept of conservatism is strongly embedded in standard setting and is still anchored in many current accounting standards. Although various rational explanations for conservatism in standard setting exist, they seem to be incomplete. Hirshleifer and Teoh (2009) therefore propose that there must be subjective preferences deeply rooted in individuals that give rise to a demand for conservatism in accounting. They argue that people dislike being disappointed and that conservatism reduces the likelihood of disappointment to occur by considering potential losses up-front. Neuroeconomics and neuroaccounting literature on human brain functioning supports the assumption that individuals do have endogenous preferences for conservatism in accounting. Parallels between human brain's as well as conservatism's differential treatment of gains and losses are considered one fundamental pillar of those endogenous preferences. Conservatism thus seems to be an evolutionary stable strategy to enhance social welfare.

In summary, a broad body of research analyzing the usefulness of conservatism in accounting from a stewardship as well as a valuation perspective exists. Only very recent literature that builds on human evolution provides theoretical arguments for individuals having endogenous preferences for conservatism in accounting. From this point of view, the current trend in standard setting to focus on neutral accounting is questionable. Up to now, it remains unclear if individuals indeed do have preferences for conservative accounting relative to neutral accounting and if these preferences translate into economic effects. The purpose of this study

is to analyze if individuals experience higher subjective value in a conservative compared to a neutral accounting setting. Furthermore, it is examined whether a higher subjective value could translate into economic consequences like, for example, a higher company valuation in situations of uncertainty. In particular, the present study's analysis is built on the following research questions (RQ):

RQ1: Do conservative accounting rules have an influence on individuals' subjective value in the presence of uncertainty?

RQ2: Do individuals have (conscious or unconscious) preferences for conservatism relative to neutrality in accounting in the presence of uncertainty?

RQ3: Do individuals' endogenous preferences for conservative accounting translate into economically relevant consequences?

This study answers to a request by Hirshleifer and Teoh (2009, p. 1075) 'to perform field or laboratory experimental testing to see whether and when people have an irrational preference for conservative reporting'. This thesis contributes to the current literature on conservatism in accounting by providing first experimental insights on individuals having endogenous preferences for conservative compared to neutral accounting in situations of uncertainty. This study furthermore enriches the current debate on the usefulness of conservatism in standard setting by investigating whether individuals' endogenous preferences for conservative vs. neutral accounting are related to higher company valuation in conservative compared to neutral settings. From an endogenous preferences perspective, conservatism could dominate neutral accounting by mitigating potential negative effects of losses on individuals' subjective value and subsequent judgment and decision making behavior.

The experimental setting created in this study relates to R&D accounting (cf. chapter 4.2), with capitalizing R&D expenditures being the neutral accounting method and expensing R&D expenditures representing the conservative accounting method. This thesis hence also provides insights on the effects of R&D accounting methods on individual behavior and adds to literature on costs and benefits of capitalizing vs. expensing R&D.

3. Hypotheses Development

The central questions this thesis wants to answer are whether people indeed have endogenous preferences for conservative versus neutral accounting and whether these preferences translate into economically relevant consequences. This thesis thus analyzes if people react differently to accounting information that is reported according to conservative vs. neutral accounting rules.

As it has been argued by several researchers (e.g., Dickhaut et al., 2010; Nagar et al., 2016), individuals' preferences for conservative accounting stem from human evolution. To be more precise, they co-developed with and are influenced by human psychological biases and behavioral anomalies (Hirshleifer and Teoh, 2009) that are deeply rooted in human beings (cf. chapter 2.4.2.1). As explained by Kahneman et al. (1991, p. 193), human behavior (as a research object) is characterized as a behavioral anomaly if 'it is difficult to "rationalize," or if implausible assumptions are necessary to explain it within the paradigm'. Hirshleifer and Teoh (2009) reason that individuals should like conservatism because they dislike being disappointed and conservatism reduces the probability of future disappointment. A psychological bias that should hence strongly induce individuals' endogenous preferences for conservative accounting is loss aversion, that is, individuals' reluctance to experience losses, being better addressed by conservative than by neutral accounting.

Individuals' reluctance to experience losses influences how humans behave when facing a potential future loss and how they behave after having experienced a prior loss. Individuals show loss aversion related behavioral biases in both situations. This chapter first provides an overview of insights from prior literature on individuals' loss aversion related behavioral biases in situations of potential future and prior outcome experiences – especially losses. In a second step, it is described how the specific framing of a situation can affect individuals' outcome perceptions potentially inducing loss aversion related behavior. Third, it is highlighted that loss aversion is a robust phenomenon endogenous to every human being, before, finally explaining how conservatism better addresses individuals' loss aversion bias compared to neutral accounting. This last chapter ends with the derivation of the related hypotheses and a description of the corresponding research model.

3.1 Loss Aversion as the Nucleus of Individuals' Endogenous Preferences for Conservatism reflected in Human Behavior

In classical economic research, researchers assume that individuals are rational decision makers aiming at maximizing their own welfare. Standard economic assumptions about market participants' characteristics and their behavior are modelled in a construct called 'homo oeconomicus' (Kirchgässner, 2013). Economic models of human decision making under risk or uncertainty, as the Expected Utility Theory (EUT) (von Neumann and Morgenstern, 1944), as well as capital market models, as, e.g., the Capital Asset Pricing Model (Sharpe, 1964; Lintner, 1965; Mossin, 1966), build on the assumed validity of the homo oeconomicus as a construct reflecting actual human behavior (Kirchgässner, 2013). With growing knowledge in and deeper insights on individuals' decision making biases, which have initially been examined in psychology and sociology research, researchers in many fields as, e.g., economics, accounting and finance, started to consider these behavioral biases in their studies questioning the validity of the homo oeconomicus. In doing so, classical research expanded in an interdisciplinary way. Even specific behavior related research areas as behavioral economics, behavioral accounting or behavioral finance developed and are still further growing (Gillenkirch and Arnold, 2008; Trotman et al., 2011).

The psychological bias most tightly related to individuals' endogenous preferences for conservatism in accounting is loss aversion (Hirshleifer and Teoh, 2009; Nagar et al., 2016). People show a strong reluctance to the experience and mental processing of losses (cf. chapter 3.1). The loss aversion bias influences peoples' decision making behavior in situations in which they face potential future losses or in which they have experienced a prior loss. Individuals' loss aversion is thus reflected in several other behavioral anomalies supporting the assumption that an endogenous demand for conservative accounting exists. These human behavioral biases and the specific decision making behavior they induce are presented in the following chapters building the underlying rationale for the hypotheses developed in this thesis.

3.1.1 Negativity Bias

On a more general level, individuals' loss aversion bias is already reflected in the fact that people generally seem to pay special attention to negative compared to positive events, a behavior called negativity bias (Vaish et al., 2008). A positive or good outcome is commonly defined as being 'desirable, beneficial, or pleasant' while a negative or bad outcome is defined as being 'undesirable, harmful, or unpleasant' (Baumeister et al., 2001, pp. 324-325). The negativity bias is a 'disappointingly relentless pattern' (Baumeister et al., 2001, p. 362)

evidenced in a variety of situations and circumstances in human (daily) life.[15] To illustrate the negativity bias and its broad appearance several key findings from prior literature are presented hereafter.

The human focus on negative events has been documented in analyses of psychology texts and textbooks in which the number of terms identifying emotions dedicated to unpleasant emotions is twice as high as the number of terms related to positive emotions (Carlson, 1966). Czapinski (1985) confirmed this trend for Polish publications on psychology. He found a predominance of works addressing negative phenomena. On a term-level, he provides evidence that words describing unpleasant emotions are more frequent than terms referring to positive emotions. Pratto and John (1991, p. 380) aim at analyzing if 'undesirable social stimuli are more likely to attract attention than are desirable social stimuli' and find confirming evidence. They further show that individuals more easily remember bad events than good events. The authors explain this finding with an automatic shift of attention from good to bad outcomes, called automatic vigilance. The negativity bias is closely linked to emotions. Negative emotions are reported to be stronger than corresponding positive emotions (Ben-Ze'ev, 2000). Ben-Ze'ev (2000) points to the fact that positive and negative emotions have a different temporal character. 'People ruminate about events inducing strong negative emotions five times as long as they do about events inducing strong positive ones' (Ben-Ze'ev, 2000, p. 99). Bad events can influence an individual's well-being during subsequent days while the impact of positive events on human well-being is shown to be less long-lasting (Sheldon et al., 1996). The differential reaction to good and bad has also been confirmed by physiological studies by, e.g., confronting people with good and bad odors (Gilbert et al., 1987). People who watched subjects smelling the odors were asked to judge the type of odor subjects smelled. Facial reactions to negative odors have been more accurately classified than facial reactions to good ones. Neurological studies provide evidence on human brain's different reactions to positive and negative outcomes (cf. chapter 2.4.2.1).

Vaish et al. (2008) underline the fact that most of the negativity bias research concentrates on adults. The authors thus focus on findings regarding the behavior of infants and conclude that besides adults also very young children behave according to the negativity bias pattern. They reason that the negativity bias has an evolutionary function for pure survival by inducing individuals to avoid harmful situations and plays an important role in children's social-emotional development by helping children to learn about their 'environment and conspecifics'

[15] Baumeister et al. (2001) and Vaish et al. (2008) provide overviews of prior research on the negativity bias.

(Vaish et al., 2008, p. 21) thereby enhancing the probability of survival. Together with insights from neuroscience research on human brain functioning (cf. chapter 2.4.2.1), the reasoning by Vaish et al. (2008) speaks to the assumption that the human tendency to pay special attention to negative events is deeply rooted in human beings and has an evolutionary background.

The negativity bias has also been documented in individuals' judgment and decision making behavior. In judgment contexts, individuals are shown to weight negative aspects of a stimulus more strongly than its positive aspects (e.g., Kahneman and Tversky, 1984).[16] The negativity bias thus shows that people mentally treat positive and negative events differently also influencing how individuals make decisions between several available options.

The above-cited literature shows individuals special attention to negative events. The negativity bias is thus also reflected in literature that provides evidence on individuals' reluctance to experience losses (i.e., negative events). Building on behavioral insights from psychology research, Kahneman and Tversky (1979; Tversky and Kahneman, 1991; 1992) examine individuals' decision making behavior in situations of uncertainty involving gains and losses. They provide first seminal evidence that individuals perceive gains and losses asymmetrically. The authors find that losses generate negative feelings that are twice as strong as positive feelings induced by equivalent sized gains. Their findings intuitively suggest that people try to avoid losses to eschew the strong negative feeling of disappointment. Loss aversion and its behavioral consequences have been examined and evidenced in a variety of different settings as, e.g., investment contexts, insurance, labor supply and politics (e.g., Kahneman and Tversky, 1979; Camerer, 2000; McDermott, 2004; Barberis, 2013). Loss aversion is therefore considered a robust cognitive phenomenon playing an important role in individuals' judgment and decision making behavior in situations of uncertainty of outcomes. Based on this type of behavioral phenomena, classical economic models of human decision making behavior that rely on the homo oeconomicus, as the EUT (von Neumann and Morgenstern, 1944), were put under question. Kahneman and Tversky (1979) aimed at integrating behavioral biases in a theoretical model of human decision making behavior and developed the so-called Prospect Theory as an alternative to the EUT that better reflects reality. Prospect Theory and its insights on human behavior based on the loss aversion bias are presented in the next chapter.

[16] Peeters and Czapinski (1990) present a review of related literature and prior findings.

3.1.2 Prospect Theory

The EUT (von Neumann and Morgenstern, 1944) is a central descriptive normative model of decision making under risk in economic research. Von Neumann and Morgenstern (1944) depart from the assumption of a rational decision maker and theorize that people who face a choice task under risk apply several axioms for choosing one prospect out of the pool of available options. The following description of EUT axioms is based on Tversky and Kahneman (1986), who, amongst other researchers, provide a summary of main EUT axioms that have been contradicted by their own research findings. One EUT axiom characterizing preference relations is completeness. Individuals need to be able to compare the available options and indicate preference relations between them. Another axiom is transitivity of preference, meaning that individuals always choose the option with the highest subjective value. If option A is preferred to option B and option B is preferred to option C, then option A should also be preferred to option C. Choices are thus assumed consistent. This is possible if people can assign a specific value to each option independent of the other options (independence axiom). According to the EUT, people apply cancellation operations, meaning that they cancel equal attributes of options when comparing them. Decision makers base their choices on attributes that differ between the available options. Options are hence valued separately. Furthermore, the EUT states that people always choose the dominant option. If a first option clearly outperforms a second option regarding one attribute and is identical to the second option in all other attributes, people will choose the first option being dominant over the second one. The EUT further assumes the principle of invariance arguing that peoples' decisions are independent from the presentation format of the respective choice problem. If these axioms hold, a utility function can be determined, that allows deriving expected utilities, which predict human preferences.

Based on the EUT axioms described above, people choose between risky or uncertain prospects by comparing the expected utility of potential outcomes of each prospect. They derive the prospects' expected utility values by weighting each possible outcome by its probability of occurrence. The following simple example taken from Koonce and Mercer (2005) illustrates this process. An alternative A includes two possible outcomes: x and y. People derive individual utilities from potential outcomes. In the example, the utility of an outcome is expressed by u. P is the outcome's probability of occurrence. The potential outcomes' utilities are weighted by their probability of occurrence. Thus, following EUT, an alternative A has the following expected utility (EU): $EU = u(x) * p(x) + u(y) * p(y)$. When asking a person to

choose between two alternatives A and B, EUT states that the decision maker will rationally choose the alternative providing higher overall expected utility.

Examining and working with the EUT, researchers first developed this normative model further. Savage (1954), for instance, developed an analytical framework for decision making under uncertainty considering personal (also called subjective) probabilities. He argues that in situations of uncertainty decision makers apply personal estimates to the prospect outcomes' probabilities of occurrence. When applying subjective estimates of p, denoted as $s(p)$, the subjective expected utility (SEU) of an outcome is defined as: $SEU = u(x) * s(p)(x) + u(y) * s(p)(y)$. As pointed out by Koonce and Mercer (2005), Savage's variant of expected utility is still consistent with basic axioms of EUT. However, since the middle of the 20th century, researchers found evidence that individuals do not always make decisions under risk and uncertainty that are in accordance with the EUT axioms transitivity, invariance, cancellation, and/or dominance. Their findings challenge the appropriateness of the EUT as a descriptive normative model of decision making under uncertainty (e.g., Allais, 1953; Ellsberg, 1961; Lichtenstein and Slovic, 1971; Tversky and Kahneman, 1986). In consequence, researchers aimed at developing new models of human decision making in situations of uncertainty that better reflect actual human behavior. The most renowned model of decision making under uncertainty considering behavioral biases is Prospect Theory developed by Kahneman and Tversky (1979). Prospect Theory is a model of individuals' risk attitudes that captures experimental evidence on risk taking and considers the experimentally derived violations of EUT (Barberis, 2013). Kahneman and Tversky (1979) conducted several experiments confronting subjects with choice problems under uncertainty (lottery gambles). Results show inconsistencies with basic axioms of EUT, as described hereafter.

First, Kahneman and Tversky (1979) document the so called 'certainty effect'. According to EUT, people weight different possible outcomes by their probabilities. In contrast, the authors' experiments reveal that people overweight outcomes that are certain, relative to outcomes that are probable. If neither of two options available is certain, people tend to overweight small and underweight medium and large probabilities. The certainty effect holds in situations when purely positive prospects (i.e., gains) are compared or when purely negative prospects (i.e., losses) are concerned.

Second, Kahneman and Tversky (1979) provide experimental evidence that an individual's preference order in the context of positive prospects is reflected around point 0 (an individuals' reference point) which leads to a reversed preference order in the context of negative prospects.

This phenomenon is labeled ‘reflection effect’. The reflection effect combined with the certainty effect induces risk averse behavior in the context of positive prospects and risk seeking behavior in contexts of losses. In other words, people prefer a sure gain over a large merely probable gain in the context of positive prospects whereas they prefer a merely probable loss over a smaller certain loss in the context of negative prospects (Kahneman and Tversky, 1979).

Third, Kahneman and Tversky (1979) provide evidence for a phenomenon which they denote ‘isolation effect’. In situations of choice between different alternatives, individuals tend to eliminate elements that the alternatives have in common and focus on those parts of the alternatives that are different to facilitate decision making. In contrast to what EUT predicts, this procedure can lead to inconsistent preferences because alternatives can be decomposed in common and differing parts in several ways. According to EUT, choice problems should be identical when looking at final states (principle of invariance). Nevertheless, as shown by Kahneman and Tversky (1979), preferences can be altered by different ways of representing alternatives (i.e., framing; cf. chapter 3.2 for more details). This important finding implies that ‘the carriers of value or utility are changes of wealth, rather than final asset positions’ (Kahneman and Tversky, 1979, p. 273).

Based on these findings, which differ from what EUT would predict, Kahneman and Tversky (1979) developed an alternative model of choice under risk that they call Prospect Theory. According to Prospect Theory, the process of choice between alternatives is divided into two subsequent phases: the editing and the evaluation phase (Kahneman and Tversky, 1979).

During the editing phase, individuals inspect all prospects and try to simplify the subsequent evaluation and choice process via one or more operations. As shown by Kahneman and Tversky (1979), individuals value outcomes based on a perception of gain or loss rather than considering the final state of welfare generated through the external stimuli. The classification of external stimuli in gains or losses occurs when individuals value these stimuli against a reference point. This procedure is called ‘coding’ (Kahneman and Tversky, 1979). As described by adaptation level theory (Helson, 1948), a reference point is what an individual would consider the neutral or expected level of an outcome. The reference point is individual to each person. The position of the reference point and thus the coding of the external stimuli as a gain or loss are not stable and can be influenced or manipulated by, e.g., the presentation or formulation of the prospects (Kahneman and Tversky, 1979; see chapter 3.2 on framing effects). Another operation that is frequently applied in the editing phase is called combination. In order to simplify prospects, ‘probabilities associated with identical outcomes’ (Kahneman and Tversky, 1979, p. 274) are

combined. Conversely, via segregation people segregate riskless components of options from risky ones. Via cancellation, components that are identical for all offered options are abandoned. People also simplify the comparison of prospects by, e.g., rounding decimal numbers of probabilities or outcomes. Detection of dominance is an operation leading to abandoning the dominant alternatives in further evaluation processes. Depending on operations applied during the editing phase as well as the order of operations chosen, prospects could be edited in different ways leading to individuals making different decisions. Applying operations as the ones described above can lead to individuals' preference anomalies that contradict the EUT axioms (Kahneman and Tversky, 1979).

Kahneman and Tversky (1979) reason that once all prospects are edited individuals will value them and finally decide for the option with the highest subjective value. According to (S)EUT, an individual would value an alternative consisting of two possible outcomes by multiplying the subjective value of each outcome with its (subjective) probability of occurrence. Whereas (S)EUT assumes a rational decision maker assessing (subjective) probabilities in an unbiased way, Prospect Theory departs from human behavioral biases in weighting outcome probabilities. Prospect Theory supposes that each probability p or s(p) is associated with a so-called decision weight 'which reflects the impact of p on the over-all value of the prospect' (Kahneman and Tversky, 1979, p. 275). The application of decision weights is derived from insights on the certainty effect showing that individuals tend to overweight small probabilities and underweight medium and large probabilities. The tendency to overweight small probabilities contributes for example to individuals' willingness to buy lottery tickets (Kahneman and Tversky, 1979). Prospect Theory furthermore differs from EUT in not defining utility as final asset positions but rather defining a prospect's subjective value in terms of gains and losses depending on the individuals' reference points. In Prospect Theory the subjective value of each possible outcome is thus defined as the value of the outcome's deviation from the individual's reference point. Thus, according to Prospect Theory, an individual's context specific value function (v) combined with the individual's probability weighting function (π) influence the perceived final value of a prospect and determines individuals' risk taking behavior (Kahneman and Tversky, 1979). Referring to the simple example used to illustrate EUT, individuals' overall value V of an Alternative A would be calculated as follows: $V = \mathrm{v}(x) * \pi(p(x)) + \mathrm{v}(y) * \pi\big(p(y)\big)$ (Koonce and Mercer, 2005, p. 181).

As explained by Kahneman and Tversky (1979), the subjective decision weight $\pi(p)$ generally differs from the objective probability p: $\pi(p) \neq p$. Based on the certainty and the reflection

effect, the decision weight of small probabilities is generally greater than the objective probability: $\pi(p) > p$. Furthermore, subjective decision weights do not necessarily add to 1: for all $0 < p < 1, \pi(p) + \pi(1-p) < 1$ (Kahneman and Tversky, 1979, p. 281). Kahneman and Tversky (1979) call this characteristic subcertainty. They assume that decision weights are equal for probabilities of the same amount, independent of the respective involved prospect outcomes.

Kahneman and Tversky's (1979) insights on individuals' valuation processes of external stimuli lead to a specific curvature of individuals' value function. The authors find in their experiments on choice problems under uncertainty that the value difference of a monetary gain of 100 and a monetary gain of 200 seems to be greater than the difference in value between gains of 1,100 and 2,200. In a loss situation, the value difference of a loss of 100 and a loss of 200 is perceived as greater than the difference between a loss of 1,100 and a loss of 2,200. The higher the gain and the higher the loss the smaller is its marginal value respectively. The decreasing marginal value in the area of higher gains or higher losses implies that in standard situations people are risk averse in the context of gains and risk seeking in a context of losses (Kahneman and Tversky, 1979; Kahneman, 2012).

The value function's characteristic most important for this thesis is the fact that it is steeper for losses than for gains departing from the individual's reference point. This asymmetric curvature in gain and loss contexts addresses the finding that individuals are more hurt by losses than they are thrilled by gains. Losing a certain amount of money hurts twice as much as gaining the same amount of money provides pleasure (Kahneman and Tversky, 1979; Tversky and Kahneman, 1991; 1992). The cognitive effect of loss aversion is related to but distinct from risk aversion. As shown by Kahneman and Tversky (1979), people being loss averse exhibit both risk aversion and risk seeking behavior. In gain situations people are risk averse and prefer secure over risky gambles whereas in loss contexts people are risk seeking and prefer gambles providing the possibility of not losing money over sure losses even if the probabilities of avoiding losses are extremely small. Hence, the phenomenon of loss aversion represents individuals' intrinsic outright contempt for losses and does not only refer to individuals' search for risk reduction.

The basic s-shaped curvature of the value function is generally identical for each individual. It turns from concavity in gain situations to convexity in loss situations at the reference point. Knowing that the position of the reference point's level is individual to each person, peoples' value functions can differ in this aspect. Insights from Prospect Theory presented above are valid in a general basic situation of decision making under uncertainty. Kahneman and Tversky

(1979) themselves describe situations in which the value function's curvature can deviate from its basic form. People who experienced a loss, which has not been mentally processed yet, will behave differently than people who have already mentally digested the experienced loss. Prospect Theory is not able to capture all psychological intuitions in once. Barberis (2013) brings up the example that convexity of the value function in loss domains captures individuals risk taking behavior in loss context. Nevertheless, it ignores the intuition that an individual who faces a loss which 'represents a large fraction of wealth will be *very* sensitive, not insensitive, to any additional losses' (Barberis, 2013, p. 175). Thus, when applying Prospect Theory to a specific context, it is important to rethink Prospect Theory's underlying basics and to consider potential deviations from its basic elements brought up by the specific setting.

To answer critiques made to the original version of Prospect Theory, Tversky and Kahneman (1992) advanced the original theory and developed the Cumulative Prospect Theory. They proved its validity in several experiments. In contrast to the original version of Prospect Theory, the Cumulative Prospect Theory is applicable to continuous distributions, it can be applied in contexts of probabilistic as well as uncertain prospects and it allows for decision weights that differ for gains and losses (Tversky and Kahneman, 1992). Decision weights, hence, can vary for probabilities of the same amount depending on the respective involved prospect outcome.

The development of Prospect Theory dated back to 1979. Until today, it is widely viewed as 'the best available description of how people evaluate risk in experimental settings' (Barberis, 2013, p. 173). Prospect Theory has gained a significant standing in finance and economics research[17] (e.g., Han and Hsu, 2004; Barberis and Huang, 2008; DellaVigna, 2009). Several researchers analyze Cumulative Prospect Theory's value function as well as its weighting function in more detail and find supporting evidence for its central elements loss aversion and probability weighting (e.g., Wu and Gonzalez, 1996; Gonzalez and Wu, 1999; Abdellaoui, 2000; Abdellaoui et al., 2008; Abdellaoui et al., 2013). Wu and Gonzalez (1996) examine individuals' probability weighting functions further and find that Cumulative Prospect Theory offers substantial improvements compared to EUT. Currim and Sarin (1989) compare prospect and expected utility models regarding their predictive power and find that prospect models outperform expected utility models in defining individual decision making parameters – at least for dependent gambles. Nevertheless, the authors argue that both models perform equally well in situations of independent gambles which more often come into play. Besides Prospect

[17] Barberis (2013) provides an overview of recent economic research building on Prospect Theory's ideas and insights.

Theory's significant standing in research as a descriptive theory of decision making under uncertainty, its application in economics is still in an early stage due to difficulties in its application (Barberis, 2013). Kahneman (2012, p. 286) underlines different 'blind spots of Prospect Theory'. He argues that this theory is not able to integrate disappointment in individual valuation: The theory does not consider that the individual value of an outcome might change when it is highly unlikely or when an alternative output is very valuable. Furthermore, Kahneman (2012) points to the fact that Prospect Theory does not integrate regret but assumes that options are evaluated separately and independently. However, it is shown in literature that outcomes are evaluated dependently in the sense that people evaluate an option based on alternatives he could have chosen but did forgo (i.e., opportunity costs; cf. chapter 3.1.5). 'Prospect Theory was accepted by many scholars not because it is "true" but because the concepts that it added to utility theory, notably reference point and loss aversion, were worth the trouble; they yielded new predictions that turned out to be true' (Kahneman, 2012, p. 288). Being difficult if not impossible to perfectly model real decision making behavior in situations of uncertainty, models as the EUT, whose basic axioms have in fact been contradicted, are also still applied as a simpler approximate forecast of human behavior.

Prospect Theory models how people react to positive and negative outcomes in situations of uncertainty. One key insight is that people show risk averse behavior in gain settings and risk seeking behavior in loss settings under uncertainty. The fact how people classify an external stimulus (i.e., as a gain or a loss) relative to their individual reference point thus influences their decision making behavior. Peoples' reluctance to losses on the one hand affects how they behave when confronted with potential future losses and on the other when having experienced a prior loss. The next two chapters present individual behavioral biases that appear in situations when potential futures losses are involved.

3.1.3 Endowment Effect

A psychological bias reflecting how individuals behave when confronted with potential future losses tightly related to loss aversion is the so-called endowment effect. The endowment effect is the phenomenon that 'goods that are included in the individual's endowment will be more highly valued than those not held in the endowment' (Thaler, 1980, p. 44). In other words, the perceived value of a good or object increases with individuals' ownership of it. The endowment effect covers the fact that individuals 'often demand much more to give up an object than they would be willing to pay to acquire it' (Kahneman et al., 1991, p. 194). Giving up a good creates a loss while adding the same good to one's endowment creates a gain. Losses loom harder than

gains and people try to avoid losses. Thus, people often behave irrationally and stick to goods owned although ceding them (e.g., accepting a buy-offer) would be beneficial. The authors add that 'the main effect of endowment is not to enhance the appeal of the good one owns, only the pain of giving it up' (Kahneman et al., 1991, p. 197). Thaler (1980) argues that people often perceive 'out-of-pocket costs', that is, costs that have already been incurred by the individual, as losses and opportunity costs, e.g., a refused bid for a good owned, as forgone gains. The author states that as losses provide much more displeasure than gains provide pleasure, these different gain and loss perceptions contribute to the endowment effect inducing individuals to underweight opportunity costs.

The following study conducted by Kahneman et al. (1991) illustrates the endowment effect. The authors create a market setting where subjects buy and sell mugs. Subjects learn in test rounds that transaction costs are insignificant in the implemented markets and that income effects are trivial. The laboratory market includes random price tests. For this reason, individuals know that 'their bids to buy and offers to sell can have no conceivable effect on the eventual ruling price – as this is known to be determined randomly – and therefore know that there is no strategic reason to nominate any price other than one representing the true value' (Kahneman et al., 2008, p. 940). In the main experiment, half of the subjects received a mug and could later sell it. The other half of subjects did not receive a mug. These subjects could buy one from the sellers. The distribution of mugs was done at random. After explanations and test rounds, mug owners were asked at which minimum price they would sell the mug. The buyers were asked at which maximum price they would buy a mug. The mean and median minimum prices demanded by sellers are $ 5.78 and $ 5.75. The mean and median prices, which buyers would pay for a mug at maximum, are $ 2.21 and $ 2.25 (Kahneman et al., 1991). Results show that the minimum selling price indicated by mug owners is about 2.5 times greater than the maximum buying price stated by mug buyers.

Literature shows that the endowment effect is stronger if a good has a higher emotional loading as it is the case if people have put much effort in receiving a good, e.g., by creating it by oneself ('IKEA effect') or winning it in a competition ('trophy winner effect') (Norton et al., 2012; Bühren and Pleßner, 2014). The more people attach emotional value to a respective good, the higher will be the price they demand for selling it, hence the stronger will be the endowment effect.

The endowment effect has been examined by numerous studies (cf. Horowitz and McConnell, 2002; Sayman and Öncüler, 2005, for meta studies) and has not only been confirmed for

humans but even for capuchin monkeys (Lakshminaryanan et al., 2008). Nevertheless, several researchers question the endowment effect arguing that the willingness to accept (WTA)/willingness to pay (WTP) gap shown in prior studies stems from individuals' misconceptions induced by the specific experimental settings (i.e., conditions and controls applied) (e.g., Plott and Zeiler, 2005). In these cases, differences in valuation hence result from uncontrolled incentives as, e.g., inexperience with goods that subjects should evaluate. Controlling for this type of misconceptions, Plott and Zeiler (2005) do not find a gap between WTA and WTP, questioning the interpretation that the endowment effect found in prior studies is a result of loss aversion. Additional studies by the same authors confirm their finding (Plott and Zeiler, 2007). In contrast, Knetsch and Wong (2009) find that the decrease in the gap between WTA and WTP found by Plott and Zeiler (2005, 2007) is following their manipulations applied to control for the incentives of classical preference theory. They argue that these manipulations reduce subjects' awareness for reference states that people generally apply to evaluate changes in value of goods. Therefore, in these cases giving up a good does not induce loss perceptions. The authors summarize that instead of the applied controls for general incentives it is the manipulations' impact on reference states that mitigates the WTA/WTP gap.

Although findings are mixed, prior literature provides evidence that the endowment effect is a behavioral bias strongly linked to loss aversion. The endowment effect reflects how people behave when facing potential future losses. Giving up a good represents a potential loss for the good's owner. He hence wants to receive an adequate reward resulting in high WTA/WTP ratios.

Further literature examining individuals' judgment and decision making behavior in settings involving future losses provides insights on the sign and dread effect, presented in the next chapter.

3.1.4 Sign and Dread Effect

A variety of prior studies investigate how humans evaluate choice options providing an immediate vs. a delayed utility (e.g., Thaler, 1981; Loewenstein, 1987; Loewenstein and Prelec, 1993; Tunney and Shanks, 2002; Worthy et al., 2012). As underlined by Pang et al. (2015), most of these studies analyze individuals' decision making behavior in gain situations and find that individuals follow a myopic approach: they prefer alternatives with better immediate rewards over alternatives with better long-term rewards. This behavior is referred to as 'melioration' (e.g., Herrnstein and Prelec, 1991). Pang et al. (2015) add to this literature by

comparing individuals' decision making behavior in gain maximizing vs. loss minimizing contexts. As shown by a huge body of prior literature, people value gains and losses differently (see chapter 3.1.2) which leads the authors to the assumption that gain vs. loss contexts will exhibit different decision making behavior when considering the immediate vs. delayed utility of options. Pang et al. (2015) find that decision makers value delayed consequences of their decisions more in loss-minimizing situations relative to gain maximizing situations. Put in other words, 'people were more eager to try to reduce losses incurred on future trials than to increase gains received on future trials even if it meant temporarily receiving larger immediate losses' (Pang et al., 2015, p. 181). Pang et al. (2015) show that this behavioral tendency is more pronounced for people with low self-control. Self-control thus moderates the effect of the reward context (gain vs. loss environment). The authors infer that losses trigger individuals' 'emotional aversiveness' (Pang et al., 2015, p. 177) and make people favor reducing delayed losses although this means to temporarily have to incur larger immediate losses. The authors further provide evidence that the eagerness to reduce delayed losses is robust for low self-control individuals even when the increasing option (reducing delayed losses and incurring immediate larger losses) is suboptimal. These findings illustrate individuals' fear of losses making them behave in a way to reduce future loss experiences.

Pang et al. (2015, p. 177) infer from their findings that 'people assign greater weights to delayed losses than comparable delayed gains (if they assign smaller weights to delayed losses, they would prefer to defer losses)'. Relatedly, several researchers have analyzed intertemporal choice behavior and show that discounting rates people apply to future outcomes differ for gains and losses. Several researchers find that people discount the value of a future loss at a lower rate than the value of a future gain, a phenomenon called 'sign effect' (Thaler, 1981; Benzion et al., 1989; Murphy et al., 2001). According to Thaler (1981), peoples' different perceptions of out-of-pocket and opportunity costs (cf. chapter 3.1.3) induce the sign effect. People who prefer receiving a gain immediately instead of receiving a gain plus a 'waiting reward' after a certain time span in the future have to bear opportunity costs. People who prefer postponing a loss into the future instead of experiencing a smaller loss immediately would have to incur additional out-of-pocket costs. As Thaler (1980; 1981) argues, individuals generally underestimate opportunity costs compared to out-of-pocket costs resulting in implicit discount rates that are higher for gains than for losses (i.e., the sign effect). Shelley (1994) finds opposite results. She examines a potential gain loss asymmetry in managerial choices in risky intertemporal choice settings and argues that managers judge future losses to be less credible than future gains because managers feel they can control the future to a certain extent.

Conformingly, Shelley (1994) provides evidence that managers discount losses more heavily than gains. She reasons that managers increased risk tolerance for future losses is probably linked to managers' overconfidence based on past success and underlines that results could differ for subjects being less overconfident. Overall, this stream of literature highlights the importance of timing effects in individuals' judgment and evaluation of immediate vs. deferred gains and losses.

Related literature referring to the so-called 'dread effect' builds on the assumption that people exhibit dread for pain (Loewenstein, 1987; Loewenstein and Prelec, 1993). The anticipation of having to experience pain (i.e., e.g., the experience of an electric shock or a dentist appointment) in the future makes people feel highly uncomfortable. Dread describes the negative utility resulting from contemplating a future negative event (Loewenstein, 1987). 'Anticipating pain is unpleasant or disadvantageous, rather like pain itself' (Story et al., 2013, p. 2). People prefer getting over with undesirable outcomes preferably sooner than later. They are even willing to accept more pain in order to expedite its occurrence (Story et al., 2013; Pang et al., 2015). Loss aversion and the dread effect are considered potential sources of the sign effect (Story et al., 2013).

In a comparable stream of literature, researchers think about how people handle payments. Contrary to the economically efficient approach to consume now and spend later, Prelec and Loewenstein (1998) assume that people show preferences for prepayments because of strong debt aversion. A prepayment makes people focus more on the enjoyment of an experience whereas a payment that has to be done after the event provokes gains in saliency of and attention to the payment and thereby reduces the individuals' enjoyment of the event (Prelec and Loewenstein, 1998). Individuals seem to prefer mentally processing payments upfront to increase the enjoyment of the respective event.

Literature presented in this chapter provides evidence that loss aversion induces people to minimize future potential losses sometimes even leading to suboptimal decisions (e.g., accepting higher losses in the aim to expedite the negative event).

The following three chapters present insights on individual behavioral biases that play a role in situations involving prior loss experiences.

3.1.5 Mental Accounting, Disposition Effect, Regret Effect, and Status Quo Bias

A psychological phenomenon affecting how individuals behave to prior gains and losses is mental accounting. Mental accounting describes the human tendency to assign monetary payoffs to different mental categories. The concept was introduced by Thaler (1980; 1985; 1999, p. 183) who defines mental accounting as 'the set of cognitive operations used by individuals and households to organize, evaluate, and keep track of financial activities'. People mentally categorize their financial transactions to monitor their investments and adjust their investment behavior. Mental accounting builds on Prospect Theory (Thaler, 1985). A decision maker confronted with gambles would separate each type of gamble (e.g., mixed vs. pure gain or loss gambles) into different mental accounts. He would apply editing and evaluation operations consistent with Prospect Theory (cf. chapter 3.1.2) to each account separately. Individuals hence classify payoffs in gains or losses relative to a reference point and assign these payoffs to gain or loss accounts (Thaler, 1999).

Individuals' mental accounting systems influence their decision making. Prior research provides evidence that people dislike closing mental accounts at a loss (Thaler and Johnson, 1990). Closing mental accounts at a loss provides displeasure while closing mental accounts at a gain provides pleasure. Due to loss aversion, the resulting displeasure from closing a loss account weights twice as hard as the resulting pleasure from closing a gain account (Tversky and Kahneman, 1991; 1992). People try to avoid negative hedonic outcomes (also see chapter 3.1.6). Under mental accounting, this can lead to another behavioral bias called disposition effect: people are prone to sell stocks that increased in value too early whereas they hold value-decreasing stocks too long (Shefrin and Statman, 1985). People thus tend to quickly realize positive hedonic outcomes and try to delay negative hedonic outcomes. A variety of studies provides insights on the disposition effect which is considered to be a robust empirical fact and a strong human behavioral bias (e.g., Odean, 1998; Grinblatt and Keloharju, 2001; Barberis and Xiong, 2009; Frydman et al., 2014).[18] Nofsinger (2001) finds that the emergence of the disposition effect is dependent on the type of news released. Investor behavior corresponds to the disposition effect for company news but not for economic news. Nofsinger (2014) argues that in the case of bad company news the investor's feeling of regret is much stronger than in the case of bad economic news. This is the case because the investor decided himself to invest in the stock, which now declines in value due to bad company news. His investment decision is thus tied to the stock loss. The author explains that bad economic or market news are out of

[18] For a broad literature review on research examining the disposition effect, see Pleßner (2017).

the investor's control. The feeling of regret when taking a stock loss is thus weaker leading to 'actions that are not consistent with the predictions of the disposition effect' (Nofsinger, 2014, p. 30) in the sense that investor are, e.g., less likely to sell in times of good news.

By postponing closing a mental account at a loss, as it is the case under the disposition effect, people preserve the possibility to turn the loss into a gain in the future. In two stage gambles providing the possibility to compensate a first stage loss by a second stage gain, people even engage in irrational risk taking behavior and aim at breaking even in the second gamble to avoid having to close the mental account from the first stage of the gamble at a loss. Loss aversion hence also induces the break-even effect (Thaler and Johnson, 1990; cf. chapter 3.1.7).

The way people behave under mental accounting also serves to address individuals' regret aversion (Shefrin and Statman, 1985). Individuals do not like the feeling of regret and therefore aim at avoiding actions that cause them regret. Nofsinger (2014, p. 24) defines regret as 'the emotional pain that comes with realizing that a previous decision turned out to be a bad one'. The opposite feeling to regret is pride which is defined by 'the emotional joy of realizing that a decision turned out well' (Nofsinger, 2014, p. 24). By letting a mental loss account open, people avoid having to admit to have made a false decision. As explained by Shefrin and Statman (1985), aiming at being pride about one's own former decisions and avoid regret fosters the disposition effect behavior under mental accounting. Shefrin and Statman (1985) attribute the disposition effect to insufficient self-control. People do not exhibit enough self-control 'to close accounts at a loss, thereby limiting losses' (Shefrin and Statman, 1985, p. 782).

Regret-aversion also relates to the status quo bias (Samuelson and Zeckhauser, 1988). Samuelson and Zeckhauser (1988) argue that in most decision situations people have the possibility to do nothing and hence stick to the current status quo. They show in several experiments that people stay with the status quo disproportionately often. The status quo becomes more attractive if it has been explicitly figured out as the status quo and if its advantages come to the fore with a growing number of competing alternatives. To protect their status quo and hence avoid experiencing a deterioration of their current situation, investors might exhibit no trading behavior and hence realize neither gains nor losses (Kahneman et al., 1991). Loss aversion thus also contributes to the status quo bias.

The behavioral biases presented in this chapter show that mental accounting does not follow severe rules as traditional accounting does (Thaler, 1999). Individuals introduce some flexibility in their own mental accounting rules to minimize negative and maximize positive hedonic outcomes regarding their monetary payoffs. The next chapter provides more insights

on hedonic optimization operations applied by individuals to mentally process prior outcomes, especially losses.

3.1.6 Hedonic Optimization

As has been described in the previous chapter, people often make decisions that influence their own mind in a way that makes them feel happier. The disposition effect exemplifies this behavioral bias known as hedonic optimization. People do not like to close mental accounts at a loss and hence tend to hold value-decreasing stocks too long to avoid regret (Shefrin and Statman, 1985). They are hence prone to maximize their hedonic outcome. Prospect Theory has already considered the human tendency to apply hedonic optimization rules. It assumes that people simplify the valuation and comparison of prospects via editing them (cf. chapter 3.1.2). They look for example for prospect dominance or, given that two options are strictly positive or strictly negative, they ignore identical prospect attributes and concentrate on the value difference between the two options (Kahneman and Tversky, 1979). The editing phase is not rigid. Prospect Theory allows flexibility in prospect editing (the order of applied editing operations can affect the decision made and hence the hedonic outcome) and thus already considers that past outcomes influence individuals' future decision making (Kahneman and Tversky, 1979).

Based on these Prospect Theory insights, Thaler and Johnson (1990) further examine individuals' valuation of prospects derived from Prospect Theory's editing phase. They call these alternative representations of prospects 'editing rules'. One important editing rule is hedonic editing. According to Thaler and Johnson (1990), people do not edit outcomes truly mechanically but in a way that makes them happiest. The authors argue that signs and magnitudes of outcomes determine whether hedonic editing makes people integrate or segregate prospect characteristics. The application of hedonic editing stems from four principles developed by Thaler (1985; 1999, p. 187):

- Segregate gains (because the gain function is concave)
- Integrate losses (because the loss function is convex)
- Integrate smaller losses with larger gains (to offset loss aversion)
- Segregate small gains (silver linings) from larger losses (because the gain function is steepest at the origin, the utility of a small gain can exceed the utility of slightly reducing a large loss)

These operations serve to make people feel happier about outcomes. By, e.g., integrating smaller losses with larger gains, the gain compensates the loss making the loss weighting less strong. Several studies find confirming evidence for hedonic editing. Lim (2006), for example, shows that investors are more prone to sell multiple stocks in loss than in gain contexts. This behavior shows the hedonic editing pattern of integrating losses and segregating gains. He also documents that investors thoroughly plan which winning and losing stocks they sell together to generate a hedonically optimized outcome by integrating losses and gains compared to treating them separately.

In several experiments, Thaler and Johnson (1990) find that the hedonic editing principles described by Thaler (1985) do not always hold true. They find that people do not necessarily integrate losses. Individuals rather express that an initial loss increases the loss aversion related to subsequent losses. The effect of a prior loss on the disutility of a subsequent loss is not linear. A small or medium sized loss rather increases peoples' awareness for comparable further losses whereas a large loss rather decreases individuals' awareness for additional small losses. To summarize, 'while subjects do seem to actively segregate gains, and cancel losses against larger gains, they do not appear to integrate losses' (Thaler and Johnson, 1990, p. 650). This is why the authors update the basic hedonic editing hypothesis developed by Thaler (1985) and introduce the quasi-hedonic editing hypothesis.

Hedonic optimization shows that people apply flexible editing operations when mentally processing stimuli and comparing different options to facilitate decision making. They thereby maximize the hedonic output for themselves. Most of the literature on hedonic editing examines the application of hedonic editing rules when individuals make prospective evaluations of options. Cowley (2008) investigates if people also apply hedonic editing rules when making retrospective evaluations of past experiences and finds confirming evidence.

Hedonic optimization relates to individuals' loss aversion bias highlighting the strong impact of humans' loss averseness on human decision making behavior in contexts of prior outcomes. Building on hedonic optimization, the next chapter presents in more detail how people react to prior outcomes focusing on the house money, the risk aversion as well as the break-even effect.

3.1.7 House Money, Risk Aversion and Break-Even Effect

The quasi-hedonic editing hypothesis (cf. chapter 3.1.6) suggests that people do not easily integrate losses. In a two-period gamble, when experiencing a loss in the first period, individuals will not integrate potential subsequent losses with the first loss, whereas after prior gains, subjects will integrate subsequent losses with the initial gain. Thaler and Johnson (1990) show that in two-stage gambles prior gains induce individuals to take on higher risks in the second stage as long as potential future losses are compensated by the prior gains while previously experienced losses increase individuals' sensitivity to future losses, resulting in higher risk aversion in loss-settings. These effects are known as the house money effect and risk aversion (or snakebite) effect (Nofsinger, 2014).

When gaining money, people do not integrate the gain necessarily directly with their own equity. This is especially the case for gamblers who feel like they were gambling with the 'casino's money' (Nofsinger, 2014, p. 37). That is why they are willing to take more financial risk after a prior gain. Nofsinger (2014) supports this assumption with results of a little experiment: 77% of a group of economics students who won $ 15.00 are willing to bet $ 4.50 on a coin toss. Hence, after a prior gain, most students placed the bet. However, without a prior gain, only 41% of the students were willing to participate in the gamble. Nofsinger (2014, p. 37) concludes that students were more risk taking after a prior unexpected gain 'even when not ordinarily inclined to take such a risk'.

The risk aversion effect describes risk averse behavior after prior losses. As Thaler and Johnson (1990) point out, risk seeking behavior should occur if prior losses were easily integrated with future outcomes. As stated above, the quasi-hedonic editing hypothesis doubts the facile integration. 'Because integration is not automatic, an initial loss might cause an increase in risk aversion, particularly when the second choice does not offer the opportunity to break even' (Thaler and Johnson, 1990, p. 656). The authors provide experimental evidence for increasing risk aversion after prior losses. After losing money, people are often less prone to take financial risks. They 'might have felt "snakebit". Snakes don't often bite people, but when they do, people become more cautious' (Nofsinger, 2014, p. 37). Thus, after having experienced a financial loss, people often think that their streak of bad luck will continue, called the 'hot hand' effect (Gilovich et al., 1985). Thus, they become more risk averse. As Gilovich et al. (1985, p. 295) explain, people think that they can detect patterns in random sequences being 'a general misconception of chance according to which even short random sequences are thought to be highly representative of their generating process'.

However, Prospect Theory predicts that individuals are risk seeking in the domain of losses (Kahneman and Tversky, 1979). Related to prospect theory's underlying assumptions, Thaler and Johnson (1990) examine risk taking behavior after prior gains and losses in more detail and show that having experienced prior losses, subjects prefer outcomes that offer a possibility to break even. In this case, they are even willing to take on higher risks. Thaler and Johnson (1990) stress the fact that the influence of prior losses on risky decisions depends on the nature of future gambles. If an option provided in a two-stage gamble offers the opportunity to compensate prior losses by accepting additional risk, the break-even effect combined with individuals' aversion to closing a mental account at a loss (cf. chapter 3.1.5) induces risk seeking (Kahneman and Tversky, 1979). The experiments designed by Kahneman and Tversky (1979) refer to the latter case offering the chance to break even. That is why the authors find risk seeking behavior in loss contexts. The possibility of breaking even apparently facilitates integration of prior losses with potential future outcomes.

Relatedly, prior literature provides evidence that people are more willing to invest in stumbling or stagnating projects or in projects with a negative NPV if they have already invested money in it before (also see chapter 2.1.3.1). This is called 'sunk cost effect' or 'escalation of commitment' (e.g., Thaler, 1980; Staw, 1981; Arkes and Blumer, 1985). As findings by Thaler and Johnson (1990) suggest, the sunk cost effect can be mitigated or strengthened depending on the setting. People hesitate to close mental accounts at a loss (cf. chapter 3.1.5). If the future provides at least a little hope that the prior loss can be compensated by a future gain, the sunk cost effect will be quite strong. In the case of two-stage gambles, when the possibility to break even exists, the 'tendencies toward risk-seeking in the domain of losses might be enhanced' (Thaler and Johnson, 1990, p. 659).

In summary, prior literature shows that people try to hedonically deal with prior losses by adapting their decision making behavior accordingly. Depending on the setting, they either become risk averse if no possibility to break even is available or they become risk seeking if future gambles provide the option to compensate prior losses.

As has been argued in the previous chapters, broad evidence exists for a direct effect of prior outcomes on individuals' subsequent judgment and decision making behavior. How people react to stimuli (previous or future outcomes) depends on their classification of the stimuli as gains or losses. Prior literature found that the way a stimulus is presented influences how the decision maker perceives and classifies it. The frame of a stimulus can have an impact on

individuals' decision making behavior. The next chapter explains outcome framing and presents its consequences (framing effects) that are related to individuals' loss aversion.

3.2 Outcome Framing inducing Loss Aversion related Behavior

Tversky and Kahneman (1981) show in several experimental studies that presenting identical information in different ways (i.e., framing the same decision problem differently), can have a significant influence on individuals' decision making behavior. Frames influence mental models (Johnson-Laird, 1983) that individuals apply in choice situations to facilitate decision making. The respective frame is characterized by all information available to the decision maker to define the decision context (Soman, 2004). Framing effects occur if the decision maker comes to differing choices depending on the applied frame. A well-known example of the influence of framing on human decision making is the 'Asian Disease Problem' (Tversky and Kahneman, 1981). Tversky and Kahneman (1981) created the following setting: subjects receive the information that 600 people are about to die due to an unusual Asian disease. They are told that the US government develops two programs to fight against this disease. Subjects must indicate which program they would choose. Subjects are distributed to two treatment groups and receive information on the two programs that is framed differently.

Treatment group 1 receives the positive frame:

Program A: 200 people will be saved.

Program B: With a probability of 1/3, 600 people will be saved; with a probability of 2/3, no one will be saved.

Treatment group 2 receives the negative frame:

Program C: 400 people will die.

Program D: With a probability of 1/3, no one will die; with a probability of 2/3, 600 people will die.

72% of subjects in treatment group 1 preferred the sure option A to the more risky option B. The choices in treatment group B were the opposite: 78% chose the riskier option D over the sure option C. Tversky and Kahneman (1981) hence provide evidence for preference reversal due to framing. According to rational choice theory (e.g., EUT, von Neumann and Morgenstern, 1944), people have preferences between different available options, which are transitive and stable. As argued for instance by Arrow (1982) and Tversky and Kahneman (1986), if rational choice theory would hold, different frames of the same choice problem should thus not influence an individual's preference order. In contrast to this reasoning, literature provides

evidence that the framing of options can influence individuals' choices and even induce a change in preference order (e.g., Tversky and Kahneman, 1981; 1986). Results of the Asian Disease Experiment also confirm Prospect Theory's proposition that people are risk averse in gain contexts and risk seeking in loss contexts (Kahneman and Tversky, 1979). Prospect Theory considers framing in the editing phase: how and in which order people apply editing rules to prospects determines the prospects' framing (Kahneman and Tversky, 1979; cf. chapter 3.1.2). Soman (2004) illustrates that the mental representation of a decision problem leads to a specific judgment that results in a specific decision. In summary, an individual's final decision thus depends on the mental representation of the respective decision problem.

Different types of framing exist. Levin et al. (1998) differentiate between attribute framing (i.e., a certain attribute of an object is the goal of the framing manipulation), goal framing (i.e., the goal of an action or behavior is the focus of the framing manipulation) and risky choice framing. Outcome framing as risky choice framing (e.g., Tversky and Kahneman, 1981; for a meta-analysis on risky-choice framing see Kühberger, 1998) is the type of framing the most relevant to this study. 'In this type of framing, the outcomes of a potential choice involving options differing in level of risk are described in different ways' (Levin et al., 1998, p. 150). Individuals judge external stimuli relative to individual reference points (Kahneman and Tversky, 1979). Shifting the reference point can hence change the perception of a stimulus as a gain or a loss in situations of uncertainty. The Asian Disease Problem described above exemplifies outcome framing: A reference point shift (how many people will be saved vs. will be killed) leads to an inverse perception of gains and losses and a subsequent preference reversal. This is consistent with mental accounting. Under mental accounting, people classify external stimuli in mental gain or loss accounts depending on their individual reference points. Framing can influence the category to which an external stimulus is assigned. Framing can thus shift individuals' perceptions regarding gains and losses thereby inducing different risk taking behavior: risk aversion in gain contexts vs. risk seeking in loss contexts. 'Perhaps the most important conclusion to be reached from this research is that making generalizations about risk-taking preferences is difficult. General tendencies can be reversed by a simple reframing of options. This result points out how difficult it is to predict behavior' (Thaler and Johnson, 1990, p. 660).

Effects of framing on preferences and subsequent choices have been examined and proven valid in a variety of contexts (e.g., cf. Kühberger, 1998, for a meta-analysis on risky choice framing). Although people generally understand the mechanism of framing and the effects that result

from it, they normally do not consider possible framing effects in their own decision making process. 'Indeed, one of the important implications of framing effects is that people are usually unaware of the possibility that their views of a problem might change with a different formulation-for example, that risk aversion could be replaced by risk-seeking when the same problems were framed in terms of losses rather than gains' (Kahneman, 1992, p. 305). Literature provides strong evidence that individuals in specifically framed decision making situations will use the presented information as such without trying to reframe it (e.g., Bettman and Kakkar, 1977; Bettman and Zins, 1979; Jarvenpaa, 1989; Kleinmuntz and Schkade, 1993). Hence, the 'information presentation format affects the way consumers acquire and process that information' (Bettman and Zins, 1979, p. 142).

Prior literature demonstrates that the way a stimulus is perceived influences individuals' behavior. Based on loss aversion, individuals aim at completely avoiding or at least minimizing future loss experiences and try to hedonically optimize prior loss experiences by adapting their future behavior accordingly. As illustrated by the previous chapters, loss aversion is a psychological phenomenon being the nucleus of several behavioral biases. The research interest in loss aversion, its roots and behavioral consequences, still endures. The next chapter presents recent empirical insights showing that loss aversion is a robust phenomenon endogenous to every human being.

3.3 Loss Aversion as a Robust Phenomenon Endogenous to Every Human Being

As has been shown in previous chapters, individuals' loss aversion bias is reflected in individuals judgment and decision making behavior in situations when (potential or prior) losses are involved. Recent research examines if these behavioral patterns stemming from loss aversion bias are stable phenomena endogenous to every human being. Researchers furthermore investigate which other factors potentially influence the appearance of these loss aversion related behavioral biases.

When describing the human brain's System 1 way of thinking (cf. chapter 2.4.2) Kahneman (2012, pp. 21-22) states that this system's capabilities 'include innate skills that we share with other animals. We are born prepared to perceive the world around us, recognize objects, orient attention, avoid losses, and fear spiders'. With this statement, he takes up the assumption that loss aversion is something innate. This assumption has been examined in prior research. Research on primates found that primates being genetically strongly related to human beings exhibit loss aversion (Chen et al., 2006; Lakshminaryanan et al., 2008). Capuchin monkeys show loss averse behavior in decision settings involving gain-loss frames. They trade food and

the specific trades are either framed as gains or losses. The monkeys show a strong preference for bonus frames compared to in fact logically identical loss frames (Chen et al., 2006). Lakshminaryanan et al. (2008) document that capuchin monkeys also exhibit the endowment effect in food-trading tasks. Related to these findings, researchers argue that loss aversion extends beyond humans and thus probably has 'a specific, evolutionarily conserved neurobiological basis' (Sokol-Hessner et al., 2009, p. 5035). Recent neurological as well as neuroeconomic research shows that losses elicit different and often stronger human neurological reactions than gains. Losses activate other brain regions than comparable gains (Knutson et al., 2003), induce stronger skin conductance response (Sokol-Hessner et al., 2009), and they generate an increase in heart rate and pupil dilation relative to equivalent-sized gains (Hochman and Yechiam, 2011).[19] These studies provide evidence that individuals neurologically process losses differently than gains induced by loss aversion. Departing from these prior neurological and neuroeconomic insights, loss aversion seems to be a universal feature endogenous to every human being.

Several studies confirm the evidence provided by Tversky and Kahneman (1991; 1992) that the aggregated loss aversion coefficient λ, reflecting the difference in slope of the loss and the gain region of Prospect Theory's value function, is around 2 (e.g., Abdellaoui et al., 2013). Kahneman (2012) states that loss aversion ratios estimated in prior experiments usually take on a value between 1.5 and 2.5. Losses thus on average produce twice as much harm as equivalent sized gains provide pleasure. In the aim of specifying the nature of loss aversion, Johnson et al. (2006) develop four assumptions about the loss aversion parameter. According to the authors, loss aversion could be constant across individuals and attributes, it could be stable across attributes but varying between people, it could be rather stable across people but clearly differing across attributes, and it could differ across both people and attributes. Recent literature provides confirming evidence for the fourth assumption, as explained hereafter.

Several researchers find that the degree of loss aversion varies between people and depends on situational factors (e.g., Gächter et al., 2010; Pighin et al., 2014; Wang et al., 2016). Gächter et al. (2010) conduct an experiment on the endowment effect using a within-subject design. Their study design elicited WTA and WTP for a good per subject. They find that the individuals' degree of loss aversion, hence the WTA/WTP ratio, differed substantially: the average loss aversion coefficient was 2.62 with a standard deviation of 2.28. Thus, nearly each subject showed loss averse behavior – but to a different degree. The authors furthermore show that

[19] For further related neuroeconomic research, see chapter 2.4.2.1.

socio-demographic variables affect individuals' degree of loss aversion. People become more loss averse with increasing age. Higher education mitigates loss aversion but does not fully eliminate it and an individuals' level of income and wealth is positively associated with loss aversion. Wang et al. (2016) add that also culture can influence the degree of loss aversion. They find that the cultural dimensions individualism, power distance and masculinity defined by Hofstede (2001) lead to higher loss aversion. These insights document that personal situational factors affect individuals' degree of loss aversion. Further recent research even shows that completely exogenous factors can influence loss aversion. Pighin et al. (2014) document that mild hypoxia (a reduced supply with oxygen) decreases the degree of loss aversion. Participants in the normoxic (i.e., normal supply of oxygen) condition accepted gambles if the gain was 2.4 times higher than the loss whereas subjects in the mild hypoxia (i.e., reduced supply with oxygen) condition accepted gambles if the gain was 1.7 times higher than the loss. This finding shows that exogenous factors as oxygen supply can influence loss aversion.

Related literature provides hints that loss aversion not only varies between people and is influenced by personal as well as exogenous factors but also varies across attributes. This variation strongly relates to individuals' emotional attachment to goods. People seem to exhibit loss aversion to avoid the experience of negative emotions that might generate from processing losses. Brain regions activated when processing losses, e.g., the amygdala (Coricelli et al., 2005), are also involved in processing stimuli that induce emotions as fear (LeDoux, 2000; Thomas et al., 2001) or regret (Coricelli et al., 2005). Hence, researchers suppose that loss aversion is an emotional reaction of fear (Camerer, 2005) also being linked to the emotion of regret (Shefrin and Statman, 1985; cf. chapter 3.1.5). Findings by research on the endowment effect (cf. chapter 3.1.3) strengthen the assumed emotional component of loss aversion. Goods with a higher emotional loading induce higher WTA and hence stronger loss aversion compared to goods with lower emotional attachment (e.g., Bühren and Pleßner, 2014).

Furthermore, it has been shown that loss aversion does not only relate to truly experienced gains and losses but also relates to predicted future outcomes. Kermer et al. (2006) provide experimental evidence that individuals show loss aversion in affective forecasts. In their study, subjects predict that losing would have a greater emotional impact than winning a certain amount of money. Nevertheless, these predictions do not correctly reflect reality. The authors argue that people fail to consider that they will apply mental techniques to handle the losses. Hence, truly experienced negative emotions linked to losses are less strong than people

predicted. Nevertheless, this way of forecasting one's own loss aversion influences peoples' judgment and decision making and might lead 'people to make decisions that maximize neither their wealth nor their happiness' (Kermer et al., 2006, p. 652).

Research has also put attention to the question if loss aversion decreases with an increase in experience. Harbaugh et al. (2001) investigate if the endowment effect decreases with age and do not find confirming evidence. Children at the age of five as well as adults at the age of 20 show a consumption behavior, which is consistent with the endowment effect. The authors derive that the endowment effect seems to be a ''real' part of preferences, rather than a mistake that diminishes with experience and learning' (Harbaugh et al., 2001, p. 181). Gächter et al. (2010) provide confirming evidence and show that age even increases loss aversion. The authors further find that, in contrast, higher education in fact decreases loss aversion but without fully eliminating it. Experimental studies on the endowment effect examine if the discipline of market experience eliminates loss aversion and find mixed evidence. Market experience can significantly reduce individuals' loss aversion bias but does not eliminate it (Brookshire and Coursey, 1987; Coursey et al., 1987; Knetsch and Sinden, 1987). List (2003; 2004) provides evidence that for individuals with intense trading experience the impact of the endowment effect on trading decisions becomes negligible. In contrast, Kahneman et al. (1990) find that experience does not mitigate the endowment effect. Pope and Schweitzer (2011) provide further evidence that loss aversion even persists in settings with intense competition and very experienced agents. Haigh and List (2005) even document that experienced option traders exhibit more myopic loss aversion than student subjects do.

In summary, prior literature provides hints that loss aversion reflected in its relating behavioral biases is an emotional reaction resulting from individuals' fear of experiencing losses. Although higher education and more experience can reduce loss aversion related behavioral anomalies, they do not fully eliminate them. These findings lead to the assumption that loss aversion is a robust phenomenon endogenous to every human being, although the degree of loss aversion reflected in the strength of behavioral biases varies across people and attributes.

The next chapter explains how conservative accounting better speaks to individuals' loss aversion bias compared to neutral accounting, derives the related hypotheses and illustrates the corresponding research model.

3.4 Conservatism addressing Loss Aversion

Numerous studies examining framing effects provide evidence that the alternative presentation of equal information affects individuals' perceptions of external stimuli and can influence individuals' preferences and subsequent choices (Kahneman and Tversky, 1979; Tversky and Kahneman, 1981; cf. chapter 3.2). Framing concepts in different ways can lead to differences in mental representation, which are quite stable. Literature provides strong evidence that, due to limited cognitive capacity, individuals process information in the form in which it is presented and do not try to reframe it (cf. chapter 3.2). Following Hirshleifer and Teoh (2009, p. 1074), individuals 'dislike being disappointed, and they find conservatism appealing because it reduces the likelihood that future disappointment will occur'. The following example on accounting for research and development expenditures[20] illustrates that conservatism better addresses individuals' loss aversion bias than neutral accounting by inducing different framing effects.

Methodologically, it is possible to either expense or capitalize R&D expenditures.[21] The immediate expensing of R&D as incurred is a typical example for conservative accounting (Beaver and Ryan, 2005). When expensing R&D, R&D expenditures are treated as costs. Hence, a future asset re-measurement is not possible because the potential asset is measured at zero (i.e., costs are immediately expensed independent of news). In contrast, capitalizing R&D expenditures represents neutral accounting. This is the case when a symmetric timely recognition of gains and losses is applied. Under this condition, capitalizing R&D leads to the creation of an asset on the balance sheet that is amortized over its useful life and tested for impairment. Changes in asset value are hence considered dependent on news.

The application of conservative vs. neutral accounting in the context of a multi-period R&D project affects a company's accounting income (i.e., earnings) differently when considering each project period separately. When looking at the project in its entirety, both accounting methods lead to the same overall income result. The following concrete example of a two-period R&D project illustrates both methods' impact on a company's accounting income.[22]

A company makes an investment of 8 million[23] in a R&D project in time period t=1. If the project is successful, the incremental cash flow in t=2 from the project will be 20 million,

[20] Accounting for R&D also serves as the setting in the experiment (cf. chapter 4.2.2).
[21] See chapter 4.2.2.1 for more details on accounting methods for R&D expenditures under IFRS.
[22] A concrete currency is left out in the example.
[23] The example serves to illustrate the general impact of both R&D accounting methods on a company's accounting income. That is why a specific currency is omitted in this example.

0 otherwise. The likelihood of project success is p=0.5. Table 1 documents the accounting income resulting from the project in t=1 and t=2 depending on the accounting method applied as well as on project success.

Accounting Method and Project Outcome Condition	**Accounting Income** (in millions)	
	t=1	**t=2**
Expense Condition: Project = Success	- 8M	+ 20M
Expense Condition: Project = Failure	- 8M	0
Capitalizing Condition: Project = Success	0	+ 12M
Capitalizing Condition: Project = Failure	0	- 8M

Table 1: Accounting Methods' Impact on Company's Accounting Income

Table 1 shows that in the conservative condition potential future losses (i.e., the loss of the invested amount in the case of project failure) are considered upfront in time period t=1 whereas in the neutral condition the company's accounting income remains unaffected in t=1 due to asset creation on the balance sheet. In t=2, under conservatism, the company and its investors can only experience a positive incremental cash inflow of +20M from the successful project or experience no change in accounting income in case of project failure. In contrast, neutral accounting either generates a decrease in equity of –8M in t=2 due to asset depreciation in case of project failure or a positive cash inflow of +12M in case of project success due to depreciation being offset with project return. Under neutrality, potential losses are hence only considered when they effectively occur. The above-described example illustrates that the impact of conservative vs. neutral accounting on accounting income only differs in the short run, when time periods are considered separately, but is the same in the long run, when considering the project in its entirety. Overall, under both accounting methods the project results in either a loss of –8M or in a gain of +12M.

Due to segregation of initial investment and subsequent returns conservatism makes people experience and mentally process potential reductions in equity immediately in t=1. It is assumed that investors rather perceive this equity reduction as an investment than a loss because project outcome has not yet turned out. In t=2, under conservatism, investors can only experience an increase in equity if the project is successful or no change in equity if the project fails.

Project failure is thus not directly linked to a reduction in equity. In contrast, in the neutral condition, due to integration of initial payment and project return, subjects do not experience a change in equity in t=1. However, individuals face a gain vs. loss situation in t=2 in the neutral condition, because depending on project outcome equity will increase or decrease in t=2. It is assumed that investors rather perceive an equity reduction in t=2 as a loss than as an investment because it is directly induced by project failure and is accounted for as an impairment loss. Neutrality hence bears the risk that individuals mentally have to process a loss in future periods. As explained in chapter 3.1.4, people prefer minimizing future losses even if this means to incur a greater loss at present (e.g., Pang et al., 2015). From a manager's perspective, it would be economically more efficient to defer losses to the future instead of considering them up-front due to discounting effects. This is in favor of neutral accounting. However, from an investor's point of view, being the focus in this study, considering losses up-front better addresses individuals' loss aversion. The stream of literature presented in chapter 3.1.4 highlights the importance of timing effects in individuals' judgment and evaluation of the utility of immediate vs. deferred gains and losses. People prefer getting over with undesirable outcomes preferably sooner than later. Mentally processing the consequences of an unsuccessful project should thus be more comfortable in a conservative than in a neutral setting.

Furthermore, individuals probably perceive a negative project outcome in t=2 differently depending on the accounting method applied. As argued above, in the conservative condition, people should process the project related potential loss as an investment in t=1 and experience project failure in t=2 as no change in equity whereas people in the neutral condition should process the project failure in t=2 as a loss reducing equity. Peoples' subjective value and future behavior should hence be more strongly influenced by a prior loss experience in the neutral than in the conservative condition. In case future investment options offer the chance to break even, the desire to compensate prior losses should be higher in the neutral than in the conservative setting. In case future investment options do not offer the possibility to compensate prior losses with future gains, risk aversion should be higher in the neutral compared to the conservative setting (cf. chapter 3.1.7).

The investment's equity impact in t=2 depends on the accounting method applied (conservative vs. neutral) and project success (gain vs. loss). The expected individuals' perception and value of the respective change in equity differs in the resulting four conditions: In case of project success, an increase in equity should be perceived equally positive in the conservative and the neutral condition, hence providing high subjective value. In contrast, people should be better

able to cope with project failure in the conservative than in the neutral setting because under conservatism the potential loss has been considered up-front and should have been mentally processed rather as a project investment than a loss. The disutility generated through project failure should hence be higher in the neutral setting because people perceive the reduction in equity as a loss.

The example demonstrates that conservatism better addresses individuals' loss aversion than neutral accounting by considering potential losses upfront and thereby mitigating future disappointment as well as the impact of prior loss experiences on subjective value. Based on the above argumentation, subjects should hence have preferences for conservative compared to neutral accounting because conservatism provides higher mental comfort especially in situations of failure.

It is important to consider that individuals do not necessarily consciously prefer conservative to neutral accounting. When people are in a judgment context and only experience the impact of one of the two accounting methods, they probably would not reframe the situation but instead value it independent of other possible frames. They are generally not aware that their judgment and decision making behavior might change with the change of presentation format (Kahneman, 1992). 'It is likely that most users are guided by "gut" or "instinctive" notions that unconsciously guide what seems plausible and appealing' (Hirshleifer and Teoh, 2009, p. 1075). Hence, in the first place, preferences for conservatism are probably unconscious. This argumentation leads to the first hypothesis:

H1a: Subjects unconsciously value conservatism more highly than neutral accounting after prior losses.

As explained in chapter 3.3, existing research provides hints that the psychological behavioral bias loss aversion is rather innate to humans than learned (e.g., Chen et al., 2006). Tom et al. (2007) conduct neural imaging studies providing evidence that individuals' asymmetric reaction towards gains and losses have a neural basis. Although loss aversion is endogenous to every human being, individuals show different degrees of loss aversion (e.g., Gächter et al., 2010). A higher degree of individual loss aversion could hence strengthen unconscious preferences for conservatism in accounting. In consequence, individuals showing higher degrees of loss aversion should also value conservative accounting more highly than people with lower degrees of loss aversion should. The corresponding hypothesis is stated as follows:

H1b: Subjects' individual degree of loss aversion is positively associated with subjects' unconscious higher valuation of conservative accounting after prior losses.

As pointed out by Maines et al. (2006), when aiming at providing insights from research that have consequences[24], it is suggested to not only focus on individuals' judgments but also on individuals' decisions. According to the authors, experimental researchers should on the one hand examine which judgments are influenced by the independent variables and on the other investigate how final decisions are affected by these judgments (Maines et al., 2006). In light of this reasoning, it is thus also important to analyze individuals' conscious preferences for conservatism relative to neutrality in accounting influencing their decision making behavior.

Because loss aversion is an innate psychological bias (Chen et al., 2006) individuals are not necessarily aware of having endogenous preferences for conservatism in accounting (Hirshleifer and Teoh, 2009). These unconscious or unintentional preferences are expressed in judgment contexts through individuals' reactions to stimuli. Nevertheless, individuals might become aware of their endogenous preferences when encountering both conservative and neutral accounting. The question arises if encountering and hence experiencing both accounting mechanisms strengthens or rather mitigates endogenous preferences for conservative accounting. On the one hand, this experience could prompt individuals to develop explicit intentional preferences for conservative accounting based on intrinsic loss aversion. On the other hand, experience could induce individuals to overcome loss aversion and thus attenuate individuals' preferences for conservatism because as the above-presented R&D example shows both accounting methods just frame logically equivalent situations differently and in the end lead to the same result.

Literature provides mixed evidence regarding the effect of experience on the persistence of behavioral biases (cf. chapter 3.3). Prior literature shows that market experience can eliminate decision errors (List, 2003; 2004) and hence mitigate loss aversion related behavior but it does not fully extinguish it (Brookshire and Coursey, 1987; Coursey et al., 1987). Recent research provides evidence that loss aversion even persists in settings with intense competition and very experienced agents (Pope and Schweitzer, 2011). Hence, despite having a high level of experience, experienced agents' behavior seem to be influenced by loss aversion. Haigh and List (2005) even show that professional traders exhibit myopic loss aversion to a greater extent than less experienced student subjects. Gächter et al. (2010) provide evidence that age increases loss aversion whereas higher education decreases loss aversion. Thus, prior literature shows that experience can indeed reduce loss aversion related behavioral biases but does not fully

[24] Maines et al. (2006) take the view that the general aim of accounting research is legitimate, consequential belief revision. According to the authors, insights from (accounting) research are useful if they have been legitimately obtained (in a truthful and honest way), and if they have the potential to influence thought.

eliminate them. Hence, loss aversion seems to be that deeply rooted in human beings that individuals do not easily overcome this and related behavioral biases.

As explained above, framing strongly influences individuals' decision making behavior (cf. chapter 3.2). Referring to the concreteness principle (Slovic, 1972; Payne, 1982; Thaler and Johnson, 1990) individuals who are confronted with a framed concept presumably do not try to reframe it. 'Concreteness represents the general notion that a judge or decision maker tends to use only the information that is explicitly displayed in the stimulus object and will use it only in the form in which it is displayed' (Slovic, 1972, p. 9). Hence, when encountering two identical concepts, which are framed differently, being the case for conservative vs. neutral accounting in this study, individuals rather do not reframe them to economize on cognitive effort. In a choice context, reframing these concepts would probably result in being indifferent between the options that are logically equivalent but if reframing does not take place, individuals would probably rather choose the frame they prefer. Due to loss aversion (Kahneman and Tversky, 1979; cf. chapter 3.1.2), the sign and the dread effect (e.g., Thaler, 1981; Loewenstein, 1987; Loewenstein and Prelec, 1993; cf. chapter 3.1.4), in a deliberate choice setting, people should prefer the conservative relative to the neutral option, which allows to get potential losses (i.e., pain) over with more quickly. As has been explained for the derivation of Hypothesis H1b, this preference should be stronger for people having higher degrees of loss aversion.

Based on these prior deliberations and findings, the related hypotheses are stated as follows:

H2a: Subjects have an explicit preference for conservative accounting.

H2b: Subjects' individual degree of loss aversion is positively associated to subjects' explicit preference for conservative accounting.

As argued above, conservatism better addresses individuals' loss aversion bias compared to neutral accounting due to framing effects. Although leading to the same result in the long term, conservative and neutral accounting frame changes in earnings differently in the short run. Prior losses should be perceived more negatively in the neutral than in the conservative accounting condition, whereas gains should be perceived equally positive, independent of the underlying accounting method. The impact of the accounting method applied on subjective value is thus based on its influence on individuals' perceptions of prior outcomes. As explained in chapters 3.1.5 to 3.1.7, a large body of literature examines how prior outcomes affect individuals' future judgment and decision making behavior. By framing accounting income differently, the accounting method applied should moderate the direct relation between prior outcome and

subjective value. Conservative relative to neutral accounting should positively moderate the direct effect of prior outcome on subjective value due to better addressing individuals' loss aversion.

Based on the above reasoning (see chapter 3.3), people with a higher degree of loss aversion should have stronger preferences for conservative compared to neutral accounting. The degree of loss aversion should thus itself positively moderate the moderating effect of the accounting method applied on the direct relation between prior outcome and subjective valuation. These deliberations thus lead to the creation of a moderated moderation model (see Hayes, 2013, for theoretical explanations of different types of research models and their related statistical models)[25] with the accounting method applied as the primary moderator and loss aversion as the secondary moderator.

The data needed to test the above-developed hypotheses are collected via an experimental study. The following chapter presents the experiment's design and its implementation.

[25] The operationalization of the constructs is explained in chapter 4.2.

4. Experimental Study

When conducting a research study, it is important to choose a research method that fits to theory and literature (Smith, 2015) and generates appropriate data for testing the hypotheses developed and for answering the research questions raised (Maines et al., 2006). The research questions introduced in this study (cf. chapter 2.5) aim at revealing if individuals have preferences for conservative vs. neutral accounting and if these preferences translate into economically relevant consequences. This thesis follows an experimental approach because this data collection method has specific strengths and is suitable for providing insights on human judgment and decision making behavior (Libby et al., 2002).

This chapter first briefly describes general methodological strengths as well as particular characteristics of experimental research to consider and think about when developing an experimental study. Second, the specific experiment created to test for the hypotheses derived in this thesis is presented, and third, the experiment's final implementation is described.

4.1 Experiments as a Method of Data Collection in Behavioral Accounting Research

Experimental research provides comparative advantages relative to other research approaches, as, e.g., archival studies, in terms of determining how, when and why financial accounting features influence human behavior (Libby et al., 2002). In an experiment, the experimenter manipulates one or more independent variables of the research study, holds constant or randomizes potentially confounding factors (extraneous independent variables) and investigates the influence of the manipulated independent variables on one or more dependent variables (Kerlinger and Lee, 2000; Maines et al., 2006).

In the following chapters, first the role of experiments in accounting research is briefly outlined. Afterwards, an experimental research's key strength, namely the possibility to examine causal relations between variables, is addressed being one reason why this data collection method has been applied in this thesis. Furthermore, potential confounding factors are described that can jeopardize an experiment's validity. After having explained main validity criteria, common experimental designs are presented.

4.1.1 Behavioral Research in Accounting

Since the 1970s, experimental studies have gained in importance for accounting research. Experimental accounting research differs from other types of accounting research not only in its method of data collection (experiments in contrast to, e.g., archival, case or field studies) but also in the underlying theories applied. Experiments in accounting often build on theories taken

from research disciplines like psychology and sociology in contrast to mainly applying economic theory, as it is the case in empirical archival research (Maines et al., 2006). These theories generally reflect behavioral biases in human decision making behavior (cf. chapter 3.1). The introduction of behavioral (experimental) research in accounting led to the development of an own field of research called Behavioral Accounting being strongly interdisciplinary (Gillenkirch and Arnold, 2008).

As highlighted by Maines et al. (2006), research questions developed in the field of accounting often address capital market participants' (e.g., investors or accountants) judgment and decision making behavior. This stream of research examines how accounting information influences individuals' judgment and decision making behavior by investigating how accounting information is used and processed. Especially behavioral accounting deals with the impact of the design of internal and external accounting systems on human decision making behavior and aims, on the one hand, at explaining and forecasting human behavior and, on the other hand, at providing recommendations for the organization and design of these accounting systems (Gillenkirch and Arnold, 2008).

Behavioral accounting is a growing research area due to an increase of interest in behavioral research in general and due to an expansion in methods used to study related issues. Thus, boundaries of behavioral accounting research are nowadays blurred (Birnberg, 2011). Gillenkirch and Arnold (2008) provide an overview of different research areas and related research topics that are commonly subsumed under behavioral accounting research.[26] They argue that depending on the respective research area, the judgment and decision making behavior of a certain group of stakeholders (e.g., investors, taxpayers, or managers) is the focus of interest. These insights contribute to the above-cited overall aim of behavioral accounting research, that is, enhancing social welfare by optimizing the design and implementation of accounting systems depending on how addressees perceive and use them (Gillenkirch and Arnold, 2008).

Gillenkirch and Arnold (2008) state that one part of behavioral accounting research addresses methodological issues. Such issues related to experimental research are further described in chapters 4.1.2 to 4.1.4. Although experiments receive special attention in behavioral accounting, other research methods as for example archival, survey or case studies also play an important role (Gillenkirch and Arnold, 2008; Birnberg, 2011). There is for example a growing

[26] An overview of experimental research in financial accounting can be found in Libby et al. (2002). Sprinkle (2003) provides an overview of experimental research in managerial accounting. Trotman et al. (2011) offer a 50 year overview of judgment and decision making experimental research in accounting.

body of archival financial accounting research, which aims at integrating economic and psychological theory to provide new behavioral insights about financial accounting issues (Koonce and Mercer, 2005). Each method has its own specific strengths and weaknesses. Researchers as Libby et al. (2002) and Trotman et al. (2011) hence argue that research methods should rather be perceived as complementing than as replacing each other. Applying various research methods with specific strengths and weaknesses to provide insights on a certain research question 'increases the diagnostic value of the findings' (Libby, 1981, p. 15).

The next chapter explains how experiments enable researchers to test for causal relations and underlines the necessity to address potential confounding factors.

4.1.2 Examination of Causal Relations and the Role of Confounding Factors

Experiments enable researchers to generate primary data especially collected for testing the hypotheses developed upfront. This is also true for other research methods as, e.g., survey or interview data (i.e., data based on questionnaires) as well as field data (observations directly taken from reality, e.g., within a company). In contrast, archival studies are based on data that is already available. This type of data, called secondary data, is generally collected and published for a non-research purpose, as, e.g., company data provided through annual reports (Maines et al., 2006).

A major strength of experimental research is that experiments not only allow for testing associations between variables but also allow for investigating causal relations (Libby et al., 2002; Smith, 2015). As stated by Shadish et al. (2002, pp. 3-4), 'the definitions of terms such as *cause* and *effect* depend partly on each other and on the causal relationship in which both are embedded'[27]. A cause is at the inception of an effect. Often times, more than one factor is required to induce an effect. Shadish et al. (2002) underline that for this reason causal relationships are not deterministic and depend on the specific factors or the specific environment under which they occur. Based on Mill (1843), the authors explain that a causal relation between two variables is dependent on three conditions that are reflected in the conduction of an experimental study. First, the cause needs to precede the effect. This sequence is found in an experiment in the sense that the potential cause is first manipulated before afterwards generating observations on the dependent variable under investigation. Second, it is necessary that cause and effect are related. In an experiment, independent variables are manipulated at different levels to examine if variations in the cause are associated to variation

[27] The cited paper applies the italic font which has been kept unchanged for citation purposes.

in the dependent variable, i.e., the effect. Third, the cause needs to be the only plausible explanation for the effect. Potential confounding factors that can have a systematic impact on the dependent variable under investigation are accounted for in an experiment to isolate the effect of the manipulated variable(s) on the dependent variable(s).

Prior literature identified various confounding factors that could potentially jeopardize a study's internal or external validity and hence its results (Campbell and Stanley, 1967; Kerlinger and Lee, 2000; Shadish et al., 2002). Campbell and Stanley (1967) provide an overview of the most common confounding factors. Other researchers build on and relate to this overview when discussing methodological issues in experimental research (e.g., Schwering, 2016). The confounding factors presented by Cambpell and Stanley (1967) have been considered for the design of the present experiment and are briefly introduced hereafter.[28] The first nine factors are threats to the internal validity of a study while the last four factors potentially distort a study's external validity (for further details on validity criteria see chapter 4.1.3).

- *History:* Events happening between two times of measurement could potentially confound the results.
- *Maturation:* Subjects mature in the passage of time independent of specific events. They could become, e.g., more tired during the study. These changes in personal well-being could introduce noise in subjects' judgment and decision making behavior.
- *Testing:* Results of or experiences gained in a first test can affect subjects' behavior in a subsequent second test.
- *Instrumentation:* A study's results could differ in case experimental instrumentation is changed between treatment groups. Experimental material (e.g., instructions) and also the experimenter himself are part of an experiment's instrumentation.
- *Statistical Regression:* It has been shown that pre- and post-test results differ in pre-test's results being higher than post-test results. This is especially the case if post-test subjects are selected based on high scores they yielded in a pre-test because in post-tests answers commonly regress to the mean.
- *Selection*: If subjects are selected for treatment groups based on specific criteria or if individuals self-select into treatment groups based on certain characteristics, results could be affected by the selection criteria and could thus potentially be biased.

[28] Chapter 4.3 describes the final implementation of the experiment conducted in this thesis and explains how the confounding factors presented in chapter 4.1.2 are addressed.

- *Experimental Mortality*: If subjects prematurely cancel the experimental task resulting in a loss of respondents.
- *Selection-maturation interaction:* Two or more of potential confounding factors could interact (e.g., selection and maturation). These interactions could be confounded with the effect of the independent variables of the study.
- A further threat to internal validity is the so-called *Demand and researcher expectancy effect* (Maines et al., 2006): The creation and implementation of an experiment demands a high degree of researcher involvement. The experimental material as well as the interactions between experimenter and participants during the implementation phase can create demand in the sense that subjects feel induced to guess the expected answer and hence might revise their responses accordingly.
- *Reactive or Interaction Effect of Testing*: A pre-test might affect a subject's sensitivity to the variable under investigation which in turn might influence the subject's post-test answers. Results gained from a pretested group of subjects are not comparable to results of a group of subjects who did not participate in the pre-test.
- *Interaction of Selection and Experimental Variable*: In case the choice of subjects who participate in the study interacts with the dependent variable, results are only valid for the specific subject group. This confounding factor threatens the generalizability of results.
- *Reactive Effects of Experimental Arrangements*: In case the experimental situation strongly differs from the real world, subjects might behave unnaturally, i.e., different from how they would behave in reality.
- *Multiple-treatment Interference*: In case subjects are exposed to multiple treatments, previous treatment effects potentially bias subjects' behavior in subsequent treatments.

By controlling variables in an experiment, the researcher can isolate the effect of the independent variables on the dependent variables of interest, which goes beyond testing for associations and can reveal causal relations (Libby et al., 2002; Sprinkle, 2003; Trotman et al., 2011). Common methods to control for confounding factors are discussed by Libby et al. (2002) and presented hereafter. The best way to deal with confounding factors would be to eliminate them. Although this is possible for certain factors (e.g., making subjects work in cubes to preempt them from communicating with each other during the study), it is not as easy for others (e.g., influence of the experimenter). In case elimination is not feasible, confounding factors can be held constant across treatment groups. In this case, their influence is the same in each

group and does not bias the results asymmetrically between groups. A further method to cope with potential confounding factors is to measure them and integrate the resulting variables as control variables in the data analyses. This method is commonly applied to control for subjects' attitudes. Another way to deal with confounding factors is randomization. Randomly distributing subjects to treatment groups mitigates or even eliminates selection biases as well as systematic differences between groups. Randomization contributes to an equal influence of potential confounding factors in each treatment group hence allowing isolating pure treatment effects. As Libby et al. (2002) explain, randomization helps keeping the omitted variable bias at a minimum level. The authors finally state that for efficiency reasons it can even be necessary to simply ignore certain extraneous variables if controlling them would be extremely complex (i.e., e.g., costly and/or time consuming).

The examination of causal relations is thus possible due to the fact that the investigator has control over the independent variables by manipulating treatment conditions as well as over potential extraneous variables by holding them constant or via randomization (Kerlinger and Lee, 2000; Libby et al., 2002; Sprinkle, 2003; Trotman et al., 2011). This is not the case for non-experimental research as, e.g., archival or field research due to a lack of control over variables (Kerlinger and Lee, 2000). Data used in non-experimental research often relate to variables, which are inherently not manipulable (Maines et al., 2006).

It is important to add that although being appropriate for investigating causal relations, experiments only have limited ability in identifying effect size. As Maines et al. (2006) explain this is partly caused by the fact that independent variables are normally not manipulated at all possible levels. Therefore, experiments are especially suitable for studying effects of discrete in contrast to continuous variables (Maines et al., 2006).

One key characteristic of experimental research is the fact that the researcher himself can design the setting for the specific experimental study (Trotman et al., 2011). Therefore, experiments are an appropriate method not only for disentangling components which are interrelated in the natural environment and investigate causal inferences between these elements but also for examining effects of conditions which do not yet exist in the real world (Libby and Luft, 1993). Hence, an experiment allows researchers to examine, e.g., effects of exposure drafts of revised or even new accounting standards by designing a corresponding experimental setting (Maines et al., 2006). Additionally, experiments are also appropriate for testing and extending analytical research (Sprinkle, 2003). Due to the ability to test causal relations, experiments are able to not only test theoretical models but also investigate their limits and provide insights on why

individuals' behavior might deviate from the models' predictions (Moser, 1998; Kerlinger and Lee, 2000).

The next two chapters point to validity criteria as well as common experimental designs both representing important aspects that need to be considered and decided on for successfully implementing an experimental study.

4.1.3 Validity Criteria

When evaluating experimental research theory and designs regarding their validity, three validity criteria commonly come into play: construct validity, internal validity and external validity (Smith, 2015). [29] These three criteria are presented hereafter.

As described by the predictive validity model (Libby, 1981), which is a framework for theory validation, a theory that a researcher develops in most cases addresses the relationship between two or more concepts. Because these concepts normally are not directly observable or measurable, the researcher needs to operationalize them. Hence, the theory must be tested via the operationalization of the variables involved (Libby, 1981; Libby et al., 2002). Construct validity addresses the extent to which these abstract concepts are appropriately operationalized through measurable variables. The less successful the operationalization is the less reliable experimental results will be (Smith, 2015). The operationalization of the constructs that are involved in the present study (cf. description of the research model presented in chapter 3.4) is presented and explained in chapters 4.2.3 to 4.2.5.

Related to construct validity that is expressed by the quality of the concepts' operationalization, internal validity concerns refer to the degree to which one can be sure that variations in dependent variables are truly triggered by variations in independent variables (Libby et al., 2002). Different approaches exist that serve for increasing an experiment's internal validity (cf. techniques to deal with confounding factors presented in chapter 4.1.2).

Because experimental designs frequently abstract from real world settings, they often suffer from external validity concerns (Maines et al., 2006). External validity is the degree to which experimental results are representative and can be generalized beyond the specific experimental setting, measurement methods, and subject pool (Libby, 1981; Libby et al., 2002). According to Libby et al. (2002), external validity is not only a question of the validity of experimental stimuli but also of the theory and hypotheses developed. The authors argue that if the theory

[29] Detailed explanations on experimental research validity criteria are provided, e.g., by Campbell and Stanley (1967) and Shadish et al. (2002).

and hypotheses address elements of the related target environment, the study's results should be generalizable to this environment under the condition that the study does not suffer from internal validity concerns. There are several ways to increase external validity of an experimental study. One approach to strengthen external validity is for example to develop hypotheses which rather focus on causal relations and specifically on directional effects than on specific numerical predictions which are less likely to be generalizable (Libby et al., 2002; cf., e.g., Cook and Campbell, 1979, for a presentation of different models increasing an experiment's external validity).

Although experiments are commonly criticized for a lack of external validity, they have a fundamental and crucial strength, which is the high level of internal validity (Kerlinger and Lee, 2000). As Campbell and Stanley (1967) state, an ideal research design is characterized by achieving a high level of both internal and external validity at the same time. However, creating a research design, which is strong in internal as well as external validity, is difficult because both criteria are often contradictory. Due to the fact that trade-offs between validity types are inevitable, the prior between validity criteria needs to be defined depending on the research conducted (Cook and Campbell, 1979).

As described above, it is important to consider all three validity criteria when designing an experiment to assure the validity and usefulness of the collected data and hence the validity of the study's results. When working on an experiment's specific design, the researcher has several possibilities to model the study. The next chapter briefly presents fundamental experimental designs that are commonly applied in behavioral experimental research.

4.1.4 Experimental Designs

The design of experiments is commonly distinguished regarding the number of treatments subjects go through.[30] In a between subjects design, participants normally experience only one out of all available treatment groups and hence provide one observation per construct. The researcher can thus analyze differences between treatment groups. To collect enough data, this design often demands a higher number of subjects relative to within-subjects designs, potentially leading to higher costs of conduction (e.g., in time and money) (Libby et al., 2002). Libby et al. (2002) state that the application of a between-subjects design can reduce the noise introduced by potential carry-over and salience effects that risk to appear in within- subject designs as explained hereafter.

[30] For an overview of common experimental designs see Campbell and Stanley (1967).

In a within-subjects design participants experience more than one treatment. In this case, the experimenter receives more than one observation per subject (Libby et al., 2002). Within-subjects designs allow controlling for between subject effects but at the same time increase the probability that subjects comprehend the underlying treatment effects (salience effect), which could introduce biases in subjects' responses such as socially desired answers. In case subjects experience more than one treatment it is important to control for order effects to assure truly isolating treatment effects (Shadish et al., 2002). Randomizing the order in which treatments appear can also reduce the practice and carry over effect: subjects' answers provided in subsequent measures can be biased by experiences made in prior measures (Shadish et al., 2002). One type of a within-subjects design is the pretest-posttest design, which enables researchers to use pretest results as covariates in the analysis of the posttest results (Libby et al., 2002).

Sometimes a combination of both between- and within-subjects design can be useful. This is especially the case in judgment and decision making research when investigators aim at separating effects of unintentional biases (heuristics) from effects of intentional judgments (rules) (Kahneman and Tversky, 1996; Libby et al., 2002). Due to the fact that in a between-subjects design participants only experience one treatment they receive less information than subjects in a within-subjects design experiencing more than one treatment. A between-subjects design provides evidence on the question if subjects rely on heuristic reasoning meaning researchers receive information on subjects' natural reasoning process. In contrast, in a within-subjects design subjects experience at least two treatments. This repetition increases the salience of the manipulated variables enabling subjects to rethink about and even change or correct their responses. It thus provides evidence on how individuals address a potential conflict between rules and heuristics (Kahneman and Tversky, 1996; Libby et al., 2002).

In case a between-subjects design provides significant differences in results while a within-subject design does not, subjects' behavior is suggested to be unintentional. On the contrary, finding significant differences in results implementing a within-subjects design but non-significant results in a between-subjects setting indicates that subjects understand and consider the manipulations of stimuli but they do not integrate this knowledge in their natural reasoning process (Kahneman and Tversky, 1996; Libby et al., 2002). If within-subjects results are consistent with between-subjects results, subjects seem to be able to integrate this information in their natural reasoning process because their judgments in the between-subjects design seem to be consistent with their intentions (Clor-Proell et al., 2014).

Depending on the hypotheses under investigation, it is thus important to apply the most suitable experimental design. Based on the prior methodological explanations, the next chapter presents the experiment conducted in this thesis.

4.2 Experimental Design and Construct Operationalization

As explained in chapter 4.1, when developing an experimental study it is desirable, even though difficult, to try to maximize all validity criteria at once and chose an appropriate experimental design to generate suitable data to test for the hypotheses under investigation. This chapter presents the experimental design as well as the applied operationalization of the constructs involved (cf. chapter 3.4) and highlights how potential methodological biases are addressed.

4.2.1 Overview of the Experiment's Design and Construct Operationalization

The number of the factor levels of the involved independent variables influences the specific experimental design. According to the research model, two main independent variables, namely prior outcome (direct effect) and accounting method applied (primary moderator), influence the dependent variables subjective value and subjective preference. Both independent variables are considered on a two factor level basis. Prior outcome is either positive or negative (gain vs. loss experience) and the accounting method applied is either conservative or neutral. The impact of these independent variables on the dependent variables is investigated between subjects. This leads to a 2 x 2 between-subjects design (see Table 6, chapter 4.2.3).

Subjects are randomly distributed to one of the four treatment groups. In the specific experimental setting (cf. chapter 4.2.2.2), subjects are invested in a company.[31] They experience changes in value of their equity stake depending on the company's investments and the accounting method applied. Throughout the experimental task, subjects have the possibility to sell their equity stake. The dependent variable subjective value is operationalized by subjects' indications of selling prices (the specific measurement of subjective value is explained in chapter 4.2.4.1).

To operationalize participants' subjective preference for one or the other accounting method, all subjects are confronted with the same choice situation between two investment options that only differ in the accounting method applied (details on the measurement of subjective preference are provided in chapter 4.2.4.2). The experimental design thus switches from a

[31] The aim of this study is to provide insights on the impact of accounting conservatism vs. neutrality on financial information users' judgment and decision making. Therefore, subjects are put in their investor role representing a main interest group of financial information users (IASB, 2010, CF; IASB, 2015, CF ED).

between-subjects design to a within-subjects design for analyzing individuals' conscious preferences for one or the other accounting method.

The secondary moderator variable loss aversion is included on a subject basis by calculating each subject's individual degree of loss aversion in risk and time settings (cf. chapter 4.2.5 for more details).

The experiment is divided into three parts that include different tasks to collect data on the dependent variables under examination as well as on independent and control variables considered in this study.

Part 1 is the main part of the experiment and serves to elicit subjects' preferences for conservative vs. neutral accounting. In part 1, subjects experience five alternative investment scenarios. In scenarios 1 to 4, individuals are in a judgment context (between-subjects design) and experience either conservative or neutral accounting. This allows examining if individuals value conservative accounting more highly than neutral accounting (H1a) and hence show unconscious preferences for it. In scenario 5, subjects are in a choice context (within-subjects design) to investigate individuals' explicit preferences for conservatism vs. neutrality in accounting (H2a).

Part 2 consists of two instruments based on Abdellaoui et al. (2013) that elicit subjects' risk and time preferences serving as control variables in this study. The data collected on risk and time preferences allow calculating subjects' individual degrees of loss aversion. Subjects' loss aversion is a moderator variable in this study (H1b; H2b).

Part 3 is the final part of the study and consists of a post experimental questionnaire (PEQ) on subjects' understanding of the tasks, their personal attitudes, and demographics that are integrated as control variables in the analysis.

The next chapter illustrates the task subjects completed in part 1.

4.2.2 Subjects' Task

This thesis investigates individuals' endogenous preferences for conservative compared to neutral accounting. The setting in which the main task is embedded thus needs to be able to capture the difference between these two accounting concepts. Several accounting topics exist that could provide an appropriate context. One example is the accounting for provisions. Recognizing provisions (e.g., for unsettled transactions) represents conservative accounting while not recognizing provisions would refer to neutral accounting, or recognizing contingent assets symmetrically to contingent liabilities, such as provisions, would then be neutral. Other

examples of conservatism are loan loss reserves and impairments of assets, or write-offs of doubtful receivables. Write-offs alone would be conservative whereas symmetrically recognizing changes in value by both write-offs and write-ups would represent neutral accounting. A typical example of neutral accounting therefore is full fair value accounting. Although these topics could provide a suitable context for the experiment, they are not further developed in this study because there is a consensus on the usefulness of recognizing provisions and depreciating receivables reducing the tension inherent in these topics. In contrast, another appropriate accounting topic that is currently controversially debated in literature and practice hence being more suspenseful is the accounting for R&D expenditures.

The following chapter first presents current R&D accounting methods under IFRS that provide the particular context in which the experimental task is modeled, before afterwards illustrating the specific task subjects fulfilled in part 1 of the study that serve to examine individuals' unconscious preferences for conservative vs. neutral accounting.

4.2.2.1 Accounting for R&D Expenditures under IFRS

The degree of conservatism in accounting depends on the prevailing accounting regulations and the exercise of accounting choice. In this thesis, this is illustrated via the example of R&D accounting under IFRS (also see chapter 3.4). According to IAS 38, expenditures on internally generated intangible assets in their *research* phase have to be expensed immediately when incurred (IAS 38.54). Capitalizing expenditures on intangibles in their *development* phase is mandatory when certain criteria are met. Otherwise, immediate expensing is required. These capitalization criteria are specified in IAS 38.57 and comprise the following points: technical and commercial feasibility, that is an entity's intention to complete and use or sell the asset, the generation of future economic benefits through the asset, availability and provision of adequate resources and an entity's ability to measure reliably the expenditures attributable to the intangible asset during its development. In summary, the fulfillment of these conditions thus confirms the project's or product's economic and technological feasibility. If a company is not able to clearly distinguish the research from the development phase of a project that is set up to create an intangible asset, the company must treat the corresponding expenditures as costs and expense them immediately as incurred (IAS 38.53).

Development expenditures that are capitalized and hence recognized as an asset on the balance sheet must be amortized. If these assets have a *finite* useful life, they are regularly amortized over their useful lives and are further subject to impairment testing. If these assets have an *indefinite* useful life, they are not amortized on a regular basis. Instead, they are assessed for

impairment at each reporting date whether or not there is any indication of an impairment-triggering event (IAS 36). In case the impairment test shows that the asset's carrying amount exceeds its recoverable amount the asset must be written-off to the recoverable amount.

On a theoretical level, several possible alternatives of recognizing expenditures on intangible assets exist representing different degrees of conservative accounting. Mandatory expensing of R&D expenditures as incurred, as prescribed under US GAAP (ASC 730-10-25-1), is an example of unconditionally conservative accounting (Penman and Zhang, 2002; Beaver and Ryan, 2005). This accounting treatment is mechanical and news-independent. R&D investments are recognized as expenses, not as assets. Expensing, being the classic conservative accounting method, does not necessarily reflect bad news about a project's success but it considers a high degree of uncertainty about the project's outcome upfront. As opposed to conservative accounting, neutral accounting prescribes capitalizing R&D expenditures, thus recognizing R&D investments as assets. As explained above, IFRS requires expensing of expenditures related to the creation of an intangible asset if the expenditures are incurred in the research phase (IAS 38.54). In contrast, IFRS requires the capitalization of development expenditures if the intangible asset arising from the development phase fulfills certain criteria that test for the commercial and technical feasibility of the venture (IAS 38.57). Under IFRS, assets are defined as future economic benefits (IASB, 2010, CF4.4-4.8). Development expenditures are treated as assets conditional on certain criteria specified in IAS 38.57 representing conditional conservative accounting because future economic benefits are likely to flow to the firm as a result of the investment. The regulations set out in IAS 38 thus reflect a compromise between conservative and neutral accounting.

Table 2 summarizes conceptual differences between conservative and neutral accounting based on the example of recognition of R&D expenditures.

	Conservatism		**Neutrality**
Types	**Unconditional**	**Conditional**	
Approach to R&D Accounting	• Full expensing of R&D expenditures	• Capitalizing of Development expenditures under the conditions of IAS 38.57	• Capitalizing of R&D expenditures
	• Treating R&D expenditures as costs, not assets	• Treating Development expenditures as assets	• Treating R&D expenditures as assets

Table 2: Conservative vs. Neutral Accounting illustrated by the Example of R&D Accounting

In summary, mandatory immediate expensing of R&D expenditures represents unconditional conservatism, capitalizing development expenditures conditional on specified criteria represents conditional conservatism, and capitalization of R&D expenditures represents neutral accounting. The experimental setting modeled in this thesis compares conservative with neutral accounting without further distinguishing between different types of conservatism. Subjects experience either pure expensing or pure capitalizing of development expenditures unconditional on news.

The next chapter presents the specific task subjects completed in the first part of the experiment.

4.2.2.2 Specific Task in Part 1 of the Experiment

The experimental task created in this study is newly developed. The experiment was programmed and conducted using z-Tree software (z-Tree Version 3.6.6; Fischbacher, 2007).[32] Participants thus performed the experimental tasks computer-based. The experiment was conducted at the University of Augsburg, Germany, and at the University of St. Gallen, Switzerland (cf. chapter 4.3 for details on the implementation of the final experiment).

Part 1 of the experiment consists of five different investment scenarios serving to elicit subjects' preferences for conservative vs. neutral accounting. Subjects are asked to put themselves in the position of an individual investor. The experimental currency used in this study is called Dollar $ (for details on the currency used and monetary incentives cf. chapter 4.3.2). In each investment scenario, subjects are endowed with equity of $ 200,000 (fresh start for each scenario). In scenarios 1 to 4, subjects are invested in a company (company A in scenario 1 to company D in scenario 4) at the full amount of their initial equity endowment of $ 200,000. The respective company has equity capital of $ 20M. Subjects' equity stake thus represents 1% of the company's equity. Investment decisions influencing the company's equity also affect subjects' equity stake in the firm. In investment scenario 5, subjects face two companies (company X and company Z) and are asked to decide in which of both companies they want to invest their equity endowment of $ 200,000. Participants see the amount of the company's equity as well as the value of their own equity stake permanently top left on the computer screen.

In investment scenarios 1 to 4, the respective company conducts two R&D projects sequentially. In investment scenario 5, subjects choose between investing their equity in

[32] Z-Tree is a software especially developed for conducting economic experiments. It is based on a client-server application. Z-Tree itself is used on the server (i.e., the experimenter's computer), and the clients (i.e., participants) use z-Leaf to run through the experiment (cf. Fischbacher, 2007).

company X vs. company Z. After investing in one of the two companies the company chosen conducts one R&D project. Table 3 provides an overview of R&D projects conducted per scenario.

Investment Scenario	Company	R&D Project
1	A	1 & 2
2	B	3 & 4
3	C	5 & 6
4	D	7 & 8
5	X vs. Z	9

Table 3: Overview of R&D Projects per Scenario

The probability of project success or failure is 50% for each R&D project conducted. Table 4 provides an overview of the amount the respective company invests in the corresponding R&D project as well as of the R&D projects' returns in case of success and failure.

R&D Project	Investment	Success	Failure
1 & 4 & 5 & 8	$ 8M	$ 20M	$ 0
2 & 6 & 9	$ 10M	$ 25M	$ 0
3 & 7	$ 6M	$ 15M	$ 0

Table 4: R&D Projects' Cash Flows in Investment Scenarios 1 to 5

Subjects have the possibility to sell their equity stake at any time throughout the investment scenarios. To make sure that selling decisions (i.e., company valuation) are not driven by differences in R&D projects' profitability, the projects' internal rate of return is hold constant at 25%[33] across all projects (calculated for a period of 1 year). To account for time value of money, subjects are informed that the respective company generates its return on equity only through conducting R&D projects. Hence, R&D projects' success represents the company's equity return. Subjects can sell their stake in the firm at any time and hold their capital in an

[33] Prior literature states that on average only 14% of initial ideas on new products finally become commercial successes and only '54% of commercialized new products were successful from a profit perspective' (cf. Barczak et al., 2009). Because of the high rate of R&D project failure these projects generally need to show a high rate of return for being conducted. Based on these deliberations, 25% is considered a realistic one-year rate of return for R&D projects.

account instead that would earn a market rate of return of 0%. This ensures that all projects are highly valuable from an economic perspective.

Investment scenarios 1 to 4 follow the same structure. Scenario 1, representative for scenarios 1 to 4, is exemplarily described in more detail hereafter. Starting the first investment scenario, subjects are informed that the company is planning to invest $ 8M in a R&D project, which spans two fiscal years: t=1 and t=2. The investment in the R&D project will be made in period t=1.[34] It is further explained that in t=2 a random generator will determine if the project is successful or not. The likelihood of project success is 50%. Depending on the treatment group, the company either capitalizes or expenses R&D expenditures.

The corresponding impact on subjects' equity stake per period depends on the accounting method applied and project success. In case the company capitalizes R&D expenditures (neutral condition), subjects' equity remains unchanged in period t=1. In fiscal year t=2, profit or loss depends on the success of the project affecting subjects' equity differently. If the project is successful, the company will receive a return of $ 20M. This leads to a profit (and an according increase in equity) of $12M after amortization of the development costs. Subjects' equity thus increases by $ 120,000. If the project fails, there will be no return on the investment, leading to a loss of $ 8M in t=2. Subjects experience a decrease in their own equity by $ 80,000. Annex 1.1 provides a screenshot of the corresponding explanations subjects see on the computer screen.[35]

In case the company expenses all development expenditures as incurred (conservative condition), the investment will lead to a reduction in company's equity of $ 8M and to a reduction in subjects' equity of $ 80,000 in fiscal year t=1. In fiscal year t=2, if the project is successful, the company will earn a return of $ 20M. This leads to a profit (and an according increase in equity) of $ 20M. Subjects' equity will hence increase by $ 200,000. If the project fails, there will be no return on the investment and no profit or loss. A screenshot of the corresponding screen subjects see at this stage of the experiment is provided in Annex 1.2.

Before the project investment is made in t=1, subjects are asked to indicate a price at which they would be willing to sell their equity stake at this point in time (t=0). Annex 1.3 shows the corresponding computer screen. To elicit subjects' true price quotations, i.e., their willingness to accept a random buy offer for selling their equity stake, an auction procedure adapted from

[34] Being in their investor role, subjects do not have any influence on whether the company invests in the R&D project or not. The company's management has decided on project conduction.
[35] All experimental material (text on computer screens included) was provided in German.

Becker et al. (1964) is applied (cf. chapter 4.2.4.1 for more details on this auction mechanism). Subjects are informed that by selling their equity stake they would forgo the chance of benefiting from a positive project return in case of project success. However, in case they do not sell their equity stake, they would continue to bear the risk of project failure.

At the end of time period t=1, after the investment has been made by the company, subjects who did not sell their equity stake in t=0 are confronted with changes in their amount of equity stemming from project investment. Changes in equity after project investment depend on the accounting method applied (capitalizing vs. expensing R&D) (cf. Annex 1.4 for the corresponding screen shown in the capitalizing condition). Afterwards, subjects again indicate a price at which they would be willing to sell their equity stake. Subjects who do not sell their stake at this point will afterwards experience the R&D project's outcome in t=2. Annex 1.5 exemplarily shows the computer screen subjects see in the capitalizing condition in case of project success. After the first R&D project has been completed in t=2 and project outcome has been revealed, subjects are again asked to indicate a price at which they would be willing to sell their equity stake. In this moment, subjects do not have any concrete information about the company's future projects.

After the indication of a selling price in t=2, subjects are informed that the company has the opportunity to invest in a second R&D project. Subjects who have not sold their equity stake yet now run through the second R&D project in an identical way as has been described above for R&D project 1. At this point, subjects' state of equity is not set back to initial values.

Table 5 illustrates the steps subjects run through in the first investment scenario depending on whether and when they sell their equity stake. In case subjects sell their equity stake in the course of the first investment scenario, they are immediately directed to investment scenario 2.

Time Periods in Investment Scenario 1	Stages Subjects run through in Investment Scenario 1 (In scenario 1, subjects are invested in Company A)
t=0	• Subjects are informed about R&D Project 1 • Possibility to sell the equity stake
t=1	• Company invests in R&D Project 1 • Possibility to sell the equity stake
t=2	• Outcome of R&D Project 1 is revealed • Possibility to sell the equity stake • Subjects are informed about R&D Project 2 • Possibility to sell the equity stake
t=3	• Company invests in R&D Project 2 • Possibility to sell the equity stake
t=4	• Outcome of R&D Project 2 is revealed • Possibility to sell the equity stake • End of Investment Scenario 1

Table 5: Stages Subjects run through in Investment Scenario 1

The stages subjects run through that are described above and illustrated in Table 5 are identical for all R&D projects involved in scenarios 1 to 4 (the cash flows related to each project are illustrated in Table 4). At the beginning of each scenario, equity is set back to initial values. Subjects thus experience a fresh start (i.e., they are invested in the respective company at the amount of $ 200,000).

Investment scenario 5 differs from investment scenarios 1 to 4 in asking subjects in time period t=0 to choose in which of two companies X and Z they want to invest their equity of $ 200,000. Company X and company Z are identical except for the accounting method applied: company X capitalizes R&D expenditures while company Z expenses R&D expenditures as incurred (see Annex 1.6 and Annex 1.7 for the respective screens subjects see at this stage of the study). Depending on the choice subjects make (cf. Annex 1.8 for the computer screen asking subjects to choose between both options), they experience R&D project 9 in either a neutral or a conservative setting. The point of interest in scenario 5 is the choice subjects make between company X and company Z. This scenario is hence shortened by making subjects experience only one R&D project instead of two.

The next chapter explains the specific manipulation of the independent variables. These explanations also provide further details on the task subjects completed in part 1 of the study.

4.2.3 Manipulation of Independent Variable and Primary Moderator

As mentioned in chapter 4.2.1, the independent variables prior project outcome and accounting method applied are both manipulated at a two factor level leading to a 2x2 between-subjects design. The accounting method applied for R&D expenditures is either neutral or conservative (*CONS*[36]) and prior R&D project outcome is either a success or a failure (*LOSS*).

These manipulations result in the creation of four treatment groups. Subjects are randomly distributed to one of the four groups. The first manipulation relates to the accounting method applied. Treatment groups 1 and 2 (3 and 4) experience investment scenarios 1 and 2 in a neutral (conservative) setting and investment scenarios 3 and 4 in a conservative (neural) setting. The second manipulation addresses R&D projects' outcome. For comparability purposes, the sequence of R&D projects' outcome is determined randomly for treatment group 1 (probability of project success p=0.5) and afterwards applied in an identical manner to treatment group 3. Treatment groups 2 and 4 experience the respective opposite project outcomes.[37] Table 6 provides an overview of the manipulations applied in investment scenarios 1 to 5 experienced by treatment groups.

	Treatment Group 1	**Treatment Group 2**	**Treatment Group 3**	**Treatment Group 4**
Scenario 1	*Capitalizing*	*Capitalizing*	*Expensing*	*Expensing*
Project 1	Loss	Gain	Loss	Gain
Project 2	Loss	Gain	Loss	Gain
Scenario 2	*Capitalizing*	*Capitalizing*	*Expensing*	*Expensing*
Project 3	Gain	Loss	Gain	Loss
Project 4	Gain	Loss	Gain	Loss

[36] Names of corresponding variables that are integrated in the data analysis (cf. chapter 5) are given in parentheses. Annex 4 provides an overview of all variables involved in this study. The overview includes variables' definitions and measurement.

[37] Predetermining a random sequence of stimuli that is subsequently applied to all participants is a procedure used in experimental research to limit variation across subjects (cf., e.g., Lejuez et al., 2002). This approach leads to enhanced data comparability.

Scenario 3	*Expensing*	*Expensing*	*Capitalizing*	*Capitalizing*
Project 5	Gain	Loss	Gain	Loss
Project 6	Loss	Gain	Loss	Gain
Scenario 4	*Expensing*	*Expensing*	*Capitalizing*	*Capitalizing*
Project 7	Loss	Gain	Loss	Gain
Project 8	Gain	Loss	Gain	Loss
Scenario 5	*Capitalizing or Expensing*	*Capitalizing or Expensing*	*Capitalizing or Expensing*	*Capitalizing or Expensing*
Project 9	Random	Random	Random	Random

Table 6: Overview of the Manipulations applied in Investment Scenario 1 to 5 per Treatment Group

At the beginning of investment scenarios 1, 3, and 5, after having received information on the basic conditions of the corresponding R&D project as well as the accounting method applied by the company, subjects answer comprehension check questions to examine if they understood the respective scenario correctly.[38] Annex 1.9 provides a screenshot of the corresponding computer screen subjects see in investment scenario 1. If subjects tick wrong answers, they are directed back to the comprehension check questions screen and have to re-answer the questions until all answers are correct.[39] These questions asked during the task mainly serve to keep subjects concentrated on the task and point their attention to the difference in accounting method applied. Classical manipulation check questions that serve to check subjects' understanding of the manipulations are part of the PEQ (cf. chapter 4.2.5.2).

The next chapter explains the measurement of the dependent variables.

4.2.4 Measurement of Dependent Variables

As stated in the hypotheses (cf. chapter 3.4), this thesis examines if individuals value conservatism more highly than neutral accounting and if individuals have explicit preferences for conservatism relative to neutrality. The operationalization and the measurement of both dependent variables, i.e., subjective value and explicit preference, are explained in the following two chapters.

[38] These manipulation check questions are not asked in investment scenarios 2 and 4 because these scenarios' settings are equivalent to the settings in investment scenarios 1 and 3.
[39] This procedure avoids losing observations due to misunderstanding of the scenario.

4.2.4.1 Subjective Value

The concept of subjective value is operationalized by individuals' valuation of the equity stake they own in a company depending on prior project outcome and the respective accounting method applied (*WTA*). As described in chapter 4.2.2.2, in each scenario, subjects are invested in a company and experience equity in- or decrease generated through R&D projects under both accounting methods. Subjects have the possibility to sell their equity stake at each point in time: before the company invests in the R&D project, after the company has invested in the project but before the project's outcome turns out, and after the R&D project outcome has been revealed. An incentive compatible variant of an auction procedure adapted from Becker, DeGroot, Marschak (1964) (BDM-procedure) is applied to elicit the actual minimum price at which subjects would be willing to sell their equity stake.

The BDM-procedure is a value elicitation method that follows a certain pattern. In a first step, subjects indicate a selling price for a certain stimulus they face or own (e.g., a lottery, a company share, a product, etc.). In a second step, a random generator draws a random buy offer for the respective stimulus. In a third step, both price quotations are compared. If the random buy offer exceeds the subject's selling price, the buying-selling transaction takes place and subjects sell the stimulus at the price of the random bid. The procedure thus elicits a specific cash amount that subjects judge to be equivalent to receiving a random reward from the lottery or from keeping the company share or product (Becker et al., 1964).

From the subjects' perspective, under the BDM-procedure it is optimal to set their minimum selling price equal to their actual valuation of the respective stimulus (i.e., to indicate the corresponding cash equivalent). If they understate their true valuation and the random generator draws a buy offer that is only slightly higher than the indicated selling price but lower than subject's true valuation, the transaction takes place. In this case, subjects forfeit money because from their perspective the stimulus is undervalued. If they overstate their true valuation and the random buy offer is lower than the indicated selling price but higher than subjects' true valuation, the transaction does not take place. In this case, subjects would forgo a monetary gain. In summary, under the BDM-procedure, a deliberate misevaluation can lead to sub-optimal transactions. The BDM-procedure thus induces subjects to reveal their true valuation of the respective stimulus. The BDM price elicitation procedure has been applied in a variety of settings (e.g., estimation of consumers' WTP (Wertenbroch and Skiera, 2002) or valuation of self-made products (Norton et al., 2012)).

The application of the BDM-procedure in the present study is illustrated hereafter based on the example of investment scenario 2, R&D project 3, time period t=0. In t=0, subjects receive the information that company B is planning to invest $ 6M in a R&D project in t=1. The project would yield a return on investment of $ 15M ($ 0) in t=2 in case of project success (failure). The probability of success is p = 0.5. Company B owns equity of $ 20M before project investment. Subjects' equity stake has a value of $ 200,000. Before the investment is made, subjects have the possibility to sell their equity stake and hence escape the risk of project failure. It is underlined that in case of selling their stake, they also forgo the chance to benefit from project success. Subjects are asked to indicate on a slider the minimum price that they would demand for selling their share. The slider spans a price range from $ 140,000 to $ 290,000.[40] Annex 1.10 shows the corresponding computer screen subjects see when indicating their selling price. Subjects are informed that after indication of their price quotation, a random generator will determine a buy offer by drawing a random number between $ 140,000 and $ 289,000. To offer subjects the possibility to definitely hold their equity stake, the buy offer is taken from a price range between $ 140,000 and $ 289,000 instead of determining $ 290,000 as the upper level. Indicating $ 290,000 as the selling price would hence prevent subjects from selling their equity stake. Indicating $ 140,000 would definitely lead to a selling transaction.

The random generator operates with equally-distributed random numbers. The fact that every number from the defined buy offer price range can potentially be drawn induces subjects to indicate their true minimum selling price. If the selling price participants indicate is equal to or below the random buy offer drawn by the random generator, subjects have to sell their equity stake at the price determined by the buy offer.[41] In case the selling price subjects indicate is above the randomly drawn buy offer, the transaction does not take place. If subjects sell their equity stake in one scenario they are immediately directed to the subsequent scenario. The respective comparable scenarios (i.e., capitalize and expense conditions in which subjects experience the same sequence of R&D project outcome; cf. Table 6) are economically identical at all times because ranges of possible selling prices are defined by project outcome. If they would have been defined by subjects' current amount of equity the scenarios would differ economically in t=0 and t=1 depending on the accounting method applied.

[40] Overall, the R&D project can lead either to a decrease in subjects' equity of $ 60,000 in case of project failure or to an increase in subjects' equity of $ 90,000 in case of project success. Departing from subjects' initial equity of $ 200,000, these amounts determine the price span for the indication of the minimum selling price: $ 140,000 to $ 290,000.

[41] Using the randomly determined buy offer instead of the selling price indicated by subjects as the final transaction price is the common approach used in this type of auctions.

Comparing the means of indicated selling prices between treatment groups allows investigating if there are differences in subjective value depending on prior project outcome and the accounting method applied. Subjective value is hence operationalized by subjects' price quotations, which represent the minimum buy offer they would accept for selling their equity stake. To solve the problem of non-comparability of absolute price quotations due to differing valuation scales based on prior project outcome, deviations of indicated selling prices from the respective rational economic value of the corresponding share (EVS) are calculated ($WTADEV = WTA - EVS$) and compared across treatment groups. Using price deviations from rational share values allows comparing all four groups because price spans from which the evaluations are taken are identical across treatments. A positive (negative) deviation of the price quotation from the rational share value indicates an overvaluation (undervaluation) of the equity stake.

Based on the Hypothesis H1a, individuals should value conservative accounting more highly than neutral accounting. The mean of deviations of subjects' price quotations from the rational share value should be higher in the conservative treatment. This would represent a lower willingness to sell their company share and thus show a higher valuation of the conservative condition. Due to the fact that at this stage of the experiment subjects do not deliberately compare conservative to neutral accounting but stay in one treatment group, the respective results would provide evidence that individuals have unconscious (i.e., unintentional) preferences for one or the other accounting method (H1a) (Kahneman and Tversky, 1996; Libby et al., 2002).

The next chapter explains how explicit preferences for an accounting method are operationalized and measured.

4.2.4.2 Explicit Preference

Investment scenarios 1 to 4 each contains two R&D projects to create several possibilities for subjects to implicitly encounter how the respective accounting method works in gain and loss situations. In investment scenarios 1 to 4, preferences for conservative vs. neutral accounting are investigated in a between-subjects design. To go one step further, it is additionally examined if these individual judgments are intentional or rather unintentional. Therefore, the between-subjects design in scenarios 1 to 4 switches to a within-subjects design in investment scenario 5. Combining a between- with a within-subjects design allows to shed more light on subjects' conscious preferences (Kahneman and Tversky, 1996; Libby et al., 2002; cf. chapter 4.1.4).

To operationalize individuals' explicit conscious preferences for one or the other accounting method (H2a), investment scenario 5 consists of a within-subjects choice setting. Being in their investor role, participants face two investment opportunities: company X and company Z. The two companies are completely identical besides the accounting methods applied for R&D projects: company X applies neutral accounting whereas company Z applies conservative accounting. Both companies envisage conducting a profitable R&D project (cf. Table 3 and Table 4). To avoid order effects, subjects receive the presentations of company X and company Z in a random sequence. Subjects are required to indicate in which company they want to invest their equity of $ 200,000 (*INVDEC*) (cf. Annex 1.8 for the computer screen subjects see at this stage of the experiment). Afterwards, subjects run through the corresponding investment setting.

From a rational economic point of view, both investment options are completely identical. The accounting method applied does not have any influence on overall profits or losses. In case subjects consider this fact when choosing one option, the choice does not necessarily reflect a preference but rather indifference between the options. Therefore, to refine this operationalization, subjects indicate how much they prefer the chosen over the unchosen option. A 7-point Likert Scale is used to measure the strength of preference (*PREF*). Subjects also specify if their choice between option X and Z was random (*RAND*). They are further asked whether they consider the accounting method to be relevant for the economic evaluation of the investments' profitability (*ACCMETH1*). Subjects also indicate if they made their investment decision based on the accounting method applied by the respective company (*ACCMETH2*).

Rationally, subjects should be indifferent between both investment options. If this is true, both options should be chosen equally often. In this thesis, it is argued that individuals' show preferences for conservative compared to neutral accounting based on loss aversion (cf. chapter 3.4). Prior literature provides hints that experience does not fully eliminate loss aversion. Due to the fact that loss aversion seems to be an innate phenomenon deeply rooted in human beings, experience should not fully mitigate individuals' endogenous preferences for conservatism in accounting. Subjects should not be able to fully overcome this bias (cf. chapter 3.4). If this is true, company Z should be chosen more often than company X and the choice should reflect real preferences for the respective option.

The next chapter presents extraneous variables that could potentially influence the dependent variables under investigation. They should therefore be considered as control variables in this study.

4.2.5 Measurement of Control Variables and Calculation of Secondary Moderator

The selling prices subjects indicate in investment scenarios 1 to 4 and the choice between the investment options subjects make in investment scenario 5 might not only be influenced by the specific independent variables that are part of the research model. To isolate the influence of the respective manipulation of the independent and moderator variables on the dependent variable, it is critical to hold the experimental setting constant across all treatment groups. Furthermore, extraneous factors that potentially influence the dependent variables and hence could bias the results should be controlled for (cf. chapter 4.1.2). The following two chapters present the measurement of control variables that are considered in this study and further describe how the secondary moderator is calculated.

4.2.5.1 Risk and Time Preferences and Derived Loss Aversion

The second part of the experiment is dedicated to the measurement of individuals' utility under risk and utility over time based on Abdellaoui et al. (2013). The instrument by Abdellaoui et al. (2013) is currently one of the most recent and complex approaches for measuring individuals' risk and time preferences compared to other instruments (cf., e.g., Charness et al., 2013, for an overview of different methods for measuring risk attitudes).

Risk involved in the R&D projects conducted in study part 1 (the probability of project success is 0.5; cf. chapter 4.2.2.2) could potentially influence subjects' decisions on selling prices and investment options. Supported by findings on the risk aversion effect presented in chapter 3.1.7, people who are more risk averse should be more reluctant to stay invested in the respective company because in this case they would take on the risk of project failure. They should be more willing to forgo potential gains by selling their equity stake than people who are less risk averse. In case future risky options (i.e., R&D projects) provide the possibility to compensate prior losses, risk attitudes might change. Even more risk averse people might stay invested and take the risk of project failure to keep the chance to break even (cf. chapter 3.1.7). Therefore, it is important to control for subjects' risk attitudes and pay special attention to the specific setting in which the risk related behavior is observed.

Individuals' time preferences might also play a role when subjects decide on selling prices in investment scenarios 1 to 5. As explained in chapter 3.1.4, individuals frequently discount future losses at a different and mostly lower rate than future gains. They get loss experiences preferably over and done with rather sooner than later. Depending on the accounting method applied in investment scenarios 1 to 5, the timing of a potential loss experience differs. In the conservative setting, potential losses are experienced upfront while under neutral accounting

they are delayed to the subsequent period. People discounting losses at a low rate should hence be more reluctant to stay invested in the company under neutral accounting than people with higher loss discounting rates should. It is hence important to control for individual time preferences.

Related to these prior deliberations, Abdellaoui et al. (2013) argue that individuals' utility functions for uncertain (delayed) outcomes are defined by individuals' risk (time) preferences. Individuals' loss aversion leads to differences in the curvature of utility functions over positive vs. negative outcomes (Kahneman and Tversky, 1979; Abdellaoui et al., 2013). The collected data on risk and time preferences builds the basis for the calculation of individuals' degrees of loss aversion for risk and time contexts (*LARISK, LATIME*). As explained in chapter 3.4, individuals' degree of loss aversion is a moderator variable in this study. A higher degree of loss aversion could strengthen endogenous preferences for conservatism in accounting. If this is true, the degree of individuals' loss aversion would moderate the hypothesized moderator impact of the accounting method applied on the direct effect of prior project outcome on individuals' subjective valuation. In consequence, individuals showing higher levels of loss aversions should also value conservative accounting more highly and show stronger preferences for conservatism than neutrality in accounting than people with lower degrees of loss aversion should.

4.2.5.1.1 Instrument for Eliciting Certainty and Present Equivalents based on Abdellaoui et al. (2013)

The instruments developed by Abdellaoui et al. (2013) allow to separate individuals' risk aversion from individuals' loss aversion and enables researchers to consider risk and time attitudes as well as loss aversion as independent or control variables in their projects. The authors do not find a unifying concept of utility. Their experiments show that utility under risk and utility over time are uncorrelated. The same is true for loss aversion: the authors' results lead to the assumption that loss aversion is stronger in risk than in time settings.

Abdellaoui et al. (2013) conducted two experiments for testing their instrument on utility under risk and utility over time: one in Rotterdam and one in Paris. The present study focuses on the instrument applied in Paris, which is the ameliorated and advanced version. Individuals' risk and time preferences are measured in pure gain, pure loss, and mixed outcome contexts. For risk, in a first step, subjects decide between a two-outcome lottery and a sure payment in a pure gain setting. Both options initially have the same expected value. Subsequently, the amount of the sure payment is adapted iteratively depending on individuals' choices to determine the

certainty equivalent for the respective lottery. In a second step, the same procedure is applied to derive certainty equivalents for losses. In a third step, individuals face choices between two-outcome lotteries with mixed payoffs and a sure payment. Annex 1.11 provides an example of a computer screen subjects see in the mixed outcome setting. The negative outcome of the lottery is changing iteratively depending on the choices subjects make. Results from the mixed setting are used for calculating loss aversion (cf. chapter 4.2.5.1.2).

In the context of time, present equivalents are identified via making subjects choose between an option consisting of a sure payment now and a second option consisting of a sure payment now and a sure payment delayed to the future. Both options initially include the same amount of money. In pure gain and loss settings, the single payment now is changing depending on individuals' choices to derive present equivalents iteratively. In a mixed setting, subjects chose between an option containing a sure payment today and an option consisting of a two-component payoff with a certain positive (negative) amount to be received now and a certain negative (positive) amount to be received later (cf. Annex 1.12 for an example of a computer screen subjects see in the mixed outcome setting). The amounts to be received later change iteratively depending on subjects' choices. Again, the results generated from the mixed prospects are used to calculate individuals' degree of loss aversion.

When applying the instruments developed by Abdellaoui et al. (2013), certain adjustments were made to fit them to the present study. Via these adjustments, elements of the investment scenarios of study part 1 are reflected in the instruments applied in study part 2. This allows collecting data on risk and time preferences that most suitably correspond to individuals' attitudes that come into play in the investment scenarios of study part 1. Adjustments made both for risk and time instruments are described hereafter.

Abdellaoui et al. (2013) collected the data in personal interview sessions where the experimenter enters the answers subjects provide. In the present study, subjects work on the task computer-based and enter their answers themselves. Abdellaoui et al. (2013) started with the instrument on time followed by the instrument on risk. The order is reversed in the present study because the instrument on utility under risk is incentive compatible as are investment scenarios in study part 1. In contrast, the instrument on time is conducted on a hypothetic basis in the present study. Therefore, the inversed order seemed to be more consistent. Instead of 18 training questions in total, the present study included only four training questions. The number of training questions was reduced to economize on time. Questions are considered easy to answer and understand. That is why this training reduction should not negatively affect

subjects' performance in study part 2. The number of rounds of each iteration process applied by Abdellaoui et al. (2013) was not fixed up-front but only stopped if the indifference values changed by less than EUR 2. In the present study, the number of iterations was fixed to five for gain and loss prospects and to six for mixed prospects, which is considered to lead to valid results. The outcomes involved in the instruments on risk and time preferences are presented in the experimental currency ($) to keep the same monetary dimensions that have been used in part 1.

In the present study, in the context of risk, seven certainty equivalents were derived for gains, seven certainty equivalents were derived for losses and two certainty equivalents were derived for mixed outcomes. The total number of stimuli applied by Abdellaoui et al. (2013) was higher due to robustness check purposes. Another adjustment made is that lotteries' payoff probabilities are held constant at 50% instead of 25%. 50% better reflects the setting of study part 1: the probability of R&D projects' success vs. failure is also held constant at 50%.

Table 7 provides an overview of the risk stimuli applied in the present study's part 2. In the gain setting, for instance, individuals first choose between a two-outcome lottery consisting of receiving $ 100,000 or 0 with a probability of 50% and a sure payment of $ 50,000. Both options thus have the same expected value. Depending on the subject's choice, the sure payment changes iteratively. The same procedure holds for loss prospects. For mixed prospects, the negative outcome of the mixed prospect changes iteratively depending on subjects' choices. Table 7 further provides descriptive information on subjects' certainty equivalents determined for all gain and loss prospects as well as for the corresponding derived negative outcome of the mixed lotteries making the lottery equivalent to a sure payment of $ 0. Regarding, for instance, the first gain prospect applied in study part 2, subjects' derived mean certainty equivalent is 45.33. The corresponding median is 48.44. As indicated by the interquartile ranges (IQR), 50% of the certainty equivalents for the first gain prospect lie between 39.06 and 51.56. These derived subjective values are used to measure probability weights and risk utility parameters per subject and calculate subjects' degree of loss aversion under risk (cf. chapter 4.2.5.1.2).

All amounts are stated in thousands of $	Two-outcome Lottery	Sure Payment	Median	IQR	Mean
Gain prospects	(100, 1/2; 0)	50	48.44	[39.06, 51.56]	45.33
	(200, 1/2; 50)	125	117.97	[99.22, 127.34]	116.05
	(200, 1/2; 100)	150	146.87	[132.81, 151.56]	142.39
	(50, 1/2; 0)	25	24.22	[19.53, 25.78]	23.05
	(150, 1/2; 100)	125	124.21	[117.97, 125.78]	122.70
	(200, 1/2; 150)	175	174.22	[167.19, 175.78]	170.72
	(200, 1/2; 0)	100	90.62	[71.87, 96.87]	82.37
Loss prospects	(-100, 1/2; 0)	-50	-48.44	[-54.69, -42.19]	-48.80
	(-200, 1/2; -50)	-125	-122.66	[-127.34, -103.90]	-115.39
	(-200, 1/2; -100)	-150	-148.44	[-151.56, -135.94]	-143.45
	(-50, 1/2; 0)	-25	-24.22	[-25.78, -21.09]	-23.98
	(-150, 1/2; -100)	-125	-124.22	[-125.78, -119.53]	-123.36
	(-200, 1/2; -150)	-175	-174.22	[-175.78, -167.19]	-170.99
	(-200, 1/2; 0)	-100	-96.87	[-103.12, 84.37]	-95.79
Mixed prospects	(200, 1/2; -200)	0	-150.00	[-203.12, -103.12]	-151.98
	(50, 1/2; -50)	0	-49.22	[-50.78, -29.09]	-44.59

Table 7: Stimuli applied for Elicitation of Utility under Risk and Corresponding Derived Certainty Equivalents and Negative Payments of Two-Outcome Prospects

As it has been the case for the instrument on risk attitudes, certain adjustments were made to optimally relate the instrument on time preferences to the first part of the study. For time, seven present equivalents are derived for gains, seven present equivalents are derived for losses and four present equivalents are derived for mixed outcomes. Again, the total number of stimuli applied by Abdellaoui et al. (2013) was higher due to robustness check purposes. Another adjustment made is the fact that the delay period is held constant at one year instead of six months. This delay corresponds to what has been used in part 1: the execution of the R&D projects is described in steps of fiscal years.

Table 8 provides an overview of the time stimuli used in the present study's part 2. In the pure gain setting, for instance, individuals first have the choice between a two-payment prospect consisting of receiving $ 100,000 in one year and 0 today and a one-payment option of receiving

$ 100,000 today. Both options thus initially include the same amount of money. Depending on the subject's choice, the one-payment option changes iteratively. The same procedure is applied for loss prospects. For mixed prospects, the negative payment of the two-payment option changes iteratively depending on the subject's choice. Table 8 provides descriptive information on subjects' present equivalents determined for all gain and loss two-payment prospects as well as for the corresponding derived negative payment of the four mixed two-payment prospects making them equivalent to a one-payment option of $ 0. Regarding, for instance, the first gain prospect used in the time setting of study part 2, subjects' derived mean present equivalent is 90.56. The corresponding median is 96.87. As indicated by the interquartile ranges (IQR), 50% of the present equivalents for the first gain prospect lie between 90.62 and 96.87. These derived subjective values are used to measure discount factors and time utility parameters per subject and calculate subjects' degree of loss aversion over time (cf. chapter 4.2.5.1.2).

All amounts are stated in thousands of $	**Two-Payment Option**	**One-Payment Option**	**Median**	**IQR**	**Mean**
Gain prospects	(100, 1 year; 0)	100	96.87	[90.62, 96.87]	90.56
	(75, 1 year; 25)	100	97.66	[88.28, 97.66]	94.66
	(150, 1 year; 0)	150	140.62	[135.94, 145.31]	135.36
	(50, 1 year; 0)	50	45.31	[42.19, 48.44]	44.45
	(100, 1 year; 50)	150	146.87	[134.37, 146.87]	140.71
	(150, 1 year; 50)	200	185.94	[176.56, 195.31]	184.38
	(200, 1 year; 0)	200	193.75	[181.25, 193.75]	183.67
Loss prospects	(-100, 1 year; 0)	-100	-96.87	[-100.00, -90.62]	-92.79
	(-75, 1 year; -25)	-100	-97.66	[-97.66, -88.28]	-92.53
	(-150, 1 year; 0)	-150	-145.31	[-145.31, 135.94]	-139.72
	(-50, 1 year; 0)	-50	-48.44	[-50.00, -42.19]	-45.85
	(-100, 1 year; -50)	-150	-146.87	[-146.87, -140.62]	-139.97
	(-150, 1 year; -50)	-200	-195.31	[-195.31, -185.94]	-185.04
	(-200, 1 year; 0)	-200	-193.75	[-193.75, -181.25]	-187.24

Mixed prospects	(-200, 1 year; 200)	0	-196.87	[-196.87, -184.37]	-186.32
	(-50, 1 year; 50)	0	-47.66	[-49.22, -42.97]	-44.54
	(200, 1 year; -200)	0	-203.12	[-215.62, -196.87]	-210.11
	(50, 1 year; -50)	0	-50.78	[-56.25, -49.22]	-54.10

Table 8: Stimuli applied for Elicitation of Utility over Time and Corresponding Derived Present Equivalents and Negative Payments of Two-Payment Prospects

The above described instruments on risk and time preferences applied in this study contain eight consistency check questions for risk and time stimuli respectively. For consistency check purposes, subjects again choose between two options in three randomly selected scenarios from the pure gain context, three scenarios from the pure loss context and two scenarios from the mixed outcome context to verify if their answers are consistent and not random. Consistency check questions appear at the end of the respective setting (gain, loss, mixed context) without drawing subjects' special attention to them. Due to the high number of choices subjects make in study part 2, they probably do not realize that they answer several questions twice. Hence, the consistency check questions should truly reflect the actual degree of consistent answers. For risk, inconsistency rates were 23.47% in the pure gain setting, 20.07% for pure loss outcomes, and 16.58% for mixed prospect questions. For time, inconsistency rates were 8.50% in the gain context, 6.80% for pure loss prospects, and 6.38% for mixed outcome questions. The inconsistency rate observed in the risk setting is comparable to reversal rates found in prior studies that normally lie in the range of 10% to 30% (e.g., Stott, 2006, for a list of corresponding studies and observed reversal rates). Answers provided in the time setting were noticeably more consistent than answers given in the risk setting. This is comparable to findings by Abdellaoui et al. (2013, Rotterdam experiment). This noise pattern indicates that decisions under risk are of higher complexity for people than decisions over time.

4.2.5.1.2 Measurement of Risk and Time Parameters and Calculation of Loss Aversion

Based on the above-described determined certainty (present) equivalents, probability weights (discount factors) and risk (time) utility parameters are derived per subject. The corresponding measurement approach applied by Abdellaoui et al. (2013) and used in this thesis is presented in Annex 2.

Abdellaoui et al. (2013) depart from Prospect Theory (Kahneman and Tversky, 1979) to derive prospect evaluation under risk (cf. Annex 2.1) and relate to a sign-dependent discounted utility model for evaluating prospects under time (cf. Annex 2.2). They assume an exponential and

sign-dependent utility function for risk and time, which consists of a basic utility function u^j (j = r for risk and t for time) and a loss aversion parameter λ^j (j = r for risk and t for time) (cf. Annex 2.3). To derive u^j and λ^j per subject, a three-step procedure is followed (cf. Annex 2.4). The corresponding regression equations are estimated via nonlinear least squares, using exponential specifications for u^r and u^t (cf. Annex 2.5). In risk contexts, the utility parameters (μ, ν) represent individuals' risk attitudes. 'The exponential utility function is concave (convex) for gains (losses) if $\mu > 0$ ($\nu > 0$), linear if $\mu = \nu = 0$, and convex (concave) if $\mu < 0$ ($\nu < 0$)' (Abdellaoui et al., 2013, p. 2156). In gain contexts, a larger compared to a lower μ represents higher risk aversion while in loss contexts a larger compared to a lower ν represents less risk aversion. Table 9 shows mean parametric estimations for Risk and Time (μ, ν) based on individual data.

	Utility Gains	**Utility Losses**	**Loss-aversion Coefficient λ**
Risk (μ)			
N=196	0.89 (0.39)	-0.26 (0.12)	2.62 (0.97)
N=193*	0.92 (0.39)	-0.25 (0.12)	1.5 (0.08)
Time (ν)			
N=196	-0.12 (0.04)	-0.37 (0.12)	1.22 (0.18)
N=195**	-0.11 (0.04)	-0.37 (0.12)	1.04 (0.05)

Means; Standard Errors in Parentheses

*3 subjects are excluded whose λ for risk is above 8

**1 subject is excluded whose λ for time is above 8

Table 9: Parametric Estimation for Utility under Risk and Utility over Time

Table 10 shows median probability weighting and discounting based on the individual data.

N=196	**Gain**	**Loss**
Probability Weight	w^+ (1/2) = 0.48	w^- (1/2) = 0.45
	[0.37, 0.55]	[0.35, 0.52]
Discount Factor	0.95	0.97
	[0.87, 0.97]	[0.89, 0.98]

Median; IQR in brackets

Table 10: Probability Weighting and Discounting based on Individual Data

The resulting utility parameters for risk (time) and probability weights (discount factors) together with certainty (present) equivalents derived from two-outcome lotteries' results serve to calculate individuals' level of loss aversion for risk and time settings (*LARISK50, LARISK200, LARISK, LATIME1, LATIME2, LATIME3, LATIME4, LATIME, LATIMESOON, and LATIMETOTAL*) (cf. Annex 2.4, Step 3).

Besides calculating values of loss aversion per subject, Abdellaoui et al. (2013, p. 2161) also measure risk aversion per subject and for all prospects i via computing $(EV_i - CE_i)/\sigma_i$, where EV_i is the expected value of prospect i, CE_i is its certainty equivalent, and σ_i is its standard deviation. Larger values of the resulting ratio represent higher risk aversion. The same approach for calculating a risk aversion ratio per subject for gain, loss and mixed prospects is applied in this thesis (*RAGAIN, RALOSS, RAMIXED*). Table 11 presents corresponding means of risk aversion ratios calculated based on individual data.

N=196	**Gain Prospects** *(RAGAIN)*	**Loss Prospects** *(RALOSS)*	**Mixed Prospects** *(RAMIXED)*
Risk Aversion Ratio	0.126	-0.082	0.138

Table 11: Mean Risk Aversion Ratios per Type of Prospect

Consistent with Prospect Theory and results found by Abdellaoui et al. (2013), subjects are risk averse in gain settings and risk seeking in loss settings (0.126 > -0.082). Based on loss aversion, individuals should show most pronounced risk aversion in mixed settings. Results confirm this prediction (0.138 > 0.126 > -0.082).

4.2.5.1.3 Risk Measure based on Gneezy and Potters (1997)

After participants completed the instrument on utility under risk that was based on Abdellaoui et al. (2013), an instrument for measuring risk preferences was added in part 2 of the experiment for robustness check purposes. This instrument is adapted from Gneezy and Potters (1997) who designed an incentive compatible measure for examining individuals' risk preferences taken from the context of financial decision-making (*RAGNEEZY*). Subjects are endowed with a certain amount of equity ($ 200,000 in this study), which they can fully or partly invest in a two-outcome lottery. The lottery is characterized by a probability of 2/3 that the subjects lose the amount they invested and a probability of 1/3 that they win two and a half times the amount they bet. Subjects keep the remaining part of the endowment in either case. Annex 1.13 shows the corresponding z-Leaf Screen. The lottery is designed in a way that the expected value of betting is higher than the expecting value of not betting. Hence, a risk-neutral or risk-seeking

person should invest the whole amount or at least a big part of the endowment whereas a risk-averse person would probably bet less in the lottery (Gneezy and Potters, 1997; Charness et al., 2013). Risk attitude was measured by dividing the amount of money subjects invest in the lottery by the total amount of equity they are endowed with (= $ 200,000). Higher ratios imply less risk aversion. Although the method does not allow for a differentiation between risk-seeking and risk-neutral decision makers, the amount invested provides a good measure of differing risk preferences since risk-seeking preferences are relatively rare (Charness et al., 2013). Only very few participants of the present study (5 out of 196 = 2.5%) chose to invest 100%. The application of this instrument in the present study was done in an incentive compatible way. Hence, subjects receive the information that this choice situation could be picked at the end of the study as the compensation relevant decision situation randomly selected from the mixed outcome context.

The next chapter presents further control variables considered in this study and addressed in a post experimental questionnaire (PEQ).

4.2.5.2 Variables measured in the Post Experimental Questionnaire

Part 3 of the study contains a PEQ on individuals' understanding of the experimental tasks as well as on their personal characteristics and demographics. Annex 3 presents the specific questions asked and the instruments used in the PEQ.

4.2.5.2.1 Manipulation Check Questions

The first part of the PEQ relates to subjects' understanding of the manipulation. As explained by Libby et al. (2002), manipulation check questions are useful for investigating if subjects did notice and understand the manipulation of the independent variable(s) correctly. These questions serve as a test of an effective operationalization of the constructs involved. In case the manipulation did not work and subjects tick wrong answers disproportionately often, the study's results are questionable because subjects' misunderstanding of the experimental setting might have biased the results. To examine if subjects understood the manipulation on accounting methods applied in scenario 1 to 5 correctly they are asked to judge two statements on the equity impact of conservative versus neutral accounting regarding their correctness. As both statements were correct, subjects should have indicated 'Yes' in both cases. 181 subjects out of 196 (92%) provided a correct answer to statement 1 (*MCQ1*) and 154 subjects out of 196 (78%) correctly judged statement 2 (*MCQ2*). Overall, 335 out of 392 answers (85%) were correct. This rate of correct answers is quite high leading to the assumption that there is no bias

in the study's results coming from a potential misunderstanding of the setting. However, to address the fact that some subjects provided false answers, the present study's main results (cf. chapter 5.3.3.3) are examined for robustness by eliminating subjects who wrongly answered *MCQ1* or *MCQ2* from the sample (cf. chapter 5.3.3.4).

4.2.5.2.2 Additional Measures of Individuals' Risk Preferences

The second part of the PEQ contains additional instruments to collect data on individual risk attitudes. Charness et al. (2013) provide an overview of different experimental methods to elicit individuals' risk preferences. The authors underline that it is important to choose an instrument, which is suitable in the specific context of the study and fits to the respective research questions and the subject pool. As described in chapter 4.2.5.1.1, the main method used to elicit subjects' risk attitudes applied in this study is based on Abdellaoui et al. (2013). Nevertheless, due to generalizability concerns (Abdellaoui et al. 2013; Charness et al., 2013) as well as for robustness check purposes, individuals' risk attitudes are verified in the PEQ via three other instruments eliciting risk preferences. These additional instruments require participants to self-report their willingness to take on risks on 7-point Likert Scales. This type of measure is less complex and not incentive compatible but also acknowledged in literature (Charness et al., 2013).

The first self-report question was developed by Dohmen et al. (2011). This question is not context-specific and aims at capturing a more general self-assessment of one's own attitude towards risk (*RAGEN*). Although it was shown in a field experiment that this general risk question realistically reflects individual risk preferences (Dohmen et al., 2011), prior literature also finds that individuals' risk preferences are differing depending on the context in which they are elicited (Weber et al., 2002). To consider this finding, two self-report instruments on risk attitudes in specific contexts are applied additional to the self-report question on risk attitude in general. Firstly, the general question developed by Dohmen et al. (2011) is modified by adding the specific context of this study, namely 'risk taking in financial situations' (*RAFIN*). Secondly, risk attitude is measured via the so-called domain-specific risk-taking (DOSPERT) scale developed by Weber et al. (2002). The full DOSPERT scale comprises 40 items, which address risk taking in different domains (e.g., Financial, Health/Safety, Recreational, and Social Risk Taking). In this study, the four statement items concerning the domain of financial investments are applied because they strongly relate to the study's context. Subjects are asked how likely they would invest part of their personal equity in rather risky (statement 1 and 2; *RAWEBER1, RAWEBER2*) or rather secure (statement 3 and 4¸ *RAWEBER3, RAWEBER4*)

shares and bonds (1=very unlikely; 7=very likely) (cf. Annex 3). To analyze correlations between the four items, items 3 and 4 are recoded to capture overall risk seeking behavior (cf. chapter 5.3.1).

4.2.5.2.3 Additional Measures of Individuals' Loss Aversion

The instruments for risk and time preferences based on Abdellaoui et al. (2013) applied in the second part of the study allow to mathematically derive individual levels of loss aversion per subject. For robustness check purposes, the PEQ contains two additional instruments measuring individuals' degree of loss aversion. These measures are based on personal acceptance of lotteries involving gains and losses adapted from Tversky and Kahneman (1992).

In the first instrument that is adapted from Wang et al. (2016) subjects face two lotteries. Each lottery offers a 50% chance of gaining and a 50% chance of losing money. The amount of the potential monetary loss is given: EUR 25 in lottery A; EUR 100 in lottery B.[42] Subjects are asked to indicate for each lottery the minimum amount of gain to make them willing to participate in the respective lottery. The resulting gain-loss ratio represents the respective loss aversion index (*LAWANG1; LAWANG2*).

The second instrument is adapted from Gächter et al. (2010) and consists of six different lotteries each including a potential gain and a potential loss. The amount of the potential gain is the same in each lottery (EUR 6)[43] whereas potential losses differ and increase from one lottery to the other (from EUR 2 in lottery 1 to EUR 7 in lottery 6). The probability of gaining or losing money is 50% in each lottery. The gain-loss ratio of the lottery when people no longer accept playing the lottery but reject it represents subjects' loss aversion index (*LAGAECHTER*). As explained by Gächter et al. (2010), this instrument explicitly uses small monetary amounts (EUR 2 to EUR 7) to make sure that the decision-making behavior truly reflects loss aversion and not risk aversion. The authors base their choice to use small monetary amounts on Rabin (2000) who theorizes that individuals who aim at maximizing expected utilities and whose utility functions are strictly increasing and concave over wealth should be approximately risk neutral towards small stake gambles. Based on Rabin (2000), choice behavior in small stake gambles cannot be explained by risk aversion because otherwise individuals would show unrealistic high degrees of risk aversion in high-stake gambles. As Gächter et al. (2010) explain,

[42] In the experimental sessions conducted in St. Gallen, monetary amounts used in the instruments adapted from Wang et al. (2016) were indicated in Suisse Francs (CHF) instead of Euros (EUR).

[43] In the experimental sessions conducted in St. Gallen, monetary amounts used in the instruments adapted from Gächter et al. (2010) were indicated in Suisse Francs (CHF) instead of Euros (EUR).

people should accept all lotteries that have a positive expected value (lotteries 1 to 5). A rejection of low-stale gambles with a positive expected value can be interpreted as an indication of loss rather than risk aversion.

Both of the two simpler measures of loss aversion that are characterized by pure gain/loss ratios are based on strong assumptions. Probability weights are assumed to be equal in gain and loss contexts and subjective values of small stake outcomes are assumed to be linear (cf. Gächter et al., 2010). In this case, the loss aversion coefficient only depends on the gain and loss outcomes involved in the lottery: $\lambda = Gain/Loss$.

The instruments on risk aversion and loss aversion applied in the PEQ are non incentive compatible, less complex and less sophisticated than the instruments developed by Abdellaoui et al. (2013) used in the second part of this study. Nevertheless, they could provide valuable results. These simpler instruments are explicitly applied for robustness check purposes and to cover a bigger part of the diverse pool of existing methods for eliciting risk and loss aversion.

4.2.5.2.4 Measures of the Judgment of the Experimental Tasks and Demographics

In the third part of the PEQ subjects were asked to indicate whether the scenarios were comprehensible (*COMP*), whether questions and tasks were clearly stated (*CLEAR*), and whether it was easy to answer the questions (*EASY)* to investigate subjects' understanding of the instructions. Statement items were judged on a 7-point Likert Scale from 1 (totally disagree) to 7 (totally agree).

The PEQ elicits via an open question what subjects think is investigated in this study to capture their understanding of the research questions. In case participants identified the study's goal correctly, they might have felt induced to give answers they think the experimenter expects or wants to get (Maines et al., 2006). Table 12 provides an overview of most frequently mentioned topics.

Assumed Underlying Research Topic	Number of Subjects
Individuals' Risk Attitude in Investment Contexts	169
Impact of Accounting Method applied on Investment Decisions	17
Other	10

Table 12: Assumed Research Topic

Table 12 shows that most subjects considered individuals' risk attitudes in investment settings as the underlying research interest of the present study. This group of subjects often referred to individuals' investment decisions after prior gains or prior losses as the study's focus. 17 out of

196 participants explicitly mentioned the impact of accounting methods applied on individual investment decisions as the central research interest of this study. No subject directly referred to individuals' preferences for one or the accounting method. Due to the fact that the instruments on utility under risk and utility over time cover a large part of the study, subjects' attention was apparently drawn to individuals' risk attitudes. Overall, participants did not identify the study's goal correctly. Subjects' assumptions on the research question should not have biased the answers provided and should not limit the validity of the collected data. Even if subjects had identified the research question correctly, it would probably not have biased the results because no right or wrong preference for one or the other accounting regime exists.

Finally, in the last part of the PEQ, subjects provide information on the following demographics that are frequently integrated in analyses of individuals' investment behavior (cf., e.g., Koonce et al., 2005; Pinello, 2008): age (*AGE*), gender (*GENDER*), nationality (*NATION*), years of professional experience (*PROFEXP*), course of current studies (bachelor or master level) (*MASTER*), major field of studies (accounting/finance; strategy (including marketing and strategic management); others (mainly including economics and politics) (*CLUSTER*), share ownership in the past (*SHARESP)*, presence (*SHARESC)* and future *(SHARESF*), and experience in analysis of annual reports (consideration of annual reports, *EXPFA1), (*analysis of annual reports, *EXPFA2),* (confidence in using/analyzing annual reports, *ANALYSISAR*).

The next chapter illustrates the final implementation of the experiment.

4.3 Running the Experiment

Besides considering extraneous factors that could affect results, it is also important to deal with potential confounding factors that might arise from the experimental design itself or from the way the experiment is implemented (cf. chapter 4.1.2) to strengthen the study's internal and external validity. This chapter first presents the type of participants invited to take part in the study and explains the monetary incentives provided before afterwards describing the conduction of a pretest and the implementation of the final experiment. It is pointed out how potential confounding factors are addressed.

4.3.1 Participants

The experiment was conducted at two different universities, the University of Augsburg, Germany, and the University of St. Gallen, Switzerland, to enlarge the sample size. Participants are business students at bachelor and master level who serve as proxies for nonprofessional investors. Both universities own experimental laboratories that have been used to conduct the

study. The Laboratory for Economic Experiments on Human Behavior of the University of Augsburg as well as the Behavioral Lab of the University of St. Gallen recruited subjects randomly from their respective experimental laboratory's database. Students were informed about the possibility to take part in the experiment via the universities' and the laboratories' homepages as well as via announcements in lectures. Regarding bachelor students, the focus was set on students who are at least in their third bachelor semester. The laboratories' databases allow filtering for business students. Only business students who are registered in the respective database received the e-mail invitation for participating in this study. In total, 196 students took part in the study (42 students participated in Augsburg and 154 students participated in St. Gallen).

4.3.2 Monetary Incentives

Researchers argue that for the implementation of an experiment it is important to decide whether to provide monetary incentives. They underline that participants may behave differently when facing monetary incentives compared to when answering hypothetical questions. Subjects' decisions made in incentive compatible settings may reflect real world investment decisions more closely than hypothetical decisions. Otherwise, if people succeed in imagining how they would behave in actual situations of choice, their hypothetical decisions should be close to what they would do in reality. Researchers argue that subjects normally do not have any reason to hide their true preferences (Kahneman and Tversky, 1979). Camerer and Hogarth (1999) analyzed 74 experiments in which the level of financial performance-based incentives varied. They found that 'in games, auctions and risky choices the most typical result is that incentives do not affect mean performance, but incentives often reduce variance in responses' (Camerer and Hogarth, 1999, p. 34). Although differences between hypothetical and actual answers seem to be rather small, other studies provide contradicting evidence (Holt and Laury, 2002). To address potential concerns related to hypothetical settings, the present study provides real monetary incentives in its main part.

Examining the moderating impact of individuals' loss aversion on the moderator effect of the accounting method applied on the influence of prior outcome on individuals' decision making behavior involves an analysis of the impact of prior gains and losses on individuals' subsequent valuations and choices. A suitable incentive compatible experiment would hence involve making subjects experience negative outcomes (i.e., losing real money). This scenario generates an ethical issue (Thaler and Johnson, 1990): subjects might actually complete the experiment at a loss. The next paragraph describes how this ethical issue is solved in this study.

The experiment took place at the University of Augsburg, Germany, and the University of St. Gallen, Switzerland. To incentivize participation, subjects receive a show up fee of € 5.00 in Augsburg and CHF 10.00 in Switzerland respectively for participating in the study. When entering the laboratory, subjects directly receive the show up fee in cash and are told to put the money in their purse. The show-up fee is fixed and independent from the subjects' performance during the study. The show-up fee is treated as being paid by the laboratory and hence being independent of the following study to keep the house money effect (Thaler and Johnson, 1990; cf. chapter 3.1.7) at a minimum.

Afterwards, subjects are informed that they have the possibility to earn a variable compensation throughout the experiment. When starting the study, subjects read on the computer screen that they receive EUR 10.00 (CHF 20.00) for their effort and time they have already spent to come to the laboratory and take part in the study. Putting the focus on subjects' personal effort invested in taking part in the study should strengthen their commitment to the study's tasks and incentivize subjects to take the tasks seriously and make truthful decisions. This procedure also serves to limit the house money effect (cf. chapter 3.1.7). By providing an initial equity endowment subjects can experience an increase as well as a decrease in equity without having to suffer a real personal monetary loss.

The currency used in the experiment is called DOLLAR $. $ is a fictitious currency applied in this study to create monetarily realistic investment scenarios regarding the amount of money invested in R&D projects by different companies (e.g., $ 6M) that would have been impossible under the application of a real currency as Euros or Swiss Francs. The exchange rate is defined as $ 100,000 = EUR 5 or $ 100,000 = CHF 10 respectively. The endowment is converted in the experimental currency. Every subject hence owns $ 200,000. The specific exchange rates were chosen to ensure that subjects receive appropriate variable payoffs after having finished the study. The experimental laboratory of the University of Augsburg demands subjects' final payment per hour to be on average at the amount of the net salary per hour of a student assistant. Final payments should hence be on average EUR 12.50/hour. The Behavioral Lab in St. Gallen suggests to provide an average payment of CHF 25.00/hour.

As explained in chapters 4.2.2.2 and 4.2.5.1, the random generator chooses one out of five scenarios of study part 1 as well as one choice situation of each choice context (gain, loss, mixed) of the instrument on risk preferences from study part 2 per subject that become compensation relevant. Each subjects sees the corresponding $ amounts generated in the respective scenario on the screen. The amounts are summed up. Annexes 1.14 to 1.16 provide

exemplary screenshots of the corresponding computer screens subjects see when their final payment is determined. In case the resulting variable compensation is negative, it is set to $ 0. The resulting $ amount is converted in EUR or CHF according to the determined underlying exchange rate: $ 100,000 = EUR 5.00 or $ 100,000 = CHF 10.00 (cf. chapter 4.2.2.2). All converted amounts greater than zero are added to the show up fee to calculate the final compensation. Subjects receive the show up fee in cash when entering the laboratory. At the end of the study, each participant receives his final variable compensation (that is greater or equal to 0) in cash and signs a receipt of reception of the total compensation (show up fee + variable compensation). One session took approximately 90 minutes. Payments (including show-up fee) averaged EUR 21.93 in Augsburg and CHF 35.49 in St. Gallen. As explained in chapter 4.2.2.2, the difference in compensation is related to differing laboratory demands for net compensation per hour as well as to differing living expenses in both countries that are higher in Switzerland than in Germany. Subjects' monetary expectations for participating in a research study are hence higher in Switzerland. Therefore, the slightly different average compensation in both countries should not influence the study's results.

At the end of the experiment, a random generator selects one out of the five investment scenarios for compensation purposes. Subjects receive their individual respective remaining amount of equity additional to the show-up fee.[44]

Subjects are informed that at the end of the study a random generator will pick one choice situation from each decision context (pure gain, pure loss, mixed outcomes) that will become relevant for their final compensation. The instrument on risk is hence incentive compatible to make sure that subjects take the task seriously and make choices according to their true risk attitudes.

The instrument on time is not incentive compatible in this study. An incentive compatible approach would have included organizing the payment of the respective compensation one year after the actual experiment was conducted. This would have been incompatible with the current specifications by the Behavioral Lab of the University of St. Gallen that demands a direct (cash) compensation. Subjects are not explicitly informed about the fact that they make hypothetical choices in the time part of the experiment. Instead, they do not get information on the compensation relevance of these decision situations and hence indirectly receive the information that answers are hypothetical. As explained in chapter 4.2.2.2, prior literature raises

[44] This random selection procedure serves to incentivize participants to take all scenarios and tasks seriously and to complete them truthfully. Subjects are induced to treat all tasks with an equal level of attention and commitment. The random selection hence assures that incentives are the same in each investment scenario.

concerns that hypothetical answers differ from answers provided in incentivized settings (e.g., Holt and Laury, 2002). In this study, subjects first run through study part 1 as well as through the instrument on risk aversion both being incentive compatible, before completing the non-incentive compatible instrument on time. It is assumed that the mindset of providing true answers generated in part 1 and the instrument on risk preferences also prevails during the instrument on time preferences inducing subjects to make honest choices. Furthermore, subjects do not have any reason to disguise their true preferences.

The next chapter presents the implementation of the final experiment.

4.3.3 Final Implementation and Consideration of Potential Confounding Factors

When conducting a laboratory experiment[45] it is usually necessary to organize several experimental sessions. Due to laboratory size restrictions it is rarely possible to just run one session that covers all participants at once. This chapter addresses the final implementation of the experiment. It first presents the organization and schedule of the experiment's sessions before afterwards describing the conduction of one exemplary experimental session in more detail. Other studies highlight the importance of considering potential confounding factors in an experiment (e.g., Schwering, 2016). During the course of the following two subchapters, it is thus explained how potential confounding factors stemming from the organization and set up of the experiment itself are addressed.

4.3.3.1 Organization of Experimental Sessions

Before finally conducting the experiment, it is highly recommended to pre- or pilot test the experimental material developed (Webster and Sell, 2014). Webster and Sell (2014) explain that in a pretest certain elements of the experiment are examined while in a pilot test a whole experimental session is conducted to test if everything works as expected. Both ways of testing the experiment before its final conduction serve to make sure that the tasks are designed in a way that subjects understand them correctly. Furthermore, these tests might for example reveal potential confounding factors that additionally need to be controlled for or potential technical or procedural issues that should be solved up-front. A pretest of the present experiment with the focus on the experiment's part 1 and 2 was run in December 2016 in the experimental laboratory of the University of Augsburg with 27 doctoral students to identify potential issues of the experimental design and its procedure. The doctoral students were randomly distributed

[45] A laboratory experiment is characterized by the fact that it takes place in a specific laboratory and hence in a controlled artificial setting instead of being conducted in a natural situation as it would be the case for field experiments (Kerlinger and Lee, 2000).

to one of the four treatment groups. They ran through the experiment and wrote down comments in case they found parts of the setting or tasks irritating or confusing. After participants completed the pretest, the experimenter (i.e., the author of this thesis) started an open discussion to ask for their comments on the study. Changes in phrasing and organization were made based on their input.

The final experiment was conducted from January to March 2017 at the University of Augsburg, Germany and the University of St. Gallen, Switzerland. The experiment was conducted in January 2017 at the University of Augsburg. This period of data collection directly preceded the university's exam period that generally covers February. This fact negatively influenced the availability of student participants. Therefore, the data collection was continued at the University of St. Gallen in March 2017 whose exam period differs from the one in Augsburg and did not negatively influence students' availability for participating in the experiment.

Business student subjects were invited via e-mail to take part in the experimental study. Because pretest participants differed from subjects used in the final study, reactive effects of testing (cf. chapter 4.1.2) that would decrease a study's external validity are ruled out in the present study. Furthermore, biases stemming from statistical regression effects (cf. chapter 4.1.2) do not play a role because subjects of the main study do not participate in the pretest and hence are not selected based on pretest results.

Via the invitation, students knew up-front that the study they are invited to participate in is a laboratory experiment. This awareness was clearly strengthened when subjects entered the respective university's laboratory for participating in the study. As argued in chapter 4.1.2, the experimental arrangements (i.e., e.g., the laboratory setting) could generate reactive effects. If this is the case, subjects do not behave naturally but instead try to guess expected answers or simply behave differently than in actual situations. This potential bias is present in this study. However, due to the fact that it concerns all participants and treatment groups this potential bias is held constant. Furthermore, as explained in chapter 4.2.5.2.4, there is no right or wrong or socially demanded answer in this study, also keeping the potential demand effect (Maines et al., 2006) at a low level.

With the invitation, subjects got the option to choose one of several proposed time slots for participating in the experiment. Due to laboratory size restrictions, a maximum of 10 subjects could participate per experimental session in Augsburg and a maximum of 20 subjects could participate per session in St. Gallen. One of the four available treatments was applied per

session. Subjects choose one session for participation according to their personal schedule and availability. The choice was independent of the respective treatment applied. Treatments were not revealed to subjects up-front. Subjects' distribution to the sessions and treatments hence followed a random procedure. Table 13 provides an overview of location, dates, time slots, treatment groups and number of participants per session.

Location	Date	Time	Number of Participants	Treatment Group
Augsburg	25/01/17	14:00 – 16:00	9	1
Augsburg	26/01/17	10:00 – 12:00	10	3
Augsburg	26/01/17	14:00 – 16:00	5	2
Augsburg	27/01/17	10:00 – 12:00	4	2
Augsburg	27/01/17	14:00 – 16:00	4	4
Augsburg	30/01/17	10:00 – 12:00	2	1
Augsburg	30/01/17	14:00 – 16:00	4	4
Augsburg	31/01/17	14:00 – 16:00	4	4
St. Gallen	14/03/17	10:00 – 12:00	19	1
St. Gallen	14/03/17	12:00 – 14:00	21	2
St. Gallen	14/03/17	14:00 – 16:00	18	3
St. Gallen	14/03/17	16:00 – 18:00	17	4
St. Gallen	16/03/17	10:00 – 12:00	11	3
St. Gallen	16/03/17	12:00 – 14:00	15	4
St. Gallen	16/03/17	14:00 – 16:00	12	1
St. Gallen	16/03/17	16:00 – 18:00	8	2
St. Gallen	21/03/17	10:00 – 12:00	14	1
St. Gallen	21/03/17	12:00 – 14:00	19	3

Table 13: Overview of Conducted Sessions

Although the distribution of subjects to treatment groups followed a random procedure selection biases might influence results. Subjects in one treatment group might differ from subjects in another treatment group regarding personal characteristics as, e.g., gender, age, and professional work experience among others. 71 women (36%) and 125 men (64%) participated in the study. The average age was 23.11 years. 107 participants (55%) were enrolled in a master program while 89 subjects (45%) were bachelor students. Subjects had on average 2.03 years of professional experience (internships included). These as well as further sample characteristics are considered in the data analyses (cf. chapters 4.2.5 and 5).

The different time slots per day can generate session effects. Subjects might be more tired and less concentrated during afternoon sessions compared to morning sessions. The variation in time slots within data collection for one treatment group addresses the potential maturation bias (cf. chapter 4.1.2). Furthermore, the change in type of tasks from study part 1 to study part 3 as well as the monetary incentives provided should limit a potential decrease in attention and motivation. Session effects can be controlled for in the statistical analysis. However, the maturation bias reflected for example in the individual level of hunger or thirst during a session cannot be eliminated at 100%.

Each part of the study took approximately 30 minutes. This led to an overall duration of one experimental session of about 90 minutes. The limited duration of each part of the study as well as the laboratory situation kept potentially biasing time influences (cf. chapter 4.1.2) at a minimum.

The following chapter provides an exemplary overview of the basic steps followed before, during and after one experimental session. This procedure was the same for each experimental session.

4.3.3.2 Description of an Experimental Session

In a first step, laboratory assistants and the experimenter[46] prepare the laboratory. The preparation includes starting z-Tree or z-Leaf on the computers and building up partitioning walls between workspaces. The experiment does not involve any interaction between participants. Partition walls separated workspaces to make subjects focus on the study and their own answers and to keep the level of external influences (e.g., things happening outside the workspace) at the lowest level possible. Each workspace is equipped with blank sheets and pencils allowing subjects to take notes if needed. The laboratory assistants also prepare money for cash compensation.

Subjects registered for a session automatically receive a reminder via e-mail to keep the rate of no-show at a minimum.[47] When subjects enter the room, they first need to identify themselves. It is checked on an attendance list if they are registered for and hence allowed to take part in the study. Subjects afterwards directly receive the respective show up fee in cash (EUR 5.00 in Augsburg and CHF 10.00 in St. Gallen) as well as a user number. The user number serves to

[46] The experimenter is the author of this thesis.

[47] In this study, only one registered participant did not show up at all. Three participants came late to the session to which they were registered for. The respective session had already started. Therefore, these students were offered to take part in one of the future sessions. All of them accepted and participated in a subsequent session.

enable an anonymous participation in the study. However, at the same time, it allows relating each subject to its corresponding final compensation generated in the study. Each subject randomly chose one of the available computer workspaces in the respective laboratory.

The experimenter asks subjects to fill in a participation form in which subjects sign that they allow the anonymous usage of the data generated in the experiment for research purposes. The experimenter briefly introduces the experiment's procedure. It is underlined that participation is voluntary and not linked to subjects' grades or university success. Subjects are asked not to talk about the experiment with their fellow students who also might take part in the study at a later date. Instrumentation bias (cf. chapter 4.1.2) that could be generated by the experimenter himself is considered and held constant by using the same prepared notes for the introductory speech in each session. Furthermore, the same experimenter supervises all sessions to avoid biases related to a change in staff.

Afterwards, the experimenter starts the experiment on the computers. Subjects first receive instructions on the study. These instructions specified that this study does not test for expert knowledge and that hence no right or wrong answers exist. It is underlined that all answers are anonymous. The anonymous data collection method enhances subjects' willingness to provide answers, which truly corresponds to their actual attitudes and opinions. Furthermore, the compensation procedure is explained and the experimental currency is introduced. Afterwards subjects run through the three parts of the experiment (see chapters 4.2.2 to 4.2.5).

As described in chapter 4.2.2.2, part 1 of the study contains five similar investment scenarios. It is thus probable that experiences subjects make in prior scenarios influence their investment decisions in subsequent scenarios. The potential confounding factor 'testing' (cf. chapter 4.1.2) is hence relevant but unproblematic in this study because prior experience is explicitly considered in the research model as the influence of prior outcome on subjective value and preferences. This effect is hence even intended. The experimental material provided in part 1 of the study only differs in the manipulation of the independent variables prior outcome (gain/loss) and accounting method applied (conservative/neutral) between treatment groups. The material used in part 2 and 3 is identical across all participants. Potential biases stemming from differing materials used in treatment groups (instrumentation, cf. chapter 4.1.2) are thus limited by holding the material constant except for the manipulated variables.

At the end of the study (i.e., at the end of study part 3), a random generator determines subjects' final variable remuneration based on the procedure explained in chapter 4.3.2. After the last session, the laboratory assistants and the experimenter shut down the computers, build down

the partitioning walls, and collect the distributed material (blank sheets and pencils). In case participants showed interest in the study's results, a brief summary of the results is provided via e-mail.

The experimental mortality bias appears if participants terminate or even quit the experiment before having completed all tasks (cf. chapter 4.1.2). The influence of this potential confounding factor is negligible in this study. Students are informed about all relevant information regarding the experimental procedure up-front and voluntarily take part in the study. They know the duration of the experiment when enrolling for one session and explicitly include the session in their personal time schedule. In case of terminating the study up-front, they would have sunk costs (at least in time) when considering the effort made to come to the laboratory. The probability that subjects cancel their participation in a research project is higher for, e.g., internet surveys, which can be completed at home. Subjects can easily terminate the survey before having finished all tasks without any need of justification. All participants enrolled for taking part in this study completed the experiment.

The data collected via the experiment is the basis for testing the hypotheses developed in chapter 3. The following section presents empirical results.

5. Empirical Results

This chapter first presents main statistical evaluation methods that are used in this thesis to analyze the data collected in the experimental study. Secondly, main pre-test results are described before thirdly presenting the final study's results. In a fourth step, this chapter summarizes main results. The chapter ends with addressing limitations of the study.

5.1 Statistical Evaluation Methods

The data collected in the experiment is analyzed to investigate if individuals value conservatism more highly than neutral accounting. If individuals show preferences for conservatism compared to neutral accounting, price quotations should differ across treatment groups. An analysis of variance (ANOVA) tests for differences in means of a dependent variable between several treatment groups that are defined by one (one-way ANOVA) or more independent categorical variables (factors) (multi-factorial ANOVA). ANOVAs analyze differences in means between treatment groups by decomposing the respective dependent variable's variance in a within-group and a between-group variance. A multi-factorial (e.g., two-way) ANOVA further splits the between-group variance of the dependent variable in the variance caused by the categorical variables (factors) and a potential interaction between them. The ANOVA finally compares between-group with within-group variances (cf., e.g., Backhaus et al., 2003).

A valid application of an ANOVA demands the fulfillment of certain conditions (cf., e.g., Sedlmeier and Renkewitz, 2008; Field, 2013).

- The dependent variable needs to be (at least) interval scaled.
- Independent variables need to be categorical variables (that have not less than two-factor levels to be able to form at least two (unpaired) treatment groups that could be compared).
- Observations of treatment groups need to be independent from each other.
- The dependent variable needs to be normally distributed for each treatment group.
- Treatment groups need to show homogeneous variances of the dependent variable.

A common way to test for a normal distribution of the dependent variable in each treatment group is a statistical analysis approach by applying the Shapiro-Wilk-Test. The null hypothesis of the Shapiro-Wilk-Test states that the dependent variable is normally distributed in all treatment groups. If the test shows significant results, the dependent variable is hence not normally distributed across treatment groups (Field, 2013). The ANOVA is quite robust against violations of the normal distribution condition. Based on the central limit theorem, researchers

commonly presume a normal distribution of the dependent variable in each treatment group if treatment groups are large enough. Respective accepted group size thresholds are N=20 or N=30 (cf., e.g., Studenmund, 2006).

A common way to test for homogeneity of variances is the Levene-Test. The null hypothesis states that variances are equal. If the Levene-Test shows significant results, the assumption of homogeneity of variances needs to be rejected (Field, 2013). An ANOVA also reacts quite robust to the violation of the criterion of homogeneity of variances if group sizes are large enough and approximately equal. If variances are not homogenous and treatment groups differ in size an ANOVA risks to generate biased results. In this case, it is recommended to use the Welch-Test, which leads to bias-adjusted F-Statistics (Welch, 1951; Field, 2013).

If the ANOVA indicates significant differences in the dependent variable between treatment groups, it is rewarding to compare the means of the dependent variable between each pair of treatment groups. This allows getting further insights on where the detected differences exactly come from. An independent-samples t-test compares the means of a dependent variable between two unpaired treatment groups. A valid application of an unpaired t-test depends on the fulfillment of the same conditions that underlie a valid application of a multi-factorial ANOVA (cf. conditions listed above) (cf., e.g., Sedlmeier and Renkewitz, 2008).

To test for moderator effects, regression models are applied. In the main analysis, the research model is estimated based on a Tobit regression (Cameron and Trivedi, 2009). The range of possible deviations of individuals' price quotations from the respective rational value of the equity stake has an upper and a lower level. This means that the dependent variable is both left- and right-censored. A censored outcome variable can generate a ceiling or floor effect, which both need to be accounted for (McBee, 2010). If two subjects indicate a selling price leading to a selling price deviation from the rational share value that represents the upper or lower level of the possible range, both subjects' selling price deviations are equal according to the range applied. However, their willingness to sell the equity stake might differ. The problem is that this potential difference cannot be defined due to the censored range. A Tobit regression solves this bias via estimating the regression model by considering the censoring of the outcome variable. It estimates a latent (unobserved) variable $\hat{y}$. The observed variable y equals the latent variable $\hat{y}$ if y lies within the range determined by the upper and lower level of possible outcomes. Otherwise, y equals the constant threshold defined by the upper or lower level respectively (Cameron and Trivedi, 2009; McBee, 2010). Estimated regression coefficients

should be interpreted as the effect of the respective independent variable on the latent variable ŷ.

The research model developed in this thesis is a moderated moderation model (cf. chapter 3.4). A moderated moderation is based on a three-way interaction that allows the interaction of an independent variable and a primary moderator to be dependent on a second moderator variable (Hayes, 2013). The hypothesized moderating effect of the accounting method applied (*CONS*) on the direct effect of prior outcome (*LOSS*) on price quotations (*WTADEV*) could hence be tested for its dependence on individuals' degree of loss aversion (*LARISK*). In general, for a moderated moderation model, regression coefficients are estimated by using the following equation (Hayes, 2013, p. 307):

$$Y = \beta_0 + \beta_1 \cdot X + \beta_2 \cdot M + \beta_3 \cdot W + \beta_4 \cdot X \cdot M + \beta_5 \cdot X \cdot W + \beta_6 \cdot M \cdot W + \beta_7 \cdot X \cdot M \cdot W + \varepsilon$$

where:

Y: Dependent Variable

X: Independent Focal Predictor Variable directly affecting Y

M: Independent Primary Moderator Variable

W: Independent Secondary Moderator Variable

XMW is the three-way interaction term, allowing the effect of M on the direct effect between X and Y to be dependent on W. As explained by Hayes (2013), the regression coefficients should be interpreted with caution. Due to the fact that most of them describe conditional effects, they cannot be interpreted as main or interaction effects as it is commonly done for ANOVA results. Only β_7 can be interpreted as the estimation of the three-way interaction (XMW). The coefficients of X, M, and W rather represent simple than main effects. These coefficients estimate the effect of the corresponding independent variable on the dependent variable when the other two independent variables are 0.[48] In the same pattern, the coefficients of the two-way interactions estimate the corresponding interaction between two independent variables if the third independent variable is 0.[49] Hayes (2013) further underlines that in case 0 is not included in the range of values X, M, or W can take, the related coefficients will be meaningless. The author points out that one approach to make the interpretation of regression coefficients possible or easier is mean centering independent variables integrated in the

[48] β_1, for instance, estimates the effect of X on Y when M and W are 0.
[49] β_4, for instance, estimates the interaction between X and M when W is 0.

regression. In case of mean centering, the regression coefficients represent conditional effects of, e.g., X on the dependent variable Y if the other variables (M and W) are at the sample mean (Hayes, 2013).

To assess partial or the full influence of X, M, or W on Y, it is useful to focus on the respective relevant slope coefficients. In the above presented three-way interaction model, the effect of X on Y depends on M and W. By rewriting the above presented regression, the effect of X depending on M and W can be separated into its single components (cf. Hayes, 2013, p. 307):

$$Y = \beta_0 + (\beta_1 + \beta_5 W) \cdot X + [(\beta_4 + \beta_7 W)M] \cdot X + \beta_2 \cdot M + \beta_3 \cdot W + \beta_6 \cdot M \cdot W + \varepsilon$$

The rearranged regression shows that X's effect on Y depends on W and M (Hayes, 2013). For investigating partial and full effects of W on Y, the regression can be rearranged as follows:

$$Y = \beta_0 + \beta_1 \cdot X + \beta_2 \cdot M + \beta_4 \cdot X \cdot M + (\beta_3 + \beta_5 X) \cdot W + [(\beta_6 + \beta_7 X)M] \cdot W + \varepsilon$$

The intercept with respect to W therefore is equal to $(\beta_0 + \beta_1 \cdot X + \beta_2 \cdot M + \beta_4 \cdot X \cdot M)$ and the slope is $(\beta_3 + \beta_5 X + \beta_6 M + \beta_7 XM)$. Table 14 provides an overview of partial and full effects of X on Y as well as partial and full effects of W on Y represented by the corresponding slope coefficients, as it is implemented in chapter 5.3.3.3.

DepVar = Y				
Independent Variable	Partial Effect of X on Y if		Full Effect of X on Y if	
	M and W are both at 0	M increases by one unit and W is at 0	M is at 0 and W increases by one unit	M and W both increase by one unit
X	β_1	$\beta_1 + \beta_4 *$ M	$\beta_1 + \beta_5 * W$	$\beta_1 + \beta_4 * M + \beta_5 * W + \beta_7 * M * W$
Independent Variable	Partial Effect of W on Y if		Full Effect of W on Y if	
	X and M are both at 0	X increases by one unit and M is at 0	X is at 0 and M increases by one unit	X and M both increase by one unit
W	β_3	$\beta_3 + \beta_5 *$ X	$\beta_3 + \beta_6 * M$	$\beta_3 + \beta_5 * X + \beta_6 * M + \beta_7 * X * M$

Table 14: Partial and Full Effects of the Focal Predictor Variable in a Moderated Moderation Model

To control for multicollinearity, Variance Inflation Factors (VIFs) are used in the present regression analyses. High VIF-values indicate correlation between regression terms. A critical VIF-threshold commonly used in literature is 10 (O'Brien, 2007). VIFs should hence be as low as possible but at least under 10 to keep multicollinearity problems at a minimum. Heteroscedasticity is accounted for by using robust standard errors in the regression analyses (White, 1980).

5.2 Pretest Results

The experiment was pretested in December 2016 in the experimental laboratory of the University of Augsburg with 27 doctoral students. Main pretest results are presented hereafter.[50]

5.2.1 Descriptive Statistics of Pretest Data

Pretest participants were randomly assigned to one of four treatment groups. As described in chapter 4.2.2.2, subjects were asked to make an evaluation of an equity stake they hold in a firm in which they are invested after they had experienced a gain or a loss in the neutral or conservative accounting condition, respectively. Subjects' valuation of the equity stake they hold in a firm is elicited by a second price auction procedure based on Becker et al. (1964) (cf. chapter 4.2.4.1). As explained in chapter 4.2.4.1, the deviations of subjects' price quotations from the rational share value represent subjects' willingness to accept a buy offer to sell their company share and are compared across treatment groups. A positive (negative) deviation of the price quotation from the rational share value indicates an overvaluation (undervaluation) of the equity stake.

To test Hypothesis 1a, deviations of subjects' price quotations from the rational economic value of their equity stake at the beginning of investment scenario 2 are analyzed (*WTA30DEV*). At this point in time, subjects have experienced a gain or loss under conservative or neutral accounting in investment scenario 1. This allows comparing project evaluation for both conservative and neutral accounting regimes in both gain and loss settings.

Table 15 presents the descriptive statistics for the corresponding sample.

[50] The experimental design and Pretest results have been presented in the form of a working paper at several international conferences and research seminars. Based on the feedback received at these occasions the experiment has been continuously ameliorated and further developed (Dinh et al., 2017).

N = 27				
Variable	Mean	Std. Dev.	Min.	Max.
WTA30DEV	23.5556	33.69128	-75.00	75.00
LOSS	0.4815	0.5092	0	1
CONS	0.5185	0.5092	0	1
LARISK	3.543	3.3077	0.22	12.00
LATIME	1.019	0.208	0.738	1.762
LATIMESOON	3.202	11.757	0.054	62.014
RATOTAL	0.0862	0.2166	-0.40	0.72

WTA30DEV is the deviation of subjects' valuation of their equity stake from the rational economic share value (R&D project 3, t=0); *LOSS* is a binary variable taking the value of 1 if prior project outcome is a loss; *CONS* is a binary variable taking the value of 1 if conservatism is applied; *LARISK* is an aggregated measure of subjects' degree of loss aversion under risk; *LATIME* is an aggregated measure of subjects' degree of loss aversion over time based on prospects including a positive (negative) payment now (in one year); *LATIMESOON* is an aggregated measure of subjects' degree of loss aversion over time based on prospects including a negative (positive) payment now (in one year); *RATOTAL* is an aggregated measure of subjects' risk aversion (cf. Annex 4 for a detailed description of all variables including their measurement/coding)

Table 15: Descriptive Statistics of Pretest Data

The mean deviation of price quotation from the rational share value of 215[51] across the four treatment groups is 23.55 (*WTA30DEV*).[52] Subjects seem to overvalue their share and include an option value for potential future positive developments not yet made explicit. Accounting regimes (*CONS*) and gain and loss (*LOSS*) settings both appear at a rate of about 50%. *LARISK* measures loss aversion under risk and is the aggregated measure of *LARISK200* and *LARISK50* both measured based on Abdellaoui et al. (2013) (Pearson correlation coefficient=0.8848, p-value=0.000, N=27). The average loss aversion under risk *(LARISK)* is 3.543. Three outliers take on extreme values above eight, which are eliminated in the regression analysis. *LATIME* measures subjects' loss aversion over time based on Abdellaoui et al. (2013). *LATIME* is the aggregated measure of *LATIME1* and *LATIME2* (Pearson correlation coefficient=0.8628, p-value=0.000, N=27). *LATIMESOON* is the aggregated measure of *LATIME3* and *LATIME4* (Pearson correlation coefficient=0.9998, p-value=0.000, N=27). Although correlation

[51] At the beginning of investment scenario 2, subjects are invested in company B at the full amount of their initial equity endowment of $ 200 thousand. Company B has equity capital of $ 20M. Subjects' equity stake thus represents 1% of the company's equity. Company B invests $ 6M in a R&D project that yields $ 15M return in case of success, 0 otherwise. The probability of project success is 50%. Departing from the equity stake of $ 200 thousand, subjects can experience either a decrease in equity of $ 60 thousand in case of project failure or an increase in equity of $ 90 thousand in case of project success. The rational economic value of subjects' equity stake considering potential future developments from the R&D project thus equals: 0.5 * $ 140 thousand + 0.5 * $ 290 thousand = $ 215 thousand.

[52] In the present experiment's investment scenarios, all monetary amounts were presented to subjects with the indication thousands of $ (e.g., $ 200 thousand). For clarity and readability purposes, the data analysis is described leaving out these indications.

coefficients between *LATIME* and *LATIMESOON* are insignificant, the VIF for *LATIME* and *LATIMESOON* are above 10 when integrating both variables in the regression analysis. *LATIMESOON* does not show a significant effect on *WTA30DEV*. It is thus dropped in the regression analysis. *RATOTAL* is the aggregated measure of *RAGAIN, RALOSS,* and *RAMIXED* measured based on Abdellaoui et al. (2013) (Cronbach's Alpha=0.7783, N=27). The average risk aversion (*RATOTAL*) is 0.0862.

Table 53 (Annex 5) presents bivariate correlations between these variables. *WTA30DEV* is significantly correlated with both the accounting treatment (*CONS*) and the project outcome (*LOSS*). These univariate correlations are in line with the expectations and provide support for Hypothesis 1a. Based on Pearson correlation analysis, loss aversion under risk *(LARISK)* and loss aversion over time (*LATIME*) are significantly correlated (p-value=0.0572) but the correlation coefficient is below 0.5 (0.370). Both variables capture different aspects of individuals' loss aversion and are both integrated in the regression analysis. Loss aversion under risk *(LARISK)* is also significantly correlated with risk aversion (*RATOTAL*) (p-value=0.011). This correlation is expected because risk and loss aversion are commonly considered as related but distinct phenomena (Kahneman and Tversky, 1979; Abdellaoui et al., 2013). The corresponding Pearson correlation coefficient is below 0.5 (0.483) indicating that both variables are reflecting different concepts.

5.2.2 Univariate and Multivariate Analysis of Pretest Data

As explained in chapter 3.3, loss aversion is deeply rooted in human beings (Chen et al., 2006). If people dislike being disappointed, they should prefer settings in which potential losses are considered upfront because these settings prevent people from having to bear losses in the future (Hirshleifer and Teoh, 2009). In this study, two different accounting settings are investigated: conservative accounting, which captures potential losses upfront while gains are only considered when they occur vs. neutral accounting, which captures both gains and losses only when they effectively occur. Due to individuals' loss aversion, these settings potentially create different levels of subjective value with the conservative setting providing higher value relative to the neutral setting.

To test Hypothesis 1a, the mean *WTA30DEV* is compared between the different treatment groups. Table 16 shows that overall, positive deviations of quoted prices from the rational share value (*WTA30DEV*) in the conservative treatment (mean 36.14) were significantly higher (T=-2.108, p-value=0.049) than in the neutral setting (mean 10.00) across the two gain/loss groups.

DepVar = *WTA30DEV*				
	CONSERVATIVE	***NEUTRAL***	**t-Statistic**	**p-Value**
GAIN & LOSS	36.14 (N=14)	10.00 (N=13)	-2.108	0.049**

WTA30DEV is the deviation of subjects' valuation of their equity stake from the rational economic share value (R&D project 3, t=0); ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed test)

Table 16: T-Test of *WTA30DEV* between the Conservative and the Neutral Condition

In addition, on average positive deviations of quoted prices from the rational share value were significantly higher (T=2.481, p-value=0.0202) in the gain (mean 37.71) than in the loss (mean 8.31) treatment, across the two accounting groups (cf. Table 17).

DepVar = *WTA30DEV*				
	GAIN	***LOSS***	**t-Statistic**	**p-Value**
CONSERVATIVE & NEUTRAL	37.71 (N=14)	8.31 (N=13)	2.4805	0.020**

WTA30DEV is the deviation of subjects' valuation of their equity stake from the rational economic share value (R&D project 3, t=0); ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed test)

Table 17: T-Test of *WTA30DEV* between the Gain and the Loss Condition

These differences are consistent with the expectation based on Prospect Theory that experiencing a loss leads to disappointment resulting in a lower evaluation of the investment. The higher *WTA30DEV* found in the conservative scenario is consistent with Hypothesis 1a suggesting that conservatism avoids disappointment resulting from loss experience.

To analyze the association between the accounting treatment and gains and losses, the corresponding means are compared in a Difference-in-Difference Analysis. Table 18 presents the results of this comparison.

DepVar = *WTA30DEV*				
R^2=0.40				
	GAIN	***LOSS***	**Diff**	**t-Statistic (p)**
NEUTRAL	30.00 (N=7)	-13.33 (N=6)	-43.33	-2.81 (0.010***)
CONSERVATIVE	45.43 (N=7)	26.86 (N=7)	-18.57	-1.25 (0.222)
Diff	15.43	40.19	24.76	
t-Statistic (p)	1.04 (0.308)	2.61 (0.016**)		1.16 (0.258)

WTA30DEV is the deviation of subjects' valuation of their equity stake from the rational economic share value (R&D project 3, t=0); ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed test)

Table 18: Difference-in-Difference Analysis Results for *WTA30DEV*

In the neutral setting, subjects value the investment at a discount, compared to the gain setting (mean 30.00), when they have experienced a loss (mean -13.33). This difference is highly significant (T=-2.81, p-value=0.010). In the conservative setting, the valuation of the investment is lower in the loss setting (mean 26.86) than in the gain setting (mean 45.43), but the difference is not significant (T=-1.25, p-value=0.222). Most interestingly, while for the gain setting the deviations of the quoted prices from rational share value are only slightly lower under neutral accounting (mean 30.00) than under conservative accounting (mean 45.43) (difference not significant: T=1.04, p-value=0.308), *WTA30DEV* in the loss setting is significantly lower for neutral accounting (mean -13.33) compared to conservative accounting (mean 26.86). This difference is highly significant (T=2.61, p-value=0.016). The difference-in-difference is not significant (T=1.16, p-value=0.258). In all settings except the *LOSS* setting under neutral accounting, subjects value their stake in the firm at a higher value than 215, which is the expected value of the project outcome without taking into account potential future additional projects. This indicates that subjects include an option value for potential future developments not yet made explicit. The fact that subjects who experienced a prior loss in the neutral condition (*NEUTRAL-LOSS*) evaluate their stake below the rational economic value of 215 (mean deviation from rational share value -13.33), implies that they are accepting a discount to escape additional loss experiences.

To further analyze the joint influence of *CONS* and *LOSS* as well as other factors potentially affecting *WTA30DEV*, the following multiple regression model is applied:

$$WTA30DEV = \beta_0 + \beta_1 \cdot LOSS + \beta_2 \cdot CONS + \beta_3 \cdot LOSS \cdot CONS + \beta_4 \cdot LARISK + \beta_5 \cdot LATIME + \beta_6 \cdot RATOTAL + \varepsilon$$

where:

WTA30DEV:	Dependent variable representing the deviation of subjects' valuation of their equity stake from the rational economic share value (Investment Scenario 2, R&D project 3, t=0)
LOSS:	Dummy variable equal to 1 for treatment group of loss experience, 0 otherwise
CONS:	Dummy variable equal to 1 for treatment group of conservatism, 0 otherwise
LARISK:	Aggregated variable adapted from Abdellaoui et al. (2013) measuring the individual subject's degree of loss aversion under risk calculated based on mixed outcome prospects
LATIME	Aggregated variable adapted from Abdellaoui et al. (2013) measuring the individual subject's degree of loss aversion over time based on payment prospects that contain a positive payment now and a negative payment in the future
RATOTAL:	Aggregated variable measuring the individual subject's risk aversion based on Abdellaoui et al. (2013)

Due to the fact that the dependent variable is censored, a Tobit Regression is applied for estimating the coefficients. The joint effect of both accounting treatment (*CONS*) and gain or loss experience *(LOSS*) is under investigation. As explained in chapter 3.4, a moderator effect of *CONS* on the direct effect between *LOSS* and *WTA30DEV* is assumed. Therefore, their interaction is integrated in the analysis. In addition, other factors potentially influence subjects' company evaluation, such as their degree of risk and loss aversion (cf. chapter 4.2.5). To isolate the effect of the accounting treatment on the subject's decisions, *LARISK, LATIME,* and *RATOTAL* are taken into account in the regression. Three observations of extreme values for *LARISK* above eight are eliminated. Regression results are presented in Table 19.

$WTA30DEV = \beta_0 + \beta_1 LOSS + \beta_2 CONS + \beta_3 LOSS*CONS + \beta_4 LARISK + \beta_5 LATIME + \beta_6 RATOTAL + \varepsilon$

	Coefficient	Robust Standard error	t-Statistic	p-Value	
LOSS	-50.73281	17.75473	-2.86	0.010	***
CONS	27.33735	12.89101	2.12	0.048	**
LOSS*CONS	29.75034	18.07967	1.65	0.177	
LARISK	1.104193	1.828808	0.60	0.554	
LATIME	-14.13225	19.02447	-0.74	0.467	
RATOTAL	29.59488	32.31511	0.92	0.372	
Constant	32.10313	20.65715	1.55	0.138	
N				24	
F-Statistic				4.74	
P-Value				0.0046	***
Pseudo R^2				0.0996	
Log Pseudolikelihood				-103.74346	
Highest VIF				5.32	

Tobit regression; ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed t-test)

Table 19: Tobit Regression Results for *WTA30DEV*

The model is highly significant (p-value 0.0046; pseudo R^2 0.0996). Results show that the interaction (*CONS*LOSS*) is not significant at conventional levels (29.75034; p-value 0.177). The coefficients of *CONS* (27.34; p-value 0.048) and *LOSS* (-50.73; p-value 0.010) are highly significant. *LARISK, LATIME,* and *RATOTAL* are not significant in the regression.

Estimations of price quotations (covariates set to their sample mean) show that price quotations under conservative accounting are generally higher than under neutral accounting, and the decrease in value for losses is more pronounced under neutral than under conservative accounting.

Taken together, these results provide support for Hypothesis 1a. They imply that prior losses and the related disappointment lead to valuation discounts under neutral accounting, while they are much lower under conservative accounting. Conservatism seems to be able to better accommodate subjects' loss aversion and leads to overall higher project evaluation. The lower *WTA30DEV* found for neutral accounting implies that subjects evaluate valuable investment projects at a discount.

To analyze Hypothesis 2a saying that subjects have an explicit preference for conservatism, subjects are asked in investment scenario 5 to choose between two identical firms, differing

only in their accounting treatment. At this point, participants have already experienced investment scenarios 1 to 4, i.e., gain and loss under both conservative and neutral accounting (cf. chapter 4.2.4.2). Overall, about half of the participants choose the conservative accounting treatment (mean 0.5185), which is not significantly different from a random allocation (T=0.1890, p-value=0.5742) (cf. Table 20).

Variable	N	Mean	Std. Err.	Std. Dev.	t-Statistic	p-Value
INVDEC	27	0.5185	0.097991	0.5091751	0.1890	0.5742
H0: mean = 0.5						

INVDEC is a binary variable coded 1 if investment decision is company Z (conservative option); ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed t-test)

Table 20: One-sample T-Test of *INVDEC* (Pretest)

This implies that subjects have no conscious preference for conservative accounting.

5.3 Main Study's Results

Analyzing pretest data is a first approach to examine if individuals do have preferences for conservative accounting. The results presented above provide evidence that conservatism is valued more highly than neutral accounting. Due to the fact that the pretest sample was small (N=27), results need to be interpreted with caution. To receive more valid results, it is important to examine individuals' preferences for conservatism using a larger sample as has been done in the main experiment. This chapter presents the main study's results.[53] It first describes correlation analysis and the aggregation of single independent variable measures to one measure to identify final measures used in the main data analysis. Afterwards, descriptive statistics are presented and structural equality of treatment groups is examined before finally testing the hypotheses and conducting robustness check analyses.

Dependent variables of interest in the main data analyses are price quotations in investment scenario 4 indicated for R&D projects 7 and 8 (*WTA70DEV* and *WTA80DEV*). All subjects evaluate R&D project 7 at the beginning of investment scenario 4. In case they sell their share during project 7, they do not have the possibility to evaluate project 8. That is why the sample for price quotations at the beginning of R&D project 8 is reduced. Correlation analyses and descriptive statistical analyses are thus run on both sample sizes (full sample: N=196; reduced sample: N=159).

[53] The experimental design and main results have been presented in the form of a working paper at several international conferences and research seminars (Dinh et al., 2017).

5.3.1 Aggregation of Single Independent Variable Measures

As described in chapter 4.2, several instruments are integrated in the experiment to measure the variables involved in the research model (cf. chapter 3.4). Some of these instruments result in more than one measure for the same construct. In these cases, it is useful to run correlation analyses between the resulting measures to investigate if they can be aggregated to one single measure. This chapter presents the correlation analyses' results. As the main data analyses focus on two different sample sizes (full data sample: N=196; reduced data sample: N=159), correlation analyses are run for both sample sizes.

If more than two items address the same construct, item reliability is measured by using Cronbach's alpha. A commonly accepted threshold indicating high item reliability is 0.7 (Field, 2013). A value of Cronbach's alpha above 0.7 would hence indicate that the separate items measure the same construct and can be aggregated to one single measure. Several researchers point to the fact that instead of relying on commonly accepted alpha thresholds, values of Cronbach's alpha need to be interpreted based on the specific underlying research (e.g., Pedhazur and Schmelkin, 1991). In certain scenarios, a value < 0.7 can hence be sufficient to assume item reliability.

To identify correlations between two items, bivariate correlation analyses based on Pearson and Spearman are conducted. The Pearson correlation coefficient is a parametric statistic indicating if a linear relationship between two variables exists. Spearman's correlation coefficient is a non-parametric test of correlation. Correlation coefficients lie between -1 and +1. -1 (+1) would indicate a perfect negative (positive) correlation: if one variable increases, the other variable decreases (increases) by a proportionate amount. 0 indicates that variables are uncorrelated: if one variable increases or decreases, the other variable stays the same. Correlation coefficients above a threshold of +0.5 or -0.5 indicate strong correlations (Field, 2013).

Loss aversion under risk is calculated based on two different mixed prospects: (50, ½; -50) (*LARISK50*) and (200, ½; -200) (*LARISK200*) (cf. Table 7). A correlation analysis tests if both loss aversion measures can be aggregated to one single measure of individuals' loss aversion under risk. Pearson correlation coefficients for the full subject sample (N=196) and for the reduced subject sample (N=159) show that both variables are highly correlated (0.759, p-value=0.000; 0.760, p-value=0.000). A one-way repeated measures ANOVA was conducted to examine if there were differences in loss aversion coefficients due to the different mixed prospects applied ((50, ½; -50) and (200, ½; -200)). Results based on the full and the reduced sample show that the different prospects do not elicit statistically significant differences in mean

loss aversion per subject (F=1.19; p-value=0.2757; F=1.06, p-value=0.3051). The aggregated measure of loss aversion under risk *(LARISK)* is calculated as *LARISK* = (*LARISK50* + *LARISK200*)/2.

Based on the four mixed prospects of the time setting (cf. Table 8), four values for individuals' loss aversion over time are calculated (*LATIME1, LATIME2, LATIME3, LATIME4*). Cronbach's alpha for the full (reduced) sample is alpha=0.249 (alpha=0.242) and indicates a low level of internal consistency between the four items. A common accepted threshold above which a variable aggregation is judged valid is 0.7. Therefore, the four items should not be aggregated to one measure. However, Pearson and Spearman correlation analyses show significant and high correlations between *LATIME1* and *LATIME2* (Spearman-Rho=0.754, p-value=0.000, N=196; Spearman-Rho=0.780, p-value=0.000; N=159) as well as *LATIME3* and *LATIME4* (Pearson Correlation=0.917, p-value=0.000, N=196; Pearson Correlation=0.928, p-value=0.000, N=159). The confirmed bivariate correlations are strongly plausible considering the fact that *LATIME1* and *LATIME2* (*LATIME3* and *LATIME4*) are calculated based on mixed prospects that contain a positive (negative) payment now and a negative (positive) payment in one year. Individuals' loss aversion thus seems to differ for time prospect settings including negative payments now vs. including negative payments later. The aggregated measures *LATIME* and *LATIMESOON* are calculated as *LATIME(LATIMESOON)* = (*LATIME1*(*3*) + *LATIME2*(*4*))/2). Related variables should hence be considered independently. *LATIME* is measured based on two prospects that both include a negative sure payment in one year and a positive sure payment now (cf. chapter 4.2.5.1.1) while the immediate payment is negative and the delayed payment is positive for *LATIMESOON*. The structure of the prospects corresponding to *LATIME* reflects the experimental setting: subjects face the situation of a future potential loss if the R&D project fails (p=0.5). For this reason, *LATIME* is used in further analyses.

It is further examined if loss aversion under risk and loss aversion over time can be aggregated or if both variables measure different constructs. Consistent with findings by Abdellaoui et al. (2013), Pearson correlation between *LARISK* and *LATIMETOTAL* is low and insignificant (-0.005, p-value=0.947, N=196; -0.003, p-value=0.965, N=159). *LARISK* and *LATIME* (0.053, p-value=0.457, N=196; 0.083, p-value=0.299, N=159) are also not significantly correlated. Similarly, the Pearson correlation between *LARISK* and *LATIMESOON* is low and insignificant (-0.011, p-value=0.881, N=196; -0.01, p-value=0.900, N=159). In summary, loss aversion does

not seem to be a constant phenomenon under risk and over time. Related variables should hence be considered independently as potentially confounding factors.

A Pearson correlation analysis of the two loss aversion measures identified based on Wang et al. (2016) (*LAWANG1, LAWANG2*) shows that both measures are highly correlated (0.857, p-value=0.000, N=196; 0.859, p-value=0.000, N=159). They are thus aggregate to one single measure of loss aversion (*LAWANG*) calculated as *LAWANG*=(*LAWANG1*+*LAWANG2*)/2.

A correlation analysis of the three risk aversion measures *RAGAIN, RALOSS,* and *RAMIXED* that are measured based on Abdellaoui et al. (2013) (cf. chapter 4.2.5.1.2) shows a scale reliability coefficient (Cronbach's Alpha) of 0.6161 (0.5216) for the full (reduced) sample suggesting considering each variable separately in the analysis. Bivariate Pearson correlation analyses run on the full and on the reduced sample document that correlations between all combinations of two out of the three variables are highly significant (p-values <0.001) but corresponding correlation coefficients are under 0.5 for both sample sizes. Based on these results, the three risk aversion measures are considered separately in the further analyses.

A Pearson correlation analysis of the risk aversion measures *RAGEN* and *RAFIN* adapted from Dohmen et al. (2011) provides evidence that both variables are highly correlated (0.7334, p-value=0.000, N=196; 0.7284, p-value=0.000, N=159). Therefore, both measures are aggregated to one single construct (*RAGENFIN)* measured as *RAGENFIN* = (*RAGEN* + *RAFIN*)/2.

A correlation analysis of the four items on risk aversion in investment contexts adapted from Weber et al. (2002) (*RAWEBER1* to *RAWEBER4*) reveals that the four items cannot be aggregated to one single construct (Cronbach's alpha=0.4052, N=196; Cronbach's alpha=0.3989, N=159). It would also be possible to aggregate item 1 and 2 to generate a variable representing risk seeking behavior and to aggregate items 3 and 4 to create a variable representing risk averse investment behavior. A Pearson correlation analysis between items 1 and 2 (0.3447, p-value=0.000, N=196; 0.4078, p-value=0.000, N=159) and items 3 and 4 (0.2273, p-value=0.001, N=196; 0.2284, p-value=0.0038, N=159) shows that the respective items are significantly correlated but correlation coefficients are under 0.5. This would lead to a separate consideration of all four items as indicators for risk seeking or risk averse investment behavior. Due to their low validity in capturing risk attitudes, these four variables are dropped in the further analysis.

The next chapter presents descriptive statistics of independent and dependent variables under investigation and examines structural equality of the four treatment groups.

5.3.2 Descriptive Statistics and Analysis of Structural Equality of Treatment Groups

Before examining if the collected data shows differences in price quotations across treatment groups, it is important to first verify if treatment groups are structurally equal regarding extraneous potentially influencing variables as, e.g., individual attitudes and demographics. As explained in chapter 4.3, subjects were randomly distributed to one of four treatment groups. This random allocation contributes to treatment groups' structural equality but cannot guarantee it. It is thus verified statistically via Chi-square tests as well as one-way ANOVAs. As the main data analyses focus on two different sample sizes (full data sample: N=196; reduced data sample: N=159), structural equality of treatment groups is thus tested for both sample sizes.

5.3.2.1 Independent Variables

Table 54 (Annex 5) provides an overview of descriptive statistics on categorical variables and further indicates results of Pearson Chi-square tests on structural equality for the whole sample (N=196). These Chi-square tests indicate no significant difference in the frequencies across treatment groups for the variables *GENDER* (χ^2=3.81, p=0.283), *NATION* (χ^2=5.0356, p=0.539), *MASTER* (χ^2=2.5553, p=0.465), *CLUSTER* (χ^2= 2.41, p=0.879), *SHARESP* (χ^2=3.2449, p=0.355), *SHARESC* (χ^2=1.7812, p=0.619), *SHARESF* (χ^2=0.7461, p=0.862), *EXPFA2* (χ^2=0.6688, p=0.881), *ANALYSISAR* (χ^2=1.3485, p=0.718), *MCQ1* (χ^2=3.1547, p=0.368), and *MCQ2* (χ^2=4.7495, p=0.191).

However, it shows a significant difference between treatment groups for *EXPFA1* (χ^2=7.9633, p=0.047). The relative amount of students who have already read or consulted financial reports is thus unequal across treatment groups. Pairwise Chi-square tests provide further evidence that this difference is significant between treatment groups 1 and 4 (χ^2=4.1395, p=0.042) as well as treatment groups 3 and 4 (χ^2=6.1420, p=0.013). The relative amount of students who have already dealt with financial reporting is smaller in treatment group 4 than in treatment groups 1 and 3. In contrast, the four treatment groups are structurally equal regarding the relative amount of students who have already analyzed a company's financial report (*EXPFA2*). Experience with active analysis of companies' financial reports would probably more strongly influence individuals' decision making than experience with pure reading or pure consultation of companies' reports (*EXPFA1*). Based on this argument, the structural differences between treatment groups found for *EXPFA1* should not bias individuals' price quotations (*WTADEV*). Therefore, this difference is neglected in further analyses.

Table 56 (Annex 5) illustrates descriptive statistics for all metric control variables for the full sample (N=196). To test for structural equality of treatment groups regarding these variables,

one-way ANOVAs are applied. Group sizes are larger than 30 (N≥30) allowing assuming normal distribution of the respective variable in each treatment group (cf. chapter 5.1). Homogeneity of variances is examined via the Levene-Test. In case variances differ between treatment groups, the Welch-Test provides more reliable insights on differences in means of the respective variable than the one-way ANOVA. Table 58 (Annex 5) provides an overview of the corresponding results. One-way ANOVAs indicate no significant differences in means across treatment groups for *AGE* (F=0.562, p-value=0.641), *PROFEXP* (F=0.821, p-value=0.484), *EASY* (F=0.163, p-value=0.921), *RALOSS* (F=0.515, p-value=0.673), *RAMIXED* (F=1.434, p-value=0.234), *RAGNEEZY* (F=1.642, p-value=0.181), *RAGENFIN* (F=0.684, p=0.563), and *LAWANG12* (F=0.729, p-value=0.536).

Homogeneity of variances between groups must be rejected for *COMP* (F=9.867, p-value=0.000), *MOTIV* (F=2.808, p-value=0.041), *LARISK* (F=2.546, p-value=0.057), and *LATIME* (F=0.513, p-value=0.002). In these cases, the WELCH-Correction tests for equality of means between groups. There are no significant differences in means for *MOTIV* (0.773, p-value=0.512), *LARISK* (0.310, p-value=0.818), and *LATIME* (0.743, p-value=0.529).

However, results show significant differences in means between treatment groups for *COMP* (Welch=3.487, p-value=0.019), *CLEAR* (F=2.542, p-value=0.058), *RAGAIN* (F=2.575, p-value=0.055), and *LAGAECHTER* (F=2.234, p-value=0.086). To control for subjects understanding of the settings, participants judge the experimental scenarios and tasks regarding clarity (*CLEAR*) and understandability (*COMP*). The mean value for *COMP* and *CLEAR* is above 6.1 in each treatment group suggesting that subjects clearly understood the scenarios and tasks and therefore did not have any problems with answering the questions. These average scale values support the validity of the construct operationalization and the validity of empirical results that should not be biased by misunderstanding of tasks or questions or a too high level of task difficulty. The differences in means are thus negligible for both variables. *RAGAIN* and *LAGAECHTER* differ in means between treatment groups. Differences in risk and loss aversion could potentially drive the results. That is why they are integrated as control variables in the main regression analysis and robustness checks (cf. chapters 5.3.3.3 and 5.3.3.4).

The same analyses are conducted for the reduced sample (N=159). Consistent to what has been found for the whole sample, Table 55 (Annex 5) shows a significant difference between treatment groups for *EXPFA1* (χ^2=11.725, p-value=0.008). As explained above, based on the fact that all treatment groups are structurally equal regarding the relative amount of subjects who have already analyzed a company's financial report (*EXPFA2*), the structural inequality in

EXPFA1 should not bias the results. However, to control for its potential effect, the variable is integrated in a robustness check regression analysis (cf. chapter 5.3.3.4). Table 55 (Annex 5) further shows a significant difference in means for *SHARESP* (χ^2=7.484, p=0.058). The percentage of subjects who have already owned shares in the past is lower for treatment groups 3 and 4 compared to treatment groups 1 and 2. However, treatment groups are structurally equal regarding the percentage of subjects who currently own shares and who plan to buy shares in the future. To control for this potentially biasing effect, *SHARESP* is integrated in a robustness analysis as a control variable (cf. chapter 5.3.3.4). Table 55 (Annex 5) documents that treatment groups differ regarding gender (χ^2=7.519, p=0.057). The percentage of women in treatment groups 1 and 2 is noticeably lower relative to treatment groups 3 and 4. Prior literature provides evidence for gender differences in risk taking behavior. Byrnes et al. (1999) conduct a meta-analysis and document overall greater risk taking for male than female study participants. Charness and Gneezy (2012) assemble data from different studies that are based on the same investment game and confirm that female subjects show more risk aversion in investment settings than male subjects. Therefore, *GENDER* is integrated as an additional control variable in a robustness check regression analyses (cf. chapter 5.3.3.4).

Table 57 (Annex 5) illustrates descriptive statistics for all metric control variables for the reduced sample (N=159). Table 59 (Annex 5) documents significant differences in means across treatment groups for *COMP* (Welch=4.234, p=0.008) and *CLEAR* (F=4.178, p=0.007). As explained above, departing from a 7-point Likert Scale, the means of both variables are higher than 6.0 across all treatment groups showing that tasks and questions were clearly stated and comprehensible. Based on this reasoning, these differences in means are neglected in the further analyses.

5.3.2.2 Dependent Variables

Dependent variables investigated in this study are deviations of individuals' price quotations from rational share values in investment scenarios 1 to 4 (*WTADEV*) as well as individuals' conscious choice between investment options made in scenario 5 (*INVDEC*). Table 21 presents the means of selling price deviations from the economic share value per project and treatment group. The price quotations considered in this analysis are measured in period t=0 for the first project of each scenario and in period t=2 for the second project of each scenario (i.e., at the beginning of each R&D project). Subjects have the possibility to sell their equity stake throughout the scenarios. As a result, treatment group sizes could vary in points in time other than the beginning of a new scenario.

		Treatment Group 1	Treatment Group 2	Treatment Group 3	Treatment Group 4
Scenario 1	Accounting Method	Capitalizing	Capitalizing	Expensing	Expensing
Project 1	Project Outcome	Loss	Gain	Loss	Gain
WTA10DEV	Mean (N)	28.23 (56)	14.71 (38)	30.48 (58)	24.43 (44)
Project 2	Project Outcome	Loss	Gain	Loss	Gain
WTA20DEV	Mean (N)	40.86 (44)	21.21 (29)	48.00 (43)	29.36 (28)
Scenario 2	Accounting Method	Capitalizing	Capitalizing	Expensing	Expensing
Project 3	Project Outcome	Gain	Loss	Gain	Loss
WTA30DEV	Mean (N)	16.50 (56)	20.39 (38)	13.57 (58)	25.02 (44)
Project 4	Project Outcome	Gain	Loss	Gain	Loss
WTA40DEV	Mean (N)	27.54 (37)	38.15 (26)	15.35 (40)	35.67 (30)
Scenario 3	Accounting Method	Expensing	Expensing	Capitalizing	Capitalizing
Project 5	Project Outcome	Gain	Loss	Gain	Loss
WTA50DEV	Mean (N)	24.96 (56)	46.66 (38)	18.46 (58)	39.00 (44)
Project 6	Project Outcome	Loss	Gain	Loss	Gain
WTA60DEV	Mean (N)	50.17 (23)	76.57 (21)	48.41 (17)	70.41 (29)

Scenario 4	Accounting Method	Expensing	Expensing	Capitalizing	Capitalizing
Project 7	Project Outcome	Loss	Gain	Loss	Gain
WTA70DEV	Mean (N)	26.61 (56)	33.81 (38)	14.77 (58)	32.70 (44)
Project 8	Project Outcome	Gain	Loss	Gain	Loss
WTA80DEV	Mean (N)	49.44 (45)	30.83 (35)	37.39 (38)	29.73 (41)

WTA10DEV is the deviation of subjects' valuation of their equity stake from the rational economic share value in scenario 1, R&D project 1, t=0; *WTA20DEV* is the deviation of subjects' valuation of their equity stake from the rational economic share value in scenario 1, R&D project 2, t=2; *WTA30DEV* is the deviation of subjects' valuation of their equity stake from the rational economic share value in scenario 2, R&D project 3, t=0; *WTA40DEV* is the deviation of subjects' valuation of their equity stake from the rational economic share value in scenario 2, R&D project 4, t=2; *WTA50DEV* is the deviation of subjects' valuation of their equity stake from the rational economic share value in scenario 3, R&D project 5, t=0; *WTA60DEV* is the deviation of subjects' valuation of their equity stake from the rational economic share value in scenario 3, R&D project 6, t=2; *WTA70DEV* is the deviation of subjects' valuation of their equity stake from the rational economic share value in scenario 4, R&D project 7, t=0; *WTA80DEV* is the deviation of subjects' valuation of their equity stake from the rational economic share value in scenario 4, R&D project 8, t=2 (cf. Annex 4 for a detailed description of all variables including their measurement/coding)

Table 21: Means of *WTADEV* across Scenarios and Treatment Groups

Table 21 documents that subjects overvalue their equity stake across all scenarios and treatment groups. They hence seem to include an option value for potential future developments. Table 21 further reveals an interesting pattern. The deviations of price quotations from the actual economic value of the share strongly increase within a scenario after a loss experience. This valuation pattern is consistent with findings by Thaler and Johnson (1990) presented in chapter 3.1.7: individuals show risk seeking behavior after prior losses if future options provide the possibility to break even, i.e., the possibility to compensate prior losses with future gains. In the present experiment, subjects obviously indicate higher prices after having experienced a prior loss to avoid selling their equity stake. By staying invested, they still have the opportunity to compensate prior losses with potential future gains. Descriptive results hence provide supporting evidence for the break-even effect (cf. chapter 3.1.7).

Table 22 provides an overview of descriptive statistics for price quotations (*WTADEV*) that are compared across treatment groups in the main analysis.

Variable		TG1	TG2	TG3	TG4	Full Sample
WTA30DEV	N	56	38	58	44	196
	Mean	16.50	20.39	13.57	25.02	18.30
	Std. Dev.	25.77	26.45	26.34	24.72	26.00
	Min.	-75.00	-55.00	-65.00	-15.00	-75.00
	Max.	75.00	75.00	75.00	75.00	75.00
WTA70DEV	N	56	38	58	44	196
	Mean	26.61	33.82	14.77	32.70	25.87
	Std. Dev.	30.68	28.53	23.39	22.88	27.48
	Min.	-75.00	-55.00	-45.00	-14.00	-75.00
	Max.	75.00	75.00	74.00	75.00	75.00
WTA80DEV	N	45	35	38	41	159
	Mean	49.44	30.83	37.39	29.73	37.38
	Std. Dev.	35.08	36.51	24.76	31.37	32.99
	Min.	-50.00	-100.00	-12.00	-100.00	-100.00
	Max.	100.00	100.00	99.00	100.00	100.00

WTA30DEV is the deviation of subjects' valuation of their equity stake from the rational economic share value in scenario 2, R&D project 3, t=0; *WTA70DEV* is the deviation of subjects' valuation of their equity stake from the rational economic share value in scenario 4, R&D project 7, t=0; *WTA80DEV* is the deviation of subjects' valuation of their equity stake from the rational economic share value in scenario 4, R&D project 8, t=2 (cf. Annex 4 for a detailed description of all variables including their measurement/coding)

Table 22: Descriptive Statistics *WTADEV* (Final Experiment)

The analysis is focused on three different price quotations. In a first step, it is interesting to analyze selling prices at the beginning of investment scenario 2 (R&D project 3, t=0; *WTA30DEV*). At this stage, subjects have experienced either a prior gain or a prior loss under conservative or neutral accounting in investment scenario 1. In a second step, it is interesting to investigate selling price differences in investment scenario 4 (*WTA70DEV; WTA80DEV*). At this point, subjects have already experienced R&D projects 1 to 6 that serve to make subjects encounter both accounting methods.

Descriptive statistics presented in Table 22 show that deviations of price quotations from the economic share value at the beginning of investment scenario 2 (*WTA30DEV*) are higher after a prior gain than after a prior loss (20.39 and 25.02 vs. 16.50 and 13.57). Descriptive results for *WTA70DEV* indicate that under neutral accounting, individuals value their investment at a discount compared to the other treatment groups: the mean of selling price deviations from the economic share value of treatment group 3 (14.77) is noticeably lower compared to the corresponding means of the other three groups (26.61, 33.82, and 32.70). Descriptive results for *WTA80DEV* show that price quotations are considerably higher after a prior loss than after

a prior gain (49.44 and 37.39 compared to 30.38 and 29.73). They further seem to be higher under conservative than under neutral accounting after a prior loss.

Table 23 adds descriptive statistics for the investment decision subjects make in investment scenario 5.

		TG1	**TG2**	**TG3**	**TG4**	**Full Sample**	**χ^2 (p)**
N		56	38	58	44	196	
INVDEC	X (Conservative)	27 (48.21%)	15 (39.47%)	18 (31.03%)	21 (47.73%)	81 (41.33%)	4.427 (0.219)
	Z (Neutral)	29 (51.79%)	23 (60.53%)	40 (68.97%)	23 (52.27%)	115 (58.67%)	
RAND	Yes	4 (7.14%)	4 (10.53%)	6 (10.35%)	7 (15.91%)	21 (10.71%)	1.998 (0.573)
	No	52 (92.86%)	34 (89.47%)	52 (89.65%)	37 (84.09%)	175 (89.29%)	
ACCMETH1	Yes	40 (71.43%)	26 (68.42%)	35 (60.34%)	24 (54.55%)	125 (63.77%)	3.693 (0.297)
	No	16 (28.57%)	12 (31.58%)	23 (39.66%)	20 (45.45%)	71 (36.23%)	
ACCMETH2	Yes	40 (71.43%)	26 (68.42%)	39 (67.24%)	27 (61.36%)	132 (67.35%)	1.161 (0.762)
	No	16 (28.57%)	12 (31.58%)	19 (32.76%)	17 (38.64%)	64 (32.65%)	

INVDEC is a binary variable coded 1 if the investment decision is company Z (conservative option); *RAND* is a binary variable coded 1 if the investment decision was random; *ACCMETH1* is a binary variable coded 1 if subjects consider the accounting method applied for R&D relevant for the investment's profitability; *ACCMETH2* is a binary variable coded 1 if subjects based their investment decision on the accounting method applied for R&D; ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed test)

Table 23: Descriptive Statistics and Chi-square Test results for Investment Decision

The Pearson Chi-square test shows that treatment groups do not differ regarding the investment decision made in scenario 5 (χ^2=4.427, p=0.219). Descriptive results provide first evidence that overall, more than half of all subjects chose the conservative rather than the neutral investment option (58.67%). Table 23 further indicates that for nearly 90% of all subjects the choice between option X and Z was not random (*RAND*). Approximately 64% of all subjects consider the accounting method relevant for the economic evaluation of the investments' profitability (*ACCMETH1*) and 67% of all subjects deliberately made their investment decision based on the accounting method applied by the respective company (*ACCMETH2*).

To refine the operationalization of subjects' conscious preferences for conservative relative to neutral accounting, subjects indicated on a 7-Point Likert Scale how much they prefer the

chosen over the unchosen option (1=no preference; 7=strong preference; *PREF*). Table 24 shows that preference mean (*PREF)* is above 4 (4.43) providing descriptive evidence that subjects' choice reflects a medium to strong preference for one or the other option.

Variable		TG1	TG2	TG3	TG4	Full Sample
PREF	N	56	38	58	44	196
	Mean	4.57	4.63	4.21	4.39	4.43
	Std. Dev.	1.925	2.072	2.300	2.180	2.117
	Min.	0	1	0	0	0
	Max.	7	7	7	7	7

PREF is the strength of preference for the chosen option (1=no preference; 7=strong preference)

Table 24: Descriptive Statistics for *PREF*

5.3.3 Analysis of Hypotheses H1a and H1b

The main data analysis is structured in several steps leading from univariate to multivariate analyses. At first, a one-way ANOVA is applied to investigate if price quotations differ across treatment groups. Afterwards, a two-way ANOVA is used to examine an interaction effect between prior outcome and accounting method applied on subjects' price quotations as well as their main effects. In a third step, differences between treatment groups are further analyzed via independent-samples t-tests. To address the fact that treatment groups are not structurally equal on each variable (cf. chapter 5.3.2), a two-way interaction Tobit Regression is conducted integrating potential confounding factors. Finally, the research model developed in this thesis (cf. chapter 3.4) is tested via a Moderated Moderation Model.

5.3.3.1 ANOVA and T-Test Results

As described in chapter 5.1, a valid application of a one- or two-way ANOVA as well as of an unpaired t-test demands the fulfillment of certain conditions. The dependent variable needs to be measured on a continuous scale. The dependent variable under investigation in this study is subjects' price quotation (*WTADEV*) measured at a ratio level. Hence, this criterion is fulfilled. Furthermore, independent variables need to be categorical on at least two-factor levels leading to the formation of (unpaired) treatment groups. This is the case in this study as accounting regime (*CONS*) and prior outcome (*LOSS*) are both considered on two-factor levels. Observations of treatment groups are independent from each other because in scenarios 1 to 4 of part 1 of this study each participant is distributed to only one of the four treatment groups (between-subjects design, cf. chapter 4.1.4).

The condition of normal distribution of the respective dependent variable for each treatment group is tested via the Shapiro-Wilk-Test. The results of the Shapiro-Wilk-Test are presented in Table 25 (cf. Table 6 for Treatment Groups).

Variable	TG	N	Shapiro-Wilk Stat.	p-Value		Normal Distribution
WTA30DEV	1	56	**0.909**	**0.000**	***	**No**
	2	38	0.959	0.179		Yes
	3	58	0.968	0.133		Yes
	4	44	0.966	0.209		Yes
WTA70DEV	1	56	**0.958**	**0.049**	**	**No**
	2	38	**0.937**	**0.034**	**	**No**
	3	58	0.976	0.297		Yes
	4	44	0.973	0.387		Yes
WTA80DEV	1	45	**0.956**	**0.087**	*	**No**
	2	35	**0.908**	**0.006**	***	**No**
	3	38	0.959	0.178		Yes
	4	41	**0.939**	**0.029**	**	**No**

WTA30DEV is the deviation of subjects' valuation of their equity stake from the rational economic share value in scenario 2, R&D project 3, t=0; *WTA70DEV* is the deviation of subjects' valuation of their equity stake from the rational economic share value in scenario 4, R&D project 7, t=0; *WTA80DEV* is the deviation of subjects' valuation of their equity stake from the rational economic share value in scenario 4, R&D project 8, t=2 (cf. Annex 4 for a detailed description of all variables including their measurement/coding); ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed test)

Table 25: Shapiro-Wilk-Test of Normal Distribution of *WTADEV*

ANOVAs and t-tests generally react quite robust against violations of the normal distribution of the dependent variable for each treatment groups. A normal distribution is assumed if group sizes are large enough. A common accepted threshold is N=30. This is given in the present study (cf. Table 25).

The Levene-Test is applied to test for homogeneity of variances of the dependent variable across treatment groups. Table 26 presents the corresponding results.

Variable	N	LEVENE Stat. (p)	ANOVA Stat. (p)
WTA30DEV	196	0.065 (0.978)	1.814 (0.146)
WTA70DEV	196	1.491 (0.218)	**5.486 (0.001***)**
WTA80DEV	159	1.727 (0.164)	**3.343 (0.021**)**

WTA30DEV is the deviation of subjects' valuation of their equity stake from the rational economic share value in scenario 2, R&D project 3, t=0; *WTA70DEV* is the deviation of subjects' valuation of their equity stake from the rational economic share value in scenario 4, R&D project 7, t=0; *WTA80DEV* is the deviation of subjects' valuation of their equity stake from the rational economic share value in scenario 4, R&D project 8, t=2 (cf. Annex 4 for a detailed description of all variables including their measurement/coding); ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed test)

Table 26: Comparison of Means of Dependent Variables across Treatments

Table 26 shows that the Levene Statistic is insignificant for all three dependent variables. The condition of homogeneity of variances of the respective dependent variable across treatment groups is thus fulfilled.

The next chapter discusses results generated by one-way and two-way ANOVA analyses.

5.3.3.1.1 ANOVA Results

Table 26 provides results of a one-way ANOVA. In contrast to the pretest, the final experiment's data do not show any significant differences in means of selling price deviations from the rational share value that are indicated at the beginning of investment scenario 2 (*WTA30DEV,* F=1.814, p-value=0.146) across treatment groups. However, treatment groups significantly differ in means of selling price deviations indicated in investment scenario 4, R&D project 7 (*WTA70DEV*, F=5.486, p-value=0.001) and R&D project 8 (*WTA80DEV,* F=3.343, p-value=0.021).

In a next step, a two-way ANOVA is conducted to test for direct and interaction effects of the manipulated variables prior project outcome (gain vs. loss) and accounting method applied (conservative vs. neutral). The Levene-Test documented in Table 26 shows that the condition of homogeneity of variances of the dependent variable across treatment groups is fulfilled (R&D project 7: Levene Stat.=1.491, p-value=0.211; R&D project 8: Levene Stat.=1.727, p-value=0.164).

Table 27 documents the two-way ANOVA's between-subjects test results. These results provide evidence whether the two types of accounting method applied, the two types of prior project outcome, and a potential joint effect of both variables' factor levels significantly

influence deviations of price quotations from the rational economic share value in R&D project 7.

DepVar = *WTA70DEV* N=196						
Source	**Type III Sum of Squares**	**df**	**Mean Square**	**F-Statistic**	**p-Value**	
Corrected Model	11,623.49[a]	3	3,874.49	5.486	0.001	***
Intercept	138,375.46	1	138,375.46	195.924	0.000	***
CONS	1,990.79	1	1,990.79	2.819	0.095	*
LOSS	7,509.79	1	7,509.79	10.633	0.001	***
*CONS*LOSS*	1,365.78	1	1,365.78	1.934	0.166	
Error	135,604.31	192	706.27			
Total	278,427.00	196				
Corrected Total	147,227.81	195				

a. R^2= 0.079 (Adjusted R^2 = 0.065)

WTA70DEV is the deviation of subjects' valuation of their equity stake from the rational economic share value in scenario 4, R&D project 7; *CONS* is a binary variable taking the value of 1 if conservatism is applied; *LOSS* is a binary variable taking the value of 1 if prior project outcome is a loss; ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed test)

Table 27: Two-way ANOVA Results for *WTA70DEV*

ANOVA-results document that the effect of prior outcome (*LOSS*) on price quotations is highly significant at the 1%-level (F=10.633, p-value=0.001). This result indicates that the type of prior project outcome, i.e., whether project outcome is a gain or a loss, has a significant effect on price quotations independent of the accounting method applied. The effect of the accounting method applied (*CONS*) is also significant but only at the 10%-level (F=2.819, p-value=0.095). This result suggests that the type of accounting method applied, i.e., conservative or neutral accounting, significantly affects price quotations independent of the type of prior project outcome. However, due to the low significance, this result needs to be interpreted with caution. Table 27 further shows that there is no statistically significant interaction between the factor levels of prior outcome and accounting method applied on price quotations for R&D project 7 (F=1.934, p-value=0.166).

Table 28 presents two-way ANOVA results indicating whether the two types of accounting method applied, the two types of prior project outcome, and a potential joint effect of both variables' factor levels significantly influence deviations of price quotations from the rational economic share value in R&D project 8.

DepVar = *WTA80DEV*
N=159

Source	**Type III Sum of Squares**	**df**	**Mean Square**	**F-Statistic**	**p-Value**	
Corrected Model	10,450.38[a]	3	3,483.46	3.343	0.021	**
Intercept	214,055.85	1	214,055.85	205.45	0.000	***
CONS	1,702.79	1	1,702.79	1.634	0.203	
LOSS	6,803.77	1	6,803.77	6.530	0.012	**
*CONS*LOSS*	1,181.92	1	1,181.923	1.134	0.288	
Error	161,495.21	155	1,041.91			
Total	394,154.00	159				
Corrected Total	171,945.59	158				

a. $R^2 = 0.061$ (Adjusted $R^2 = 0.043$)

WTA80DEV is the deviation of subjects' valuation of their equity stake from the rational economic share value in scenario 4, R&D project 2; *CONS* is a binary variable taking the value of 1 if conservatism is applied; *LOSS* is a binary variable taking the value of 1 if prior project outcome is a loss; ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed test)

Table 28: Two-way ANOVA Results for *WTA80DEV*

Table 28 documents a highly significant effect for prior outcome (*LOSS*) on relative price quotations (F=6.530, p-value=0.012) while the accounting method applied (*CONS*) is insignificant in the model (F=1.634, p-value=0.203). Price quotations thus differ depending on the type of prior project outcome, independent of the accounting method applied. A prior gain thus differently influences price quotations compared to a prior loss. In contrast, price quotations do not differ between the two accounting methods, independent of prior project outcome. Conservative and neutral accounting thus do not differently influence price quotations. Table 28 further shows that there is no significant interaction effect between factor levels of prior project outcome and accounting method applied on price quotations (F=1.134, p-value=0.288).

In summary, the conducted two-way ANOVAs do not find a significant interaction effect between the two types of prior project outcome and the two types of accounting method applied on price quotations. However, they provide strong evidence for a main effect of the type of prior outcome on subjects' relative price quotations. The evidence for a main effect of the type of the accounting method applied is less strong.

One-way ANOVA results presented above provide evidence for a difference in means of deviations of price quotations from the rational economic share value across the four treatment groups. However, it remains unclear where these differences exactly come from. The one-way ANOVA does not identify if differences in means exist across all four treatment groups, or if, for instance, differences only stem from one treatment group while the three other treatment groups are equal in means.

The two-way ANOVA examines if differences in means of price quotations between treatment groups are influenced by the manipulated factor variables. Corresponding results reveal a main effect of the type of prior project outcome suggesting that price quotations differ between conditions of prior gain and conditions of prior loss. Evidence showing that the two types of accounting method applied differently influence price quotations is less strong. Results do not indicate an interaction effect between factor levels of the two manipulated variables. The adjusted R^2 of both two-way ANOVAs is very small (0.065 and 0.043 respectively) indicating that only 6.5% (4.3%) of the variance of the dependent variable is explained by the respective model.

The research model developed in this thesis (cf. chapter 3.4) is based on a three-way interaction between prior project outcome, accounting method applied, and individuals' degree of loss aversion. The effect of the accounting method applied on the relation of prior project outcome and price quotations is assumed to be conditional on loss aversion. As explained in chapter 5.1, in a moderated moderation model the full effect of each independent variable on the dependent variable partly depends on the two other variables. In case a three-way interaction reasonably reflects the true relation between the variables under investigation, a two-way interaction will thus not provide useful results. In the two-way ANOVA conducted in this chapter, the assumed moderating effect between the accounting method applied and loss aversion is neglected. This analysis is only interesting for examining if the accounting method applied already moderates the relation between prior project outcome and price quotations without considering loss aversion as a secondary moderator. However, based on the theoretically derived three-way interaction model it is not surprising that the two-way ANOVA does not provide evidence for

an interaction effect between the different factor levels of the accounting method applied and prior project outcome.

Although not providing evidence for an interaction effect, the ANOVAs conducted in this chapter detect differences in means of price quotations between treatment groups. To get further insights on where these differences in means of price quotations exactly come from, unpaired t-tests are conducted. T-test results can reveal between which treatment groups differences in means of price quotations exist and under which type of prior project outcome (gain vs. loss) and type of accounting method applied (conservative vs. neutral) price quotations are higher or lower respectively. Corresponding results are presented in the next chapter.

5.3.3.1.2 T-Test Results

Independent t-tests allow examining differences of the depending variable between each pair of treatment groups. Table 29 documents the results of a comparison of means of deviations of price quotations from the respective rational economic share value in investment scenario 4, R&D project 7 (*WTA70DEV)*.

Variable	TG	N	LEVENE Stat. (p)	T-Stat. (p)	Corrected T-Stat. (p)
WTA70DEV	1	56	0.457	-1.150	-1.166
	2	38	(0.501)	(0.253)	(0.247)
	3	58	0.093	**-3.869**	-3.881
	4	44	(0.760)	**(0.000***)**	(0.000)
	1	56	3.616	2.320	**2.309**
	3	58	(0.060*)	(0.022)	**(0.023**)**
	2	38	0.520	0.196	0.192
	4	44	(0.473)	(0.845)	(0.848)

WTA70DEV is the deviation of subjects' valuation of their equity stake from the rational economic share value in scenario 4, R&D project 7; ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed test)

Table 29: Levene Test and T-Test Results for *WTA70DEV*

Treatment groups 1 and 2 (3 and 4) are in the expense (capitalizing) condition. Subjects in treatment groups 1 and 3 (2 and 4) experienced a prior loss (gain) (cf. Table 6). Table 30 presents the corresponding t-test results in a 2x2-Design.

DepVar = *WTA70DEV*			
	Prior GAIN	***Prior LOSS***	**T (p)**
NEUTRAL	TG4 32.70 (N=44)	TG3 14.77 (N=58)	**-3.869** **(0.000***)**
CONSERVATIVE	TG2 33.82 (N=38)	TG1 26.61 (N=56)	-1.150 (0.253)
T (p)	0.196 (0.845)	**2.309** **(0.023**)**	

WTA70DEV is the deviation of subjects' valuation of their equity stake from the rational economic share value in scenario 4, R&D project 7; ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed test)

Table 30: T-Test Results for *WTA70DEV*

Table 30 documents that price deviations after a prior gain vs. after a prior loss do not differ significantly under conservative accounting (T=-1.150, p-value=0.253) whereas they differ significantly under neutral accounting (T=-3.869, p-value=0.000). Subjects in treatment group 3 who experienced a prior loss, value their equity stake at a significantly lower price than subjects in treatment group 4 who experienced a prior gain (mean=14.77 vs. mean=32.70). Comparing treatment groups 1 and 3, it is noticeable that after a prior loss, subjects in the conservative condition value their equity stake significantly more highly than subjects in the neutral condition do (T=2.309, p-value=0.023). After a prior gain, subjects' valuations of their equity stake do not differ significantly in both accounting conditions (T=0.196, p-value=0.845). These results are consistent with Hypothesis 1a, showing that subjects value conservatism more highly than neutral accounting.

This is confirmed by an unpaired t-test comparing deviations of selling prices (*WTA70DEV*) of treatment groups 1 and 2 (conservative condition) with relative price quotations of treatment groups 3 and 4 (neutral condition). As documented in Table 31, under conservatism, price quotations are significantly higher than under neutrality (mean=29.52 > mean=22.51) (Levene Stat.=1.797, p-value=0.182; T=1.795, p-value=0.074).

DepVar = *WTA70DEV*				
	CONSERVATIVE	***NEUTRAL***	**t-Statistic**	**p-Value**
GAIN & LOSS	29.52 (N=94)	22.51 (N=102)	1.795	0.074*

WTA70DEV is the deviation of subjects' valuation of their equity stake from the rational economic share value in scenario 4, R&D project 7; ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed test)

Table 31: T-Test of *WTA70DEV* between the Conservative and the Neutral Condition

An independent t-test analyzing price quotations based on prior gains and losses reveals that prior outcome has a significant effect on future valuation. Table 32 shows that subjects value their equity stake significantly more highly after a prior gain than after a prior loss (mean=33.22 > mean=20.59) (Levene Stat.=0.662, p-value=0.417; T=3.252, p-value=0.001).

DepVar = *WTA70DEV*				
	GAIN	***LOSS***	**t-Statistic**	**p-Value**
CONS & NEUTRAL	33.22 (N=82)	20.59 (N=114)	3.252	0.001***

WTA70DEV is the deviation of subjects' valuation of their equity stake from the rational economic share value in scenario 4, R&D project 7; ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed test)

Table 32: T-Test of *WTA70DEV* between the Gain and the Loss Condition

An analysis of price quotations indicated in scenario 4, project 8 (*WTA80DEV)* leads to the results presented in Table 33.

Variable	**TG**	**N**	**LEVENE Stat. (p)**	**T-Stat. (p)**	**Corrected T-Stat. (p)**
WTA80DEV	1 2	45 35	0.244 (0.623)	**2.313** **(0.023**)**	2.302 (0.024**)
	3 4	38 41	4.000 (0.049**)	1.199 (0.234)	1.210 (0.230)
	1 3	45 38	5.444 (0.022**)	1.776 (0.080*)	**1.827** **(0.071*)**
	2 4	35 41	0.008 (0.927)	0.141 (0.888)	0.139 (0.890)

WTA80DEV is the deviation of subjects' valuation of their equity stake from the rational economic share value in scenario 4, R&D project 8; ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed test)

Table 33: Levene Test and T-Test Results for *WTA80DEV*

Treatment groups 1 and 2 (3 and 4) are in the expense (capitalizing) condition. Subjects in treatment groups 1 and 3 (2 and 4) experienced a prior loss (gain) (cf. Table 6). Table 34 presents the corresponding t-test results in a 2x2-Design.

DepVar = *WTA80DEV*			
	Prior GAIN	***Prior LOSS***	**T (p)**
NEUTRAL	TG4 29.73 (N=41)	TG3 37.39 (N=38)	1.210 (0.230)
CONSERVATIVE	TG2 30.83 (N=35)	TG1 49.44 (N=45)	**2.313** **(0.023**)**
T (p)	0.141 (0.888)	**1.827** **(0.071*)**	

WTA80DEV is the deviation of subjects' valuation of their equity stake from the rational economic share value in scenario 4, R&D project 8; ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed test)

Table 34: T-Test Results for *WTA80DEV*

Results show that price quotations after a prior loss differ significantly depending on the accounting method applied: subjects in the conservative condition value their equity stake more highly than subjects in the neutral condition (T=1.827, p-value=0.071). Table 34 further documents that in contrast to what has been found for *WTA70DEV*, price quotations are significantly higher after a prior loss than after a prior gain under conservative accounting (comparison of treatment group 1 and 2, T=2.313, p-value=0.023). This difference is also descriptively confirmed for neutral accounting, however being insignificant in this case (comparison of treatment group 3 and 4; mean=37.39 > mean=29.73; T=1.210, p-value=0.230).

An unpaired t-test comparing deviations of selling prices under conservatism (TG1+2) and neutral accounting (TG3+4) reveals that price quotations are higher under conservative than under neutral accounting (mean=41.30 > mean=33.42) (cf. Table 35). However, these results only hold descriptively (Levene Stat.=1.774, p-value=0.185; T=-1.5136, p-value=0.132).

DepVar = *WTA80DEV*				
	CONSERVATIVE	***NEUTRAL***	**t-Statistic**	**p-Value**
GAIN & LOSS	41.30 (N=80)	33.42 (N=79)	-1.5136	0.132

WTA80DEV is the deviation of subjects' valuation of their equity stake from the rational economic share value in scenario 4, R&D project 8; ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed test)

Table 35: T-Test of *WTA80DEV* between the Conservative and the Neutral Condition

In contrast to what has been found for *WTA70DEV*, a t-test analysis of *WTA80DEV* based on prior gains and losses documents that subjects value their equity stake significantly more highly after a prior loss than after a prior gain (mean=43.93 > mean=30.24) (Levene Stat.=0.303, p-value=0.583; T=-2.664, p-value=0.009) (cf. Table 36).

DepVar = *WTA80DEV*				
	GAIN	***LOSS***	**t-Statistic**	**p-Value**
CONSERVATIVE & NEUTRAL	30.24 (N=76)	43.93 (N=83)	-2.664	0.009***

WTA80DEV is the deviation of subjects' valuation of their equity stake from the rational economic share value in scenario 4, R&D project 8; ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed test)

Table 36: T-Test of *WTA80DEV* between the Gain and the Loss Condition

As explained in chapter 5.3.2.2, these valuation patterns are consistent with deliberations on the break-even effect presented in chapter 3.1.7. At the beginning of investment scenario 4, when facing R&D project 7, there is no need to break even because subjects start every new scenario with an endowment of $ 200,000 (i.e., a fresh start, cf. chapter 4.2.2.2). As shown by Table 30, in this situation, prior gains lead to higher company overvaluation compared to prior losses and prior losses in a neutral setting lead to the lowest overvaluation. This is in accordance with Hypothesis 1a. However, Table 34 documents that at the beginning of R&D project 8 when subjects have experienced a prior gain or loss in R&D project 7, the overvaluation of the equity stake expressed by positive selling price deviations from the rational share value are higher after a prior loss than after a prior gain.

This leads to the assumption that the break-even effect comes into play. Subjects who experienced a prior loss in R&D project 7 apparently indicate higher price quotations at the beginning of R&D project 8 than subjects who experienced a prior gain to avoid selling their share and thus keeping the opportunity to compensate prior losses with potential future gains resulting from R&D project 8. Nevertheless, it is further documented that in prior loss cases

positive deviations of price quotations from the rational share value are lower under neutral than under conservative accounting. This reflects Hypothesis 1a: subjects mentally better cope with a prior loss in the conservative than in the neutral setting leading to higher valuations of the investment under conservative accounting. Deviations of price quotations from the rational economic share value in R&D project 8 hence result from a combination of two effects: the possibility to break even and loss aversion leading to higher valuations under the conservative than the neutral accounting regime.

Conversely, one could argue that subjects in the conservative condition who experienced a prior loss are more willing to break even than subjects who experienced a prior loss under neutral accounting leading to highest valuations under conservative accounting in cases of prior losses. However, this explanation contradicts findings from R&D project 7 (cf. Table 30) showing that after a prior loss subjects value their equity stake significantly more highly under conservative than under neutral accounting when there is no need to break even (T=2.309, p-value=0.023).

The interpretation of price quotations made for R&D project 7 is based on the assumption that subjects do have experienced investment scenario 3 to its end and hence do have experienced a gain or loss in R&D project 6. However, as shown in Table 21, a noticeable amount of subjects have sold their equity stake during R&D project 5 and hence have not experienced R&D project 6 at all. Therefore, the results based on data collected in R&D project 7 probably contain noise and should be interpreted with caution. However, prior experiences are clearly determinable for subjects who make a price quotation at the beginning of R&D project 8: they definitely experienced R&D project 7, which is part of the same investment scenario (i.e., investment scenario 4). Therefore, the multivariate analyses presented in the next two chapters focus on price quotations indicated at the beginning of R&D project 8 (*WTA80DEV)*.

5.3.3.2 Moderation Model Results

Prior analyses show that price quotations are influenced by prior outcome (cf. chapter 5.3.3.1.2). In case of a prior loss, subjects indicate higher price quotations compared to a prior gain. This increase in price quotations after prior loss experiences seem to be driven by subjects' loss aversion reflected in the break-even effect: subjects indicate higher prices after a prior loss to stay invested and keep the chance to compensate prior losses with potential future gains. As argued in chapter 3, conservatism should better address individuals' loss aversion than neutral accounting. That is why a moderation effect of conservatism on the relation between prior project outcome and price quotations is expected. This moderation represents one part of the research model developed in this thesis (cf. chapter 3.4). For a stepwise test of the research

model, the regression analysis conducted in this chapter is modeled as a two-way interaction between prior project outcome and accounting method applied. The two-way interaction analysis does not capture the full research model due to neglecting the secondary moderator. Corresponding regression results are thus only provided for interest and completeness purposes and are not used for testing the hypotheses developed in this thesis. The full research model is tested via a three-way interaction regression in the subsequent chapter 5.3.3.3.

In this chapter, the following two-way interaction Tobit regression is run:

$$WTA80DEV = \beta_0 + \beta_1 \cdot LOSS + \beta_2 \cdot CONS + \beta_3 \cdot LOSS \cdot CONS + \beta_4 \cdot LARISK + \beta_5 \cdot LATIME + \beta_6 \cdot RAGAIN + \beta_7 \cdot RALOSS + \beta_8 \cdot RAMIXED + \varepsilon$$

where:

WTA80DEV:	Dependent variable representing the deviation of subjects' valuation of their equity stake from the rational economic share value in investment scenario 4, R&D project 8, t=2
LOSS:	Dummy variable equal to 1 for treatment group of prior loss experience, 0 otherwise
CONS:	Dummy variable equal to 1 for treatment group experiencing conservatism, 0 otherwise
LARISK:	Aggregated variable adapted from Abdellaoui et al. (2013) measuring the individual subject's degree of loss aversion under risk calculated based on mixed outcome prospects
LATIME:	Aggregated variable adapted from Abdellaoui et al. (2013) measuring the individual subject's degree of loss aversion over time based on payment prospects that contain a positive payment now and a negative payment in the future
RAGAIN:	Variable measuring the individual subject's risk aversion in gain contexts based on Abdellaoui et al. (2013)
RALOSS:	Variable measuring the individual subject's risk aversion in loss contexts based on Abdellaoui et al. (2013)
RAMIXED:	Variable measuring the individual subject's risk aversion in mixed contexts based on Abdellaoui et al. (2013)

A moderator effect of *CONS* on the direct effect of *LOSS* on *WTA80DEV* is assumed. Therefore, the interaction term is the focus of the analysis. Prior literature shows that loss aversion as well

as risk attitudes influence individuals' investment behavior (cf. chapter 3.1). To isolate the effect of project outcome and the accounting method applied on subject's company evaluation, loss aversion under risk (*LARISK),* loss aversion over time (*LATIME)* and risk aversion (*RAGAIN, RALOSS, RAMIXED*) are taken into account as control variables in the regression (cf. chapter 4.2.5). Three observations of extreme values for loss aversion under risk above eight are eliminated.

A Pearson-Spearman correlation matrix of the regression variables is provided in Table 60 (Annex 5). Bivariate correlations show that price quotations (*WTA80DEV*) are significantly positively correlated with prior project outcome (*LOSS*) while the correlation with the accounting treatment is insignificant. Table 60 (Annex 5) further shows a significant positive correlation between price quotations (*WTA80DEV*) and loss aversion under risk (*LARISK*) and loss aversion over time (*LATIME*), while it documents negative correlations between *WTA80DEV* and risk aversion in gain and loss settings (*RAGAIN, RALOSS*). Individuals' loss aversion (risk aversion) hence seems to positively (negatively) influence individuals' company valuation. Loss aversion under risk (*LARISK*) is significantly correlated with risk aversion (*RAGAIN, RALOSS, RAMIXED)*. As explained in chapter 3.1.2, this correlation is expected because risk and loss aversion are commonly considered as related but distinct phenomena (Kahneman and Tversky, 1979; Abdellaoui et al., 2013). All corresponding correlation coefficients are below 0.5 indicating that risk and loss aversion variables are reflecting different concepts. Hence, all variables are kept in the regression analysis.

Tobit regression results are documented in Table 37. Corresponding VIFs are under 10 (highest VIF=7.47) indicating that multicollinearity is not a problem in this regression.

$WTA80DEV = \beta_0 + \beta_1 LOSS + \beta_2 CONS + \beta_3 LOSS*CONS + \beta_4 LARISK + \beta_5 LATIME + \beta_6 RAGAIN + \beta_7 RALOSS + \beta_8 RAMIXED + \varepsilon$

	Coefficient	Robust Standard error	t-Statistic	p-Value	
LOSS	7.026964	6.343573	1.11	0.270	
CONS	-1.658903	7.539446	-0.22	0.826	
LOSS*CONS	13.70999	9.753897	1.41	0.162	
LARISK	4.59674	4.031185	1.14	0.256	
LATIME	11.7508	4.768602	2.46	0.015	**
RAGAIN	-44.65488	16.61026	-2.69	0.008	***
RALOSS	-4.960283	15.96624	-0.31	0.756	
RAMIXED	0.2780812	20.65373	0.01	0.989	
Constant	24.38761	6.997483	3.49	0.001	***
Observations				156	
F-Statistic				4.71	
p-Value				0.000	***
Pseudo R^2				0.0174	
Log Pseudolikelihood				-740.67014	
Highest VIF				3.07	

Tobit regression; ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed test)

Table 37: Two-way Interaction Tobit Regression Results (*WTA80DEV)*

The model is highly significant (F=4.71, p-value=0.000). Results show that there is no significant interaction effect between prior project outcome and the accounting method applied on price quotations (t=1.41, p-value=0.162). Furthermore, neither the coefficient of prior project outcome (*LOSS)* nor the coefficient of the accounting method applied (*CONS)* is significant in the regression (t=1.11, p-value=0.270; t=0.22, p-value=0.826).

In contrast, Tobit regression results provide evidence that individuals' loss aversion over time (*LATIME*) is positively associated to individuals' price quotations: in case loss aversion over time increases by one unit, price quotations would increase by $ 11,751 (all else equal). Individuals' risk aversion in gain contexts (*RAGAIN*) is negatively related to individuals' price quotations: price quotations would decrease by $ -44,655 if risk aversion in gain settings increases by one unit. Individuals thus tend to escape future risk (and secure prior gains or the status quo) by selling their equity stake at a lower price. *LARISK*, *RALOSS,* and *RAMIXED* are not significant in the regression (T=1.14, p-value=0.256; T=-0.31, p-value=0.756; T=0.01,

p-value=0.989). Based on this model, price quotations are mainly driven by loss aversion over time and risk aversion in gain contexts.

In summary, consistent with findings from ANOVA and t-test analyses presented in chapter 5.3.3.1, regression results do not provide evidence for a two-way interaction between prior project outcome and accounting method applied. Based on the theoretically derived three-way interaction model these findings are not surprising because the secondary moderator is neglected. As argued in chapter 3.4, the effect of prior outcome on price quotations should be moderated by the accounting method applied and this moderator effect should itself depend on individuals' loss aversion, leading to a moderated moderation model (i.e., a three-way interaction; cf. Hayes, 2013). Results of the corresponding three-way interaction regression are presented in the next chapter.

5.3.3.3 Moderated Moderation Model Results

Regression results presented in the prior chapter do not provide evidence for an interaction effect between prior project outcome and accounting method applied on price quotations. This is consistent with ANOVA and t-test results presented in chapter 5.3.3.1. The two-way interaction was run considering individuals' loss aversion under risk and loss aversion over time as control variables. Abdellaoui et al. (2013) show that individuals' degree of loss aversion significantly differs under risk and over time. Correlation analyses conducted in this thesis confirm that loss aversion under risk and loss aversion over time measured based on Abdellaoui et al. (2013) are uncorrelated (cf. chapter 5.3.1). Loss aversion under risk and loss aversion over time should thus both be considered separately in the regression analysis. The experimental setting considers the time dimension by splitting R&D projects in several periods each representing one fiscal year. Because subjects' equity value is influenced by the R&D projects' development and outcome, subjects experience changes in equity in steps of fiscal years. However, the time delays are introduced on a hypothetical basis because the time spans subjects experience between changes in equity do not truly correspond to a period of one year. In contrast, the risk dimension is implemented under real conditions. The R&D projects' probability of success or failure is 50% and the corresponding project outcome directly affects the value of subjects' equity stake in the company. For this reason, the risk dimension is more present than the time dimension in the experimental setting. Based on these deliberations, individuals' degree of loss aversion under risk (*LARISK*) is integrated as the secondary moderator variable in the three-way interaction analysis, while *LATIME* is integrated as a control variable.

To analyze the full research model developed in this thesis (cf. chapter 3.4), the following moderated moderation model is applied:

$$\begin{aligned} WTA80DEV = \; & \beta_0 + \beta_1 \cdot LOSS + \beta_2 \cdot CONS + \beta_3 \cdot LARISK + \beta_4 \cdot LOSS \cdot CONS + \\ & \beta_5 \cdot LOSS \cdot LARISK + \beta_6 \cdot CONS \cdot LARISK + \beta_7 \cdot CONS \cdot LOSS \cdot LARISK + \\ & \beta_8 \cdot LATIME + \beta_9 \cdot RAGAIN + \beta_{10} \cdot RALOSS + \beta_{11} \cdot RAMIXED + \varepsilon \end{aligned}$$

The moderated moderation analysis conducted is based on a Tobit regression. According to the research model, the accounting method applied (*CONS*) represents the primary moderator, while loss aversion under risk (*LARISK*) is the secondary moderator. The two-way interaction of *CONS* and *LOSS* is thus examined conditional on different levels of *LARISK*. Three observations of extreme values for *LARISK* above eight are eliminated.

Table 61 (Annex 5) presents a Pearson-Spearman correlation matrix of the regression variables. Bivariate correlations document a significant positive correlation between price quotations (*WTA80DEV*) and prior project outcome (*LOSS*) while no significant correlation is found between price quotations and the accounting treatment (*CONS*). Table 61 (Annex 5) further shows a significant positive correlation between price quotations (*WTA80DEV*) and loss aversion under risk (*LARISK*) as well as loss aversion over time (*LATIME*), while it documents negative correlations between *WTA80DEV* and risk aversion in gain and loss settings (*RAGAIN, RALOSS*). Loss aversion under risk *(LARISK)* is significantly correlated with risk aversion (*RAGAIN, RALOSS*) but the correlation coefficients are below 0.5.

For conducting the three-way interaction regression, the moderator variable *LARISK* is mean-centered (cf. chapter 5.1) to facilitate the interpretation of the regression coefficients of the dummy variable *LOSS* as well as of corresponding interaction terms. As explained in chapter 5.1, without mean centering, the coefficient of the focal predictor (*LOSS*) shows the effect of *LOSS* on the dependent variable *WTA80DEV* under the condition that the primary (*CONS*) and secondary (*LARISK*) moderator variables are 0 and all controls are held constant. In the present study, this interpretation of the regression coefficient β_1 would not make sense because individuals' degree of loss aversion under risk is always > 0 (i.e., 0 is not part of possible values of *LARISK*). For this reason, the variable *LARISK* is mean-centered. Subtracting the sample mean of *LARISK* from each *LARISK* observation (i.e., mean centering *LARISK*) leads to a mean of the mean-centered variable *LARISK* of 0. The interpretation of the regression coefficient β_1 is still conditioned on the mean-centered variable *LARISK* being 0 (this is different from its sample mean of 0). The mean-centered variable *LARISK* is 0 at the sample mean of *LARISK*

uncentered (=1.45). The interpretation of the regression coefficients of *LOSS* and its corresponding interaction terms is thus conditioned on *CONS* being 0 and *LARISK* being at its sample mean of 1.45.

Table 38 provides the Tobit regression results. Reported VIFs are below 10 (highest VIF = 3.07) indicating that multicollinearity is not of concern in this analysis.

$$WTA80DEV = \beta_0 + \beta_1 LOSS + \beta_2 CONS + \beta_3 LARISK + \beta_4 LOSS{\cdot}CONS + \beta_5 LOSS{\cdot}LARISK + \beta_6 CONS{\cdot}LARISK + \beta_7 LOSS{\cdot}CONS{\cdot}LARISK + \beta_8 LATIME + \beta_9 RAGAIN + \beta_{10} RALOSS + \beta_{11} RAMIXED + \varepsilon$$

Variables	Coefficient	Robust Standard Error	t-Statistic	p-Value	
LOSS	6.982352	6.07716	1.15	0.252	
CONS	-1.945844	7.140317	-0.27	0.786	
LARISK	-1.446784	4.566591	-0.32	0.752	
LOSS*CONS	14.39964	9.478829	1.52	0.131	
LOSS*LARISK	13.2203	7.457482	1.77	0.078	*
CONS*LARISK	15.68638	6.261025	2.51	0.013	**
LOSS*CONS*LARISK	-20.19987	9.770042	-2.07	0.040	**
LATIME	13.48979	3.972499	3.40	0.001	***
RAGAIN	-36.82603	16.96173	-2.17	0.032	**
RALOSS	-1.145277	16.08425	-0.07	0.943	
RAMIXED	-9.655555	20.80126	-0.46	0.643	
Constant	23.18434	6.855398	3.38	0.001	***
N				156	
F-Statistic				4.80	
P-Value				0.000	***
Pseudo R^2				0.0218	
Log Pseudolikelihood				-737.31672	
Highest VIF				3.07	

Tobit regression; *LARISK* is mean centered; ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed test)

Table 38: Three-way Interaction Tobit Regression Results (*WTA80DEV*)

Table 38 documents that prior project outcome (*LOSS*) does not show a significant regression coefficient indicating that a change from prior gain to prior loss does not significantly influence price quotations (β_1=6.98, T=1.15, p-value=0.252), all else equal. The same is true for a change from neutral to conservative accounting (*CONS)* (β_2=-1.95, T=-0.27, p-value=0.786). Results further show an insignificant regression coefficient of loss aversion under risk

(*LARISK*) (β_3=-1.45, T=-0.32, p-value=0.752). However, regression results document significant coefficients for the control variables *LATIME* and *RAGAIN*. An increase in loss aversion over time (*LATIME)* by one unit increases price quotations by $ 13,490 (β_8=13.490, T=3.40, p-value=0.001) (all else equal). In contrast, an increase in risk aversion (*RAGAIN)* by one unit decreases *WTA80DEV* by $ -36,826 (β_9=-36.826, T=-2.17, p-value=0.032). Table 38 further provides evidence for significant interaction effects when *LARISK* is involved. After a prior loss experience, an increase in loss aversion leads to a significant increase in price quotations by $ 13,220 (β_5=13.2203, T=1.77, p-value=0.078). Under conservatism, an increase in loss aversion significantly increases price quotations by $ 15,686 (β_6=15.68638, T=2.51, p-value=0.013). The significant and negative three-way interaction regression coefficient (β_7=-20.19987, T=-2.07, p-value=0.040) documents that an increase in loss aversion in the condition of a prior loss experience under conservatism leads to a significant decrease in price quotations by $ -20,200. Summing up the three regression coefficients $\beta_5 + \beta_6 + \beta_7 = 8.70681$ indicates that the overall effect of *LARISK* is still positive. These interaction terms indicate that *LOSS* and *CONS* have an effect on price quotations when variations in *LARISK* are considered.

Based on the research model developed in this thesis (cf. chapter 3.4), it is important to not only examine the effect of prior project outcome on price quotations if all else is equal but to also assess its effects on price quotations depending on conditions of the two moderator variables, i.e., investigating its partial and full effects. Prior project outcome is defined by the dummy variable *LOSS* taking the value of 1 in case of prior loss, 0 otherwise. The corresponding partial and full effects thus need to be interpreted as the discrete change from prior gain to prior loss.

Table 14 presented in chapter 5.1 provides an overview of relevant slope coefficients useful for examining partial and full effects of an independent focal predictor variable X (*LOSS*) on a dependent variable Y (*WTA80DEV*) conditional on a primary moderator variable M (*CONS*) and a secondary moderator W (*LARISK*). In the present setting, the primary moderator variable *CONS* is a dummy variable coded 1 if the accounting method applied is conservative and 0 if it is neutral. It is thus interesting to analyse the effect of a change from prior gain to prior loss (*LOSS*=1) under the two accounting methods applied holding the level of risk aversion constant (i.e., examining partial effects of *LOSS* on price quotations). *LARISK* is a continuous variable that is mean-centered in the above presented Tobit regression. Results presented in Table 38 are thus based on the mean-centered variable *LARISK* being at 0. Because the mean-centered variable is at 0, partial effects of a prior loss on price quotations are equivalent to its full effects as documented in Table 39. P-values are based on the delta method's z-Statistics.

	Partial Effect of *LOSS* on *WTA80DEV* if		Full effect of *LOSS* on *WTA80DEV* if	
LARISK is at 0	*CONS* is 0	*CONS* is 1	*CONS* is 0	*CONS* is 1
Relevant β	β_1	$\beta_1 + \beta_4 * 1$	$\beta_1 + \beta_5 * LARISK$	$\beta_1 + \beta_4 * 1 + \beta_5 * LARISK + \beta_7 * 1 * LARISK$
Coefficient (p-Value)	6.982352 (0.251)	21.38199 (0.005***)	6.982352 (0.251)	21.38199 (0.005***)

WTA80DEV is the deviation of subjects' valuation of their equity stake from the rational economic share value in scenario 4, R&D project 8; *LOSS* is a binary variable taking the value of 1 if prior project outcome is a loss; *CONS* is a binary variable taking the value of 1 if conservatism is applied; *LARISK* is an aggregated measure of subjects' loss aversion under risk calculated based on mixed outcome prospects; *LARISK* is mean-centered in this analysis, ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed test)

Table 39: Partial and Full Effect of *LOSS* on *WTA80DEV* under Different Levels of *LARISK*

Table 39 indicates that a prior loss leads to a significant increase in price quotations by $ 21,382 (p-value=0.005) under conservatism while its effect is insignificant under neutral accounting. The full effect of prior loss on price quotations is reflected in the addition of corresponding regression coefficients. However, as documented in Table 39, this addition is not sufficient because as indicated by the significant regression coefficients of all interaction terms involving *LARISK*, the effect of a prior loss on price quotations seem to be dependent on *LARISK*. For this reason, the effect of a prior loss experience on price quotations is analyzed by varying the level of *LARISK*.

The effect of *LARISK* on price quotations can be separated into its single components depending on the levels of the dummy variables *LOSS* and *CONS*. These components represent the intercept and the slope of the corresponding regression line defined by results presented in Table 38 as follows. As explained in Chapter 5.1, the intercept with respect to W is equal to $(\beta_0 + \beta_1 \cdot X + \beta_2 \cdot M + \beta_4 \cdot X \cdot M)$ and the slope is $(\beta_3 + \beta_5 \cdot X + \beta_6 \cdot M + \beta_7 \cdot X \cdot M)$. To analyze the influence of changes in W=*LARISK* on price quotations, X=*LOSS* and M=*CONS* are varied interchangeably. Table 40 displays the intercepts and slopes that are obtained when setting X = *LOSS* = 0 or 1 and M = *CONS* = 0 or 1. Being independent of *LARISK,* control variables are unconsidered. Table 40 hence presents the corresponding results for both the condition of prior loss (*LOSS*=1) as well as for prior gain (*LOSS*=0).

***LOSS*=1**	**Intercept**	**Slope**
CONS=0	30.166692 $(\beta_0 + \beta_1)$	11.773516 $(\beta_3 + \beta_5)$
CONS=1	42.620488 $(\beta_0 + \beta_1 + \beta_2 + \beta_4)$	7.260026 $(\beta_3 + \beta_5 + \beta_6 + \beta_7)$
***LOSS*=0**	**Intercept**	**Slope**
CONS=0	23.18434 (β_0)	-1.446784 $(\beta_3 + \beta_5)$
CONS=1	21.238496 $(\beta_0 + \beta_2)$	14.239596 $(\beta_3 + \beta_6)$

Table 40: Calculation of Intercept and Slope of Regression Lines based on *LARISK* for all conditions of *LOSS* and *CONS*

Based on the intercept and slope parameters presented in Table 40, it is possible to calculate estimations of price quotations for different levels of loss aversion. To define a high, a medium and a low level of loss aversion under risk, one standard deviation (1.016878) is added (subtracted) to (from) the sample mean (1.446014). Due to the fact that *LARISK* is mean-centered in the above presented analysis, one standard deviation is added (subtracted) from 0 because 0 represents the sample mean if *LARISK* is mean-centered. Low loss aversion is thus represented by a level of -1.016878 and high loss aversion is defined by a level of 1.016878. Table 41 documents estimated price quotations for the three levels of loss aversion under all conditions of prior project outcome and accounting method applied.

DepVar = WTA80DEV		
LOSS=1		
	CONS=0	*CONS*=1
Low LARISK	18.1944626	35.23792728
Medium LARISK	30.166692	42.620488
High LARISK	42.1389214	50.00304872
LOSS=0		
	CONS=0	*CONS*=1
Low LARISK	24.6555428	6.7585641
Medium LARISK	23.18434	21.238496
High LARISK	21.7131372	35.7184279

Table 41: Estimation of *WTA80DEV* for different Levels of *LARISK*

Results presented in Table 41 suggest that consistent with Hypothesis H1a, after a prior loss experience (LOSS=1), valuations are higher in the conservative (CONS=1) than in the neutral

(CONS=0) accounting setting for all levels of loss aversion under risk. Results further provide evidence for Hypothesis H1b, showing that after a prior loss (LOSS=1) under conservatism (CONS=1), price quotations are highest for individuals with a high level of loss aversion.

Results further suggest that after a prior gain (LOSS=0), price quotations are higher under neutral accounting (CONS=0) than under conservative accounting (CONS=1) for individuals with a low level loss aversion. However, price quotations strongly increase under conservatism with increasing loss aversion. This finding documents that even after a prior gain valuations are higher under conservative than neutral accounting if loss aversion increases. Consistent with expectations, loss aversion under risk is the main moderator implying that results cannot be interpreted without its moderation impact.

The three-way interaction regression was rerun by splitting the sample at the median of *LARISK* (1.162769) and mean-centering *LARISK* for the corresponding subsamples. Untabulated results confirm expectations that after a prior loss, price quotations are significantly higher under conservatism for subjects with high loss aversion, while results are insignificant for individuals with low loss aversion. However, by splitting the sample into two subsamples, only half of the observations are examined per regression analysis (N=78) reducing the validity and the informative value of the corresponding results.

5.3.3.4 Robustness Checks

Several sensitivity analyses are conducted to examine the robustness of the results generated by the moderated moderation Tobit regression. In a first step, alternative measures of the secondary moderator loss aversion and the control variables for risk aversion are used in the regression. Secondly, additional control variables are integrated in the regression. Thirdly, the regression is run on the data collected in St. Gallen while data collected in Augsburg is removed from the sample. In a fourth step, subjects who wrongly answered one or both manipulation check questions (*MCQ1* and *MCQ2*) are removed from the sample. Finally, an OLS instead of a Tobit regression is used to test the moderated moderation model.

The secondary moderator in the research model under investigation is individuals' loss aversion under risk (*LARISK*). The corresponding measure applied in the main analysis is an aggregation of two loss aversion measures that are calculated based on the final negative payment of two mixed outcome prospects matching subjects' certainty equivalent of 0: (50, ½; -50) (*LARISK50*) and (200, ½; -200) (*LARISK200*) (cf. chapter 4.2.5.1.2). Correlation analyses show that the strength of correlation between *LARISK50* and *LARISK200* depends on sample size (cf. Annex

5, Table 61). For robustness check purposes, the main Tobit regression is run by replacing the aggregated measure of loss aversion under risk by its single components (*LARISK50* and *LARISK200*). Both variables are mean-centered. Three (four) extreme values for *LARISK50* (*LARISK200*) above eight are removed from the sample. Table 63 (Table 64) (Annex 5) presents results generated based on *LARISK50 (LARISK200)*. Consistent with the main analysis, the coefficient of the three-way interaction is negative and still (but less) significant in both models (p-values=0.085 and 0.087). Levels and signs of interaction related coefficients are similar to the main analysis besides the coefficient of the respective measure of loss aversion under risk: in contrast to the main analysis, loss aversion under risk itself is significant in both models and shows higher coefficients. Two-way interactions are only significant for *LARISK200*. Results of *LARISK200* more strongly reflect the main analysis' results than *LARISK50*.

Two other instruments measuring individuals' degree of loss aversion in risky choices are applied for robustness check purposes (cf. chapter 4.2.5.2.3). The first instrument is adapted from Wang et al. (2016) and asks subjects to indicate the minimum amount of gain that needs to be offered by a two-outcome lottery (p=0.5) to make them willing to participate in the lottery if the involved loss amount is known up-front. The resulting gain-loss ratio represents the loss aversion index (*LAWANG*; cf. chapter 5.3.1). Five observations of extreme values of loss aversion above eight are removed from the sample. Results presented by Table 65 (Annex 5) provide evidence for a highly significant three-way interaction (p-value=0.001). It is noticeable that compared to the results of the main regression analysis the three-way interaction coefficient is this time positive. Furthermore, contrary to the main analysis, the coefficients of both two-way interaction terms involving loss aversion show negative signs both being insignificant.

The second additional instrument measuring loss aversion under risk is adapted from Gächter et al. (2010). Subjects indicate for six different mixed lotteries (p=0.5) if they would accept or reject it. The amount of the potential gain is the same in each lottery whereas potential losses vary. The gain-loss ratio resulting at the point when people switch from playing the lottery to rejecting it represents subjects' loss aversion index (*LAGAECHTER*, cf. chapter 4.2.5.2.3). Table 66 (Annex 5) presents results of the corresponding regression analysis. The three-way interaction has a positive coefficient that is not significant in this analysis. Also two-way interactions involving loss aversion are insignificant and differ in levels and signs compared to the main analysis. Based on this model, price quotations are associated to *LATIME* and *RAGAIN* both showing significant coefficients.

The fact that applying alternative measures of the secondary moderator leads to differing results is not surprising if taking into account results of bivariate correlation analyses presented in Table 61 (Annex 5). *LARISK* is not at all correlated to *LAWANG* or *LAGAECHTER*: for the corresponding pairs of loss aversion measures correlation coefficients are very low and insignificant. Although *LAWANG* and *LAGAECHTER* are significantly correlated, regression results differ in the three-way interaction being only significant under *LAWANG*. Regression and correlation analyses' results suggest that the more developed loss aversion measure adapted from Abdellaoui et al. (2013) and the very simple loss aversion measures applied by Gächter et al. (2010) and Wang et al. (2016) seem to capture different concepts.

The risk aversion measures based on Abdellaoui et al. (2013) (*RAGAIN, RALOSS, RAMIXED*) are replaced by the following alternative measures of risk aversion to check for robustness of results: *RAGENFIN* and *RAGNEEZY*. *RAGENFIN* is an aggregated risk aversion measure adapted from Dohmen et al. (2011) (cf. chapter 4.2.5.2.2) that is based on individuals' self-reported risk attitudes in general as well as financial contexts. *RAGNEEZY* is adapted from Gneezy and Potters (1997) measuring risk aversion via individuals' investment in a two-outcome lottery (cf. chapter 4.2.5.1.3). Table 67 and Table 68 (Annex 5) present the corresponding Tobit regression results. Compared to the main analysis, results based on *RAGENFIN* do not show noticeable changes in levels, signs or significance of coefficients while the three-way interaction is no longer significant under the analysis based on *RAGNEEZY*. Under *RAGNEEZY, CONS* has a positive coefficient, however, still being insignificant. The signs of the controls *RAGENFIN* and *RAGNEEZY* differ compared to risk measures used in the main analysis: coefficients of the risk aversion measures in the main analysis have negative signs while *RAGENFIN* and *RAGNEEZY* positively influence price quotations. This change in signs is consistent with the variables' inverse coding: higher values of *RAGENFIN* and *RAGNEEZY* represent risk seeking behavior while higher values of *RAGAIN, RALOSS, RAMIXED* represent risk averse behavior. Bivariate correlation analyses fit to these results (cf. Table 62, Annex 5): correlations between *RAGENFIN* or *RAGNEEZY* and *RAGAIN, RALOSS, RAMIXED* are negative and highly significant. The large and positive significant coefficient of *RAGNEEZY* suggests that this measure has a strong impact on price quotations if all other variables are held constant: more risk seeking positively affects price quotations. This makes sense since higher price quotations allow staying invested and participating in subsequent risky R&D projects.

Structural equality analyses conducted for the reduced sample (N=159) show that treatment groups differ regarding *GENDER*, *SHARESP*, and *EXPFA1* (cf. Table 59, Annex 5). These variables are integrated as additional controls in the main Tobit regression. Corresponding results are provided in Table 69 (Annex 5). Compared to the main analysis, results do not show noticeable changes in signs, levels or significance of coefficients.

In the main analysis, data collected in St. Gallen is merged with data collected in Augsburg to enlarge the sample. To check for robustness of result, data from Augsburg is eliminated from the sample. Table 70 (Annex 5) presents regression results run on the data collected in St. Gallen (N=122). The three-way interaction is still significant, but at the 10% level. The interaction between *LOSS* and *CONS* is significant (p-value=0.044) while the interaction between *LOSS* and *LARISK* is no longer significant. The coefficient of *CONS* is larger compared to the main regression but still insignificant. Results do not show further noticeable changes in signs, levels, or significance of interaction-related coefficients.

A further robustness check is run by excluding participants from the sample who wrongly answered manipulation check questions. Table 71 (Annex 5) provides corresponding results. It is shown that the three-way interaction is still but less significant (p-value=0.066). In this model, contrary to the main analysis, the coefficient of *LARISK* is positive but it is still insignificant. The interaction between *LOSS* and *LARISK* shows a smaller regression coefficient compared to the main model being no longer significant at conventional levels.

The main analysis is based on a Tobit regression that considers that dependent variable (*WTA80DEV*) is left and right censored. For robustness check purposes, an OLS regression is applied. Table 72 (Annex 5) shows the corresponding results. The OLS and the Tobit regression generate very similar results. The three-way interaction is still significant, but at the 10% level. OLS estimates might be biased due to not considering variable censoring.

In summary, results are robust when using the single instead of the aggregated measures of *LARISK*, applying additional controls, reducing the sample to data collected in St. Gallen, removing subjects from the sample who wrongly answered manipulation check questions and running an OLS instead of a Tobit regression. The change in measures of risk aversion does not extremely affect results under *RAGENFIN* and *RAGNEEZY,* although the three-way interaction is no longer significant when controlling for *RAGNEEZY*. The robustness analyses document that results noticeably differ depending on the measure of loss aversion applied: although the three-way interaction is highly significant under *LAWANG*, the sign of its coefficient is inverse

to the one in the main analysis. The measure of loss aversion being the secondary moderator in the research model hence seems to be crucial. As has been explained above, loss aversion measures applied in this study are not correlated. They seem to capture different concepts leading to opposing results. The incentive compatible measure of loss aversion under risk (*LARISK*) calculated based on Abdellaoui et al. (2013) is one of the most complex and far developed ones currently applied in research. Therefore, corresponding results are considered more comprehensive than results generated through the simple loss aversion measures *LAWANG* and *LAGAECHTER*.

The next chapter presents data analyses for testing Hypotheses 2a and 2b.

5.3.4 Analysis of Hypotheses H2a and H2b

Investment scenarios 1 to 4 are designed to let subjects experience all four different treatments in order to prepare them for an informed choice they are asked to make in investment scenario 5. To test for subjects having explicit preferences for conservative over neutral accounting (cf. Hypotheses 2a and b), subjects are asked in scenario 5 to choose in which of two firms they want to invest their endowment of $ 200,000. The firms are identical except for the accounting method applied for R&D. Subjects make the choice after having experienced scenarios 1 to 4, that is, project gain and loss under both conservative and neutral accounting. The investment decision (*INVDEC*) is modelled as a binary variable taking the value of 1 if subjects chose the company applying conservative accounting and the value of 0 if subjects choose the company using neutral accounting. Rationally, subjects should be indifferent between both investment options. Indifference would lead to both options being chosen equally often. However, as argued in this study, loss aversion is assumed to be that deeply rooted in human beings that experience does not fully mitigate individuals' endogenous preferences for conservatism in accounting. This should materialize in company Z being chosen more often than company X. Consistent with expectations, a one-sample t-test presented in Table 42 documents that overall participants choose the conservative accounting treatment more often than the neutral option (mean 0.5867). The mean is significantly different from a random allocation (p-value=0.0148).

Variable	N	Mean	Std. Err.	Std. Dev.	t-Statistic	p-Value
INVDEC	196	0.5867	0.03526	0.4936	2.4597	0.0148**
H0: mean = 0.5						

INVDEC is a binary variable coded 1 if investment decision is company Z (conservative option); ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed t-test)

Table 42: One-sample T-Test *INVDEC* (Final Experiment)

This implies that subjects have a conscious preference for conservative accounting. To analyze if subjects' choice between the two companies is not random but based on true preferences subjects tick on a 7-point Likert Scale how much they prefer the chosen over the unchosen option (1=not at all; 7=very much). Table 43 shows the corresponding mean and standard deviation.[54]

Variable	N	Mean	Std. Err.	Std. Dev.
PREF	187	4.647	0.1407	1.9242

PREF is the strength of preference for the chosen option (1=no preference; 7=strong preference)

Table 43: Descriptive Statistics for *PREF* (Final Experiment)

Table 44 presents the number of subjects per Likert-Scale-Point.

DepVar=*PREF*		
Likert-Scale Point	Absolute Number of Subjects (N=187)	Percentage of Subjects (N=187)
1 = No Preference	22	0.12
2	15	0.08
3	10	0.05
4	17	0.09
5	51	0.27
6	40	0.21
7 = Strong Preference	32	0.17

PREF is the strength of preference for the chosen option (1=no preference; 7=strong preference)

Table 44: *PREF* per Scale-Point

The 7-point scale allows dividing the answers in rather low preferences (categories 1 to 3) and rather high preference (categories 5 to 7) for the respective treatment chosen. This leads to the insights that 25% of subjects have rather no or only weak preferences for one or the other treatment, 9% have medium preferences for the respective treatment chosen and 65% of subjects have rather strong preferences for the chosen over the unchosen option. Hence, nearly 2/3 of the sample of subjects has explicit preferences for the option chosen.

To verify conscious preferences for one or the other accounting treatment, subjects are further asked to indicate if their choice was random (*RAND*), if they think that the accounting method

[54] Due to a technical issue, Z-Tree did not save nine subjects' z-Leaf entries for *PREF*. Hence, nine observations are missing for *PREF* leading to a sample size of N=187.

applied is relevant for the economic evaluation of the investment options (*ACCMETH1*), and if their choice between option X and option Z was deliberately based on the accounting method applied (*ACCMETH2*). The three variables are binary variables with the coded answer Yes=1 and No=0. The following table documents corresponding results.

Variable	N	Mean	Std. Err.	Std. Dev.	t-Statistic	p-Value
RAND	196	0.107	0.0221	0.3100	-17.737	0.000***
ACCMETH1	196	0.6377	0.03442	0.4818	4.0022	0.000***
ACCMETH2	196	0.6734	0.03358	0.4701	5.1656	0.000***

H0: mean = 0.5

RAND is a binary variable coded 1 if the investment decision was random; *ACCMETH1* is a binary variable coded 1 if subjects consider the accounting method applied for R&D relevant for the investment's profitability; *ACCMETH2* is a binary variable coded 1 if subjects based their investment decision on the accounting method applied for R&D; ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed Test)

Table 45: One-Sample T-Test *RAND, ACCMETH1, ACCMETH2*

Table 45 provides supportive evidence for the above described result that subjects have true preferences for the treatment chosen because the very small mean of *RAND* (0.107) indicates that choices were not at all random (175 subjects ticked 'No', while only 21 subjects ticked 'Yes'). The variable *ACCMETH1* captures if subjects think that the accounting method applied is relevant for the economic evaluation of the investment options. Table 45 shows that the majority of subjects considers the accounting method applied as relevant for the economic evaluation of the investment options (mean=0.6377; 71 participants ticked 'No' while 125 subjects ticked 'Yes'). Table 45 further documents that the majority of participants based their investment decision deliberately on the accounting method applied (*ACCMETH2*) (mean=0.6734; 64 subjects ticked 'No', 132 subjects ticked 'Yes'). Preferences could hence be influenced by (erroneous) economic evaluations of the investment options instead of being solely dependent on individuals' loss aversion.

In summary, the above presented results support Hypothesis 2a arguing that subjects have conscious preferences for conservative over neutral accounting. However, the answers provided do not fully reveal why subjects prefer conservative compared to neutral accounting. Economic evaluation of the investment options could potentially come into play (cf. Table 45). Loss aversion is a psychological phenomenon influencing individuals' judgment and decision making behavior (cf. chapter 3.1). However, people do not necessarily deliberately think about being loss averse. It is considered an unconscious phenomenon (Hirshleifer and Teoh, 2009). Therefore, directly asking subjects if their preferences stem from intrinsic loss aversion is

problematic. To examine if loss aversion could be the reason for subjects' explicit preferences for conservatism it is analyzed if rather subjects with higher degrees of loss aversion than subjects with lower degrees of loss aversion prefer conservative to neutral accounting.

The median of loss aversion under risk *(LARISK)* based on the whole subject sample (N=196) is 1.175903. This value is used to split the sample and separate subjects with lower degrees of loss aversion (*LARISK*≤1.175903) from subjects with higher degrees of loss aversion (*LARISK*>1.175903). The generation of these two subsamples allows examining if rather individuals with higher degrees of loss aversion show preferences for the conservative option than subjects with lower degrees of loss aversion (H2b).

Table 46 provides descriptive statistics of the investment decision per subsample.

Variable		**Low *LARISK***	**High *LARISK***	**Full Sample**	**χ^2 (p)**
N		98	98	196	
INVDEC	*CONSERVATIVE*	55 (56.12%)	60 (61.22%)	115 (58.67%)	0.5260 (0.468)
	NEUTRAL	43 (43.88%)	38 (38.78%)	81 (41.33%)	

INVDEC is a binary variable coded 1 if investment decision is company Z (conservative option); *LARISK* is an aggregated measure of subjects' degree of loss aversion under risk; ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed t-test)

Table 46: Descriptive Statistics and Structural Equality of *INVDEC* between two *LARISK*-Subsamples

It is documented that in both subsamples more subjects chose the conservative than the neutral option. The percentage of subjects who chose the conservative investment option is greater in the sample group characterized by higher degrees of loss aversion (61.22% > 56.12%). A Pearson Chi-square test does not reveal structural differences regarding the investment decision between both groups.

Additional analyses are conducted for both subgroups separately. Table 47 documents that subjects with low degrees of loss aversion do not show explicit preferences for the conservative accounting option. The mean of the binary variable *INVDEC* is not significantly different from 0.5 (p-value=0.2273) indicating that both investment options have been chosen approximately equally often.

DepVar=*INVDEC*

Variable	N	Mean	Std. Err.	Std. Dev.	t-Statistic	p-Value
Low *LARISK*	98	0.5612245	0.0503853	0.4987888	1.2151	0.2273
High *LARISK*	98	0.6122449	0.0494715	0.4897433	2.2689	0.0255 **
H0: mean = 0.5						

INVDEC is a binary variable coded 1 if investment decision is company Z (conservative option); *LARISK* is an aggregated measure of subjects' degree of loss aversion under risk; ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed t-test)

Table 47: Investment Decision of Low and High Loss Aversion Subsample

However, Table 47 further documents that subjects with high degrees of loss aversion show explicit preferences for the conservative investment option. The sample mean is significantly different from 0.5 (p-value=0.0255) and greater than 0.5, confirming that the conservative option has been chosen significantly more often than the neutral option. A comparison of *INVDEC* sample means of both subsample groups reveals that overall group means are not significantly different from each other (T=-0.7225, p-value=0.4708).

Examining the strength of preferences per subsample group, it is shown that means are not significantly different (T=-0.5725, p-value=0.5676). A separate analysis of both subsamples provides evidence that for the low loss aversion group the mean strength of preference is not significantly different from a medium level of 4 (T=1.5599, p-value=0.1220) while for the high loss aversion group the strength of preferences is significantly higher than 4 (T= 2.5292, p-value=0.0130) (cf. Table 48).

DepVar=*PREF*

Group	N	Mean	Std. Err.	Std. Dev.	t-Statistic	p-Value
Low *LARISK*	98	4.346939	0.2224049	2.201696	1.5599	0.1220
High *LARISK*	98	4.520408	0.2057605	2.036925	2.5292	0.0130 **
H0: mean = 4						

PREF is the strength of preference for the chosen option (1=no preference; 7=strong preference); *LARISK* is an aggregated measure of subjects' degree of loss aversion under risk; ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed t-test)

Table 48: Strength of Preference for Chosen Option of Low and High Loss Aversion Subsample

Dividing the full sample into three subsamples based on *LARISK* terziles and comparing the investment decision made in scenario 5 between the three groups leads to the results documented in Table 49.

DepVar=*INVDEC*

Group	**N**	**Mean**	**Std. Err.**	**Std. Dev.**	**t-Statistic**	**p-value**
Low *LARISK*	66	0.5454545	0.0617606	0.5017452	0.7360	0.4644
Medium *LARISK*	65	0.5692308	0.061898	0.4990375	1.1185	0.2675
High *LARISK*	65	0.6461538	0.0597703	0.4818833	2.4453	0.0172 **
H0: mean = 0.5						

INVDEC is a binary variable coded 1 if investment decision is company Z (conservative option); *LARISK* is an aggregated measure of subjects' degree of loss aversion under risk; ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed t-test)

Table 49: Comparison of *INVDEC* between Low, Medium and High Loss Aversion Subsample

Table 49 shows that subjects with high loss aversion chose the conservative investment option significantly more often than the neutral option (mean=0.646; p-value=0.0172), while the means of *INVDEC* for subgroups with medium or low levels of loss aversion are not significantly different from 0.5 (p-values=0.2675 and 0.4644). Comparing means of *INVDEC* across the three subgroups does not reveal significant differences between groups (χ^2=1.4924, p-value = 0.474).

Results found for the strength of preferences tabulated in Table 50 indicate that subjects with medium or high loss aversion show strong preferences for the investment option chosen. Means are significantly different from 4 indicating a medium level of strength of preference (p-values = 0.0529 and 0.0591). The mean of *PREF* of the subgroup of subjects with low levels of loss aversion is not significantly different from 4 (p-value = 0.2847). A one-way ANOVA does not document significant differences in means of *PREF* across the three subgroups (F = 0.25; p-value = 0.7808).

DepVar=*PREF*

Group	N	Mean	Std. Err.	Std. Dev.	t-Statistic	p-Value
Low *LARISK*	66	4.287879	0.2668692	2.168056	1.0787	0.2847
Medium *LARISK*	65	4.538462	0.2730498	2.201398	1.9720	0.0529 *
High *LARISK*	65	4.476923	0.2481738	2.000841	1.9217	0.0591 *
H0: mean = 4						

PREF is the strength of preference for the chosen option (1=no preference; 7=strong preference); *LARISK* is an aggregated measure of subjects' degree of loss aversion under risk; ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed t-test)

Table 50: Comparison of *PREF* between Low, Medium and High Loss Aversion Subsample

The moderated moderation analysis conducted in chapter 5.3.3.3 is based on a reduced sample (N=156; observations of subjects who did not experience the beginning of R&D project 8 as

well as subjects with loss aversion *(LARISK)* above 8 are eliminated). It is thus interesting to analyze subjects' investment decision in scenario 5 based on the reduced sample. Table 51 shows that individuals chose the conservative option significantly more often than the neutral option (p-value=0.0245). These results do not differ compared to the analysis run on the full sample (N=196).

Variable	N	Mean	Std. Err.	Std. Dev.	t-Statistic	p-Value
INVDEC	156	0.5897436	0.0395088	0.4934643	2.2715	0.0245**
H0: mean = 0.5						

INVDEC is a binary variable coded 1 if investment decision is company Z (conservative option); ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed t-test)

Table 51: One-sample T-Test *INVDEC* (N=156) (Final Experiment)

The reduced sample is split into three subsamples based on *LARISK* terziles. Results of a comparison of the investment decision made in scenario 5 between the three groups are documented in Table 52.

DepVar=*INVDEC*

Group	N	Mean	Std. Err.	Std. Dev.	t-Statistic	p-Value
Low *LARISK*	52	0.4807692	0.0699622	0.5045046	-0.2749	0.7845
Medium *LARISK*	52	0.5576923	0.0695464	0.501506	0.8296	0.4107
High *LARISK*	52	0.7307692	0.0621108	0.4478876	3.7154	0.000 ***
H0: mean = 0.5						

INVDEC is a binary variable coded 1 if investment decision is company Z (conservative option); *LARISK* is an aggregated measure of subjects' degree of loss aversion under risk; ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed t-test)

Table 52: Comparison of *INVDEC* between Low, Medium and High Loss Aversion Subsample (N=156)

Consistent with findings for the whole sample, Table 52 shows that subjects with high loss aversion chose the conservative investment option significantly more often than the neutral option (mean=0.7308; p-value=0.0000). Means of *INVDEC* for subgroups with medium or low levels of loss aversion are not significantly different from 0.5 (p-values=0.4107 and 0.7845). Comparing means of *INVDEC* across the three subgroups reveals that differences in means between groups that are driven by the high loss aversion group are significant at a 5%-level (χ^2=7.0476; p-value = 0.029).

In summary, the above presented findings generated by analyzing subsamples separately provide supportive evidence for Hypothesis 2b saying that conscious preferences for

conservatism are more pronounced for subjects showing higher degrees of loss aversion than for subjects with lower degrees of loss aversion. However, differences in means of *INVDEC* between subsamples are only statistically significant for the reduced sample.

5.4 Summary of Results

A one-way ANOVA analysis conducted in chapter 5.3.3.1 provides evidence for differences in means of price quotations between treatment groups. To get further insights on where these differences come from, unpaired t-tests are conducted. T-test results for price quotations made for R&D project 7 (*WTA70DEV)* document that price quotations are significantly higher under conservative than under neutral accounting. It is further revealed that subjects evaluate their equity stake significantly higher after a prior gain than after a prior loss. When investigating price quotations for R&D project 8 (*WTA80DEV*), results show that after a prior loss experience deviations of price quotations from the rational share value are significantly higher under conservative than under neutral accounting. Consistent with Hypothesis 1a, processing a prior loss seems to be more comfortable in the conservative than in the neutral setting leading to higher valuations of the investment under conservative accounting. Evaluation patterns further reflect the break-even effect presented in chapter 3.1.7. At the beginning of R&D project 8 when subjects have experienced a prior gain or a prior loss in R&D project 7, overvaluations of the equity stake expressed by positive selling price deviations from the rational share value are higher after a prior loss than after a prior gain. Induced by the break-even effect, subjects who experienced a prior loss in R&D project 7 aim at staying in the game and keeping the possibility to break even in R&D project 8 by indicating higher selling prices.

A multivariate analysis testing a moderation model based on an interaction effect between prior project outcome and the accounting method applied on price quotations (cf. chapter 5.3.3.2) documents that the interaction effect is not significant at conventional levels. Regression coefficients of prior project outcome and accounting method applied are insignificant. Price quotations seem to be mainly driven by individuals' loss aversion over time as well as subjects' risk aversion in gain settings. These results do not support the hypotheses derived in this study. However, this is little surprising because the two-way interaction analysis does not capture the full research model because it neglects the secondary moderator.

A three-way interaction regression is conducted (cf. chapter 5.3.3.3) to test the moderated moderation model developed in this thesis (cf. chapter 3.4). Consistent with Hypothesis H1a, results confirm that after a prior loss experience, valuations are higher under conservatism than under neutrality across low, medium and high levels of loss aversion. Results also support

Hypothesis H1b, showing that after a prior loss under conservatism price quotations are highest for individuals with a high level of loss aversion. It is further revealed that even after a prior gain valuations are higher under conservative than neutral accounting if loss aversion increases. Consistent with expectations, loss aversion serves as the main moderator implying that results cannot be interpreted without its moderation impact.

Hypotheses 2a and 2b state that subjects explicitly prefer conservative relative to neutral accounting and that these preferences are more pronounced for subjects with high degrees of loss aversion compared to subjects with low levels of loss aversion. Results presented in chapter 5.3.4 provide supporting evidence. Analyzing subjects' investment decision in scenario 5 across the full subject sample reveals that the conservative option has been chosen significantly more often than the neutral option. Individuals thus show explicit preferences for conservative compared to neutral accounting. Overall, the strength of these preferences is at a medium to a high level: 65% of subjects have indicated a strength of preference above 4.

By dividing the full sample into two subsamples of low and high loss averse participants it is documented that both subsample groups descriptively show preferences for conservative accounting: in both subsample groups the conservative investment options was chosen more often than the neutral option. These preferences are confirmed statistically for the high loss aversion group whose mean on the binary variable *INVDEC* is higher and significantly different from 0.5 while the investment choice is not significantly different from 0.5 in the low loss aversion group. The strength of preferences is statistically above medium level for the subsample of higher loss aversion while it is not significantly different from medium level for subjects with low loss aversion. Consistent results are found when splitting the sample into three subsamples characterized by low, medium, and high loss aversion. Subjects in the group of high levels of loss aversion show explicit preferences for conservative accounting: they chose the conservative accounting option significantly more often than the neutral option. In contrast, choices are not significantly different from 0.5 for the medium and low level loss aversion subsamples. These results support Hypothesis 2b confirming that preferences for conservatism are more pronounced for subjects with higher loss aversion.

Subjects' unconscious preferences for conservatism revealed in investment scenarios 1 to 4 are consistent with their explicit preferences for conservatism shown in investment scenario 5. As explained in chapter 4.1.4, in case within-subjects results consistently reflect between-subjects results, subjects' judgments in the between-subjects design are consistent with their intentions (Clor-Proell et al., 2014).

In general, results should always be interpreted by considering potential limitations of the underlying study that might reduce the study's internal or external validity (cf. chapter 4.1.3). The next chapter presents limitations of the present experimental study.

5.5 Limitations

The design of the experiment not only induces valuations based on the accounting method applied but also on prior project outcome. Subjects' desire to break even after a prior loss may interfere with their company valuation based on the accounting treatment. However, this does not negatively affect the general evidence provided for an impact of the accounting method applied on company valuation depending on individuals' loss aversion and project outcome.

The use of business students at bachelor and master level as proxies for individual investors could have introduced noise in the results and limit their generalizability (i.e., its external validity). Researchers argue that the usefulness and validity of the application of students as proxies for real investors or managers is highly context dependent. In case the study demands previous knowledge related for example to the experience and tasks of real managers or investors, students are considered inappropriate proxies for these roles. Student subjects are judged appropriate when no particular knowledge is required and general cognitive abilities are addressed (Libby et al., 2002). Libby et al. (2002) advise to recruit subjects who fit to the study's goal and suggest avoiding taking overly sophisticated participants for economic reasons. The usage of student subjects is common in laboratory experiments. In experimental research on nonprofessional investor behavior, MBA students are frequently used as proxies for nonprofessional individual investors (e.g., Maines and McDaniel, 2000; Frederickson and Miller, 2004). The present study does not require any particular knowledge or experience in accounting or finance. Additionally, the underlying theory builds on psychological phenomena applying to all human beings in general: loss aversion has been shown to be intrinsic to every individual (cf. chapter 3.3). Furthermore, the tasks involved in this study are not overly complex. For these reasons, business students at bachelor and master level are considered appropriate proxies for nonprofessional investors in this study. The noise introduced by student subjects should be weak.

It could be possible that students prefer conservative or neutral accounting because they learnt during their studies that one or the other accounting method provides more decision useful or more reliable information to stakeholders (cf. chapter 2.1 for an overview of benefits and costs of conservative and neutral accounting). Both accounting methods are addressed in accounting lectures on IFRS standards because both are reflected in the IFRS. They are discussed based on

their benefits and costs. Due to the fact that both methods have strengths and weaknesses, students should not be biased up-front by their studies' content.

Another factor that could bias the results would be limited effort invested by subjects in thinking about the case and their judgments and choices. Information processing effort can be ameliorated by introducing incentives as, for example, a performance-contingent compensation for participation. This concern is addressed in this study by not only providing participants with a show-up fee but also by incentivizing them to take the task seriously by paying out a variable compensation dependent on subjects' choices and project outcome (cf. chapter 4.3.3). An artificial currency (experimental $) is used in the experiment to create monetarily realistic investment amounts that would have been impossible by using a real currency as Euros or Swiss Francs. The variable compensation is converted from experimental currency to real currency and paid out immediately after the end of the experimental session. Providing incentives keeps the bias of non-effort in information processing to a minimum.

In case the experiment takes long time, a reduced effort in information processing can also stem from subjects becoming tired in the course of the study. The present experiment takes about 90 minutes. It is thus rather long. The study is divided into three parts, each taking approximately 30 minutes. The task diversity contributes to subjects' effort and concentration. Subjects were informed about the length of the study up-front when they signed in for participation. They were thus mentally prepared to the duration of the study. Furthermore, data shows that subjects were highly motivated to fulfill all tasks (mean of *MOTIV* = 6.65), which also contributes to their effort and attention. The bias of tiredness and lack of concentration should only have little impact on results.

The experiment models an investment scenario that refers to real world investment situations. However, to a certain extent, the experimental setting remains artificial. The time gap between the R&D projects' periods in investment scenarios 1 to 5 is very short. In reality, time lags between project investment and project outcome and hence individuals' real world investment decisions based on company valuation would be much larger. In the experiment, individuals do not have much time to mentally process and digest the impact that the respective accounting method applied has on their equity. Subjects' judgments could thus differ from how they would value their equity stake in reality. However, differences in subjects' valuation found in the experiment that are due to different accounting methods applied should rather be stronger if the time lag is larger (i.e., if it is closer to reality). In this study, it is argued that individuals perceive the investment in the R&D project in t=1 as an investment under conservative accounting. In

t=2 they can only experience a positive or no change in equity under conservatism. Project failure is thus not directly linked to an equity reduction. In contrast, under neutral accounting the initial payment and project return are integrated making subjects face a gain vs. loss situation in t=2. It is argued that subjects perceive an equity reduction due to project failure in t=2 rather as a loss than as an investment (cf. chapter 3.4). If the time lag between R&D investment and project outcome is larger, the differing perceptions should be strengthened: the longer the investment dated back to the past the more strongly subjects should perceive a gain vs. loss situation under neutral accounting. The shortened time lag should not introduce much noise in the results that should rather become stronger than weaker in a real world situation.

The limitations discussed above mainly concern the results' generalizability (i.e., the experiment's external validity). They should be considered when interpreting the study's findings. The next chapter concludes on the results by addressing their implications and points at paths for future research.

6. Conclusion and Future Research

Recent literature argues that individuals have endogenous preferences for conservatism in accounting (Hirshleifer and Teoh, 2009; Nagar et al., 2016). No empirical evidence for this claim exists. 'Conservatism's effects on financial users are driven by its effects on the financial statements. An understanding of how users make decisions in light of specific financial statement effects would be beneficial to the literature' (Ruch and Taylor, 2015, p. 35). This thesis adds insights to this topic by considering the role of individuals' endogenous preferences in the analysis of financial statement users' reactions to different accounting methods that have different financial statement effects. Drawing on findings from behavioral and psychological literature, this thesis provides first experimental insights on individuals' endogenous preferences for conservative accounting. Results show that individuals indeed have preferences for conservatism. From an economic point of view, it is more efficient to defer potential losses to the future than considering them up-front due to interest earnings effects. On the contrary, considering potential losses up-front better addresses individuals' intrinsic loss aversion. This thesis provides evidence for unconscious preferences for conservative accounting after prior loss experiences. When exposed to losses, conservative accounting seems to accommodate investors' loss aversion better than neutral accounting leading to a more positive investment evaluation. Individuals with high degrees of loss aversion also prefer conservatism after prior gain experiences while subjects with low levels of loss aversion prefer neutral accounting. Subjects do also express explicit, conscious preferences for conservatism compared to neutrality in accounting. These explicit preferences are more pronounced for individuals with high levels of loss aversion. Results imply that neutral accounting can have detrimental effects on investors, causing them to undervalue investment options and withdraw from valuable investment opportunities too early.

These findings shed light on the implications of the current standard setting focus on neutrality in accounting. Since 2010, the concept of conservatism is no longer part of the current framework to the IFRS. Neutrality is introduced by the standard setters into the IFRS' framework with the aim of providing financial statement users with more decision useful information. In view of this thesis's findings, from an addressee's perspective, the current envisaged approach to reintegrate prudence in the framework seems to be useful. However, standard setters changed the definition of prudence (Wagenhofer, 2014) and still judge the concept of asymmetric prudence as not being compatible with neutral accounting information. Asymmetric prudence is still excluded from the framework (IASB, 2015, CF ED, BC 2.11 ff.).

Focusing on managers' behavior, recent evidence suggests that the elimination of conservatism from regulatory frameworks may lead to undesired economic consequences (cf. chapter 2.1.3 and 2.1.4). Conservatism is shown to mitigate managers' self-interested over- or underinvestment decisions. Eliminating conservatism from regulatory frameworks could hence reduce firm investment efficiency (cf., e.g., García Lara et al., 2016). Focusing on investors' behavior, eliminating asymmetric prudence from regulatory frameworks can lead to undesired economic consequences as investors' lower willingness to pay for neutral accounting. Investors' intrinsic preferences should be deliberately considered in standard setting to avoid that those good intentions of providing more decision useful information through neutral accounting result in undesired investor behavior, as e.g., company undervaluation and early withdrawal from investments.

This thesis's results also contribute to the R&D accounting literature that investigates the usefulness of capitalizing intangible investments. It has been shown that capitalizing R&D expenditures is value relevant to investors (cf., e.g., Aboody and Lev, 1998; Ciftci and Zhou, 2016). This study suggests that from an individual's endogenous preference perspective expensing can be more beneficial than capitalizing R&D expenditures when considering individuals' related investment decisions depending on individual levels of loss aversion.

Results of this thesis also contribute to prior literature on measuring individuals' risk and loss aversion. As explained in chapters 4.2.5.1.1 and 4.2.5.1.2, the instruments for measuring risk attitudes as well as loss aversion over risk and under time applied by Abdellaoui et al. (2013) are replicated in this study by adapting them to the present experiment's setting. Main results are consistent with what has been found by Abdellaoui et al. (2013): loss aversion differs in settings under risk and over time and is thus context- and framing-dependent. It is further confirmed that individuals show risk aversion in gain settings and risk seeking behavior in loss settings. The most pronounced risk averse behavior is found in mixed settings (cf. chapter 4.2.5.1.2). Further instruments for measuring risk and loss aversion have been applied in this study for robustness check purposes (cf. chapters 4.2.5.1.3, 4.2.5.2 and 5.3.3.4). Bivariate correlation analyses indicate that correlations between the different measures of loss aversion are very low and insignificant (cf. Table 61, Annex 5). Bivariate correlations found for the different measures of risk aversion applied in this study (cf. Table 62, Annex 5) are documented to be mostly significant revealing correlation coefficients at medium level. The inexistent correlations between the different loss aversion measures indicate that different instruments for

measuring loss aversion that are currently applied in research not necessarily capture the same concepts and hence could lead to differing or even contradicting results.

This thesis opens several directions for future research. As stated by Nagar et al. (2016), conservatism often serves as a contracting argument considering information asymmetry between parties. Their model is based on the assumption that information asymmetry patterns are the most crucial driver of endogenous preferences. The endogenously created demand for conservatism is said to be stronger when information asymmetry between counterparts is high and trust between parties is low. Nagar et al. (2016, p. 4) argue that 'when users of financial reports are placed in settings where they know more, the gain-loss asymmetry in their preference declines, as does the resulting demand for conservatism'. Therefore, mechanisms reducing information asymmetry between for example managers and investors should induce a change in investor preferences expressed by a reduced demand for accounting conservatism. Following this line of argumentation, it would be interesting to analyze if the neutrality approach in standard setting should be accompanied by mechanisms reducing information asymmetry and enhancing trust between parties to better fit to individuals' endogenous preferences for asymmetric verification of gains and losses. Neutrality in accounting might demand more information disclosure under conditions of risk and uncertainty to avoid undesirable economic consequences as, e.g., investors' lower willingness to pay for neutral accounting.

In this thesis, the accounting for R&D expenditures provides the context to test the hypotheses developed in chapter 3. R&D accounting is one example allowing contrasting conservative and neutral accounting methods because both are applicable under IAS 38 (expensing vs. capitalizing R&D). To rule out that the results generated in this study are R&D context specific, it would be interesting to conduct a comparable study using different accounting settings such as fair value accounting.

Furthermore, it would be interesting to analyze if the findings hold in a large cross-cultural setting. Cultural differences may have an influence on the preferences for conservative vs. neutral accounting, since it has been shown that the degree of loss aversion varies with culture (Wang et al., 2016).

Annex with Table of Annexes

Annex 1: Z-Leaf Screens

Annex 1.1: Basic Conditions of a R&D Project (Capitalizing Treatment)

Investitionsszenario 1

Aktueller Eigenkapitalwert des Unternehmens ($):	20 Mio.
Aktueller Stand Ihres Vermögens (1%) ($):	200 Tsd.
Aktuelles Geschäftsjahr (t):	0

Rahmenbedingungen eines F&E-Projekts

Bitte lesen Sie die nachfolgenden Informationen sehr sorgfältig durch. Im Anschluss werden Ihnen zu den Inhalten Verständnisfragen gestellt.

Das Unternehmen A plant, ein neues Forschungs- und Entwicklungsprojekt (F&E-Projekt) umzusetzen. Wir befinden uns aktuell am Ende des Geschäftsjahres t=0 und stehen kurz vor der Durchführung des Projekts. Die Rahmenbedingungen des Projekts werden Ihnen nachfolgend erläutert.

Das F&E-Projekt ist auf zwei Geschäftsjahre ausgelegt: t=1 und t=2. Im Laufe des Geschäftsjahres t=1 investiert das Unternehmen A $ 8 Mio. in die Entwicklung eines neuen Produkts. Zum aktuellen Zeitpunkt ist unsicher, ob die Produktentwicklung erfolgreich sein wird. Dies wird sich im darauffolgenden Geschäftsjahr t=2 zeigen. Die Erfolgswahrscheinlichkeit liegt bei 50%.

Im Rahmen der Projektdurchführung aktiviert Unternehmen A die entstehenden Entwicklungskosten.
Daher resultiert im Geschäftsjahr der Investition (t=1) weder ein Gewinn noch ein Verlust, sodass das Eigenkapital unverändert bleibt.
Ob im darauffolgenden Geschäftsjahr ein Gewinn oder Verlust eintritt, der das Eigenkapital verändert, hängt vom Projekterfolg ab.
Im Falle des Projekterfolgs entsteht in t=2 nach Amortisation der Entwicklungskosten ein Gewinn (und somit ein entsprechender Anstieg des Eigenkapitals) von $ 12 Mio.
Sollte das Projekt fehlschlagen, ist die Anfangsinvestition verloren und es entsteht ein Verlust von $ 8 Mio.

Geschäftsjahr t=1

Wirkung auf das Eigenkapital des Unternehmens
$ 0

Wirkung auf den Stand Ihres Vermögens
$ 0

Geschäftsjahr t=2

	Wirkung auf das Eigenkapital des Unternehmens
Erfolgsfall	+ $ 12 Mio.
Misserfolgsfall	- $ 8 Mio.

	Wirkung auf den Stand Ihres Vermögens
Erfolgsfall	+ $ 120 Tsd.
Misserfolgsfall	- $ 80 Tsd.

Weiter

Annex 1.2: Basic Conditions of a R&D Project (Expensing Treatment)

Investitionsszenario 1

Aktueller Eigenkapitalwert des Unternehmens ($):	20 Mio.
Aktueller Stand Ihres Vermögens (1%) ($):	200 Tsd.
Aktuelles Geschäftsjahr (t):	0

Rahmenbedingungen eines F&E-Projekts

Bitte lesen Sie die nachfolgenden Informationen sehr sorgfältig durch. Im Anschluss werden Ihnen zu den Inhalten Verständnisfragen gestellt.

Das Unternehmen A plant, ein neues Forschungs- und Entwicklungsprojekt (F&E-Projekt) umzusetzen.Wir befinden uns aktuell am Ende des Geschäftsjahres t=0 und stehen kurz vor der Durchführung des Projekts. Die Rahmenbedingungen des Projekts werden Ihnen nachfolgend erläutert.

Das F&E-Projekt ist auf zwei Geschäftsjahre ausgelegt: t=1 und t=2. Im Laufe des Geschäftsjahres t=1 investiert das Unternehmen $ 8 Mio. in die Entwicklung eines neuen Produkts. Zum aktuellen Zeitpunkt ist unsicher, ob die Produktentwicklung erfolgreich sein wird. Dies wird sich im darauffolgenden Geschäftsjahr t=2 zeigen. Die Erfolgswahrscheinlichkeit liegt bei 50%.

Das Unternehmen A verbucht grundsätzlich die anfallenden Entwicklungskosten sofort als Aufwand. Daher resultiert im Geschäftsjahr der Investition (t=1) ein Verlust in Höhe von $ 8 Mio., der das Eigenkapital schmälert. Ob im darauffolgenden Geschäftsjahr ein Gewinn eintritt, der das Eigenkapital erhöht, hängt vom Projekterfolg ab. Im Falle des Projekterfolgs entsteht in t=2 ein Gewinn in Höhe von $ 20 Mio. Sollte das Projekt fehlschlagen, entsteht kein Gewinn oder Verlust. In diesem Fall bleibt das Eigenkapital in t=2 unverändert.

Geschäftsjahr t=1

Wirkung auf das Eigenkapital des Unternehmens
- $ 8 Mio.

Wirkung auf den Stand Ihres Vermögens
- $ 80 Tsd.

Geschäftsjahr t=2

	Wirkung auf das Eigenkapital des Unternehmens
Erfolgsfall	+ $ 20 Mio.
Misserfolgsfall	$ 0

	Wirkung auf den Stand Ihres Vermögens
Erfolgsfall	+ $ 200 Tsd.
Misserfolgsfall	$ 0

Weiter

Annex 1.3: Possibility to sell the Equity Stake (Scenario 1, Project 1, t=0)

Annex 1.4: Project Investment and Development of Equity (Capitalizing Condition)

Investitionsszenario 1

Aktueller Eigenkapitalwert des Unternehmens ($):	20 Mio.
Aktueller Stand Ihres Vermögens (1%) ($):	200 Tsd.
Aktuelles Geschäftsjahr (t):	1

Projektinvestition und Entwicklung Ihres Vermögens

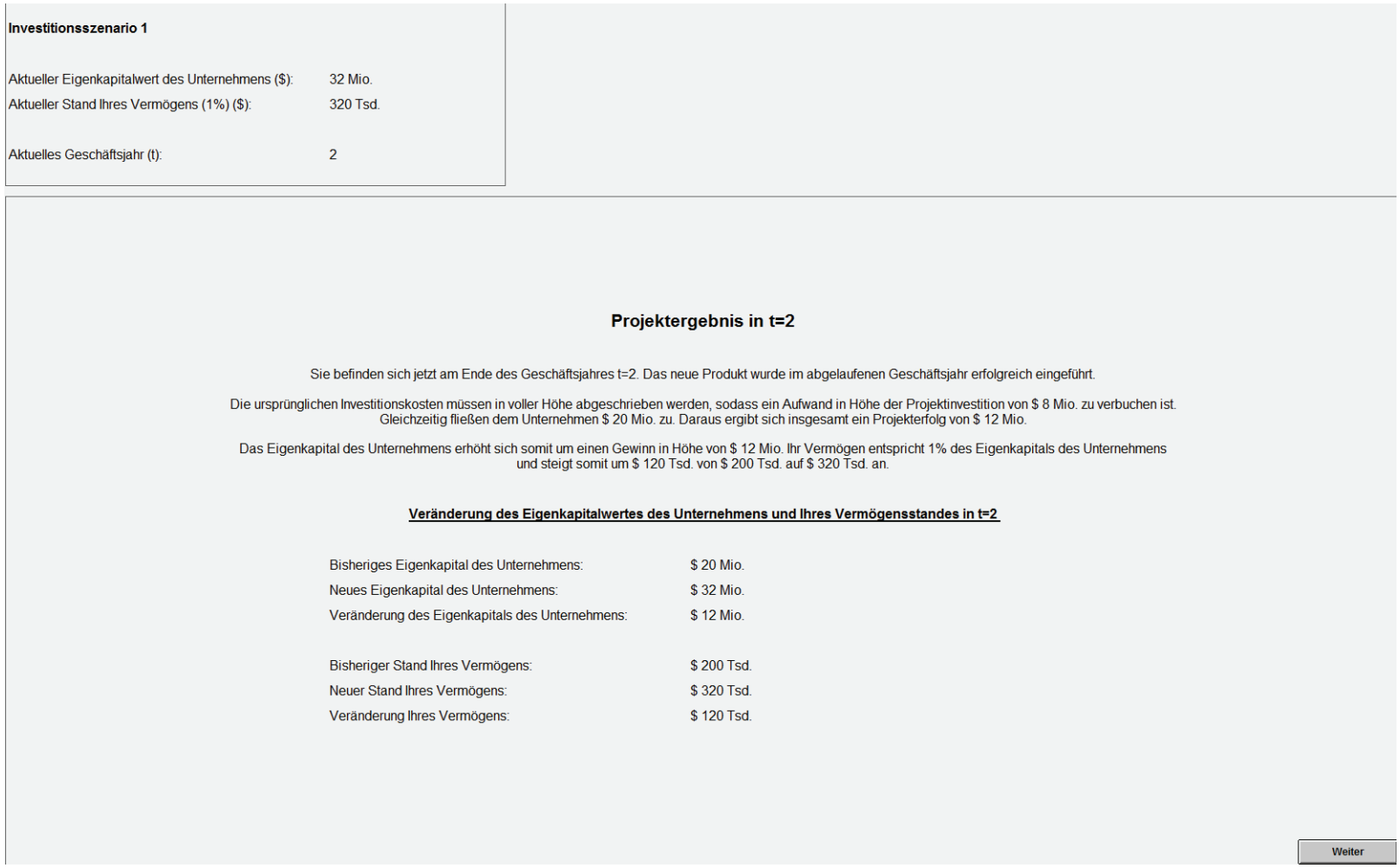
Wir befinden uns nun am Ende des Geschäftsjahres t=1. Das Unternehmen A hat im Geschäftsjahr t=1 wie geplant $ 8 Mio. in die Entwicklung eines neuen Produkts investiert.
In Höhe der Projektinvestition entsteht ein Vermögenswert in der Bilanz. Dadurch bleibt die Ertragslage des Unternehmens unverändert
und es erfolgt keine Aufwandserfassung in der Gewinn- und Verlustrechnung
Daher hat sich im Geschäftsjahr t=1 weder das Eigenkapital des Unternehmens noch der Stand Ihres Vermögens verändert.

Veränderung des Eigenkapitalwertes des Unternehmens und Ihres Vermögensstandes in t=1

Bisheriges Eigenkapital des Unternehmens:	$ 20 Mio.
Neues Eigenkapital des Unternehmens:	$ 20 Mio.
Veränderung des Eigenkapitals des Unternehmens:	$ 0
Bisheriger Stand Ihres Vermögens:	$ 200 Tsd.
Neuer Stand Ihres Vermögens:	$ 200 Tsd.
Veränderung Ihres Vermögens:	$ 0

Weiter

Annex 1.5: Project Outcome (Capitalizing Condition, Project Success)



Annex 1.6: Basic Conditions of a R&D Project conducted by Company X

Rahmenbedingung zum F&E-Projekt von Unternehmen X

Bitte lesen Sie die nachfolgenden Informationen sehr sorgfältig durch. Im Anschluss werden Ihnen zu den Inhalten Verständnisfragen gestellt.

Das Unternehmen X plant, ein neues Forschungs- und Entwicklungsprojekt (F&E-Projekt) umzusetzen. Wir befinden uns aktuell am Ende des Geschäftsjahres t=0 und stehen kurz vor der Durchführung des Projekts.
Die Rahmenbedingungen des Projekts werden Ihnen nachfolgend erläutert.

Das F&E-Projekt ist auf zwei Geschäftsjahre ausgelegt: t=1 und t=2. Im Laufe des Geschäftsjahres t=1 investiert das Unternehmen X $ 10 Mio. in die Entwicklung eines neuen Produkts.
Zum aktuellen Zeitpunkt ist unsicher, ob die Produktentwicklung erfolgreich sein wird. Dies wird sich im darauffolgenden Geschäftsjahr t=2 zeigen. Die Erfolgswahrscheinlichkeit liegt bei 50%.

Im Rahmen der Projektdurchführung aktiviert Unternehmen X die entstehenden Entwicklungskosten.
Daher resultiert im Geschäftsjahr der Investition (t=1) weder ein Gewinn noch ein Verlust, sodass das Eigenkapital unverändert bleibt.
Ob im darauffolgenden Geschäftsjahr ein Gewinn oder Verlust eintritt, der das Eigenkapital verändert, hängt vom Projekterfolg ab.
Im Falle des Projekterfolgs entsteht in t=2 nach Amortisation der Entwicklungskosten ein Gewinn (und somit ein entsprechender Anstieg des Eigenkapitals) von $ 15 Mio.
Sollte das Projekt fehlschlagen, ist die Anfangsinvestition verloren und es entsteht ein Verlust von $ 10 Mio.

Geschäftsjahr t=1

Wirkung auf das Eigenkapital des Unternehmens
$ 0

Wirkung auf den Stand Ihres Vermögens
$ 0

Geschäftsjahr t=2

	Wirkung auf das Eigenkapital des Unternehmens
Erfolgsfall	+ $ 15 Mio.
Misserfolgsfall	- $ 10 Mio.

	Wirkung auf den Stand Ihres Vermögens
Erfolgsfall	+ $ 150 Tsd.
Misserfolgsfall	- $ 100 Tsd.

Weiter

Annex 1.7: Basic Conditions of a R&D Project conducted by Company Z

Rahmenbedingung zum F&E-Projekt von Unternehmen Z

Bitte lesen Sie die nachfolgenden Informationen sehr sorgfältig durch. Im Anschluss werden Ihnen zu den Inhalten Verständnisfragen gestellt.

Das Unternehmen Z plant, ein neues Forschungs- und Entwicklungsprojekt (F&E-Projekt) umzusetzen. Wir befinden uns aktuell am Ende des Geschäftsjahres t=0 und stehen kurz vor der Durchführung des Projekts. Die Rahmenbedingungen des Projekts werden Ihnen nachfolgend erläutert.

Das F&E-Projekt ist auf zwei Geschäftsjahre ausgelegt: t=1 und t=2. Im Laufe des Geschäftsjahres t=1 investiert das Unternehmen Z $ 10 Mio. in die Entwicklung eines neuen Produkts. Zum aktuellen Zeitpunkt ist unsicher, ob die Produktentwicklung erfolgreich sein wird. Dies wird sich im darauffolgenden Geschäftsjahr t=2 zeigen. Die Erfolgswahrscheinlichkeit liegt bei 50%.

Das Unternehmen Z verbucht grundsätzlich die anfallenden Entwicklungskosten sofort als Aufwand. Daher resultiert im Geschäftsjahr der Investition (t=1) ein Verlust in Höhe von $ 10 Mio., der das Eigenkapital schmälert. Ob im darauffolgenden Geschäftsjahr ein Gewinn eintritt, der das Eigenkapital erhöht, hängt vom Projekterfolg ab. Im Falle des Projekterfolgs entsteht in t=2 ein Gewinn in Höhe von $ 25 Mio. Sollte das Projekt fehlschlagen, entsteht kein Gewinn oder Verlust. In diesem Fall bleibt das Eigenkapital in t=2 unverändert.

Geschäftsjahr t=1

Wirkung auf das Eigenkapital des Unternehmens
- $ 10 Mio.

Wirkung auf den Stand Ihres Vermögens
- $ 100 Tsd.

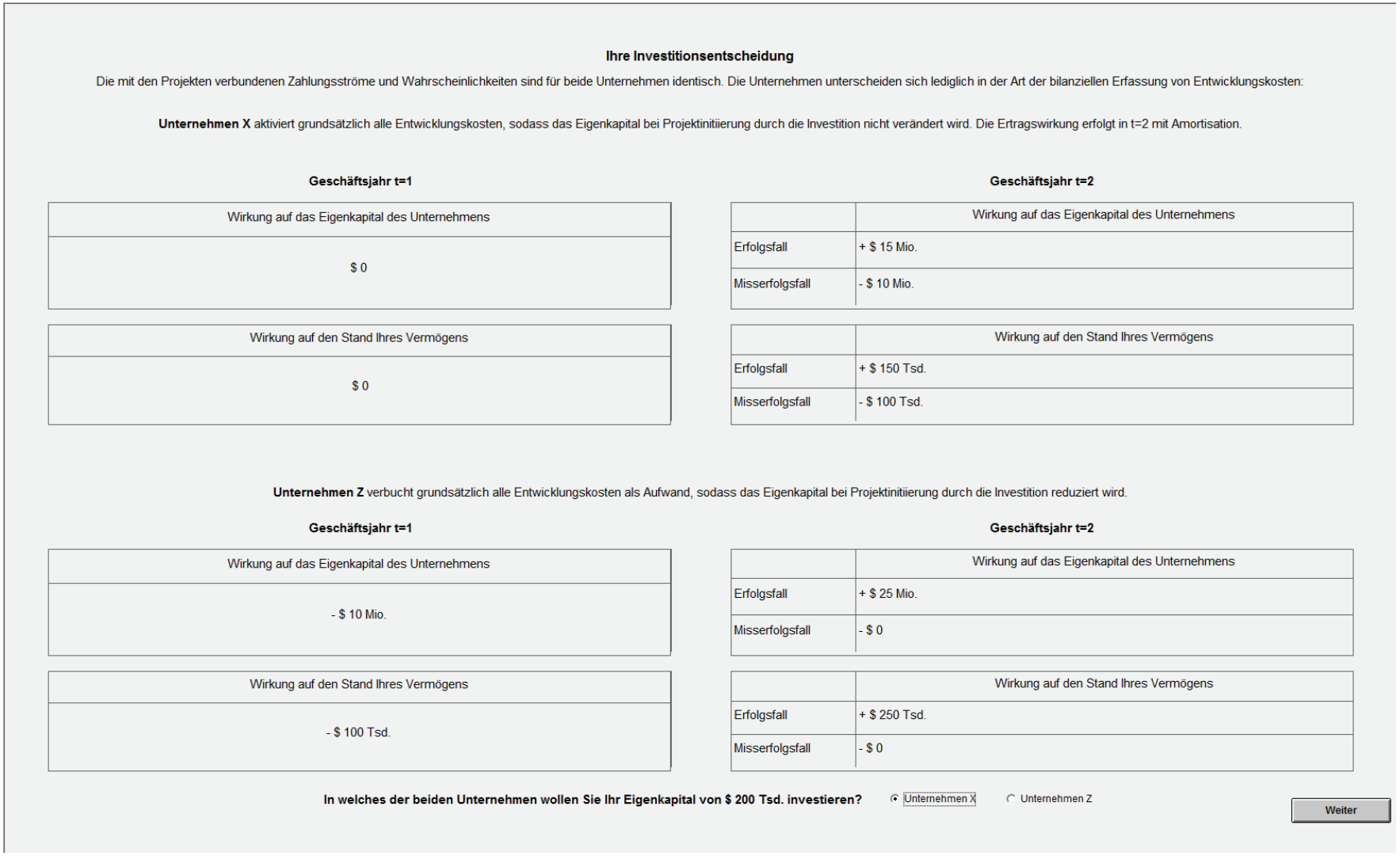
Geschäftsjahr t=2

	Wirkung auf das Eigenkapital des Unternehmens
Erfolgsfall	+ $ 25 Mio.
Misserfolgsfall	- $ 0

	Wirkung auf den Stand Ihres Vermögens
Erfolgsfall	+ $ 250 Tsd.
Misserfolgsfall	- $ 0

Weiter

Annex 1.8: Investment Decision between Company X and Company Z



Ihre Investitionsentscheidung

Die mit den Projekten verbundenen Zahlungsströme und Wahrscheinlichkeiten sind für beide Unternehmen identisch. Die Unternehmen unterscheiden sich lediglich in der Art der bilanziellen Erfassung von Entwicklungskosten:

Unternehmen X aktiviert grundsätzlich alle Entwicklungskosten, sodass das Eigenkapital bei Projektinitiierung durch die Investition nicht verändert wird. Die Ertragswirkung erfolgt in t=2 mit Amortisation.

Geschäftsjahr t=1

Wirkung auf das Eigenkapital des Unternehmens
$ 0

Wirkung auf den Stand Ihres Vermögens
$ 0

Geschäftsjahr t=2

	Wirkung auf das Eigenkapital des Unternehmens
Erfolgsfall	+ $ 15 Mio.
Misserfolgsfall	- $ 10 Mio.

	Wirkung auf den Stand Ihres Vermögens
Erfolgsfall	+ $ 150 Tsd.
Misserfolgsfall	- $ 100 Tsd.

Unternehmen Z verbucht grundsätzlich alle Entwicklungskosten als Aufwand, sodass das Eigenkapital bei Projektinitiierung durch die Investition reduziert wird.

Geschäftsjahr t=1

Wirkung auf das Eigenkapital des Unternehmens
- $ 10 Mio.

Wirkung auf den Stand Ihres Vermögens
- $ 100 Tsd.

Geschäftsjahr t=2

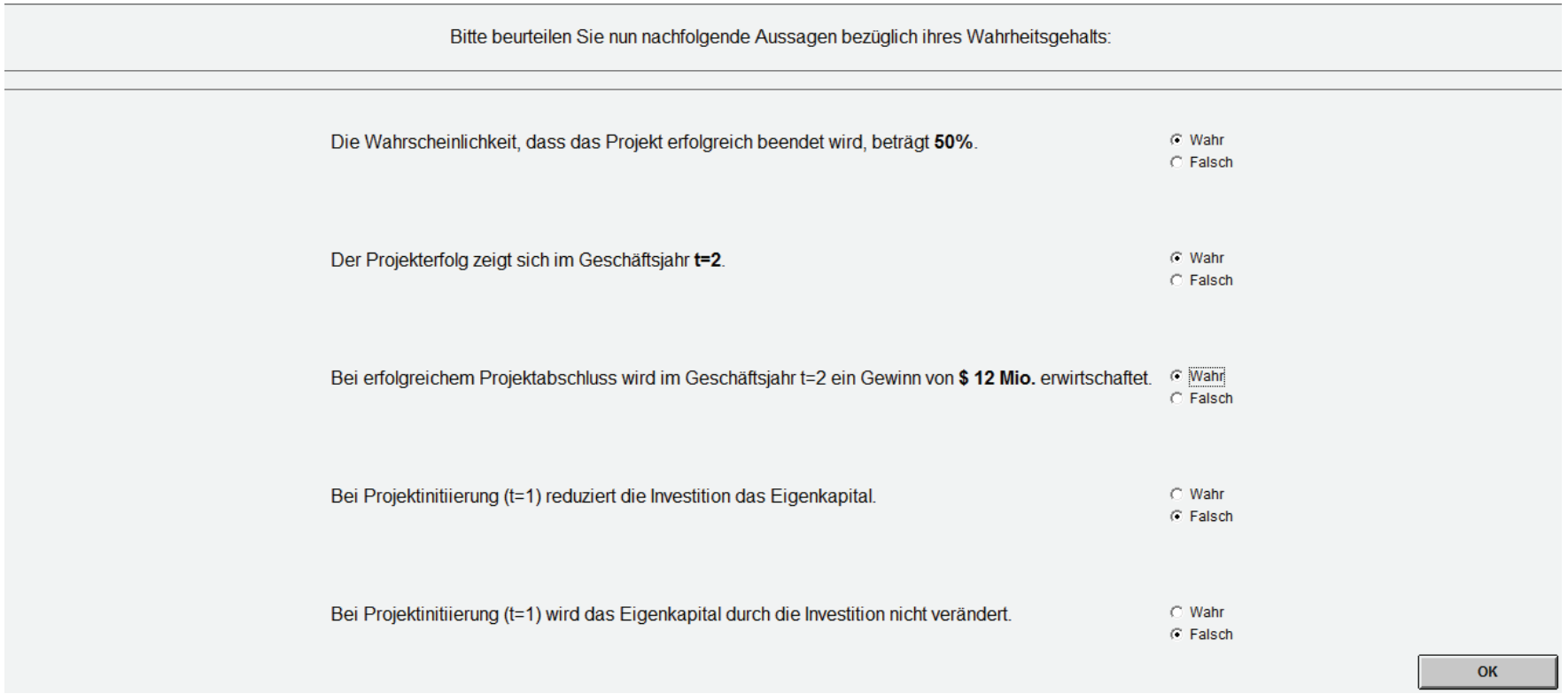
	Wirkung auf das Eigenkapital des Unternehmens
Erfolgsfall	+ $ 25 Mio.
Misserfolgsfall	- $ 0

	Wirkung auf den Stand Ihres Vermögens
Erfolgsfall	+ $ 250 Tsd.
Misserfolgsfall	- $ 0

In welches der beiden Unternehmen wollen Sie Ihr Eigenkapital von $ 200 Tsd. investieren? ◉ Unternehmen X ○ Unternehmen Z

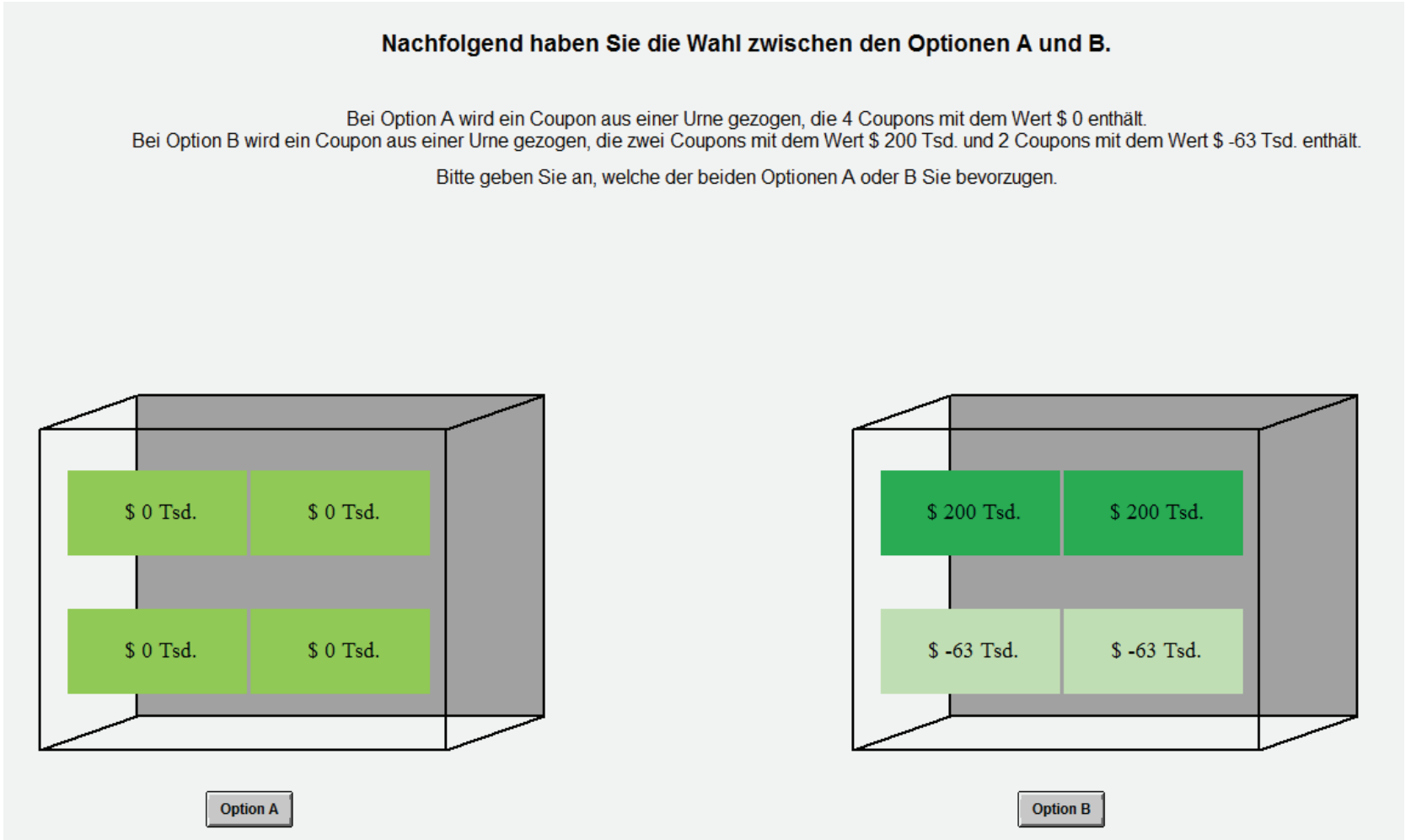
Weiter

Annex 1.9: Judging Statements regarding their Truthfulness

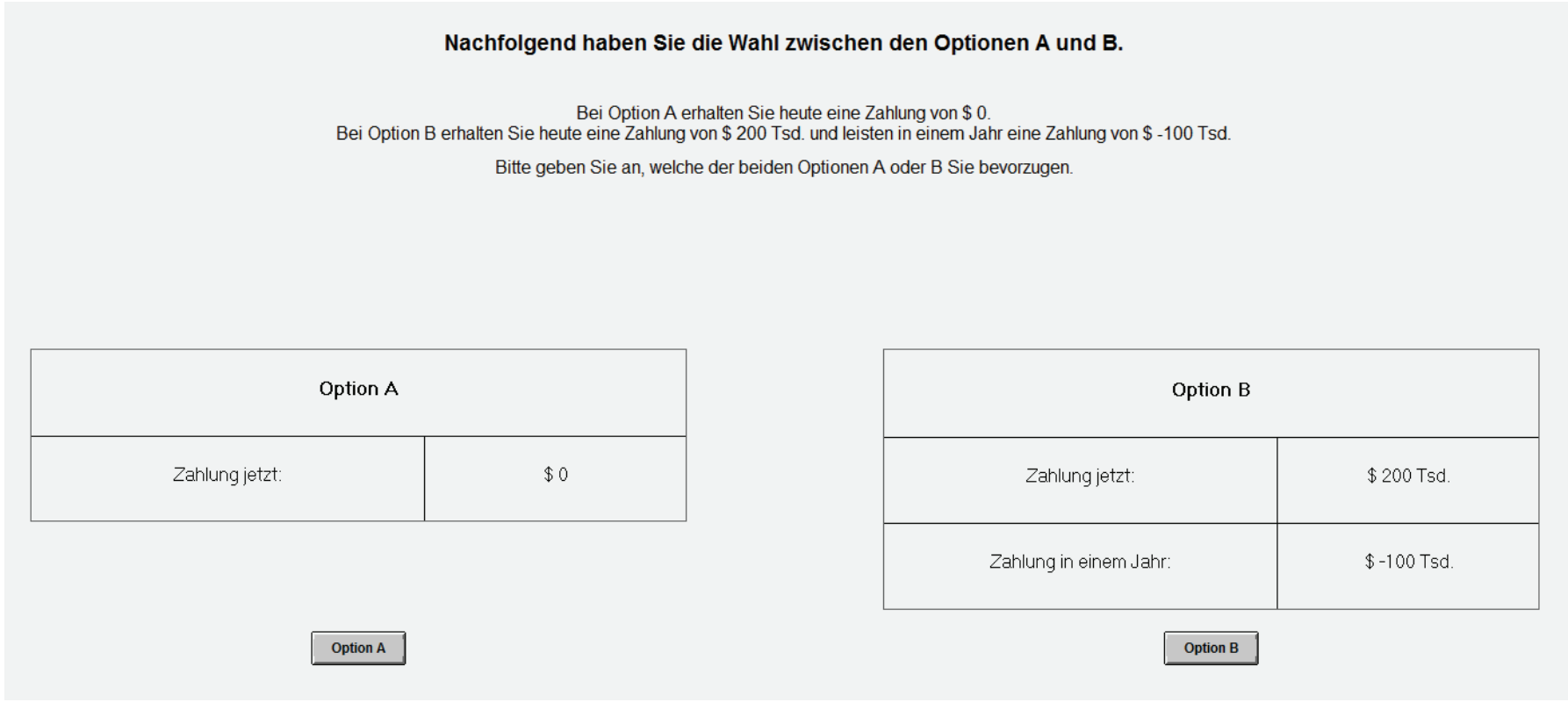


Annex 1.10: Possibility to sell the Equity Stake (Scenario 2, Project 3, t=0)

Annex 1.11: Choice between Mixed Prospects (Risk Setting)



Annex 1.12: Choice between Mixed Prospects (Time Setting)



Annex 1.13: Lottery Investment

Nachfolgend können Sie in eine Lotterie investieren.

Sie erhalten nun die Möglichkeit, bis zu $ 200 Tsd. aus Ihrem bisher erwirtschafteten Kapital in der folgenden Lotterie einzusetzen.
Diese Lotterie kann als eine Frage des dritten Szenarios zahlungsrelevant werden.

Lotterie:

Mit einer Wahrscheinlichkeit von **2/3 (67 %)** verlieren Sie den von Ihnen eingesetzten Betrag.

Mit einer Wahrscheinlichkeit von **1/3 (33 %)** gewinnen Sie das 1,5-Fache des von Ihnen eingesetzten Betrags.

Sollte diese Entscheidungssituation am Ende der Studie gezogen werden, wird Ihre Einnahme aus der Lotterie wie folgt ermittelt:

Wenn Sie entschieden haben, einen Betrag von $ X Tsd. in der Lotterie einzusetzen, verlieren Sie Ihren Einsatz $ X Tsd. mit einer Wahrscheinlichkeit von 2/3, sodass sich Ihr Kapital am Ende der Studie um - $ X Tsd. verringert.
Mit einer Wahrscheinlichkeit von 1/3 erzielen Sie einen Gewinn in Höhe von 1,5 Mal Ihrem Einsatz $ X Tsd., sodass sich Ihr Kapital am Ende der Studie um 1,5 Mal $ X Tsd. erhöht.

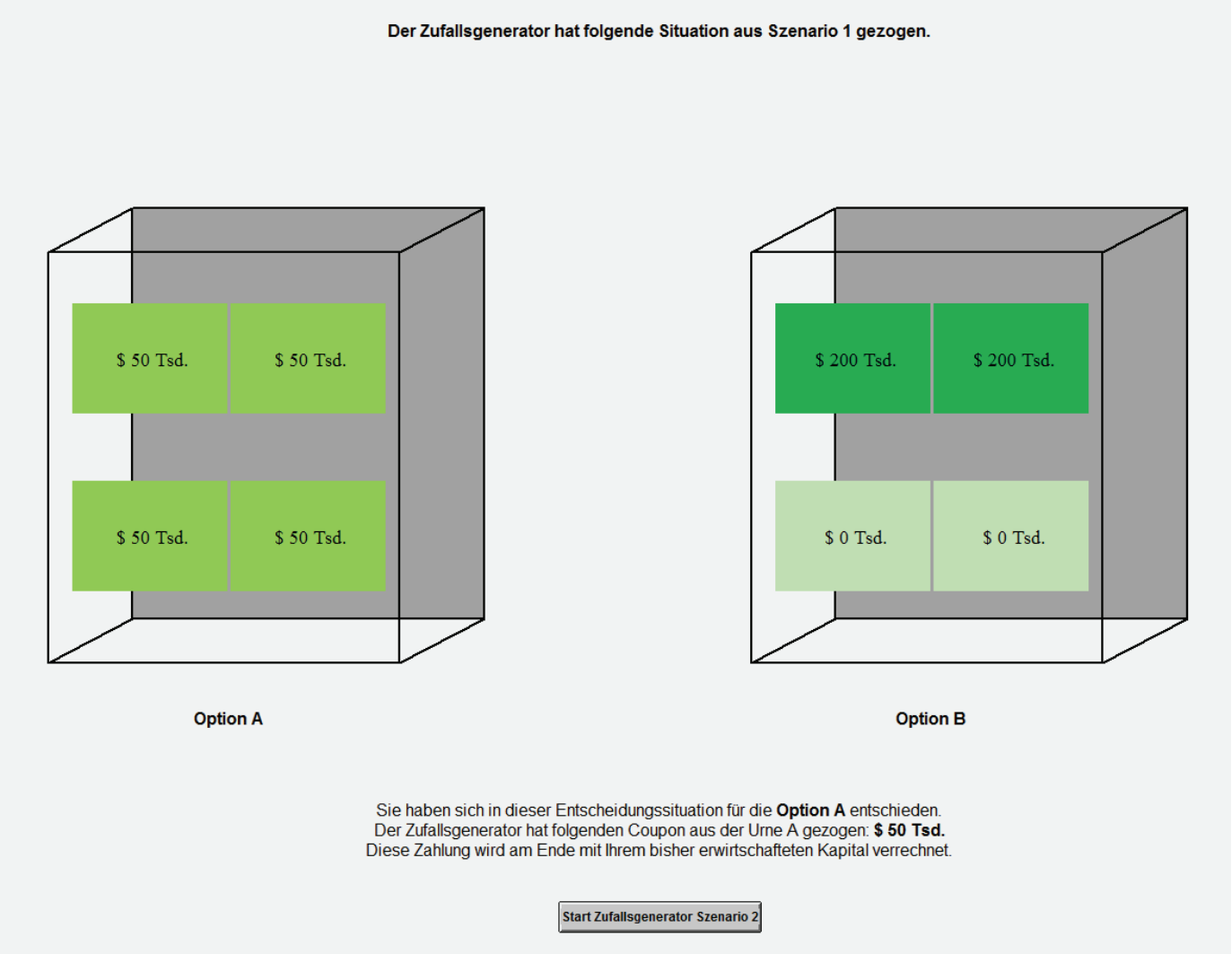
Bitte tragen Sie in das nachfolgende Feld den Betrag X ein, den Sie in der Lotterie einsetzen möchten. Geben Sie den Betrag bitte als ganze Zahl in dem Format $ Tsd. an. Sollte diese Entscheidungssituation am Ende der Studie gezogen werden, wird ein Zufallsgenerator entsprechend der oben genannten Wahrscheinlichkeiten den Ausgang der Lotterie bestimmen.

Ihre Eingabe für X (in $ Tsd.): 30

Weiter

Annex 1.14: Determination of Variable Compensation from Study Part 1

Annex 1.15: Determination of Variable Compensation from Study Part 2 (Gain Setting)



Annex 1.16: Final Compensation

Ihr Kapital

Nachfolgend sind die ermittelten auszahlungsrelevanten Zahlungen nochmals aufgeführt:

Studienteil 1:	$ 223 Tsd.
Studienteil 2, Szenario 1:	$ 50 Tsd.
Studienteil 2, Szenario 2:	$ -50 Tsd.
Studienteil 2, Szenario 3:	$ -27 Tsd.

Daraus ergibt sich in Summe für Sie ein erwirtschaftetes Kapital in Höhe von $ 196 Tsd. Dies entspricht CHF 19.60.

Dieser Betrag wird aufgerundet. Ihre **variable Vergütung** beträgt daher insgesamt **CHF 20.00.**

Unter Berücksichtigung der CHF 10.00, die Sie zu Beginn der Studie bereits in bar erhalten haben,
ergibt sich für Sie somit eine **Gesamtvergütung** aus der Teilnahme an dieser Studie in Höhe von **CHF 30.00.**

Bitte tragen Sie nun sowohl den Betrag Ihrer variablen Vergütung als auch den Betrag Ihrer Gesamtvergütung in die Quittung ein, die Sie zu Beginn der Studie erhalten haben.

Bitte geben Sie zudem nachfolgend Ihre Teilnehmernummer ein, die Ihnen zu Beginn der Studie ausgehändigt wurde.

Ihre Teilnehmernummer: 8

Die Studie ist nun beendet.

Vielen herzlichen Dank für Ihre Teilnahme!

Bitte bleiben Sie bitte noch ruhig auf Ihrem Platz sitzen, bis Ihnen der Experimentleiter mitteilt, dass Sie den Raum verlassen dürfen,
um Ihr erwirtschaftetes Kapital entgegenzunehmen.

ENDE

Annex 2: Measurement Method applied by Abdellaoui et al. (2013)

Annex 2.1: Prospect Evaluation under Risk

($x, p; y$*)* is a prospect that provides a monetary amount x with a probability p, and a monetary amount y with a probability $1 - p$.

Preferences over prospects are expressed by a utility function U^r defined over monetary amounts and by probability weighting functions, ω^+ for gains and ω^- for losses. r indicates that the utility function relates to risky prospects.

A risky prospect *(*$x, p; y$*)* is evaluated as: $\pi_1 U^r(x) + \pi_2 U^r(y)$,

where $\pi_1 = \omega^+(p)$ and $\pi_2 = \omega^-(1-p)$ for mixed prospects and $\pi_1 = \omega^i(p)$ and

$\pi_2 = 1 - \omega^i(p)$, $i = +, -$, for gain and loss prospects.

Annex 2.2: Prospect Evaluation under Time

$(x, t; y)$ denotes a temporal prospect that pays x at time point t and y now $(t = 0)$.

Preferences over prospects are expressed by a utility function U^t defined over monetary amounts and by discount functions, τ^+ for gains and τ^- for losses. t indicates that the utility function relates to temporal prospects.

A temporal prospect $(x, t; y)$ is evaluated as: $U^t(y) + \tau^i(t) U^t(x), \quad i = +, -$

Annex 2.3: Sign-Dependent Utility Function for Risk and Time

The sign-dependent utility function $U^j, j = r, t$, is composed of a loss-aversion coefficient λ^j and a basic utility function u^j:

$$U^j(x) = \begin{cases} u^j(x), & if\ x \geq 0, \\ \lambda^j u^j(x), & if\ x < 0, \end{cases} \qquad j = r, t.$$

Annex 2.4: Three Step Measurement Method of u^j and λ^j

Step one and step two serve to derive the utility parameters $u^r$and u^t and the probability weighting parameters π^+ and π^-as well as the discount parameters $\tau^+$and τ^-.

G^r (G^t) is a subject's certainty (present) equivalent in gain contexts that equals $(x, p_g\,; y)$ or $(x, t_g\,; y)$ respectively.

L^r (L^t) is a subject's certainty (present) equivalent in loss contexts, i.e., the amount that equals $(x, p_l\,; y)$ or the amount received now that equals $(x, t_l; y)$ respectively.

The third step combines the derived utility for gains and losses to calculate loss aversion parameters. For risk, a gain G_*^r is selected. L_*^r is the loss that produces indifference between receiving 0 for sure and the prospect $(G_*^r, p_g; L_*^r)$.

For time, a gain G_*^t is selected. L_*^t is the loss that produces indifference between receiving 0 for sure and the temporal prospect $(G_*^r, t_g; L_*^r)$.

	Assessed Quantity	Indifference	Regression equation
Step 1: Utility gains	Risk: G^r	$G^r \sim (x, p_g\,; y)$	$G^r = u^{r^{-1}}(\pi^+\big(u^r(x) - u^r(y)\big) + u^r(y))$
	Time: G^t	$G^t \sim (x, t_g; y)$	$G^t = u^{t^{-1}}(\tau^+ u^t(x) + u^t(y))$
Step 2: Utility losses	L^r	$L^r \sim (x, p_l; y)$	$L^r = u^{r^{-1}}(\pi^-\big(u^r(x) - u^r(y)\big) + u^r(y))$
	L^t	$L^t \sim (x, t_l; y)$	$L^t = u^{t^{-1}}(\tau^- u^t(x) + u^t(y))$
Step 3: Loss aversion	L_*^r	$(G_*^r, p_g; L_*^r) \sim 0$	$\lambda^r = -\pi^+ u^r(G_*^r)/\pi^- u^r(L_*^r)$
	L_*^t	$(G_*^t, t_g;\ L_*^t) \sim 0$	$\lambda^t = -\tau^+ u^t(G_*^t)/u^t(L_*^t)$

Annex 2.5: Exponential Specifications for u^j and u^t

Regression equations presented in Annex 2.4 are estimated by nonlinear least squares using the following exponential specifications for u^j and u^t. Outcomes are scaled by the highest absolute value in a specific task $\left(\frac{x}{|x_{max}|}\right)$.

$$u^j(x/|x_{max}|) = \begin{cases} \frac{1-e^{-\mu^j x/|x_{max}|}}{\mu^j}, & if\ x \geq 0 \\ \frac{e^{v^j\, x/|x_{max}|}-1}{v^j}, & if\ x < 0 \end{cases} \qquad j = r, t$$

Annex 3: Post Experimental Questionnaire[55]

Manipulation Check Questions
(MCQ1, MCQ2)

Bitte beurteilen Sie nachfolgende Aussagen:

Wenn ein Unternehmen im Geschäftsjahr t=1 in ein Entwicklungsprojekt investiert und dabei alle entstehenden Entwicklungskosten als Aufwand verbucht, reduziert sich das Eigenkapital des Unternehmens durch das Entwicklungsprojekt im Geschäftsjahr der Investition (t=1).	O Wahr O Falsch
Wenn ein Unternehmen im Geschäftsjahr t=1 in ein Entwicklungsprojekt investiert und dabei alle entstehenden Entwicklungskosten aktiviert, reduziert sich das Eigenkapital des Unternehmens durch das Entwicklungsprojekt im Geschäftsjahr der Investition (t=1) nicht.	O Wahr O Falsch

General Risk Attitude – Dohmen et al. (2011)
(RAGEN)

Wie schätzen Sie sich persönlich ein: Sind Sie im Allgemeinen ein risikobereiter Mensch oder versuchen Sie, Risiken zu vermeiden?
Bitte kreuzen Sie ein Kästchen auf der Skala an, wobei der Wert 1 bedeutet: "gar nicht risikobereit" und der Wert 7: "sehr risikobereit".
Mit den Werten dazwischen können Sie Ihre Einschätzung abstufen.

Ihre Eingabe: O 1 O 2 O 3 O 4 O 5 O 6 O 7

Risk Attitude in Financial Contexts – Dohmen et al. (2011)
(RAFIN)

Wie schätzen Sie sich persönlich ein: Sind Sie bei finanziellen Fragen ein risikobereiter Mensch oder versuchen Sie, Risiken zu vermeiden?
Bitte kreuzen Sie ein Kästchen auf der Skala an, wobei der Wert 1 bedeutet: "gar nicht risikobereit" und der Wert 7: "sehr risikobereit"
Mit den Werten dazwischen können Sie Ihre Einschätzung abstufen.

Ihre Eingabe: O 1 O 2 O 3 O 4 O 5 O 6 O 7

[55] The experimental material was provided in German. Annex 3 presents the original PEQ without translation into English.

Risk Attitude – Weber et al. (2012)
(RAWEBER1 to RAWEBER4)

Bitte geben Sie für jede der folgenden Aussagen an, wie wahrscheinlich Sie jeder dieser Aktivitäten oder Verhaltensweisen nachgehen würden.

Geben Sie dafür gemäß folgender Skala ein Rating von 1 bis 7 an:

1 = Es ist ausgeschlossen, dass ich ...

2 = Es ist sehr unwahrscheinlich, dass ich ...

3 = Es ist unwahrscheinlich, dass ich ...

4 = Es ist fraglich, ob ich ...

5 = Es ist wahrscheinlich, dass ich ...

6 = Es ist sehr wahrscheinlich, dass ich ...

7 = Es ist sicher, dass ich ...

... 10% meines jährlichen Einkommens in einen moderat wachsenden Investment Fonds investieren würde.

O 1 O 2 O 3 O 4 O 5 O 6 O 7

... 5% meines jährlichen Einkommens in eine hoch spekulative Aktie investieren würde.

O 1 O 2 O 3 O 4 O 5 O 6 O 7

... 5% meines jährlichen Einkommens in eine konservative Aktie investieren würde.

O 1 O 2 O 3 O 4 O 5 O 6 O 7

... 10% meines jährlichen Einkommens in Staatsanleihen (Schatzanweisungen) investieren würde.

O 1 O 2 O 3 O 4 O 5 O 6 O 7

Loss Aversion – Wang et al. (2016)
(LAWANG1, LAWANG2, LAWANG)

In den beiden nachfolgend dargestellten Lotterien beträgt die Wahrscheinlichkeit, dass Sie Geld gewinnen oder Geld verlieren, jeweils 50%. Der in den Lotterien potenziell eintretende Verlust ist jeweils aufgeführt.

Bitte geben Sie nun für jede der beiden Lotterien den minimalen Betrag für EUR[56] X bzw. EUR Y an, zu dem Sie bereit wären, an der jeweiligen Lotterie teilzunehmen.

Lotterie 1

50% Wahrscheinlichkeit: Verlust in Höhe von EUR 25

50% Wahrscheinlichkeit: Gewinn in Höhe von EUR X

Damit ich an der Lotterie teilnehmen würde, sollte der Gewinn X mindestens _____ betragen.

Ihre Eingabe für X: ☐

Lotterie 2

50% Wahrscheinlichkeit: Verlust in Höhe von EUR 100

50% Wahrscheinlichkeit: Gewinn in Höhe von EUR Y

Damit ich an der Lotterie teilnehmen würde, sollte der Gewinn Y mindestens _____ betragen.

Ihre Eingabe für Y: ☐

[56] In the experimental sessions conducted in St. Gallen, monetary amounts used in the instruments adapted from Wang et al. (2016) were indicated in CHF instead of EUR.

Loss Aversion – Gächter et al. (2010)
(LAGAECHTER)

Sie werden nun vor die Wahl gestellt, an nachfolgend beschriebenen Lotterien teilzunehmen. Die Wahrscheinlichkeit, dass aus der Lotterie ein Gewinn bzw. ein Verlust resultiert, beträgt jeweils 50%.

Bitte geben Sie an, an welchen Lotterien Sie teilnehmen würden.
"Ja" bedeutet hierbei, dass Sie die Lotterie spielen würden.
"Nein" bedeutet, dass Sie eine Teilnahme an der Lotterie ablehnen würden.

Lotterie A: Zu 50% verlieren Sie EUR[57] 2, zu 50% gewinnen Sie EUR 6.	O Ja O Nein
Lotterie B: Zu 50% verlieren Sie EUR 3, zu 50% gewinnen Sie EUR 6.	O Ja O Nein
Lotterie C: Zu 50% verlieren Sie EUR 4, zu 50% gewinnen Sie EUR 6.	O Ja O Nein
Lotterie D: Zu 50% verlieren Sie CHF 5, zu 50% gewinnen Sie CHF 6.	O Ja O Nein
Lotterie E: Zu 50% verlieren Sie EUR 6, zu 50% gewinnen Sie EUR 6.	O Ja O Nein
Lotterie F: Zu 50% verlieren Sie EUR 7, zu 50% gewinnen Sie EUR 6.	O Ja O Nein

[57] In the experimental sessions conducted in St. Gallen, monetary amounts used in the instruments adapted from Wang et al. (2016) were indicated in CHF instead of EUR.

Comprehensibility of the Tasks
(COMP, CLEAR, EASY, MOTIV)

Bitte bewerten Sie die nachfolgenden Aussagen auf einer Skala von 1 = "stimme überhaupt nicht zu", bis 7 = "stimme voll zu":

Die Szenarien der Studie waren klar dargestellt

Ihre Eingabe: O 1 O 2 O 3 O 4 O 5 O 6 O 7

Die Fragestellungen waren deutlich formuliert

Ihre Eingabe: O 1 O 2 O 3 O 4 O 5 O 6 O 7

Es war nicht schwer, die gestellten Fragen zu beantworten

Ihre Eingabe: O 1 O 2 O 3 O 4 O 5 O 6 O 7

Ich war motiviert, alle Fragen wahrheitsgetreu zu beantworten

Ihre Eingabe: O 1 O 2 O 3 O 4 O 5 O 6 O 7

Was, glauben Sie, soll in dieser Studie untersucht werden?

Demographics
(GENDER, AGE, NATION, PROFEXP, MASTER, CLUSTER)

Bitte machen Sie nachfolgend einige Angaben zu Ihrer Person. Zur Erinnerung: Alle Informationen werden anonym erfasst und können nicht mit Ihrer Person in Verbindung gebracht werden!

Geschlecht:	O männlich O weiblich
Alter	
Nationalität	
Wie viele Jahre Berufserfahrung haben Sie? (z.B. durch Praktika, Werkstudententätigkeit, Ausbildung etc.)	
Haben Sie ein Studium erfolgreich abgeschlossen und somit schon einen Studienabschluss erworben?	O Ja O Nein

Wenn Sie bereits ein Studium abgeschlossen haben, geben Sie nachfolgend bitte den entsprechenden Studiengang sowie den erworbenen Abschluss an (z.B. B.A. HSG Major BWL[58]). Lassen Sie das Feld andernfalls bitte leer.

Welchen Studiengang studieren Sie aktuell und mit welchem Abschluss schließt dieser Studiengang ab? (z.B. B.A. HSG Major International Affairs[59]; M.A. HSG Rechnungswesen und Finanzen)

[58] In the PEQ version used in Augsburg, examples correspond to courses of studies offered by the University of Augsburg.
[59] In the PEQ version used in Augsburg, examples correspond to courses of studies offered by the University of Augsburg.

Im wievielten Fachsemester studieren Sie in Ihrem aktuellen Studiengang?
Wenn Sie in einem Bachelorstudiengang studieren, zählen Sie bitte die Assessmentsemester dazu. Wenn Sie in einem Masterstudiengang studieren, geben Sie bitte nur die Fachsemester an, die sich auf Ihren Master beziehen und rechnen keine Bachelorsemester dazu.)

Welcher inhaltliche Fachbereich bildet im Rahmen Ihres aktuellen Studiums für Sie Ihren persönlichen Studien- bzw. Interessensschwerpunkt? (z.B. Marketing; Rechnungslegung; Controlling; Steuern; etc.).

Share Ownership
(*SHARESC, SHARESP, SHARESF, EXPFA1, EXPFA2, ANALYSISAR*)

Halten Sie aktuell Anteile (z.B. Aktien) eines Unternehmens?	O Ja O Nein
Haben Sie bereits in der Vergangenheit Anteile (z.B. Aktien) eines Unternehmens besessen?	O Ja O Nein
Planen Sie, in Zukunft Anteile (z.B. Aktien) eines Unternehmens zu kaufen?	O Ja O Nein
Haben Sie sich jemals schon mit der Finanzberichterstattung von Unternehmen beschäftigt (Jahresabschlüsse konsultiert, Analystenreports gelesen, Aktienkurse verfolgt etc.)?	O Ja O Nein
Haben Sie jemals schon die Finanzberichterstattung von Unternehmen analysiert (Jahresabschlüsse, Analystenreports, Aktienkurse etc.)?	O Ja O Nein
Fühlen Sie sich sicher im Umgang mit Geschäftsberichten?	O Ja O Nein

Annex 4: Overview of Variables Involved in the Analyses

Variable	Description	Measurement/Coding
ACCMETH1	In investment scenario 5, subjects indicate if they consider the accounting method applied for R&D expenditures to be relevant for the economic evaluation of the investments' profitability.	Dummy variable that takes the value of 1 if the answer is yes, 0 otherwise
ACCMETH2	In investment scenario 5, subjects indicate if they made their investment decision based on the accounting method applied for R&D expenditures.	Dummy variable that takes the value of 1 if the answer is yes, 0 otherwise
AGE	Subject's age in years	Self-reported metric variable
ANALYSISAR	Subjects indicate if they feel confident in using/analyzing annual reports	Dummy variable that takes the value of 1 if the answer is yes, 0 otherwise
CLEAR	Subjects indicate whether questions and tasks were clearly stated.	7-point Likert Scale (1=strongly disagree; 7=strongly agree)
CLUSTER	Subject's major field of studies	Self-reported information trans-formed into categorical variable taking the value of 0 if major field of studies is accounting/finance, 1 if it is strategy, and 2 if it is others
COMP	Subjects indicate whether the scenarios were comprehensible.	7-point Likert Scale (1=strongly disagree; 7=strongly agree)
CONS	Accounting Method applied for R&D expenditures	Dummy variable that takes the value of 1 if conservatism is applied, 0 otherwise
EASY	Subjects indicate whether it was easy to answer the questions asked in the experiment.	7-point Likert Scale (1=strongly disagree; 7=strongly agree)
EXPFA1	Subjects indicate if they have already considered financial reports (e.g., annual reports, analysts' reports, etc.)	Dummy variable that takes the value of 1 if the answer is yes, 0 otherwise
EXPFA2	Subjects indicate if they have experience in analyzing of financial reports (annual reports, analysts' reports, etc.)	Dummy variable that takes the value of 1 if the answer is yes, 0 otherwise
GENDER	Subjects' gender	Dummy variable that takes the value of 1 if subject is a woman, 0 otherwise

INVDEC	Subjects' investment decision in investment scenario 5	Dummy variable that takes the value of 1 if subject choses the conservative investment option (company Z), 0 otherwise (company X)
LAGAECHTER	Subjects' degree of loss aversion derived from subjects' indications for six different mixed lotteries (p=0.5) if they would accept or reject it. The amount of the potential gain is the same in each lottery whereas potential losses vary (gain = EUR (CHF) 6; loss = EUR (CHF) 2 to 7).	Gain-loss ratio resulting at the point when subjects switch from playing the lottery to rejecting it
LARISK	Subjects' degree of loss aversion under risk calculated based on aggregating *LARISK50* and *LARISK200*	*LARISK*= (*LARISK50*+*LARISK200*)/2
LARISK50	Subjects' degree of loss aversion under risk calculated based on final negative payment of mixed outcome prospect (50, 1/2; -50) matching a certainty equivalent of 0	$\lambda^r = -\pi^+ u^r(G_*^r)/\pi^- u^r(L_*^r)$ (cf. Annex 2)
LARISK200	Subjects' degree of loss aversion under risk calculated based on final negative payment of mixed outcome prospect (200, 1/2; -200) matching a certainty equivalent of 0	$\lambda^r = -\pi^+ u^r(G_*^r)/\pi^- u^r(L_*^r)$ (cf. Annex 2)
LATIME	Subjects' degree of loss aversion over time calculated based on aggregating *LATIME1* and *LATIME2*	*LATIME*= (*LATIME1*+*LATIME2*)/2
LATIME1	Subjects' degree of loss aversion over time calculated based on final negative payment of two-payment prospect (-200, 1 year; 200) matching a present equivalent of 0	$\lambda^t = -\tau^+ u^t(G_*^t)/u^t(L_*^t)$ (cf. Annex 2)
LATIME2	Subjects' degree of loss aversion over time calculated based on final negative payment of two-payment prospect (-50, 1 year; 50) matching a present equivalent of 0	$\lambda^t = -\tau^+ u^t(G_*^t)/u^t(L_*^t)$ (cf. Annex 2)
LATIME3	Subjects' degree of loss aversion over time calculated based on final negative payment of two-payment prospect (200, 1 year; -200) matching a present equivalent of 0	$\lambda^t = -\tau^+ u^t(G_*^t)/u^t(L_*^t)$ (cf. Annex 2)

LATIME4	Subjects' degree of loss aversion over time calculated based on final negative payment of two-payment prospect (50, 1 year; -50) matching a present equivalent of 0	$\lambda^t = -\tau^+ u^t(G_*^t)/u^t(L_*^t)$ (cf. Annex 2)
LATIMESOON	Subjects' degree of loss aversion over time calculated based on aggregating *LATIME3* and *LATIME4*	*LATIMESOON*= (*LATIME3*+*LATIME4*)/2
LATIMETOTAL	Subjects' degree of loss aversion over time calculated based on aggregating *LATIME1* to *LATIME4*	*LATIMETOTAL*= (*LATIME1*+*LATIME2*+*LATIME3*+ *LATIME4*)/4
LAWANG	Subjects' degree of loss aversion based on aggregating *LAWANG1* and *LAWANG2*	*LAWANG* = (*LAWANG1*+*LAWANG2*)/2
LAWANG1	Subjects' degree of loss aversion derived from subjects' indication of a minimum amount of gain necessary to make them willing to participate in a lottery involving a potential loss of EUR (CHF) 25 (p=0.5)	*LAWANG1* Ratio = Subject's indicated amount of gain/25
LAWANG2	Subjects' degree of loss aversion derived from subjects' indication of a minimum amount of gain necessary to make them willing to participate in a lottery involving a potential loss of EUR (CHF) 100 (p=0.5)	*LAWANG2* Ratio = Subject's indicated amount of gain/100
LOSS	Prior R&D project's outcome	Binary variable that takes the value of 1 if prior project outcome is a loss, 0 otherwise
MASTER	Subjects' level of studies	Binary variable that takes the value of 1 if subjects are at master level, 0 otherwise
MCQ1	Manipulation Check Question 1	Binary variable that takes the value of 1 if subjects identify statement as true, 0 otherwise
MCQ2	Manipulation Check Question 2	Binary variable that takes the value of 1 if subjects identify statement as true, 0 otherwise
MOTIV	Subjects indicate whether they were motivated to answer all questions truthfully.	7-point Likert Scale (1=strongly disagree; 7=strongly agree)
NATION	Subjects' nationality	Self-reported information trans-formed into categorical variable taking the value of 0 if nationality is German, 1 if it is Suisse, 2 otherwise

PREF	Strength of subjects' preference for the chosen over the unchosen investment option in investment scenario 5	7-point Likert Scale (1=no preference; 7=strong preference)
PROFEXP	Subjects' professional experience in years	Self-reported metric variable
RAFIN	Subjects' risk attitude in financial situations	7-point Likert Scale (1=not at all risk taking; 7= very risk taking)
RAGAIN	Subjects' risk aversion in gain settings	*RAGAIN*= $(EV_i\text{-}CE_i)/\sigma_i$ for all gain prospects i
RAGEN	Subjects' risk attitude in general	7-point Likert Scale (1=not at all risk taking; 7=very risk taking)
RAGENFIN	Subjects' risk preferences based on an aggregation of *RAGEN* and *RAFIN*	*RAGENFIN*=(*RAGEN*+*RAFIN*)/2
RAGNEEZY	Subjects' risk attitude measured based on the ratio between part of equity individuals are willing to invest in a certain mixed outcome lottery (probability of gaining 2.5 times invested amount=1/3; probability of losing investment=2/3) and full amount of equity owned	*RAGNEEZY*=Invested amount of equity/full amount of equity owned
RALOSS	Subjects' risk aversion in loss settings	*RALOSS*= $(EV_i\text{-}CE_i)/\sigma_i$ for all loss prospects i
RAMIXED	Subjects' risk aversion in mixed settings	*RAMIXED*= $(EV_i\text{-}CE_i)/\sigma_i$ for all mixed prospects i
RAND	Subjects specify if their choice between option X and Z in investment scenario 5 was random.	Binary variable that takes the value of 1 if subjects choice was random, 0 otherwise
RATOTAL	Subjects' risk aversion calculated based on aggregating *RAGAIN*, *RALOSS*, and *RAMIXED*	*RATOTAL* = (*RAGAIN* + *RALOSS* + *RAMIXED*)/3
RAWEBER1	Subjects' risk attitude measured based on subjects' indications regarding how likely they would invest 10% of their personal equity in a moderately growing investment fund	7-point Likert Scale (1=very unlikely; 7=very likely)
RAWEBER2	Subjects' risk attitude measured based on subjects' indications regarding how likely they would invest 5% of their personal equity in a very risky share	7-point Likert Scale (1=very unlikely; 7=very likely)

RAWEBER3	Subjects' risk attitude measured based on subjects' indications regarding how likely they would invest 5% of their personal equity in a conservative share	7-point Likert Scale (1=very unlikely; 7=very likely)
RAWEBER4	Subjects' risk attitude measured based on subjects' indications regarding how likely they would invest 10% of their personal equity in government bonds	7-point Likert Scale (1=very unlikely; 7=very likely)
SHARESC	Subjects indicate if they currently own shares	Binary variable that takes the value of 1 if the answer is 'Yes', 0 otherwise
SHARESF	Subjects indicate if they plan to buy shares in the future	Binary variable that takes the value of 1 if the answer is 'Yes', 0 otherwise
SHARESP	Subjects indicate if they owned shares in the past	Binary variable that takes the value of 1 if the answer is 'Yes', 0 otherwise
TG	Treatment group subjects are distributed to	Categorical variable taking the value of 1 to 4 (2x2 experimental design)
WTADEV	Deviation of subjects' valuation of an equity stake they own in a company from the rational economic share value	*WTADEV* = subjects' price quotation for the equity stake they own in a company – corresponding rational economic share value
WTA10DEV	Deviation of subjects' valuation of the equity stake they own in investment scenario 1 (R&D project 1, t=0) from the rational economic share value	*WTA10DEDV* = subjects' price quotation for the equity stake they own in investment scenario 1 at t=0 – corresponding rational economic share value
WTA20DEV	Deviation of subjects' valuation of the equity stake they own in investment scenario 1 (R&D project 2, t=2) from the rational economic share value	*WTA20DEDV* = subjects' price quotation for the equity stake they own in investment scenario 1 at t=2 – corresponding rational economic share value
WTA30DEV	Deviation of subjects' valuation of the equity stake they own in investment scenario 2 (R&D project 3, t=0) from the rational economic share value	*WTA30DEDV* = subjects' price quotation for the equity stake they own in investment scenario 2 at t=0 – corresponding rational economic share value
WTA40DEV	Deviation of subjects' valuation of the equity stake they own in investment scenario 2 (R&D project 4, t=2) from the rational economic share value	*WTA40DEDV* = subjects' price quotation for the equity stake they own in investment scenario 2 at t=2 – corresponding rational economic share value

WTA50DEV	Deviation of subjects' valuation of the equity stake they own in investment scenario 3 (R&D project 5, t=0) from the rational economic share value	*WTA50DEDV* = subjects' price quotation for the equity stake they own in investment scenario 3 at t=0 – corresponding rational economic share value
WTA60DEV	Deviation of subjects' valuation of the equity stake they own in investment scenario 3 (R&D project 6, t=2) from the rational economic share value	*WTA60DEDV* = subjects' price quotation for the equity stake they own in investment scenario 3 at t=2 – corresponding rational economic share value
WTA70DEV	Deviation of subjects' valuation of the equity stake they own in investment scenario 4 (R&D project 7, t=0) from the rational economic share value	*WTA70DEDV* = subjects' price quotation for the equity stake they own in investment scenario 4 at t=0 – corresponding rational economic share value
WTA80DEV	Deviation of subjects' valuation of the equity stake they own in investment scenario 4 (R&D project 8, t=2) from the rational economic share value	*WTA80DEDV* = subjects' price quotation for the equity stake they own in investment scenario 4 at t=2 – corresponding rational economic share value

Annex 5: Tables

Table 53: Pearson-Spearman Correlation Matrix for Pretest Analysis

N = 27

Pearson correlations below the diagonal and Spearman correlations above the diagonal.

	WTA30DEV	*CONS*	*LOSS*	*LARISK*	*LATIME*	*LATIMESOON*	*RATOTAL*
WTA30DEV	**1.000**	0.376	-0.438	0.117	-0.095	0.157	-0.170
		0.053*	0.022**	0.561	0.637	0.434	0.397
CONS	0.395	**1.000**	0.038	0.095	0.129	0.029	0.048
	0.041**		0.849	0.637	0.522	0.888	0.814
LOSS	-0.444	0.038	**1.000**	0.361	0.004	-0.133	0.276
	0.020**	0.849		0.064*	0.981	0.507	0.163
LARISK	0.114	0.016	0.327	**1.000**	0.178	0.049	0.342
	0.571	0.936	0.096*		0.373	0.806	0.080*
LATIME	-0.100	0.265	0.041	0.370	**1.000**	0.261	-0.074
	0.619	0.181	0.839	0.0572*		0.188	0.714
LATIMESOON	0.159	0.184	0.199	0.245	-0.095	**1.000**	-0.065
	0.426	0.359	0.319	0.217	0.637		0.746
RATOTAL	-0.208	0.046	0.372	0.483	0.301	0.348	**1.000**
	0.297	0.821	0.056*	0.011**	0.127	0.075*	

WTA30DEV is the deviation of subjects' valuation of their equity stake from the rational economic share value (R&D project 3, t=0); *CONS* is a binary variable taking the value of 1 if conservatism is applied; *LOSS* is a binary variable taking the value of 1 if prior project outcome is a loss; *LARISK* is an aggregated measure of subjects' degree of loss aversion under risk; *LATIME* is an aggregated measure of subjects' degree of loss aversion over time based on prospects including a positive (negative) payment now (in one year); *LATIMESOON* is an aggregated measure of subjects' degree of loss aversion over time based on prospects including a negative (positive) payment now (in one year); *RATOTAL* is an aggregated measure of subjects' risk aversion; a detailed description of all variables including their measurement/coding is provided in Annex 4; ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10

Table 54: Descriptive Statistics and Pearson Chi-square Test Results for Categorical Variables (Full Sample)

Variable		TG1	TG2	TG3	TG4	Full Sample	χ^2 (p)
N		56	38	58	44	196	
GENDER	Female	20 (35.71%)	9 (23.68%)	23 (39.66%)	19 (43.18%)	71 (36.22%)	3.81 (0.283)
	Male	36 (64.29%)	29 (76.32%)	35 (60.34%)	25 (56.82%)	125 (63.78%)	
NATION	German	29 (51.79%)	17 (44.74%)	24 (41.38%)	22 (50.00%)	92 (46.94%)	5.0356 (0.539)
	Suisse	25 (44.64%)	17 (44.74%)	28 (48.28%)	21 (47.73%)	91 (46.43%)	
	Others	2 (3.57%)	4 (10.52%)	6 (10.34%)	1 (2.27%)	13 (6.63%)	
MASTER	Master	34 (60.71%)	17 (44.74%)	33 (56.90%)	23 (52.27%)	107 (54.59%)	2.5553 (0.465)
	Bachelor	22 (39.29%)	21 (55.26%)	25 (43.10%)	21 (47.73%)	89 (45.41%)	
CLUSTER	Finance	17 (30.36%)	12 (31.58%)	22 (37.93%)	18 (40.91%)	69 (35.20%)	2.4069 (0.879)
	Strategy	20 (35.71%)	15 (39.47%)	19 (32.76%)	16 (36.36%)	70 (35.72%)	
	Others	19 (33.93%)	11 (28.95%)	17 (29.31%)	10 (22.73%)	57 (29.08%)	
SHARESP	Yes	29 (51.79%)	18 (47.37%)	26 (44.83%)	15 (34.09%)	88 (44.90%)	3.2449 (0.355)
	No	27 (48.21%)	20 (52.63%)	32 (55.17%)	29 (65.91%)	108 (55.10%)	
SHARESC	Yes	21 (37.50%)	10 (26.32%)	21 (36.21%)	13 (29.55%)	65 (33.16%)	1.7812 (0.619)
	No	35 (62.50%)	28 (73.68%)	37 (63.79%)	31 (70.45%)	131 (66.84%)	
SHARESF	Yes	48 (85.71%)	31 (81.58%)	47 (81.03%)	35 (79.55%)	161 (82.14%)	0.7461 (0.862)
	No	8 (14.29%)	7 (18.42%)	11 (18.97%)	9 (20.45%)	35 (17.86%)	

EXPFA1	Yes	53 (94.64%)	34 (89.47%)	56 (96.55%)	36 (81.82%)	179 (91.33%)	**7.9633 (0.047**)**
	No	3 (5.36%)	4 (10.53%)	2 (3.45%)	8 (18.18%)	17 (8.67%)	
EXPFA2	Yes	43 (76.79%)	29 (76.32%)	41 (70.69%)	33 (75.00%)	146 (74.49%)	0.6688 (0.881)
	No	13 (23.21%)	9 (23.68%)	17 (29.31%)	11 (25.00%)	50 (25.51%)	
ANALYSISAR	Yes	25 (44.64%)	20 (52.63%)	32 (55.17%)	22 (50.00%)	99 (50.51%)	1.3485 (0.718)
	No	31 (55.36%)	18 (47.37%)	26 (44.83%)	22 (50.00%)	97 (49.49%)	
MCQ1	Correct	53 (94.64%)	35 (92.11%)	55 (94.83%)	38 (86.36%)	181 (92.35%)	3.1547 (0.368)
	Wrong	3 (5.36%)	3 (7.89%)	3 (5.17%)	6 (13.64%)	15 (7.65%)	
MCQ2	Correct	42 (75.00%)	26 (68.42%)	49 (84.48%)	37 (84.09%)	154 (78.57%)	4.7495 (0.191)
	Wrong	14 (25.00%)	12 (31.58%)	9 (15.52%)	7 (15.91%)	42 (21.43%)	

GENDER is a binary variable that takes the value of 1 if subject is a woman; *NATION* is a categorical variable taking the value of 0 if nationality is German, 1 if it is Suisse, and 2 otherwise; *MASTER* is a binary variable that takes the value of 1 if subjects are at master level; *CLUSTER* is a categorical variable taking the value of 0 if major field of studies is accounting/finance, 1 if it is strategy, and 2 otherwise; *SHARESP* is a binary variable that takes the value of 1 if subjects owned shares in the past; *SHARESC* is a binary variable that takes the value of 1 if subjects currently own shares; *SHARESF* is a binary variable that takes the value of 1 if subjects plan to own shares in the future; *EXPFA1* is a binary variable that takes the value of 1 if subjects considered annual reports in the past; *EXPFA2* is a binary variable that takes the value of 1 if subjects have experience in analyzing annual reports; *ANALYSISAR* is a binary variable that takes the value of 1 if subjects feel confident in analyzing annual reports; *MCQ1* is a binary variable that takes the value of 1 if subjects identify manipulation check statement 1 as true; *MCQ2* is a binary variable that takes the value of 1 if subjects identify manipulation check statement 2 as true; a detailed description of all variables including their measurement/coding is provided in Annex 4; ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed test)

Table 55: Descriptive Statistics and Pearson Chi-square Test Results for Categorical Variables (Reduced Sample)

Variable		TG1	TG2	TG3	TG4	Full Sample	χ^2 (p)
N		45	35	38	41	159	
GENDER	Female	12 (26.67%)	8 (22.86%)	17 (44.74%)	19 (46.34%)	56 (35.22%)	**7.519 (0.057*)**
	Male	33 (73.33%)	27 (77.14%)	21 (55.26%)	22 (53.66%)	103 (64.78%)	
NATION	German	24 (53.33%)	16 (45.71%)	17 (44.74%)	22 (53.66%)	79 (49.69%)	4.727 (0.579)
	Suisse	20 (44.44%)	15 (42.86%)	18 (47.37%)	18 (43.90%)	71 (44.65%)	
	Others	1 (2.23%)	4 (11.43%)	3 (7.89%)	1 (2.44%)	9 (5.66%)	
MASTER	Master	29 (64.44%)	15 (42.86%)	21 (55.26%)	21 (51.22%)	86 (54.09%)	3.878 (0.275)
	Bachelor	16 (35.56%)	20 (57.14%)	17 (44.74%)	20 (48.78%)	73 (45.91%)	
CLUSTER	Finance	15 (33.33%)	11 (31.43%)	16 (42.10%)	16 (39.02%)	58 (36.48%)	1.5193 (0.958)
	Strategy	16 (35.56%)	14 (40.00%)	12 (31.58%)	16 (39.02%)	58 (36.48%)	
	Other	14 (31.11%)	10 (28.57%)	10 (26.32%)	9 (21.96%)	43 (27.04%)	
SHARESP	Yes	25 (55.56%)	17 (48.57%)	12 (31.58%)	13 (31.71%)	67 (42.14%)	**7.484 (0.058*)**
	No	20 (44.44%)	18 (51.43%)	26 (68.42%)	28 (68.29%)	92 (57.86%)	
SHARESC	Yes	19 (42.22%)	9 (25.71%)	10 (26.32%)	11 (26.83%)	49 (30.82%)	3.839 (0.279)
	No	26 (57.78%)	26 (74.29%)	28 (73.68%)	30 (73.17%)	110 (69.18%)	
SHARESF	Yes	40 (88.89%)	29 (82.86%)	29 (76.32%)	33 (80.49%)	131 (82.39%)	2.384 (0.497)
	No	5 (11.11%)	6 (17.43%)	9 (23.68%)	8 (19.51%)	28 (17.61%)	

EXPFA1	Yes	44 (97.77%)	33 (94.29%)	37 (97.37%)	33 (80.49%)	147 (92.45%)	**11.725 (0.008***)**
	No	1 (2.23%)	2 (5.71%)	1 (2.63%)	8 (19.51%)	12 (7.55%)	
EXPFA2	Yes	36 (80.00%)	27 (77.14%)	29 (76.32%)	31 (75.00%)	123 (77.36%)	0.275 (0.965)
	No	9 (20.00%)	8 (22.86%)	9 (23.68%)	10 (25.00%)	36 (22.64%)	
ANALYSISAR	Yes	21 (46.67%)	18 (51.43%)	21 (55.26%)	20 (48.78%)	80 (50.31%)	0.668 (0.881)
	No	24 (53.33%)	17 (48.57%)	17 (44.74%)	21 (51.22%)	79 (49.69%)	
MCQ1	Correct	42 (93.33%)	32 (91.43%)	37 (97.37%)	36 (87.80%)	147 (92.45%)	2.688 (0.442)
	Wrong	3 (6.67%)	3 (8.57%)	1 (2.63 %)	5 (12.20%)	12 (7.55%)	
MCQ2	Correct	34 (75.56%)	24 (68.57%)	32 (84.21%)	36 (87.80%)	126 (79.25%)	5.193 (0.158)
	Wrong	11 (24.44%)	11 (31.43%)	6 (15.79%)	5 (12.20%)	33 (20.75%)	

GENDER is a binary variable that takes the value of 1 if subject is a woman; *NATION* is a categorical variable taking the value of 0 if nationality is German, 1 if it is Suisse, and 2 otherwise; *MASTER* is a binary variable that takes the value of 1 if subjects are at master level; *CLUSTER* is a categorical variable taking the value of 0 if major field of studies is accounting/finance, 1 if it is strategy, and 2 otherwise; *SHARESP* is a binary variable that takes the value of 1 if subjects owned shares in the past; *SHARESC* is a binary variable that takes the value of 1 if subjects currently own shares; *SHARESF* is a binary variable that takes the value of 1 if subjects plan to own shares in the future; *EXPFA1* is a binary variable that takes the value of 1 if subjects considered annual reports in the past; *EXPFA2* is a binary variable that takes the value of 1 if subjects have experience in analyzing annual reports; *ANALYSISAR* is a binary variable that takes the value of 1 if subjects feel confident in analyzing annual reports; *MCQ1* is a binary variable that takes the value of 1 if subjects identify manipulation check statement 1 as true; *MCQ2* is a binary variable that takes the value of 1 if subjects identify manipulation check statement 2 as true; a detailed description of all variables including their measurement/coding is provided in Annex 4; ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed test)

Table 56: Descriptive Statistics for Interval or Ratio Scaled Variables by Treatment Group (Full Sample)

Variable		TG1	TG2	TG3	TG4	Full Sample
	N	56	38	58	44	196
AGE	Mean	23.30	22.65	23.20	23.13	23.11
	Std. Dev.	2.922	1.962	2.476	2.298	2.480
	Min.	19	19	19	19	19
	Max.	34	27	30	27	34
PROFEXP	Mean	1.928	1.894	2.379	1.840	2.035
	Std. Dev.	1.895	1.752	2.412	1.737	2.003
	Min.	0	0	0	0	0
	Max.	9	7	15	7	15
COMP	Mean	6.660	6.710	6.275	6.454	6.510
	Std. Dev.	0.5144	0.459	1.005	0.761	0.754
	Min.	5	6	3	4	3
	Max.	7	7	7	7	7
CLEAR	Mean	6.375	6.605	6.155	6.431	6.367
	Std. Dev.	0.905	0.547	0.913	0.695	0.815
	Min.	3	5	3	4	3
	Max.	7	7	7	7	7
EASY	Mean	6.053	5.973	5.913	5.977	5.979
	Std. Dev.	1.085	1.026	1.064	1.088	1.061
	Min.	2	2	3	3	2
	Max.	7	7	7	7	7
MOTIV	Mean	6.660	6.657	6.431	6.568	6.571
	Std. Dev.	0.580	0.668	1.094	0.661	0.797
	Min.	5	4	2	5	2
	Max.	7	7	7	7	7
RAGAIN	Mean	0.149	0.051	0.159	0.116	0.126
	Std. Dev.	0.242	0.164	0.189	0.189	0.204
	Min.	-0.951	-0.540	-0.272	-0.245	-0.951
	Max.	0.674	0.353	0.629	0.513	0.674

RALOSS	Mean	-0.103	-0.088	-0.061	-0.076	-0.082
	Std. Dev.	0.190	0.170	0.173	0.205	0.185
	Min.	-0.968	-0.647	-0.549	-0.495	-0.969
	Max.	0.281	0.218	0.281	0.656	0.656
RAMIXED	Mean	0.148	0.128	0.170	0.089	0.138
	Std. Dev.	0.202	0.174	0.211	0.213	0.203
	Min.	-0.303	-0.239	-0.262	-0.224	-0.303
	Max.	0.672	0.513	0.939	0.778	0.939
RAGNEEZY	Mean	0.181	0.180	0.115	0.207	0.167
	Std. Dev.	0.247	0.206	0.180	0.249	0.223
	Min.	0	0	0	0	0
	Max.	1	1	0.75	1	1
RAGENFIN	Mean	3.893	4.026	3.681	3.818	3.839
	Std. Dev.	1.186	1.185	1.198	1.239	1.199
	Min.	2	1.5	1.5	2	1.5
	Max.	6	6	6	6	6
LARISK	Mean	4.778	1.692	1.839	1.695	2.618
	Std. Dev.	25.092	1.270	3.106	1.891	13.541
	Min.	0.368	0.414	0.227	0.117	0.117
	Max.	188.991	5.988	24.396	10.809	188.991
LAWANG	Mean	2.201	2.684	2.157	2.770	2.410
	Std. Dev.	1.907	4.220	1.553	2.615	2.587
	Min.	0.465	1	0.2	0.4	0.2
	Max.	12.5	27	10	15	27
LAGAECHTER	Mean	1.792	1.509	1.817	1.856	1.759
	Std. Dev.	0.674	0.487	0.786	0.650	0.680
	Min.	0.857	0.857	1	1	0.857
	Max.	3	3	6	3	6
LATIME	Mean	1.085	0.891	0.902	0.917	0.956
	Std. Dev.	0.937	0.248	0.171	0.401	0.557
	Min.	0.001	0.418	0.566	0.322	0.001
	Max.	6.407	1.913	1.459	2.884	6.407

AGE is subjects' age in years; *PROFEXP* is subjects' professional experience in years, *COMP* is subjects indication if scenarios were comprehensible (1=strongly disagree, 7=strongly agree); *CLEAR* is subjects indication if questions and tasks were clearly stated (1=strongly disagree, 7=strongly agree); *EASY* is subjects indication whether it was easy to answer the questions (1=strongly disagree, 7=strongly agree); *MOTIV* is subjects' indication whether they were motivated to answer all questions truthfully (1=strongly disagree, 7=strongly agree); *RAGAIN* is subjects' risk aversion in gain settings; *RALOSS* is subjects' risk aversion in

loss settings; *RAMIXED* is subjects' risk aversion in mixed settings; *RAGNEEZY* is subjects' overall risk attitude measured based on individuals' willingness to invest in a certain mixed outcome lottery; *RAGENFIN* is an aggregated measure of subjects' overall risk attitude and their risk attitude in financial situations (1=not at all risk taking; 7=very risk taking); *LARISK* is an aggregated measure of subjects' loss aversion under risk calculated based on mixed outcome prospects; *LAWANG* is an aggregated measure of subjects' degree of loss aversion based on the gain/loss ratio that makes subjects willing to participate in a certain lottery; *LAGAECHTER* is a measure of subjects' degree of loss aversion based on subjects' willingness to participate in six different lotteries; *LATIME* is an aggregated measure of subjects' degree of loss aversion over time based on payment prospects that contain a positive payment now and a negative payment in the future; a detailed description of all variables including their measurement/coding is provided in Annex 4

Table 57: Descriptive Statistics for Interval or Ratio Scaled Variables by Treatment Group (Reduced Sample)

Variable		TG1	TG2	TG3	TG4	Full Sample
	N	45	35	38	41	159
AGE	Mean	23.400	22.600	23.132	23.098	23.081
	Std. Dev.	3.056	1.943	2.549	2.354	2.533
	Min.	19	19	19	19	19
	Max.	34	27	30	27	34
PROFEXP	Mean	1.933	1.629	2.316	1.829	1.931
	Std. Dev.	1.959	1.308	1.905	1.787	1.776
	Min.	0	0	0	0	0
	Max.	9	5	9	7	9
COMP	Mean	6.778	6.743	6.211	6.463	6.553
	Std. Dev.	0.420	0.443	1.119	0.778	0.768
	Min.	6	6	3	4	3
	Max.	7	7	7	7	7
CLEAR	Mean	6.467	6.629	6.026	6.415	6.384
	Std. Dev.	0.815	0.547	0.915	0.706	0.786
	Min.	3	5	3	4	3
	Max.	7	7	7	7	7
EASY	Mean	6.133	5.971	5.842	5.902	5.968
	Std. Dev.	0.968	1.043	1.128	1.091	1.052
	Min.	2	2	3	3	2
	Max.	7	7	7	7	7
MOTIV	Mean	6.667	6.714	6.237	6.610	6.559
	Std. Dev.	0.603	0.622	1.283	0.628	0.839
	Min.	5	4	2	5	2
	Max.	7	7	7	7	7
RAGAIN	Mean	0.113	0.074	0.143	0.125	0.115
	Std. Dev.	0.239	0.133	0.183	0.189	0.193
	Min.	-0.951	-0.112	-0.201	-0.246	-0.951
	Max.	0.442	0.353	0.629	0.513	0.629

RALOSS	Mean	-0.107	-0.076	-0.093	-0.073	-0.088
	Std. Dev.	0.203	0.146	0.167	0.212	0.185
	Min.	-0.969	-0.388	-0.549	-0.496	-0.969
	Max.	0.281	0.219	0.281	0.656	0.656
RAMIXED	Mean	0.102	0.133	0.181	0.094	0.125
	Std. Dev.	0.168	0.153	0.221	0.216	0.193
	Min.	-0.303	-0.163	-0.262	-0.224	-0.303
	Max.	0.596	0.439	0.940	0.778	0.939
RAGNEEZY	Mean	0.177	0.190	0.124	0.214	0.176
	Std. Dev.	0.255	0.211	0.197	0.254	0.232
	Min.	0	0	0	0	0
	Max.	1	1	0.75	1	1
RAGENFIN	Mean	4.000	4.057	3.565	3.854	3.871
	Std. Dev.	1.196	1.199	1.203	1.231	1.211
	Min.	2	1.5	1.5	2	1.5
	Max.	6	6	6	6	6
LARISK	Mean	5.396	1.568	2.135	1.730	2.829
	Std. Dev.	28.002	1.046	3.794	1.950	15.019
	Min.	0.368	0.696	0.426	0.117	0.117
	Max.	188.991	5.392	24.397	10.809	188.991
LAWANG	Mean	2.290	2.775	2.149	2.792	2.493
	Std. Dev.	2.023	4.387	1.787	2.705	2.823
	Min.	0.55	1	0.2	0.4	0.2
	Max.	12.5	27	10	15	27
LAGAECHTER	Mean	1.708	1.519	1.789	1.841	1.720
	Std. Dev.	0.637	0.491	0.873	0.641	0.679
	Min.	0.857	0.857	1	1	0.857
	Max.	3	3	6	3	6
LATIME	Mean	1.039	0.905	0.907	0.915	0.946
	Std. Dev.	1.652	0.250	0.189	0.415	0.433
	Min.	0.001	0.418	0.566	0.322	0.001
	Max.	4.138	1.913	1.459	2.884	4.138

AGE is subjects' age in years; *PROFEXP* is subjects' professional experience in years, *COMP* is subjects indication if scenarios were comprehensible (1=strongly disagree, 7=strongly agree); *CLEAR* is subjects indication if questions and tasks were clearly stated (1=strongly disagree, 7=strongly agree); *EASY* is subjects indication whether it was easy to answer the questions (1=strongly disagree, 7=strongly agree); *MOTIV* is subjects' indication whether they were motivated to answer all questions truthfully (1=strongly disagree, 7=strongly agree); *RAGAIN* is subjects' risk aversion in gain settings; *RALOSS* is subjects' risk aversion in loss

settings; *RAMIXED* is subjects' risk aversion in mixed settings; *RAGNEEZY* is subjects' overall risk attitude measured based on individuals' willingness to invest in a certain mixed outcome lottery; *RAGENFIN* is an aggregated measure of subjects' overall risk attitude and their risk attitude in financial situations (1=not at all risk taking; 7=very risk taking); *LARISK* is an aggregated measure of subjects' loss aversion under risk calculated based on mixed outcome prospects; *LAWANG* is an aggregated measure of subjects' degree of loss aversion based on the gain/loss ratio that makes subjects willing to participate in a certain lottery; *LAGAECHTER* is a measure of subjects' degree of loss aversion based on subjects' willingness to participate in six different lotteries; *LATIME* is an aggregated measure of subjects' degree of loss aversion over time based on payment prospects that contain a positive payment now and a negative payment in the future; a detailed description of all variables including their measurement/coding is provided in Annex 4

Table 58: Results of Structural Equality Analysis (Full Sample)

Variable N=196	LEVENE Stat. (p)	ANOVA Stat. (p)	WELCH Stat. (p)
AGE	1.089 (0.355)	0.562 (0.641)	0.735 (0.534)
PROFEXP	0.202 (0.895)	0.821 (0.484)	0.659 (0.579)
COMP	9.867 (0.000***)	3.732 (0.012**)	**3.487** **(0.019**)**
CLEAR	1.393 (0.246)	**2.542** **(0.058*)**	3.078 (0.031**)
EASY	0.402 (0.752)	0.163 (0.921)	0.159 (0.924)
MOTIV	2.808 (0.041**)	0.982 (0.402)	0.773 (0.512)
RAGAIN	1.308 (0.273)	**2.575** **(0.055*)**	3.305 (0.023**)
RALOSS	0.405 (0.749)	0.515 (0.673)	0.527 (0.665)
RAMIXED	0.176 (0.912)	1.434 (0.234)	1.300 (0.278)
RAGNEEZY	1.700 (0.168)	1.642 (0.181)	1.933 (0.129)
RAGENFIN	0.218 (0.884)	0.684 (0.563)	0.686 (0.563)
LARISK	2.546 (0.057*)	0.663 (0.576)	0.310 (0.818)
LAWANG	1.674 (0.174)	0.729 (0.536)	0.772 (0.512)
LAGAECHTER	0.875 (0.455)	**2.234** **(0.086*)**	3.472 (0.019**)
LATIME	0.513 (0.002***)	1.446 (0.231)	0.743 (0.529)

AGE is subjects' age in years; *PROFEXP* is subjects' professional experience in years, *COMP* is subjects indication if scenarios were comprehensible (1=strongly disagree, 7=strongly agree); *CLEAR* is subjects indication if questions and tasks were clearly stated (1=strongly disagree, 7=strongly agree); *EASY* is subjects indication whether it was easy to answer the questions (1=strongly disagree, 7=strongly agree); *MOTIV* is subjects' indication whether they were motivated to answer all questions truthfully (1=strongly disagree, 7=strongly agree); *RAGAIN* is subjects' risk aversion in gain settings; *RALOSS* is subjects' risk aversion in loss settings; *RAMIXED* is subjects' risk aversion in mixed settings; *RAGNEEZY* is subjects' overall risk attitude measured based on individuals' willingness to invest in a certain mixed outcome lottery; *RAGENFIN* is an aggregated measure of subjects' overall risk attitude and their risk attitude in financial

situations (1=not at all risk taking; 7=very risk taking); *LARISK* is an aggregated measure of subjects' loss aversion under risk calculated based on mixed outcome prospects; *LAWANG* is an aggregated measure of subjects' degree of loss aversion based on the gain/loss ratio that makes subjects willing to participate in a certain lottery; *LAGAECHTER* is a measure of subjects' degree of loss aversion based on subjects' willingness to participate in six different lotteries; *LATIME* is an aggregated measure of subjects' degree of loss aversion over time based on payment prospects that contain a positive payment now and a negative payment in the future; a detailed description of all variables including their measurement/coding is provided in Annex 4; ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed test)

Table 59: Results of Structural Equality Analysis (Reduced Sample)

Variable N=159	**LEVENE Stat. (p)**	**ANOVA Stat. (p)**	**WELCH Stat. (p)**
AGE	1.434 (0.235)	0.660 (0.578)	0.795 (0.500)
PROFEXP	1.015 (0.388)	0.978 (0.405)	1.097 (0.355)
COMP	13.384 (0.000***)	5.060 (0.002***)	**4.234** **(0.008***)**
CLEAR	0.679 (0.566)	**4.178** **(0.007***)**	3.939 (0.011**)
EASY	0.661 (0.577)	0.601 (0.616)	0.626 (0.600)
MOTIV	5.116 (0.002***)	2.645 (0.051*)	1.450 (0.234)
RAGAIN	1.543 (0.206)	0.831 (0.478)	1.326 (0.271)
RALOSS	0.728 (0.537)	0.311 (0.818)	0.293 (0.830)
RAMIXED	1.054 (0.370)	1.696 (0.170)	1.409 (0.246)
RAGNEEZY	0.819 (0.485)	1.028 (0.382)	1.176 (0.324)
RAGENFIN	0.131 (0.941)	1.260 (0.290)	1.253 (0.296)
LARISK	2.629 (0.052**)	0.616 (0.606)	0.560 (0.643)
LAWANG	1.157 (0.328)	0.532 (0.661)	0.637 (0.593)
LAGAECHTER	0.633 (0.595)	1.616 (0.188)	2.314 (0.082*)
LATIME	2.636 (0.052*)	0.965 (0.411)	0.573 (0.634)

AGE is subjects' age in years; *PROFEXP* is subjects' professional experience in years, *COMP* is subjects indication if scenarios were comprehensible (1=strongly disagree, 7=strongly agree); *CLEAR* is subjects indication if questions and tasks were clearly stated (1=strongly disagree, 7=strongly agree); *EASY* is subjects indication whether it was easy to answer the questions (1=strongly disagree, 7=strongly agree); *MOTIV* is subjects' indication whether they were motivated to answer all questions truthfully (1=strongly disagree, 7=strongly agree); *RAGAIN* is subjects' risk aversion in gain settings; *RALOSS* is subjects' risk aversion in loss settings; *RAMIXED* is subjects' risk aversion in mixed settings; *RAGNEEZY* is subjects' overall risk attitude measured based on individuals' willingness to invest in a certain mixed outcome lottery; *RAGENFIN* is an aggregated measure of subjects' overall

risk attitude and their risk attitude in financial situations (1=not at all risk taking; 7=very risk taking); *LARISK* is an aggregated measure of subjects' loss aversion under risk calculated based on mixed outcome prospects; *LAWANG* is an aggregated measure of subjects' degree of loss aversion based on the gain/loss ratio that makes subjects willing to participate in a certain lottery; *LAGAECHTER* is a measure of subjects' degree of loss aversion based on subjects' willingness to participate in six different lotteries; *LATIME* is an aggregated measure of subjects' degree of loss aversion over time based on payment prospects that contain a positive payment now and a negative payment in the future; a detailed description of all variables including their measurement/coding is provided in Annex 4; ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed test)

Table 60: Correlation Matrix (Two-way Interaction Tobit Regression)

N = 154, Pearson correlations below the diagonal and Spearman correlations above the diagonal.

	WTA80DEV	*LOSS*	*CONS*	*LARISK*	*LATIME*	*RAGAIN*	*RALOSS*	*RAMIXED*
WTA80DEV	**1.000**	0.220	0.122	0.113	0.201	-0.218	-0.165	-0.007
		0.006***	0.130	0.165	0.013**	0.007***	0.041**	0.936
LOSS	0.199	**1.000**	0.078	-0.025	0.129	0.086	-0.073	0.098
	0.013**		0.336	0.754	0.110	0.290	0.367	0.224
CONS	0.103	0.078	**1.000**	-0.105	0.039	-0.073	0.015	-0.002
	0.205	0.336		0.196	0.627	0.370	0.854	0.976
LARISK	0.155	-0.078	-0.066	**1.000**	0.035	-0.145	-0.356	0.531
	0.055*	0.334	0.413		0.668	0.073*	0.000***	0.000***
LATIME	0.171	0.086	0.046	0.117	**1.000**	-0.119	0.040	-0.043
	0.034**	0.287	0.569	0.149		0.141	0.623	0.600
RAGAIN	-0.236	0.081	-0.084	-0.068	0.019	**1.000**	0.271	0.318
	0.003***	0.316	0.299	0.400	0.811		0.001***	0.000***
RALOSS	-0.162	-0.074	0.008	-0.329	-0.040	0.324	**1.000**	0.150
	0.045**	0.365	0.926	0.000***	0.623	0.000***		0.063*
RAMIXED	0.013	0.075	-0.004	0.490	0.060	0.301	0.182	**1.000**
	0.876	0.355	0.958	0.000***	0.460	0.000***	0.024**	

WTA80DEV is the deviation of subjects' valuation of their equity stake from the rational economic share value in scenario 4; *LOSS* is a binary variable taking the value of 1 if prior project outcome is a loss; *CONS* is a binary variable taking the value of 1 if conservatism is applied; *LARISK* is an aggregated measure of subjects' loss aversion under risk calculated based on mixed outcome prospects; *LATIME* is an aggregated measure of subjects' degree of loss aversion over time based on payment prospects that contain a positive payment now and a negative payment in the future; *RAGAIN* is subjects' risk aversion in gain settings; *RALOSS* is subjects' risk aversion in loss settings; *RAMIXED* is subjects' risk aversion in mixed settings; a detailed description of all variables including their measurement/coding is provided in Annex 4; ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10

Table 61: Correlation Matrix Loss Aversion (Three-way Interaction Tobit Regression)

N = 156, Pearson correlations below the diagonal and Spearman correlations above the diagonal.

	WTA80DEV	*LOSS*	*CONS*	*LARISK*	*LATIME*	*LARISK200*	*LARISK50*	*LAWANG*	*LAGAECHTER*	*RAGAIN*	*RALOSS*	*RAMIXED*
WTA80DEV	**1.000**	0.221	0.136	0.101	0.219	0.048	0.129	0.088	0.015	-0.194	-0.165	0.001
		0.005***	0.091*	0.212	0.006***	0.548	0.108	0.273	0.854	0.015**	0.039**	0.990
LOSS	0.204	**1.000**	0.076	-0.039	0.125	-0.127	0.073	-0.057	0.022	0.088	-0.070	0.097
	0.010***		0.343	0.627	0.120	0.114	0.368	0.479	0.789	0.274	0.388	0.229
CONS	0.116	0.076	**1.000**	-0.106	0.059	-0.178	0.080	-0.031	-0.118	-0.057	0.012	0.004
	0.151	0.343		0.189	0.462	0.026**	0.318	0.699	0.141	0.477	0.884	0.959
LARISK	0.145	-0.083	-0.070	**1.000**	0.030	0.842	0.664	0.011	0.073	-0.151	-0.356	0.526
	0.072*	0.304	0.387		0.709	0.000***	0.000***	0.891	0.367	0.060*	0.000***	0.000***
LATIME	0.187	0.077	0.067	0.110	**1.000**	-0.025	0.082	0.004	0.074	-0.092	0.033	-0.033
	0.010***	0.340	0.403	0.172		0.752	0.309	0.957	0.358	0.252	0.679	0.684
LARISK200	0.087	-0.117	-0.111	0.868	0.011	**1.000**	0.268	0.009	-0.005	-0.011	-0.206	0.370
	0.278	0.027**	0.168	0.000***	0.891		0.001***	0.915	0.947	0.892	0.010***	0.000***
LARISK50	0.153	0.103	0.029	0.664	0.200	0.205	**1.000**	-0.128	-0.017	-0.389	0.417	0.449
	0.056*	0.199	0.716	0.000***	0.012**	0.010***		0.111	0.830	0.000***	0.000***	0.000***
LAWANG	0.166	-0.114	0.027	0.069	0.021	0.077	0.019	**1.000**	0.697	0.362	0.006	0.257
	0.038**	0.157	0.740	0.395	0.794	0.337	0.818		0.000***	0.000***	0.945	0.001***
LAGAECHTER	0.025	0.013	-0.106	0.056	0.170	-0.012	0.127	0.341	**1.000**	0.200	-0.074	0.176
	0.755	0.875	0.186	0.491	0.034**	0.885	0.114	0.000***		0.013**	0.361	0.028**
RAGAIN	-0.211	0.084	-0.069	-0.074	0.042	0.027	-0.185	0.115	0.147	**1.000**	0.265	0.320
	0.008***	0.299	0.395	0.361	0.599	0.741	0.021**	0.151	0.068*		0.001***	0.000***
RALOSS	-0.159	-0.071	0.006	-0.329	-0.042	-0.276	-0.234	-0.005	-0.050	0.320	**1.000**	0.146
	0.047**	0.381	0.937	0.000***	0.602	0.000***	0.003***	0.950	0.532	0.000***		0.070*
RAMIXED	0.017	0.074	-0.001	0.488	0.065	0.263	0.566	0.169	0.186	0.303	0.182	**1.000**
	0.837	0.356	0.992	0.000***	0.421	0.001***	0.000***	0.034**	0.020**	0.000***	0.023**	

WTA80DEV is the deviation of subjects' valuation of their equity stake from the rational economic share value in scenario 4; *LOSS* is a binary variable taking the value of 1 if prior project outcome is a loss; *CONS* is a binary variable taking the value of 1 if conservatism is applied; *LARISK* is an aggregated measure of subjects' loss aversion under risk calculated based on mixed outcome prospects; *LATIME* is an aggregated measure of subjects' degree of loss aversion over time based on payment prospects that contain a positive payment now and a negative payment in the future; *LARISK200* is a measure of subjects' degree of loss aversion under risk calculated based on subjects' certainty equivalents for the following mixed outcome prospect: (200, 1/2; -200); *LARISK50* is a measure of subjects' degree of loss aversion under risk calculated based on subjects' certainty equivalents for the following mixed outcome prospect: (50, 1/2; -50); *LAWANG* is an aggregated measure of subjects' degree of loss aversion based on the gain/loss ratio that makes subjects willing to participate in a certain lottery; *LAGAECHTER* is a measure of subjects' degree of loss aversion based on subjects' willingness to participate in six different lotteries; *RAGAIN* is subjects' risk aversion in gain settings; *RALOSS* is subjects' risk aversion in loss settings; *RAMIXED* is subjects' risk aversion in mixed settings; a detailed description of all variables including their measurement/coding is provided in Annex 4; ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10

Table 62: Correlation Matrix Risk Aversion (Three-way Interaction Tobit Regression)

N = 156, Pearson correlations below the diagonal and Spearman correlations above the diagonal.

	WTA80DEV	*LOSS*	*CONS*	*LARISK*	*LATIME*	*RAGAIN*	*RALOSS*	*RAMIXED*	*RAGENFIN*	*RAGNEEZY*	*GENDER*	*SHARESP*	*EXPFA1*
WTA80DEV	**1.000**	0.221	0.136	0.101	0.219	-0.194	-0.165	0.001	0.183	0.255	0.031	-0.003	0.003
		0.005***	0.091	0.212	0.006***	0.015**	0.039**	0.990	0.022**	0.001***	0.700	0.974	0.966
LOSS	0.204	**1.000**	0.076	-0.039	0.125	0.088	-0.070	0.097	-0.057	-0.143	-0.015	0.059	0.204
	0.010***		0.343	0.627	0.120	0.274	0.388	0.229	0.481	0.075*	0.853	0.468	0.011**
CONS	0.116	0.076	**1.000**	-0.106	0.059	-0.057	0.012	0.004	0.125	0.000	-0.211	0.210	0.148
	0.151	0.343		0.189	0.462	0.477	0.884	0.959	0.119	0.996	0.008***	0.008***	0.065*
LARISK	0.145	-0.083	-0.070	**1.000**	0.030	-0.151	-0.356	0.526	-0.015	0.012	0.168	-0.153	-0.076
	0.072*	0.304	0.387		0.709	0.060*	0.000***	0.000***	0.850	0.880	0.036**	0.056*	0.343
LATIME	0.187	0.077	0.067	0.110	**1.000**	-0.092	0.033	-0.033	-0.035	-0.070	-0.001	0.008	0.110
	0.020**	0.340	0.403	0.172		0.252	0.679	0.684	0.660	0.387	0.991	0.920	0.172
RAGAIN	-0.221	0.084	-0.069	-0.074	0.042	**1.000**	0.265	0.320	-0.312	-0.044	0.131	-0.150	-0.005
	0.008***	0.299	0.395	0.361	0.599		0.001***	0.000***	0.000***	0.582	0.104	0.062*	0.952
RALOSS	0.159	-0.071	0.006	-0.329	-0.042	0.320	**1.000**	0.146	-0.114	-0.282	-0.246	0.051	0.113
	0.047**	0.381	0.937	0.000***	0.602	0.000***		0.070*	0.157	0.000***	0.002***	0.528	0.160
RAMIXED	0.017	0.074	-0.001	0.488	0.650	0.303	0.182	**1.000**	-0.230	-0.157	0.077	-0.184	0.028
	0.837	0.356	0.992	0.000***	0.421	0.000***	0.023**		0.004***	0.050**	0.340	0.021**	0.730
RAGENFIN	0.162	-0.055	0.119	0.073	-0.020	-0.307	-0.155	-0.235	**1.000**	0.101	-0.235	0.386	0.117
	0.043**	0.499	0.139	0.367	0.804	0.000***	0.053*	0.003***		0.210	0.003***	0.000***	0.147
RAGNEEZY	0.268	-0.134	-0.007	0.054	-0.062	-0.106	-0.194	-0.212	0.194	**1.000**	0.222	-0.002	0.068
	0.001***	0.095*	0.935	0.502	0.441	0.188	0.015**	0.008***	0.015**		0.005***	0.981	0.396
GENDER	0.066	-0.015	-0.211	0.176	0.143	0.152	-0.188	0.116	-0.236	0.166	**1.000**	-0.297	-0.240
	0.415	0.853	0.008***	0.028**	0.074*	0.059*	0.019**	0.148	0.003***	0.038**		0.000***	0.003***
SHARESP	0.018	0.059	0.210	-0.131	-0.030	-0.170	0.041	-0.169	0.382	0.026	-0.297	**1.000**	0.244
	0.820	0.468	0.008***	0.103	0.711	0.034**	0.612	0.035**	0.000***	0.744	0.000***		0.002***
EXPFA1	0.015	0.204*	0.148	-0.016	0.012	0.036	0.52	0.005	0.118	0.075	-0.240	0.244	**1.000**
	0.852	0.011	0.065**	0.839	0.886	0.657	0.520	0.946	0.142	0.349	0.003***	0.002***	

WTA80DEV is the deviation of subjects' valuation of their equity stake from the rational economic share value in scenario 4; *LOSS* is a binary variable taking the value of 1 if prior project outcome is a loss; *CONS* is a binary variable taking the value of 1 if conservatism is applied; *LARISK* is an aggregated measure of subjects' loss aversion under risk calculated based on mixed outcome prospects; *LATIME* is an aggregated measure of subjects' degree of loss aversion over time based on payment prospects that contain a positive payment now and a negative payment in the future; *RAGAIN* is subjects' risk aversion in gain settings; *RALOSS* is subjects' risk aversion in loss settings; *RAMIXED* is subjects' risk aversion in mixed settings; *RAGENFIN* is an aggregated measure of subjects' overall risk attitude and their risk attitude in financial situations (1=not at all risk taking; 7=very risk taking); *RAGNEEZY* is subjects' overall risk attitude measured based on individuals' willingness to invest in a certain mixed outcome lottery; *GENDER* is a binary variable that takes the value of 1 if subject is a woman; *SHARESP* is a binary variable that takes the value of 1 if subjects owned shares in the past; *EXPFA1* is a binary variable that takes the value of 1 if subjects considered annual reports in the past; a detailed description of all variables including their measurement/coding is provided in Annex 4; ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10

Table 63: Regression Results *LARISK50*

$$WTA80DEV = \beta_0 + \beta_1 LOSS + \beta_2 CONS + \beta_3 LARISK(50) + \beta_4 LOSS{\cdot}CONS + \beta_5 LOSS{\cdot}LARISK(50) + \beta_6 CONS{\cdot}LARISK(50) + \beta_7 LOSS{\cdot}CONS{\cdot}LARISK(50) + \beta_8 LATIME + \beta_9 RAGAIN + \beta_{10} RALOSS + \beta_{11} RAMIXED + \varepsilon$$

DepVar= *WTA80DEV*

	LARISK			***LARISK50***		
Variables	**Coefficient**	***t*-Statistic**		**Coefficient**	***t*-Statistic**	
LOSS	6.982352	1.15		5.08511	0.87	
CONS	-1.945844	-0.27		-2.874653	-0.38	
LARISK(50)	-1.446784	-0.32		-11.90805	-3.40	***
LOSS*CONS	14.39964	1.52		12.81032	1.32	
LOSS*LARISK(50)	13.2203	1.77	*	8.336094	1.03	
CONS*LARISK(50)	15.68638	2.51	**	11.91176	1.41	
LOSS*CONS*LARISK(50)	-20.19987	-2.07	**	-22.8914	-1.73	*
LATIME	13.48979	3.40	***	17.19843	3.46	***
RAGAIN	-36.82603	-2.17	**	-56.19463	-3.10	***
RALOSS	-1.145277	-0.07		-32.45631	-1.83	*
RAMIXED	-9.655555	-0.46		38.60295	1.94	*
Constant	23.18434	3.38	***	14.83682	1.94	*
N		156			156	
F-Statistic		4.80			5.10	
p-Value		0.000	***		0.000	***
Pseudo R^2		0.0218			0.0191	
Log pseudolikelihood		-737.31672			-737.98712	
Highest VIF		3.07			3.34	

Tobit regression; *LARISK(50)* is mean-centered; *WTA80DEV* is the deviation of subjects' valuation of their equity stake from the rational economic share value in scenario 4; *LOSS* is a binary variable taking the value of 1 if prior project outcome is a loss; *CONS* is a binary variable taking the value of 1 if conservatism is applied; *LARISK* is an aggregated measure of subjects' loss aversion under risk calculated based on mixed outcome prospects; *LARISK50* is a measure of subjects' degree of loss aversion under risk calculated based on subjects' certainty equivalents for the following mixed outcome prospect: (50, 1/2; -50); *LATIME* is an aggregated measure of subjects' degree of loss aversion over time based on payment prospects that contain a positive payment now and a negative payment in the future; *RAGAIN* is subjects' risk aversion in gain settings; *RALOSS* is subjects' risk aversion in loss settings; *RAMIXED* is subjects' risk aversion in mixed settings; a detailed description of all variables including their measurement/coding is provided in Annex 4; ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed test)

Table 64: Regression Results *LARISK200*

$$WTA80DEV = \beta_0 + \beta_1 LOSS + \beta_2 CONS + \beta_3 LARISK(200) + \beta_4 LOSS{\cdot}CONS + \beta_5 LOSS{\cdot}LARISK(200) + \beta_6 CONS{\cdot}LARISK(200) + \beta_7 LOSS{\cdot}CONS{\cdot}LARISK(200) + \beta_8 LATIME + \beta_9 RAGAIN + \beta_{10} RALOSS + \beta_{11} RAMIXED + \varepsilon$$

DepVar= *WTA80DEV*

	LARISK			***LARISK200***		
Variables	**Coefficient**	***t*-Statistic**		**Coefficient**	***t*-Statistic**	
LOSS	6.982352	1.15		5.25014	0.86	
CONS	-1.945844	-0.27		-4.762326	-0.64	
LARISK(200)	-1.446784	-0.32		-6.005544	-2.53	**
LOSS*CONS	14.39964	1.52		16.22804	1.65	
LOSS*LARISK(200)	13.2203	1.77	*	11.0324	3.02	***
CONS*LARISK(200)	15.68638	2.51	**	9.251162	2.74	***
LOSS*CONS*LARISK(200)	-20.19987	-2.07	**	-14.97093	-1.72	*
LATIME	13.48979	3.40	***	15.23805	3.49	***
RAGAIN	-36.82603	-2.17	**	-47.51506	-2.97	***
RALOSS	-1.145277	-0.07		-12.03432	-0.84	
RAMIXED	-9.655555	-0.46		14.92959	0.87	
Constant	23.18434	3.38	***	19.97736	2.97	***
N		156			155	
F-Statistic		4.80			4.71	
p-Value		0.000	***		0.000	***
Pseudo R^2		0.0218			0.0205	
Log pseudolikelihood		-737.31672			-734.7917	
Highest VIF		3.07			3.03	

Tobit regression; *LARISK(200)* is mean-centered; *WTA80DEV* is the deviation of subjects' valuation of their equity stake from the rational economic share value in scenario 4; *LOSS* is a binary variable taking the value of 1 if prior project outcome is a loss; *CONS* is a binary variable taking the value of 1 if conservatism is applied; *LARISK* is an aggregated measure of subjects' loss aversion under risk calculated based on mixed outcome prospects; *LARISK200* is a measure of subjects' degree of loss aversion under risk calculated based on subjects' certainty equivalents for the following mixed outcome prospect: (200, 1/2; -200); *LATIME* is an aggregated measure of subjects' degree of loss aversion over time based on payment prospects that contain a positive payment now and a negative payment in the future; *RAGAIN* is subjects' risk aversion in gain settings; *RALOSS* is subjects' risk aversion in loss settings; *RAMIXED* is subjects' risk aversion in mixed settings; a detailed description of all variables including their measurement/coding is provided in Annex 4; ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed test)

Table 65: Regression Results *LAWANG*

$$WTA80DEV = \beta_0 + \beta_1 LOSS + \beta_2 CONS + \beta_3 LARISK(LAWANG) + \beta_4 LOSS{\cdot}CONS + \beta_5 LOSS{\cdot}LARISK(LAWANG) + \beta_6 CONS{\cdot}LARISK(LAWANG) + \beta_7 LOSS{\cdot}CONS{\cdot}LARISK(LAWANG) + \beta_8 LATIME + \beta_9 RAGAIN + \beta_{10} RALOSS + \beta_{11} RAMIXED + \varepsilon$$

DepVar= *WTA80DEV*

	LARISK			***LAWANG***		
Variables	**Coefficient**	***t*-Statistic**		**Coefficient**	***t*-Statistic**	
LOSS	6.982352	1.15		7.037979	1.11	
CONS	-1.945844	-0.27		-3.939851	-0.53	
LARISK(LAWANG)	-1.446784	-0.32		3.569517	1.57	
LOSS*CONS	14.39964	1.52		14.1608	1.49	
LOSS*LARISK(LAWANG)	13.2203	1.77	*	-3.313145	-1.09	
CONS*LARISK(LAWANG)	15.68638	2.51	**	-4.620476	-1.22	
LOSS*CONS*LARISK(LAWANG)	-20.19987	-2.07	**	17.08624	3.25	***
LATIME	13.48979	3.40	***	9.988817	2.38	**
RAGAIN	-36.82603	-2.17	**	-54.49575	-3.95	***
RALOSS	-1.145277	-0.07		-12.23032	-0.96	
RAMIXED	-9.655555	-0.46		4.242331	0.28	
Constant	23.18434	3.38	***	26.32383	3.84	***
N		156			154	
F-Statistic		4.80			6.26	
p-Value		0.000	***		0.000	***
Pseudo R^2		0.0218			0.0262	
Log pseudolikelihood		-737.31672			-724.08139	
Highest VIF		3.07			3.08	

Tobit regression; *LARISK(LAWANG)* is mean-centered; *WTA80DEV* is the deviation of subjects' valuation of their equity stake from the rational economic share value in scenario 4; *LOSS* is a binary variable taking the value of 1 if prior project outcome is a loss; *CONS* is a binary variable taking the value of 1 if conservatism is applied; *LARISK* is an aggregated measure of subjects' loss aversion under risk calculated based on mixed outcome prospects; *LAWANG* is an aggregated measure of subjects' degree of loss aversion based on the gain/loss ratio that makes subjects willing to participate in a certain lottery; *LATIME* is an aggregated measure of subjects' degree of loss aversion over time based on payment prospects that contain a positive payment now and a negative payment in the future; *RAGAIN* is subjects' risk aversion in gain settings; *RALOSS* is subjects' risk aversion in loss settings; *RAMIXED* is subjects' risk aversion in mixed settings; a detailed description of all variables including their measurement/coding is provided in Annex 4; ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed test)

Table 66: Regression Results *LAGAECHTER*

$$WTA80DEV = \beta_0 + \beta_1 LOSS + \beta_2 CONS + \beta_3 LARISK(LAGAECHTER) + \beta_4 LOSS{\cdot}CONS + \beta_5 LOSS{\cdot}LARISK(LAGAECHTER) + \beta_6 CONS{\cdot}LARISK(LAGAECHTER) + \beta_7 LOSS{\cdot}CONS{\cdot}LARISK(LAGAECHTER) + \beta_8 LATIME + \beta_9 RAGAIN + \beta_{10} RALOSS + \beta_{11} RAMIXED + \varepsilon$$

DepVar= *WTA80DEV*

	LARISK			***LAGAECHTER***		
Variables	**Coefficient**	***t*-Statistic**		**Coefficient**	***t*-Statistic**	
LOSS	6.982352	1.15		6.385931	1.01	
CONS	-1.945844	-0.27		-3.455341	-0.41	
LARISK(LAGAECHTER)	-1.446784	-0.32		0.9409011	0.13	
LOSS*CONS	14.39964	1.52		14.29763	1.39	
LOSS*LARISK (LAGAECHTER)	13.2203	1.77	*	0.6712699	0.08	
CONS*LARISK (LAGAECHTER)	15.68638	2.51	**	-9.034868	-0.64	
LOSS*CONS*LARISK (LAGAECHTER)	-20.19987	-2.07	**	13.97869	0.83	
LATIME	13.48979	3.40	***	10.59769	1.97	*
RAGAIN	-36.82603	-2.17	**	-41.73734	-2.94	***
RALOSS	-1.145277	-0.07		-14.63129	-1.08	
RAMIXED	-9.655555	-0.46		14.81263	0.96	
Constant	23.18434	3.38	***	23.20882	3.05	***
N		156			159	
F-Statistic		4.80			4.15	
p-Value		0.000	***		0.000	***
Pseudo R^2		0.0218			0.0178	
Log pseudolikelihood		-737.31672			-754.49575	
Highest VIF		3.07			3.05	

Tobit regression; *LARISK(LAGAECHTER)* is mean-centered; *WTA80DEV* is the deviation of subjects' valuation of their equity stake from the rational economic share value in scenario 4; *LOSS* is a binary variable taking the value of 1 if prior project outcome is a loss; *CONS* is a binary variable taking the value of 1 if conservatism is applied; *LARISK* is an aggregated measure of subjects' loss aversion under risk calculated based on mixed outcome prospects; *LAGAECHTER* is a measure of subjects' degree of loss aversion based on subjects' willingness to participate in six different lotteries; *LATIME* is an aggregated measure of subjects' degree of loss aversion over time based on payment prospects that contain a positive payment now and a negative payment in the future; *RAGAIN* is subjects' risk aversion in gain settings; *RALOSS* is subjects' risk aversion in loss settings; *RAMIXED* is subjects' risk aversion in mixed settings; a detailed description of all variables including their measurement/coding is provided in Annex 4; ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed test)

Table 67: Regression Results *RAGENFIN*

$$WTA80DEV = \beta_0 + \beta_1 LOSS + \beta_2 CONS + \beta_3 LARISK + \beta_4 LOSS{\cdot}CONS + \beta_5 LOSS{\cdot}LARISK + \beta_6 CONS{\cdot}LARISK + \beta_7 LOSS{\cdot}CONS{\cdot}LARISK + \beta_8 LATIME + \beta_9 RAGAIN + (\beta_9 RAGENFIN) + \beta_{10} RALOSS + \beta_{11} RAMIXED + \varepsilon$$

DepVar= *WTA80DEV*

Variables	**Coefficient**	***t*-Statistic**		**Coefficient**	***t*-Statistic**	
LOSS	6.982352	1.15		7.173822	1.17	
CONS	-1.945844	-0.27		-1.143609	-0.15	
LARISK	-1.446784	-0.32		-2.94897	-0.68	
LOSS*CONS	14.39964	1.52		12.34616	1.26	
LOSS*LARISK	13.2203	1.77	*	16.06687	2.37	**
CONS*LARISK	15.68638	2.51	**	15.66179	2.29	**
LOSS*CONS*LARISK	-20.19987	-2.07	**	-21.76764	-2.25	**
LATIME	13.48979	3.40	***	13.67704	2.77	***
RAGAIN	-36.82603	-2.17	**			
RALOSS	-1.145277	-0.07				
RAMIXED	-9.655555	-0.46				
RAGENFIN				4.350548	2.01	**
Constant	23.18434	3.38	***	0.7768852	0.08	
N		156			156	
F-Statistic		4.80			5.18	
p-Value		0.000	***		0.000	***
Pseudo R^2		0.0218			0.0197	
Log pseudolikelihood		-737.31672			-738.93071	
Highest VIF		3.07			4.72	

Tobit regression; *LARISK* is mean-centered; *WTA80DEV* is the deviation of subjects' valuation of their equity stake from the rational economic share value in scenario 4; *LOSS* is a binary variable taking the value of 1 if prior project outcome is a loss; *CONS* is a binary variable taking the value of 1 if conservatism is applied; *LARISK* is an aggregated measure of subjects' loss aversion under risk calculated based on mixed outcome prospects; *LATIME* is an aggregated measure of subjects' degree of loss aversion over time based on payment prospects that contain a positive payment now and a negative payment in the future; *RAGAIN* is subjects' risk aversion in gain settings; *RALOSS* is subjects' risk aversion in loss settings; *RAMIXED* is subjects' risk aversion in mixed settings; *RAGENFIN* is an aggregated measure of subjects' overall risk attitude and their risk attitude in financial situations (1=not at all risk taking; 7=very risk taking); a detailed description of all variables including their measurement/coding is provided in Annex 4; ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed test)

Table 68: Regression Results *RAGNEEZY*

$$WTA80DEV = \beta_0 + \beta_1 LOSS + \beta_2 CONS + \beta_3 LARISK + \beta_4 LOSS{\cdot}CONS + \beta_5 LOSS{\cdot}LARISK + \beta_6 CONS{\cdot}LARISK + \beta_7 LOSS{\cdot}CONS{\cdot}LARISK + \beta_8 LATIME + \beta_9 RAGAIN + (\beta_9 RAGNEEZY) + \beta_{10} RALOSS + \beta_{11} RAMIXED + \varepsilon$$

DepVar= *WTA80DEV*

Variables	**Coefficient**	***t*-Statistic**		**Coefficient**	***t*-Statistic**	
LOSS	6.982352	1.15		10.61157	1.72	*
CONS	-1.945844	-0.27		1.391077	0.19	
LARISK	-1.446784	-0.32		-3.535677	-0.81	
LOSS*CONS	14.39964	1.52		10.39469	1.08	
LOSS*LARISK	13.2203	1.77	*	15.58129	1.92	*
CONS*LARISK	15.68638	2.51	**	14.64049	2.23	**
LOSS*CONS*LARISK	-20.19987	-2.07	**	-16.72905	-1.53	
LATIME	13.48979	3.40	***	15.30205	3.04	***
RAGAIN	-36.82603	-2.17	**			
RALOSS	-1.145277	-0.07				
RAMIXED	-9.655555	-0.46				
RAGNEEZY				48.75044	3.75	***
Constant	23.18434	3.38	***	5.422923	0.79	
N		156			156	
F-Statistic		4.80			5.36	
p-Value		0.000	***		0.000	***
Pseudo R^2		0.0218			0.0292	
Log pseudolikelihood		-737.31672			-731.73919	
Highest VIF		3.07			2.74	

Tobit regression; *LARISK* is mean-centered; *WTA80DEV* is the deviation of subjects' valuation of their equity stake from the rational economic share value in scenario 4; *LOSS* is a binary variable taking the value of 1 if prior project outcome is a loss; *CONS* is a binary variable taking the value of 1 if conservatism is applied; *LARISK* is an aggregated measure of subjects' loss aversion under risk calculated based on mixed outcome prospects; *LATIME* is an aggregated measure of subjects' degree of loss aversion over time based on payment prospects that contain a positive payment now and a negative payment in the future; *RAGAIN* is subjects' risk aversion in gain settings; *RALOSS* is subjects' risk aversion in loss settings; *RAMIXED* is subjects' risk aversion in mixed settings; *RAGNEEZY* is subjects' overall risk attitude measured based on individuals' willingness to invest in a certain mixed outcome lottery; a detailed description of all variables including their measurement/coding is provided in Annex 4; ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed test)

Table 69: Regression Results *GENDER, SHARESP, EXPFA1*

$$WTA80DEV = \beta_0 + \beta_1 LOSS + \beta_2 CONS + \beta_3 LARISK + \beta_4 LOSS{\cdot}CONS + \beta_5 LOSS{\cdot}LARISK + \beta_6 CONS{\cdot}LARISK + \beta_7 LOSS{\cdot}CONS{\cdot}LARISK + \beta_8 LATIME + \beta_9 RAGAIN + \beta_{10} RALOSS + \beta_{11} RAMIXED + (\beta_{12}GENDER) + (\beta_{13}SHARESP) + (\beta_{14}EXPFA1) + \varepsilon$$

DepVar= *WTA80DEV*

Variables	**Coefficient**	***t*-Statistic**		**Coefficient**	***t*-Statistic**	
LOSS	6.982352	1.15		8.041343	1.27	
CONS	-1.945844	-0.27		-0.0755078	-0.01	
LARISK	-1.446784	-0.32		-1.896572	-0.41	
LOSS*CONS	14.39964	1.52		13.72865	1.45	
LOSS*LARISK	13.2203	1.77	*	12.60416	1.67	*
CONS*LARISK	15.68638	2.51	**	16.86718	2.68	***
LOSS*CONS*LARISK	-20.19987	-2.07	**	-20.19555	-2.04	**
LATIME	13.48979	3.40	***	12.53129	3.26	***
RAGAIN	-36.82603	-2.17	**	-41.32887	-2.52	**
RALOSS	-1.145277	-0.07		3.987241	0.24	
RAMIXED	-9.655555	-0.46		-11.07515	-0.55	
GENDER				6.713135	1.16	
SHARESP				-0.8292485	-0.15	
EXPFA1				-2.396017	-0.30	
Constant	23.18434	3.38	***	24.13922	2.49	***
N		156			156	
F-Statistic		4.80			4.05	
p-Value		0.000	***		0.000	***
Pseudo R^2		0.0218			0.0230	
Log pseudolikelihood		-737.31672			-736.46181	
Highest VIF		3.07			6.86	

Tobit regression; *LARISK* is mean-centered; *WTA80DEV* is the deviation of subjects' valuation of their equity stake from the rational economic share value in scenario 4; *LOSS* is a binary variable taking the value of 1 if prior project outcome is a loss; *CONS* is a binary variable taking the value of 1 if conservatism is applied; *LARISK* is an aggregated measure of subjects' loss aversion under risk calculated based on mixed outcome prospects; *LATIME* is an aggregated measure of subjects' degree of loss aversion over time based on payment prospects that contain a positive payment now and a negative payment in the future; *RAGAIN* is subjects' risk aversion in gain settings; *RALOSS* is subjects' risk aversion in loss settings; *RAMIXED* is subjects' risk aversion in mixed settings; *GENDER* is a binary variable that takes the value of 1 if subject is a woman; *SHARESP* is a binary variable that takes the value of 1 if subjects owned shares in the past; *EXPFA1* is a binary variable that takes the value of 1 if subjects considered annual reports in the past; a detailed description of all variables including their measurement/coding is provided in Annex 4; ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed test)

Table 70: Regression Results Sample St. Gallen

$$WTA80DEV = \beta_0 + \beta_1 LOSS + \beta_2 CONS + \beta_3 LARISK + \beta_4 LOSS{\cdot}CONS + \beta_5 LOSS{\cdot}LARISK + \beta_6 CONS{\cdot}LARISK + \beta_7 LOSS{\cdot}CONS{\cdot}LARISK + \beta_8 LATIME + \beta_9 RAGAIN + \beta_{10} RALOSS + \beta_{11} RAMIXED + \varepsilon$$

DepVar= *WTA80DEV*

	Full Sample			**St. Gallen**		
Variables	**Coefficient**	***t*-Statistic**		**Coefficient**	***t*-Statistic**	
LOSS	6.982352	1.15		4.048756	0.53	
CONS	-1.945844	-0.27		-8.756895	-0.98	
LARISK	-1.446784	-0.32		-0.1947025	-0.04	
LOSS*CONS	14.39964	1.52		22.86961	2.04	**
LOSS*LARISK	13.2203	1.77	*	16.53606	1.56	
CONS*LARISK	15.68638	2.51	**	15.44603	2.46	**
LOSS*CONS*LARISK	-20.19987	-2.07	**	-22.46176	-1.82	*
LATIME	13.48979	3.40	***	13.04173	3.43	***
RAGAIN	-36.82603	-2.17	**	-39.15507	-2.02	**
RALOSS	-1.145277	-0.07		13.47144	0.74	
RAMIXED	-9.655555	-0.46		-21.75602	-0.91	
Constant	23.18434	3.38	***	30.21698	3.74	***
N		156			122	
F-Statistic		4.80			4.75	
p-Value		0.000	***		0.000	***
Pseudo R^2		0.0218			0.0245	
Log pseudolikelihood		-737.31672			-573.55362	
Highest VIF		3.07			2.98	

Tobit regression; *LARISK* is mean-centered; *WTA80DEV* is the deviation of subjects' valuation of their equity stake from the rational economic share value in scenario 4; *LOSS* is a binary variable taking the value of 1 if prior project outcome is a loss; *CONS* is a binary variable taking the value of 1 if conservatism is applied; *LARISK* is an aggregated measure of subjects' loss aversion under risk calculated based on mixed outcome prospects; *LATIME* is an aggregated measure of subjects' degree of loss aversion over time based on payment prospects that contain a positive payment now and a negative payment in the future; *RAGAIN* is subjects' risk aversion in gain settings; *RALOSS* is subjects' risk aversion in loss settings; *RAMIXED* is subjects' risk aversion in mixed settings; a detailed description of all variables including their measurement/coding is provided in Annex 4; ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed test)

Table 71: Regression Results Manipulation Check Questions Correctly Answered

$$WTA80DEV = \beta_0 + \beta_1 LOSS + \beta_2 CONS + \beta_3 LARISK + \beta_4 LOSS{\cdot}CONS + \beta_5 LOSS{\cdot}LARISK + \beta_6 CONS{\cdot}LARISK + \beta_7 LOSS{\cdot}CONS{\cdot}LARISK + \beta_8 LATIME + \beta_9 RAGAIN + \beta_{10} RALOSS + \beta_{11} RAMIXED + \varepsilon$$

DepVar= *WTA80DEV*

	Full Sample			**MCQ correct**		
Variables	**Coefficient**	***t*-Statistic**		**Coefficient**	***t*-Statistic**	
LOSS	6.982352	1.15		6.19018	0.93	
CONS	-1.945844	-0.27		-3.810707	-0.44	
LARISK	-1.446784	-0.32		3.410841	0.97	
LOSS*CONS	14.39964	1.52		18.77483	1.65	
LOSS*LARISK	13.2203	1.77	*	1.549762	0.22	
CONS*LARISK	15.68638	2.51	**	21.81207	2.74	***
LOSS*CONS*LARISK	-20.19987	-2.07	**	-19.45522	-1.85	*
LATIME	13.48979	3.40	***	14.72589	3.19	***
RAGAIN	-36.82603	-2.17	**	-23.78292	-1.23	
RALOSS	-1.145277	-0.07		0.7713735	0.04	
RAMIXED	-9.655555	-0.46		-2.465984	-0.09	
Constant	23.18434	3.38	***	17.77213	2.56	***
N		156			115	
F-Statistic		4.80			5.06	
p-Value		0.000	***		0.000	***
Pseudo R^2		0.0218			0.0270	
Log pseudolikelihood		-737.31672			-541.29517	
Highest VIF		3.07			3.02	

Tobit regression; *LARISK* is mean-centered; *WTA80DEV* is the deviation of subjects' valuation of their equity stake from the rational economic share value in scenario 4; *LOSS* is a binary variable taking the value of 1 if prior project outcome is a loss; *CONS* is a binary variable taking the value of 1 if conservatism is applied; *LARISK* is an aggregated measure of subjects' loss aversion under risk calculated based on mixed outcome prospects; *LATIME* is an aggregated measure of subjects' degree of loss aversion over time based on payment prospects that contain a positive payment now and a negative payment in the future; *RAGAIN* is subjects' risk aversion in gain settings; *RALOSS* is subjects' risk aversion in loss settings; *RAMIXED* is subjects' risk aversion in mixed settings; a detailed description of all variables including their measurement/coding is provided in Annex 4; ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed test)

Table 72: OLS Regression Results *LARISK*

$$WTA80DEV = \beta_0 + \beta_1 LOSS + \beta_2 CONS + \beta_3 LARISK + \beta_4 LOSS{\cdot}CONS + \beta_5 LOSS{\cdot}LARISK + \beta_6 CONS{\cdot}LARISK + \beta_7 LOSS{\cdot}CONS{\cdot}LARISK + \beta_8 LATIME + \beta_9 RAGAIN + \beta_{10} RALOSS + \beta_{11} RAMIXED + \varepsilon$$

DepVar= *WTA80DEV*

	Tobit			**OLS**		
Variables	**Coefficient**	***t*-Statistic**		**Coefficient**	***t*-Statistic**	
LOSS	6.982352	1.15		7.246979	1.18	
CONS	-1.945844	-0.27		-1.698822	-0.24	
LARISK	-1.446784	-0.32		-1.548124	-0.33	
LOSS*CONS	14.39964	1.52		13.9938	1.46	
LOSS*LARISK	13.2203	1.77	*	12.51248	1.63	
CONS*LARISK	15.68638	2.51	**	13.19811	2.48	**
LOSS*CONS*LARISK	-20.19987	-2.07	**	-17.2817	-1.87	*
LATIME	13.48979	3.40	***	13.18004	3.27	***
RAGAIN	-36.82603	-2.17	**	-36.72637	-2.15	**
RALOSS	-1.145277	-0.07		-3.006994	-0.18	
RAMIXED	-9.655555	-0.46		-5.622375	-0.28	
Constant	23.18434	3.38	***	22.41989	3.32	***
N		156			156	
F-Statistic		4.80			5.18	
p-Value		0.000	***		0.000	***
Pseudo R^2		0.0218				
Log pseudolikelihood		-737.31672				
R^2					0.1892	
Root MSE					30.883	
Highest VIF		3.07			3.07	

Tobit/OLS regression; *LARISK* is mean-centered; *WTA80DEV* is the deviation of subjects' valuation of their equity stake from the rational economic share value in scenario 4; *LOSS* is a binary variable taking the value of 1 if prior project outcome is a loss; *CONS* is a binary variable taking the value of 1 if conservatism is applied; *LARISK* is an aggregated measure of subjects' loss aversion under risk calculated based on mixed outcome prospects; *LATIME* is an aggregated measure of subjects' degree of loss aversion over time based on payment prospects that contain a positive payment now and a negative payment in the future; *RAGAIN* is subjects' risk aversion in gain settings; *RALOSS* is subjects' risk aversion in loss settings; *RAMIXED* is subjects' risk aversion in mixed settings; a detailed description of all variables including their measurement/coding is provided in Annex 4; ***p-value ≤ 0.01, **p-value ≤ 0.05, *p-value ≤ 0.10 (two-tailed test)

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