

Thesis

Investment Risk Preferences of Decision Makers Acting on Behalf of German Charitable Trusts

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Abstract

This research programme investigates the subjective utility of monetary outcomes and applies the existing knowledge base regarding the quantification and description of risk preferences to German charitable trusts. Results are discussed on the basis of Expected Utility Theory (EUT) and Prospect Theory (PT) with a focus on the “Fourfold Pattern (4FP)” of PT. The description of risk preferences of trusts enables investors, advisors and portfolio managers to optimise their investment strategies for this specific target group disposing of an estimated asset base of about € 100bn.

The subjects of this study, German charitable trusts, are restricted in their investment decisions by a given legal framework and therefore prone to deviate in their preferences from the subjects that have been examined in prior academic studies. The thesis aims at filling this research gap by applying the knowledge base of decision theory to German charitable trusts using an original set of representative data which was generated as part of this study.

Firstly, regarding the general investment risk preferences of trusts, the study finds risk aversion predominating in the domain of gains and observes loss aversion, both analogous to prior research on private individuals. The PT pattern of risk-seeking behaviour for losses can only partly be asserted. In contrast to PT, no evidence is found for the subjective overweighting of small probabilities. Secondly, the study identifies and discusses characteristics of trusts which are associated with risk preferences: Equity investments, expected external growth of assets, age of the investment decision makers, type of donor and involvement of the donor in investment decisions.

As a contribution to decision theory, the author proposes a utility function representing the preferences of trusts based on decision theoretical backgrounds. As a contribution to practical investment implications, the author proposes to redefine the question of “safe investments” and to focus on distributable yields generated by a higher equity portion in trust portfolios.

To Anja

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Glossary of Key Terms

Abgabenordnung (AO)

German Fiscal Code

Bundesverband Deutscher Stiftungen (BDS)

Federal Association of German Charitable Trusts

Bürgerliches Gesetzbuch (BGB)

The German Civil Code explicitly deals with trusts in its articles §§ 80 – 88 and sets the basic definitions and rules for trusts. Other regulations of the BGB can be relevant for trusts as well.

Certainty Equivalence Method (CEM)

Method for the elicitation of utility curves (Farquhar, 1984)

Decision Theory

Superordinate term, including all concepts, normative as well as descriptive ones (see below), that deal with human decision making (Peterson, 2009)

Expected Utility Theory (EUT)

Predominant normative decision theory which prescribes behaviour based on axioms of economic rationality but fails to explain various phenomena in actually observed behaviour (von Neumann/Morgenstern, 1947)

Fourfold Pattern (4FP)

In Prospect Theory, typically observed pattern of preferences: 1) risk aversion with high probability gains, 2) risk-seeking for low probability high gains, 3) risk-seeking for high probability losses, 4) risk aversion for low probability high losses (Kahneman/Tversky, 1979)

Landesstiftungsgesetz (LStiftG)

The 16 German Federal States each have laws that set the framework for trusts. They add to the general regulations of the BGB and are per definition subordinated to the BGB.

Loss Aversion

Observed phenomenon that losses loom larger than gains of the same absolute magnitude (Kahneman/Tversky, 1979)

Lottery

Common method to elicit the utility of outcomes, where the subject has to state preferences for sets of potential outcomes with different probabilities (Farquhar, 1984)

Lottery Equivalence Method (LEM)

Method for the elicitation of utility curves (McCord/De Neufville, 1986)

Probability Equivalence Method (PEM)

Method for the elicitation of utility curves (Farquhar, 1984)

Prospect

List of consequences with associated probabilities (Starmer, 2000)

Prospect Theory (PT) / Cumulative Prospect Theory (CPT)

Predominant descriptive decision theory which describes typical human behaviour, dividing between utility in the domain of gains and losses and accounting for subjective (instead of objective, as in EUT) decision weights (Kahneman/Tversky, 1979; Tversky/Kahneman, 1992)

Rank Dependent Expected Utility Theory (RDEUT)

Utility theory taking into account ranks in decision weights (Quiggin, 1982; Schmeidler, 1989)

Tradeoff Method (TOM)

Method for the elicitation of utility curves (Wakker/Deneffe, 1996)

von Neumann and Morgenstern (VNM)

Authors who made essential contributions to Expected Utilities Theory (von Neumann/ Morgenstern, 1947)

List of Abbreviations

4FP	Fourfold Pattern
AO	Abgabenordnung [German Fiscal Code]
BDS	Bundesverband Deutscher Stiftungen [Federal Association of German Charitable Trusts]
BFH	Bundesfinanzhof [German Supreme Tax Court]
BGB	Bürgerliches Gesetzbuch [German Civil Code]
CEM	Certainty Equivalence Method
CPT	Cumulative Prospect Theory
CSI	Centre for Social Investment, University of Heidelberg
EUT	Expected Utility Theory
K.O.	Knock-out (with respect to questions discarding subjects from the study)
LStiftG	Landesstiftungsgesetz [German Federal State's Trust Law]
LEM	Lottery Equivalence Method
PEM	Probability Equivalence Method
PT	Prospect Theory
RDEUT	Rank Dependent Expected Utility Theory
TOM	Tradeoff Method
VNM	von Neumann and Morgenstern

1 Introduction

Previous research in the field of decision theory has developed mathematical techniques to quantify and to describe the risk preferences of individuals and groups of people. Decision theory is applicable to investigate preferences in a broad variety of decisions in human life which have to be made under risk, i.e. with given probabilities for the potential outcomes, or under uncertainty, i.e. without a complete set of these parameters. Decisions may include essential questions concerning health like “Does a person accept a medical treatment which can cure her disease at a probability of 50% but will lead to immediate death otherwise?” as well as questions concerning potential investment outcomes like “Does a person prefer a safe annual yield of 3% over a 50/50 chance on 8% or nothing?”.

This research programme deals with the latter kind of questions and investigates the subjective utility of potential monetary outcomes. It applies the existing knowledge base regarding the quantification and description of risk preferences to German charitable trusts, which have not yet been subjects of this kind of investigation, in order to address this research gap.

Firstly, the study aims at general findings regarding the investment risk preferences of decision makers acting on behalf of German charitable trusts which are restricted in their decisions by a given legal framework. This particular framework is the reason why the study focuses on Germany exclusively. Secondly, the research wants to make a contribution with respect to testing for the association of certain trust characteristics with stated investment risk preferences.

The researcher works under a predominantly positivist paradigm using a mixed methods sequential explanatory approach. The quantitative first part of the study is realised by an internet survey that embeds as a core component the well-established method of lottery questions to elicit risk preferences. In prior studies on private individuals, a fourfold pattern (hereafter: 4FP) of risk attitudes

and loss aversion has been found. The study investigates whether this pattern can also be observed for the investor group of German charitable trusts and what trust specific circumstances cause behaviour that deviates from the group's.

The programme contains in its subsequent part a qualitative assessment of the results of the quantitative part which are generated by semi-structured interviews. The conclusions of the study are twofold: As a contribution to decision theory, the author proposes a utility function representing the preferences of trusts based on decision theoretical backgrounds. As a contribution to practical investment implications and with particular regard to the current capital market environment, the author proposes to redefine the question of "safe investments" and to focus on distributable yields generated by a higher equity portion in trust portfolios.

Chapter 2 gives an overview of the main characteristics of German charitable trusts and puts them into context with the investment strategy. The legal framework is analysed for its direct and indirect limitations to the investment policy and resulting implications on risk preferences of the decision makers acting on behalf of the trusts. Chapter 3 describes and discusses the tools of decision theory, with a strong focus on the descriptive works of Prospect Theory (PT) / Cumulative Prospect Theory (CPT) and particularly its 4FP, for their potential as a theoretical backbone of the study to describe the risk preferences of trusts. A synthesis of the preceding two chapters is given in chapter 4, leading to conjectures for investigation which are then formulated as initial research questions, aims, objectives and hypotheses. The subsequent chapter 5 deals with the pilot study that was conducted as a survey with trusts in order to test the methodology and to confirm the author's interpretation of the theoretical background. Chapter 6 discusses and defines the mixed methods sequential explanatory approach to be chosen for the main study. Chapter 7 provides the quantitative results of the survey and the analysis of the collected data. The qualitative assessment and triangulation of results by telephone interviews with trusts follows in chapter 8. Chapter 9 closes the thesis with the integration of quantitative and qualitative results, making conclusions by providing a utility curve for trusts and discussing the implications on investment practice.

2 German Charitable Trusts and the Legal Investment Framework

Despite the theoretically eternal life-time of German charitable trusts, which might point to a high risk bearing capability, its decision makers are constrained in their investment decisions and at least partly short-term oriented. They must abide by the legal framework, justify their decisions in front of authorities and have to consider cash flow needs to finance their activities.

This study focuses solely on charitable trusts in Germany. The legislation with regard to German trusts is specific and is assumed to be influential on investment preferences. It differs substantially for example from the USA, where an annual distribution of 5% on the trust capital is mandatory and may direct decision makers to a more growth oriented investment policy.¹ In the UK, the guidance by the authorities towards riskier investments is much more pronounced than in Germany and will be discussed in section 2.6.

In Germany, the basic legal framework is set by the German Civil Code (Bürgerliches Gesetzbuch, BGB) in its §§ 80 - 88, the law of the respective federal state (Landesstiftungsgesetz, LStiftG) in which the charitable trust is domiciled and the German Fiscal Code (Abgabenordnung, AO) in its §§ 51 - 68. All the articles have in common that they contain only guidelines, some limitations, but no concrete specification of how to invest the trust's capital. Dedicated federal state-run bodies, the supervisory authorities (Stiftungsaufsicht), approve and supervise the trusts that are a legal entity concerning their abidance by the BGB and LStiftG, whereas the fiscal authorities are able to award a tax-exempt status on the basis of acknowledging charitable status according to the AO.

The trusts' capital ("Kapitalstock" or "Grundstockvermögen") is central to this research study. It is defined as the capital that is constituent of the trust according

¹ Tax Reform Act, 1969

to § 81 (1) BGB (“Vermögen”, wealth) for the durable and sustainable fulfilment of the purpose. It includes all additions that can potentially be made after the foundation of the trust (“Zustiftungen”) and the building of dedicated capital reserves. Returns from the trust’s capital, donations that are not dedicated to the trust’s capital and other income that is to be used directly in the sense of the purpose of the trust as an expense, are explicitly not included to the definition of a trust’s capital.

The literature on German charitable trusts and their investments is dominated by interpretations of the legal framework. Additionally, descriptive empirical studies mainly analysing the diversity of the landscape of trusts have been conducted. Some authors put emphasis on the demand for an enduring and sustainable optimal realisation of the purpose of the trust, while others concentrate on the restrictions for investments. The challenge for the trusts, after all, is to fulfil their purpose in compliance with the legal framework which may in particular require to reach certain yields for distribution and to avoid losses on their capital base.

2.1 Characteristics of German Charitable Trusts and their Meaning for the Investment Strategy

German charitable trusts are institutions which are founded to pursue certain individually defined purposes. An essential characteristic of a charitable trust are its initial assets (the trust’s capital as defined above) which usually serve as the basis to generate income. Typically, trusts distribute these returns from capital to a large extent as well as other funds that can be raised in order to fulfil the purpose of the trust.

A trust, under the German Civil Code (BGB) §§80 - 88, can be founded by any person that is willing and able to capitalise it. Even though the laws do not prescribe a certain minimum amount, it can be argued that a lack of sufficient capital must automatically question the sustainability of the trust. Schwalmé (2010) proposes a minimum of € 50k. The authorities of the federal states which

are responsible for the approval of trusts may accept also a lower initial capital (e.g. € 25k in Rhineland-Palatinate). The only main other restriction is that the purpose of the trust must not endanger common welfare. If the trust aims at following goals listed in a catalogue of the German Fiscal Code (AO), it will qualify to be regarded as charitable and enjoy the benefits of the tax-exempt status. The relevant catalogue of §§ 52-54 AO comprises purposes like the promotion of science and research, religion, healthcare, welfare, art and culture, education, protection of the environment or sports. These charitable trusts are the ones to be examined in this study.

2.1.1 The Legal Structure of Trusts in Germany

The term “Stiftung” (translated as “trust”) in the German language refers to a variety of sometimes similar, but often different organisations. For the study, it is important to distinguish between the various kinds of trusts and to define criteria for inclusion in the study.

The first general distinction between trusts can be made according to their legal capacity. A trust with legal capacity is a self-contained estate with its own legal personality. A trust without legal capacity, called fiduciary trust, comes into existence by donation of assets to a natural or legal person with the requirement to use them for the purpose named by the donor. Trusts without legal capacity are not subject to the regulation of the LStiftG and to the approval and control procedure of the supervisory authority.

The study will concentrate on trusts with legal capacity only.

The second distinguishing criterion is the question whether a trust was founded under private (BGB) or public (Öffentliches Recht, ÖR) law. The main differences between the two concern the establishment of the trust and the purpose. A trust under private law is based on articles §§ 80-88 BGB, whereas a trust under public law is usually established by a dedicated foundation law and takes

responsibilities of public administration.

The study will concentrate on the trusts founded under regulation of BGB only.

The third distinguishing mark that can be made concerns the charitable status according to the Fiscal Code (AO) in its articles §§ 52-54. Organisations that are named “trusts” but are used as a vehicle to follow private welfare purposes only will be excluded from the study as these trusts may rather represent the investment behaviour of private persons.

For the study, only those trusts acknowledged as charitable by the fiscal authorities according to the Fiscal Code will be included.

2.1.2 Types of Trusts in Germany

The literature distinguishes between various basic types of trusts, the compilation below partly follows the classification of Von Holt/Koch (2004):

- a) “Financial Aid”: Simple trusts for the promotion of a purpose (Einfache Förderstiftung), without any operational activity, restrict themselves to investing the trust’s capital and allocate the returns in accordance with the purpose.
- b) “Operational”: Trusts with an operational activity (Operativ tätige Stiftung) fulfil the purpose of the trust not only by allocating to others but also by proprietary operational activities. These activities can either be of idealistic nature without aiming at material income for a service or they represent a business which includes income like from providing a home and education for disabled people.
- c) “Financial Aid and Operational”: Mixed trusts that contain the elements of both a) and b)

It can be expected that the “Financial Aid” trusts rely to a higher degree on income from capital because they lack income from operational activities and may therefore exhibit investment risk preferences different from those trusts of

the other two categories.

With regard to the donors and the surrounding of the trusts, the literature names:

- a) Trusts founded by natural persons
- b) Civic Trusts (Bürgerstiftung), which are in many cases characterised by a high number of co-donors for purposes that concern common interest like the maintenance of local institutions like libraries, which are no longer financed by the state.
- c) Ecclesiastical trusts (Kirchenstiftung) can serve the criteria of having legal capacity, being established under private law and considered charitable under the Fiscal Code. These trusts need additional approval of the respective ecclesiastical authorities. Under these restrictions, they can be included in this study.
- d) Municipal trusts (Kommunalstiftung), which are usually administered by the bodies of the regional authorities.
- e) Trusts with ownership of companies (Unternehmensstiftung) may generate income from activities that possibly do not directly serve the original purpose of the trust, but use the generated income for donations to the trust.
- f) Other forms of trusts exist, which do not match exactly to the descriptions above, e.g. where the founder is a registered association

The donor could be of relevance for investment preferences insofar as personal involvement and public attention are concerned.

Some special types of trusts are listed below:

- a) Family trusts (Familienstiftung) serve the purpose of supporting family members. They only have the chance to receive the fiscal status of a charitable trust if they use a maximum of 1/3 for the family and the rest for activities considered charitable.
- b) Trusts with a predefined life time (Verbrauchsstiftung), where the consumption of capital is intended, will be excluded from this study as their time horizon is

limited. In many cases, they are founded just for one dedicated purpose like the renovation of a church building.

c) As a substitute for a trust under the regulations of BGB, trusts with a deviating legal form can be founded. These organisations may call themselves trusts as well, but are not subject to the full regulatory impact. They will be excluded from this study.

Conjectures for investigation:

Trust specific: There is an association between the type of trust (with respect to its activities) and investment risk preferences.

Trust specific: There is an association between the type of donor and investment risk preferences.

2.1.3 Organisational Structures within Trusts

Regarding the internal organisation of a trust, the law, §86 BGB in combination with §26 BGB, requires only a management board (Vorstand) which may consist of only one person. The management board represents the trust in all matters. Depending on the size of the trust and the individual needs, the organisation of the trust can expand far beyond these minimum requirements and establish more bodies.

Von Holt/Koch (2004) describe a variety of possibilities in structuring the organisation of a trust. A rather complex example illustrated in figure 1 includes a number of bodies starting with the Congregation of Donors (Stifternversammlung), consisting of all the donors, which advises and possibly sends delegates to the Board of Directors (Kuratorium, Stiftungsrat). The Board of Directors may preferably take duties in all strategic matters of the trust and receive, if needed, additional advice concerning specific topics from experts in Advisory Councils (Ausschuss, Beirat). The Board of Directors can appoint, advise and control the Management Board (Vorstand) which is supposed to take care of all operational issues. The Management Board may hire a manager and other employees to do

the day-to-day business in the trust. All the afore mentioned participating persons may take their responsibilities on a honorary or on a professional basis.

The segregation of duties and power is also an expression of good trust governance and gains importance with the size of the trust (Pues/Scheerbarth, 2008). The cooperation of the Management Board and the Board of Directors will in many cases be of superior importance for the functioning of organisation of the trust (Schuhen, 2005).

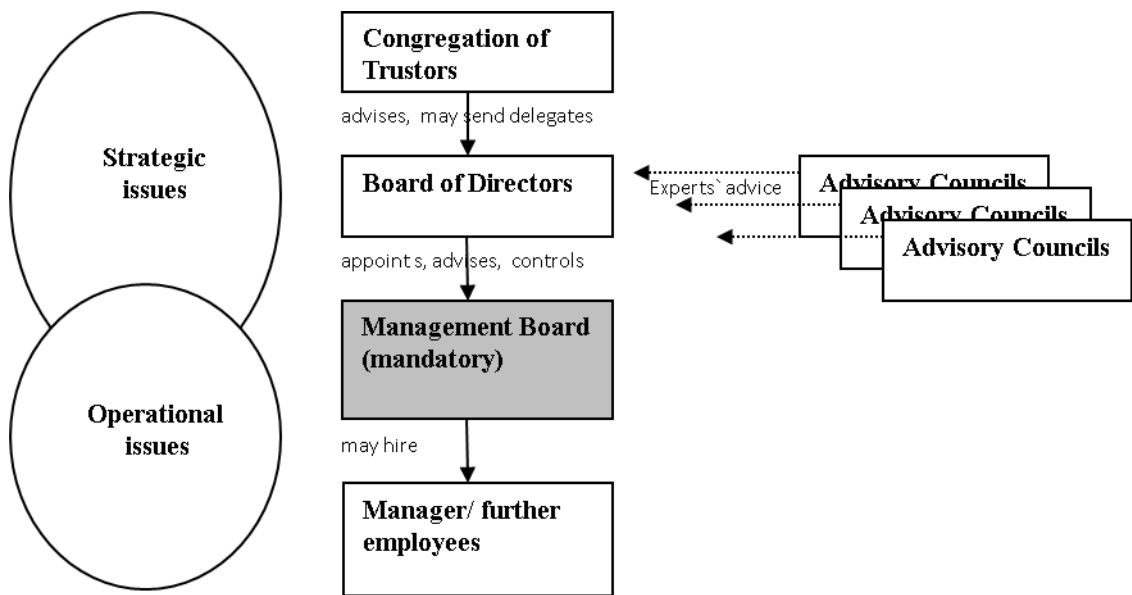


Figure 1: Example for organisation of a trust, similar to von Holt/Koch (2004)

With increasing complexity of organisational structures, the task for the researcher to find appropriate addressees gets more demanding and the position of persons and responsibility in the trust must be assessed. With regard to the complexity of the organisation, it could be of importance for investment decisions, how many people are directly involved, their age and their gender (Eckel/Grossmann, 2008; Borghans et al., 2009; Palsson, 1996; Gächter, 2007). The donor can be in an accentuated position, virtually controlling all important decisions in the trust, even if other formally responsible bodies exist. Schwalme

(2010) points to the danger of potential principal-agent² problems in trusts as board members might abuse their power in the trust to pursue their aims instead of following the will of the donor, a topic that may especially concern financial decisions. The study will therefore also address the question of donor involvement in investment decision making.

Conjectures for investigation:

Trust specific: There is an association between the involvement of the donor in investment decisions and investment risk preferences.

Trust specific: There is an association between the number of investment decision makers and investment risk preferences.

Trust specific: There is an association between the age of investment decision makers and investment risk preferences.

Trust specific: There is an association between the gender of investment decision makers and investment risk preferences.

2.1.4 Trends in Number and Assets under Management

The number of charitable trusts in Germany has risen sharply within the last decade. Bundesverband Deutscher Stiftungen (BDS) counts about 19,000 trusts as of the end of 2011 (BDS, 2012) and approximately 900 new trusts per year in average for the last ten years, with the lowest figure being 774 in 2002 and the highest one 1,134 in 2007. This means that the number of trusts founded within the last ten years equals almost 50% of all trusts existing at the end of 2011. One reason for the increasing numbers can be found in the legal reforms of the years 2000/2002 and 2007 which additionally encourage donors, for example by giving them higher tax incentives than before. Assets under management grow with asset price appreciation and the rising number of trusts. It can be estimated that the total volume of assets of all German charitable trusts as of end 2010 reaches about €100 bn. (BDS, 2011a).

² The classic principal-agent conflict between an owner and the top management of a company is described by Jensen/Meckling (1976). It refers to deviating personal goals of the two parties.

The size of the single trusts varies substantially. The largest ones are estimated to have assets with a net worth of several billion € (BDS, 2012), whereas a high number of small trusts does not even reach € 100,000. Sprengel/Ebermann (2007) point to huge difficulties in comparing the size of trusts for the reason of the non-existence of consistent standards of measurement which is an issue that has not been solved yet. Knowing that precise comparable data will not be available, the researcher nevertheless categorised trusts for their size measured by their capital base as this may be an important, maybe even the single most important factor that determines investment behaviour. Very large trusts on the one side of the scale, having a professional management, can be expected to rely on more expertise in financial matters than small ones with limited human resources and specific financial know-how on the other side of the scale.

The rationale behind the decision to establish a trust can be varicoloured for the founder. Von Holt/Koch (2004) see philanthropy only as one possible reason. Others include personal motives like prestige, vanity, and even a kind of search for eternity. Becoming a founder can also be caused by a lack of inheritors and the existing tax incentives for donors. The list of potential triggers is long. Timmer (2005) gives an overview. This in combination with an ageing society gives reason to assume that the number of charitable trusts in Germany is set to rise further in coming years.

The future will reveal what kind of trusts will really be able to survive for the intended long time period. It can be questioned (Benke, 2006) whether especially the trusts with a low capital base and those which depend heavily on the personal commitment and work of their founders, will be able to persist in a meaningful way following their original goals. Furthermore, the administrative costs can make up a high portion of the returns of the trust's capital leaving less or even no room for the sustainable fulfilment of the purpose.

Especially the high number of young trusts will have to prove that they can fulfil their mission in a sustainable way. They may encounter challenges, also in investing their capital, different from the ones that older trusts have. The study will

therefore also analyse whether the investment preferences of these trusts are different from the established ones. The study will also ask the trusts for the prospect of potential donations dedicated to the trusts' capital within coming years and investigate the influence on risk attitudes. Trusts which expect further substantial donations may have a different financial planning and with it also different investment preferences.

Conjectures for investigation:

Trust specific: There is an association between the size of trusts and investment risk preferences.

Trust specific: There is an association between the age of trusts and investment risk preferences.

Trust specific: There is an association between prospective growth of the asset base and investment risk preferences.

2.1.5 The Importance of Returns from Capital and Typical Investment Strategies

In order to finance their projects, German charitable trusts need income. This income may stem from different sources, the most important ones usually are income from investment of the trust's capital, donations, sponsoring, own activities and public sources (Sandberg, 2007). Asset management can be seen as one of the economically crucial points for the success of a trust. Byallas (2004) states that securing the assets of the trust must be seen as a superior goal even in comparison to the work on the purpose of the trust because it is the returns from assets (and other income if applicable) which make it possible at all to pursue the purpose of the trust. Carstensen (2005) argues that aiming at returns from investment activity must be seen as the centre point of the economic target system because higher yields increase the effectiveness of the trust. It can be objected that trusts may for example concentrate on fund raising instead and the relative importance of asset management for the effectiveness of a trust could be substantially reduced by fund raising activities. This may have a significant effect on investment risk attitudes.

The literature usually discusses two main aims of investment management in trusts which are not always compatible: the preservation of capital and the need for yield leading to a sufficient distribution of returns to fulfil the purpose of the trust. The preservation of capital is widely described as a fundamental principle for the investment policy of trusts (e.g. Carstensen, 2005; Waiblinger, 2008). Anders (2009) states that loss aversion gains importance, which finds its expression in the demand for absolute return strategies. The exact meaning of “capital preservation” and its implications are nevertheless subject of discussion as will be analysed in the subsequent chapters of this text.

Typical investment strategies of German charitable trusts can be derived from dedicated mutual funds for this target group (“Stiftungsfonds”) and the activities of Stifterverband für die Deutsche Wissenschaft / Deutsches Stiftungszentrum (DSZ) as an asset manager. The three largest public mutual funds, of those which are dedicated investment vehicles for German charitable trusts, predominantly invest in €-denominated bonds and have limited their maximum equity exposure to 30% (Deka, DWS) and 35% (F&C HVB). Anders (2009) manages the capital of a few hundred trusts at DSZ with a strategic equity portion of 25% which can vary tactically. Their strategies aim at income from investment grade bonds and capital appreciation from the equity portion in the portfolio.

The above comparison can be important as Benke/Maucher (2007) state that charitable trusts are also influenced in their decisions by comparing themselves with the investment behaviour of their peer group, i.e. other German charitable trusts. If this was the case, it could be expected that trusts show some conformity in their investment behaviour and therefore also exhibit similar risk preferences for investment outcomes. This could be expected for the portion of financial assets in the portfolio but does not necessarily take into consideration the overall asset allocation including immovable / intangible assets, shareholdings and other assets. It shall therefore be investigated whether the structure of assets in the capital stock influences risk attitudes.

Conjectures for investigation:

General: Trusts are risk-averse in the domain of gains.

General: Trusts are loss-averse.

Trust specific: There is an association between the sources of funding and investment risk preferences.

Trust specific: There is an association between the structure of the capital stock and investment risk preferences.

2.2 *The German Civil Code (Bürgerliches Gesetzbuch, BGB) and its implications on investments by charitable trusts*

2.2.1 The Statutes of the Charitable Trust as the Basis for all Activities

The donor needs to declare in the statutes of the charitable trust, according to §81 BGB, details concerning the

- name of the trust
- domicile
- purpose
- assets
- board of directors.

The statutes of the charitable trust are binding for the bodies of the trust according to §85 as they incorporate the will of the donor. This is important as it means that the power to make obliging specifications, also concerning investment guidelines, is left to the donor.

The practical consequence is that wherever a donor decided to give precise specifications, these have to be obeyed and the investment activities may differ from what could later in this study be found as “typical” investment behaviour. If, for example, the donor declares that the rents from a specific apartment house shall be the only source of income for the trust, the question of asset management and investment preferences does not have to be answered by the

Management Board of the trust any more. In cases of restrictions that do not allow the responsible persons in the trust to take decisions over investments, the subjects will be discarded from the study.

In contrast, a rather common restriction in the statutes of trusts, which partly has its roots in former legislation and deserves special attention in this study, is the demand for gilt-edged investment.

The statutes can be supplemented by rules of procedure (Anlagerichtlinien), including more detailed information on operational issues which can have the advantage that they can be adjusted rather easily to changing conditions in the future without the need for approval by the authorities.

The documents of the donation act (“Stiftungsgeschäft”) may in certain cases also contain relevant information that is to be treated analogous to the statutes (Fritz, 2009).

Conjecture for investigation:

Trust specific: There is an association between the (existence of explicit restrictions in the) statutes and investment risk preferences.

2.2.2 The Claim for Durable and Sustainable Fulfilment of the Purpose

The wording of the federal Civil Code in §80 BGB postulates the durable and sustainable fulfilment of the purpose of the trust. This can be interpreted as an implicit demand for a sufficient periodic return from the trusts’ capital. Hüttemann/Schön (2007) claim that there was a duty for the trust and its Management Board to aim for a yield from investments which would implicitly prohibit any investment strategy that can ex ante already be considered unprofitable or purely speculative. The demand for a return must always be seen in a portfolio context, so that the investment strategy may also contain volatile assets like commodities, hedge funds or derivatives, if they contribute to the

improvement of the overall risk-return relation. They point out that the appropriate investment strategy will first of all depend on the objective needs of the trust's purpose, especially in terms of the desired payout and its periodicity, if the statutes do not prescribe concrete investment guidelines.

Given that there is a desired payout, there is reason to suppose that also a target return from investments will exist. This point of target return may influence risk behaviour in the domain of gains. A yield of 0% can be supposed to be an important anchor or reference point for assessing the utility of investment results. If an implicit demand for a return of whatever magnitude is assumed, this could mean strict avoidance of a zero return, possibly even leading to risk-seeking behaviour and accepting potential losses for the chance on a gain (if 0% is the safe alternative option; at the time of writing the nominal short term interest rates were close to 0%).

Waiblinger (2008) does not only claim the need for a return, but even sees the maximisation of income to finance expenses as the main target of investment activity. Kohnke (2009) sees the maximisation of returns as well as the preservation of capital as an implicit demand in the BGB with regard to the durable and sustainable fulfilment of the purpose. He acknowledges that these aims will not harmonise and therefore sees the necessity to find a balanced mix of assets in practice. The authors mentioned afore do not discuss explicitly the question of time horizons for a maximisation of returns. This information would be valuable as for instance a short-term maximisation may conflict with long-term goals and a pure long-term view may reduce the capability to optimally finance potential current projects. Schwalm (2010) does not derive from the law a maximisation of income from capital but a perpetuation of returns. If achievable in practice, this would indeed help to increase the visibility of future financial flows and thus establish planning reliability. The latter could be regarded as an additional value itself as it would enable trusts to evaluate projects with a higher degree of certainty with regard to financing issues and potentially lead to an optimisation of the trusts' long-term strategies. Nevertheless, it must be questioned whether a perpetuation of returns would not necessarily lead to

suboptimal investment results which in turn would contradict a maximisation of returns independent of the time horizon. A creative way to the perpetuation of returns could be the building of reserves in good performance years and the reduction of these reserves, within the legal boundaries, in years with less than average returns. BDS (2011b) refer to the importance of reserves in years of crises.

Waiblinger (2008) points to the fact that the durable and sustainable fulfilment of the purpose can only be reached if the performance capacity remains intact in the sense of an inflation adjusted capital base. Hüttemann/Schön (2007) agree and state that the need for returns can theoretically be regarded as unlimited. A trust would usually be able to find additional sponsoring-worthy projects which match its purpose. This may be true from a theoretical point of view, but it can be doubted whether an additional unit of return beyond the point of the target return will develop the same utility as the units of return to reach the target return.

Depending on the purpose and the organisational structure of the trust, the yield might in practice have to reach at least a certain minimum level on a regular, e.g. annual, basis. A number of charitable trusts are involved in recurring obligations, for example in scholarships that are granted for a certain time period and are paid out in monthly instalments (Rodloff and Drabe, 2003). Another important block of costs can be of administrative nature like rents, salaries and other expenses related to the maintenance of a trust. In order to secure at least these foreseeable cash outflows, the respective trusts need a solid income from capital investment. Even though the intended life time of a charitable trust usually is of eternal duration, the investment strategy of many trusts can be expected to be avoiding high short-term volatilities in order not to endanger the payment of recurring obligations and therefore makes trusts prefer safe positive returns even if they are low.

Losses on investments are not explicitly mentioned in the law, but they can have adverse consequences for the spending ability of the charitable trust. In extreme cases, where no reserves are available, this may even lead to a temporary stop

of charitable activities, which would then miss the above postulation of a durable and sustainable fulfilment of the purpose. The trusts need to gradually replenish at least the original nominal capital of the trust in order to restore the potential for a durable and sustainable fulfilment of the purpose before they will be able to continue their spending behaviour on a normal level. Nevertheless, a complete stop of all activities until the original capital is reached again cannot be derived from the legal framework (Rodloff and Drabe, 2003).

The conjectures for investigation partly point to opposite directions because of the conflicts described above.

Conjectures for investigation:

General: Trusts are risk-averse in the domain of gains.

General: Trusts are risk-averse for low-probability high gains.

General: Trusts are loss-averse, but avoid 0% performance? Conflict.

Trust specific: There is an association between the existence of reserves and investment risk preferences.

2.2.3 Personal Liability of Board Members

Personal liability of board members is regulated in §280 BGB. In the case of breach of duty, board members may be held personally responsible for compensation for losses suffered which potentially punishes losses but not (too) low positive returns. This may lead to a strong tendency for safe but low yielding investments instead of fully exploiting more volatile but higher return opportunities on capital markets. It may also lead to risk-averse behaviour concerning high losses with low probabilities. The supervisory authority monitors the reports of the trust on an annual basis and is supposed to take action in the case of irregularities.

Schindler (2003) criticises the asymmetry of lacking inducement for high returns and potential sanctions in case of negative returns because a completely

risk-averse investment strategy can therefore be the most rational behaviour for the board members of the trust. The point Schindler makes is comprehensible in the sense that tendencies towards safe investments will most probably be encouraged by the regulation. On the other hand, he misses the point that the board of the trust is also responsible for the enduring and sustainable realisation of the trust's purpose. Too low returns from investment activity due to a completely risk-averse investment strategy may therefore lead to irregularities as well, if for example the trust misses to meet its obligations for scheduled activities or is generally not able to fulfil its mission in a durable and sustainable way.

Many authors (e.g. Schwintek, 2005; Kohnke, 2009; Hüttemann, 2009) agree that the legal framework grants some administrative discretion to board members which may restrict personal liability only to cases where the board members act intentionally in an inappropriate way. Schindler (2003) sees a personal risk for board members only if they invest beyond the traditional asset classes bonds, real estate and equities or miss to diversify a risky portfolio or use derivatives for speculative positions. Hüttemann (2009) goes a step further in his argumentation and claims that also no restrictions for certain asset classes can be derived from the legal framework. Roth (2010) stresses that due to the new § 31a BGB, introduced in 2009, liability for unpaid board members is limited to cases of deliberate intention and gross negligence.

The trust, acting through its responsible bodies, may sue decision makers for their transactions, if the losses are realised or regarded as sustainable. Potential claims become time-barred already after three years on the basis of § 195 BGB, if the decision maker has not been discharged from liability before by the responsible body of the trust.

Personal liability (at least the perceived one) of board members may potentially contribute to increased loss aversion. The perceived utility of higher gains may decrease, if the chance for higher returns is considered to be connected with higher volatility and its potentially negative implication, i.e. losses. Decision makers are prone to avoid high losses that could evoke liability.

Conjectures for investigation:

General: Trusts are risk-averse in the domain of gains.

General: Trusts are risk-averse for low-probability high gains.

General: Trusts are loss-averse.

General: Trusts are risk-averse for low-probability high losses.

2.3 The Federal States' Laws (Landesstiftungsgesetze, LStiftG) and their Implications on Investments by Charitable Trusts

The states' laws supplement the federal laws and regulate more details. In some points, they deviate from state to state.

As an example, the federal state's law of Rhineland-Palatinate (Rheinland-Pfälzisches Landesstiftungsgesetz, LStiftG RP) stipulates in its first article that the main purpose of the law is to secure the donor's will and to ensure freedom of action and decision to the responsible bodies in the trusts. This stresses the super-ordinate meaning of the statutes of the trust as long as they do not conflict with the, for many issues, rather imprecise prescriptions of the legal framework. It also signals to the bodies of the trust that the lawmaker tends to refrain from interfering to the matters of the trust wherever possible.

Even though other federal states are in some points less precise or less strict in the protection of the donor's will, they all respect its superior importance. Fritz (2009) gives a good overview of the details of legal regulation in the various federal states.

2.3.1 The Connected Questions of Capital Preservation and Time Horizon

Almost all federal states, with the exceptions of Brandenburg and Mecklenburg-Vorpommern, contain the postulation of preserving the trust's capital. The wording in the laws leaves much room for controversial discussion

about the topic of capital preservation. Hüttemann/Schön (2007) discuss several basic ways of interpretation. The first one prohibits any transactions and defines capital preservation as keeping the status quo of existing assets – a definition that is not shared by the majority of practitioners and even explicitly not supported in some of the LStiftG. It may rather be relevant in cases where the statutes stipulate no change in assets anyway. The second interpretation, which is currently the dominant one in the literature, reduces the demand for capital preservation to the preservation of the value, meaning that transactions are allowed to take place and just the value of the assets has to remain at least constant. This interpretation opens new discussions on how the term “value” should be defined, e.g. as a book value, time value or as another measure. The annual report of trusts that is to be submitted to the supervisory authority does not have to contain more than a simple summing up of assets with no concrete rules concerning the valuation approach. Hüttemann/Schön therefore reason that a duty for nominal capital preservation cannot be derived. This conclusion is debatable and will be discussed below. The third alternative, which is clearly favoured by Hüttemann/Schön, is an interpretation that focuses primarily on the enduring and sustainable fulfilment of the purpose of the trust and waives the traditional understanding of capital preservation to a certain degree. Among other recent authors, Fritz (2009) supports this interpretation and argues that the preservation of capital is no purpose of its own, but only derived from the demand for the fulfilment of the real purpose of the trust.

Since inflation adjustment is not explicitly mentioned, the phrasing of the above mentioned LStiftG leaves room for interpretation as far as the question of nominal vs. real capital preservation is concerned. Some authors (e.g. Carstensen, 2005; Waiblinger, 2008) interpret the formulation in the LStiftG as a demand for the inflation adjusted preservation of purchasing power in order to keep the performance potential in any given time period. They point out that the ability to pursue the trusts’ original goals can only be kept on a sustainable level for the implicitly assumed eternal duration, if the capital basis grows at least with the rate of inflation. Schindler (2003) states that in practice, capital preservation in the sense of the LStiftG and its supervision by the authority concerns only the

nominal. Haase-Theobald (2009) supports the interpretation that the lawmakers only expect nominal capital preservation (with the exception of the state of Saxony), but sees most trusts striving for real capital preservation.

When following the arguments of real capital preservation, it must also be discussed which rate of inflation should be applied. Waiblinger (2008) argues that the adjustment for inflation should be made according to the respective rate that applies to the promotion area of the trust instead of simply adjusting for the officially published rates of average private households. Schindler (2003) proposes to create a specific index by an appropriate composition of the publicly available inflation sub-indices, e.g. for wages and food.

In the strict sense of keeping the performance potential, the appropriate adjustment can only be made on the back of price changes in the respective markets in which the charitable trust operates (Benke, 1997). For example, a German trust aiming at awarding scholarships to students in Romania would therefore better adjust for the living expenses for students in Romania converted into Euros instead of using a measure like the harmonised consumer price index (HCPI) of the Euro-zone which might be available more easily. Given the potential structural price changes in currencies which may trend for years or even decades like the appreciation of (former) hard currencies like the Deutschmark and later the Euro against many other currencies, even a gradual and long lasting deflation of the respective prices measured in Euros is imaginable. Would that allow the capital base in home currency to shrink? This question will in the vast majority of cases never have to be answered, but it shows that the question of inflation adjustment must by nature be highly individual. But even the precise knowledge of an appropriate inflation index would then lead to the next question of time deferred measurement and adjustment. Finally, it raises the question of how the appropriate inflation (if finally determined) could be controlled by the states' supervisory authorities.

The logic behind the concept of individual and specific inflation adjustment seems overwhelming from an academic point of view, but it seems more than only a

challenge to be “correctly” applied by the trusts, which may have substantial difficulties in determining their specific rate of inflation especially if they are small with regard to their asset base or have a variety of different sponsoring areas. The authorities would not easily be able to check the “correct” measure of inflation. It is even not always possible to assess the asset base in cases where assets are illiquid like most forms of real estate. These might be two important reasons why it is widely accepted to preserve the nominal capital base without making any adjustments for inflation and strengthens the case for 0% being the reference yield for most trusts.

It is generally left to the prudence of the trusts whether they systematically provision for rising expenses and to what extent. It can be expected that many trusts are not able or not willing to do these extensive calculations and leave the specific inflation adjustment as an issue that influences investment decisions aside.

Another very basic question, beyond a potential inflation adjustment, around the impetus of capital preservation needs to be discussed. It concerns the time horizon or the units of time that are to be applied to the topic. If there is demand for capital preservation, will it be applicable to any given time period or is there a definition of time frames to be looked at and which can be derived from the legal framework?

The law is not precise in these matters. If capital preservation for any given time period was meant, it would necessitate an investment strategy that allows for no volatility at all. This seems not realistic as the risk free (money market) return can be expected to cover not much more than the inflation rate over long terms and is therefore not appropriate to finance the projects of the trust in an optimal way – a violation of the demand for durable and sustainable realisation of the trust’s purpose. Any kind of yield enhancement will on the other hand create volatility of returns and allow for at least temporary losses.

The regular periods that are monitored by the supervisory authority may be seen as a hint. The LStiftG stipulate annual periods for the reports which are to be presented to the supervisory authority. It can therefore be argued that any kind of capital preservation must be considered on the annual basis that coincides with the regular monitoring interval. This in turn would already allow at least for some volatility over the year. Given the low expected nominal and especially real returns of an investment strategy that aims at guaranteeing capital preservation on an annual basis, the conflict regarding the optimal return to finance projects can be considered only to a very low and unsatisfying degree as being solved. It is even possible that low yielding “safe” investments turn out to be capital destructive in a phase of rising inflation and therefore not appropriate. Some authors (Benke/Maucher, 2007; Fritz, 2010) argue that capital preservation cannot be reduced to looking at calendar years, but is a long-term consideration.

The systematic conflict between the safety of investments measured as capital preservation on a predefined time horizon and the demand for yield to optimally finance the original goals of the trusts lead a growing number of authors (e.g. Hüttemann/Schön, 2007) to the idea of putting more emphasis on the return expectations. They argue that the fulfilment of the trusts’ purposes must be central to the question of capital investment. It can therefore be appropriate to seek risky but in the long term (>1y) higher yielding investments in order to be able to sustainably finance the needs of the trust. This complies with Hüttemann (2009) who sees no binding legal postulation, neither for real nor nominal capital preservation.

A high degree of freedom is given to the management board in all investment matters combined with the overriding duty of following the goals of the trust. Even temporary losses on investments could therefore be acceptable, provided that they would not endanger the existence of the trust.

Waiblinger (2008) points to the LStiftG of the federal state of Bremen (BremStiftG, §7) as far as the treatment of losses is concerned. The law recommends only in case of sustainable losses to accumulate future income to

restore the performance capability of the trust. This could imply, according to Waiblinger, that temporary losses could be regarded as acceptable and the moderate lower of cost or market principle may apply.

All in all, the legislation leaves it very much in the hands of the boards how to invest the trusts' capital, at least if there are no clear statements concerning the investment strategy in the statutes. A categorical need to preserve the nominal or even the real capital evaluated at market prices in every annual reporting period cannot unambiguously be derived, neither directly by the text of the law nor implicitly. As far as the investment strategy for a trust is concerned, the LStiftG limits themselves to basic principles of capital preservation and the enduring and sustainable realisation of the purpose which can at least partially be regarded as contradictory if a narrow time frame is set.

The discussion shows that losses, at least to a certain extent and especially if they are no realised losses, seem to be acceptable for the annual reporting periods. This suggests that the claim for capital preservation by the law will not necessarily lead to complete loss aversion, i.e. to enter no investments with a loss potential even if the expected monetary value is very high. The study will look at risk preferences in the domain of losses and also examine loss aversion.

Furthermore, the discussion shows that some trusts may see the need for inflation adjustment while others do not. In order to reach comparability, the results shall be normalised by asking the trusts to assume zero inflation when stating preferences for the study.

Conjectures for investigation:

General: Trusts are risk-seeking in the domain of medium-sized losses.

General: Trusts are risk-averse for low-probability high losses.

General: Trusts are loss-averse, but avoid 0% performance ? Conflict.

2.3.2 The Need for Yield and Distributable Returns Without Speculation

Schindler (2003) points to the fact that the LStiftG of the single federal states do not explicitly claim for the maximisation of distributable returns, even though this could be regarded as the primary goal in order to fulfil the mission of the trust in an optimal way (Waiblinger, 2008; Kohnke, 2009). The laws (LStiftG) instead postulate general values like canniness and a focus on costs and economic efficiency which do not allow the trusts to derive concrete guidelines for investment decisions.

Carstensen (2005) states that the LStiftG usually contain a formulation concerning current returns which could imply that the legislation rules out the possibility of investing in assets which are due to their nature not able to deliver a running yield like precious metals. On the other hand, one can argue that only a portfolio view should be adopted which does not primarily judge the single investments but rather looks at the overall characteristics in order to benefit from diversification effects. In such a portfolio also non-yielding assets like precious metals could play a role, if they optimise the expected risk/return profile of the portfolio or replace paper money as an alternative store of value.

Fritz (2009) remarks that there seems to be a common agreement upon the denial of speculative investment of the trusts' capital, but it is hard to find direct evidence in the literature about this point. Schwalme (2010) also mentions a generally accepted prohibition of speculation and discusses how the term "speculation" could be defined without reaching an economically sensible and distinct conclusion. Richter (2011) states that there is no standard definition of speculative investments and gives examples of potential speculative behaviour. These examples include uncertainty with regard to the fulfilment of the purpose, striving for high yields at the price of high risk and if the investment allows for a high return only in extreme cases but offers no higher overall expected value. Since there is no clear legislation on this issue, it can be expected that some trusts will avoid any kind of investment that could be regarded as speculative, leading to systematically risk-averse behaviour for all extreme (high and low)

outcomes.

Conjectures for investigation:

General: Trusts are risk-averse for low-probability high gains.

General: Trusts are risk-averse for low-probability high losses.

2.3.3 The Role and Potential Influence of the Supervisory Authority

The supreme authority for the supervisory of trusts, according to the LStiftG, is the respective ministry of the federal state, in some cases depending on the purpose of the trust. The laws stipulate that the supervisory authority monitors that the administration of the trust remains in line with the statutes and the will of the donor. In case of non-observance of the legal regulations, the authority may use a number of enforcing measures to restore accordance to the law, reaching from the right for information to the appointment of a third person who empowered to implement the ruling of the authority. In a case of very serious neglect of duty, the supervisory authority may demand for the suspension of board members and enjoin persons from fulfilling the tasks in the trust.

Von Holt/Koch (2004) state that the supervisory authority does not undertake an all-embracing examination of the management of the trust and that only massive irregularities and critical incidents that endanger the existence of the trust will lead to direct action by the authorities.

The supervisory authority relies on the documents submitted by the trusts. The laws do not prescribe a certain way of financial reporting standards that give precise and binding information on the valuation of assets. The only relevant claim that can be found in the LStiftG demands for an annual calculation including an asset statement.

In the LStiftG, the implicitly assumed time horizon for charitable trusts is unlimited if not the statutes deviate concerning this question. Nevertheless, the trusts have

to provide paperwork on the use of capital and the fulfilment of the purpose of the trust to the supervisory authority on an annual basis. This recurring duty can lead to the assumption that investment goals must be met not only for the potentially eternal life expectation of the trust but also for the one-year periods of time which can be assessed by the authorities.

The supervisory authority is faced with a number of difficult issues in monitoring the trusts. The question of capital preservation is hard to answer for several reasons:

- there are no binding standards of evaluation and presentation of assets for the reports
- the value of assets is not in all cases obvious, e.g. it can be hard to determine the “correct” value of real estate
- inflation adjustment cannot be checked since potential still reserves in the valuation of assets are not obvious and the trust specific inflation rate can hardly be calculated

Schwalme (2010) states that in practice, trusts actively seek the discussion with the supervisory authorities for virtually all major decisions to take. This happens as a consequence of missing legislation and indirectly empowers the authorities which can use wide administrative discretion for their decisions.

The supervisory authority seems to play an active role itself for the investment policy mainly in cases of serious losses, where it is empowered to take direct action. It can be expected that trusts will not only for this reason try to avoid reaching this point.

Conjecture for investigation:

General: Trusts are risk-averse for low-probability high losses.

2.4 The German Fiscal Code (*Abgabenordnung, AO*) and its Implications on Investments by Charitable Trusts

German charitable trusts benefit from a tax-exemption status that is granted by the Fiscal Code in its §§ 51-68 AO in combination with § 5 Körperschaftsteuergesetz (Corporate Tax Act). The status is linked to a number of rules that have to be followed. Failure to comply will lead to the loss of tax exemption which is a large motivation to follow the rules (Carstensen, 2005). Hüttemann/Schön (2007) state that a difficulty in the handling of the law is that it was not specifically made for trusts. It does not make concrete regulations on how to generate returns or to preserve the capital and it does not provide a frame for the reporting standards.

The goals of the trust need to be compatible with the catalogue of charitable purposes defined in §§ 52-54 AO. According to §56 AO, the main guideline of a trust must be the fulfilment of its purpose. This supports the assumption that the purpose of the trust should guide the investment strategy.

2.4.1 The Building of Reserves and the Tax-Exempt Status

§ 55 AO stipulates the prompt use of resources for the purposes of the trust. All current income like the income from investments, donations to the trust or membership fees belong to the definition of “resources.” The capital stock that is used to generate income is not required to be distributed.

A big challenge concerning the provisioning for inflation is the rule of § 58 Nr. 7 AO which sets limits to the building of reserves. The Fiscal Code demands that a maximum of one third of the net income can be used to build a free reserve in order to keep the privilege of tax exemption. The net income can be defined as the ordinary income, from interest and dividends for example, minus the costs of managing the assets. Realised price increases of assets on the other hand are not regarded that way and can be used as reserves and treated like the capital of

the trust, at least if the strategy is not exclusively focused on price appreciation. Realised price increases are not for distribution, but to be put into a special reserve for gains from transactions which can in turn be used to cover potential losses of future transactions (“Umschichtungsrücklage”). Rising asset prices, of real estate or equities for example, would therefore not endanger tax exemption.

Problems can arise for trusts that have invested a big portion of their assets in interest bearing securities in times of negative real yields. At the time of writing this study, the yields of German sovereign bonds with ten years to maturity trade at a level of about 1.5%. Under the assumption that this is the coupon, the “one third rule” will therefore only allow for building reserves of 0.5% which seems extremely low compared to realised inflation of historic standards. The inflation rate, be it an official consumer price index or a trust specific measure, will probably in many cases be higher. This implies that the trust’s capital could in these cases only be preserved in real terms, if the trust adopted an investment strategy that at least partially includes investments aiming at rising asset prices which are not relevant for distribution in the sense of the AO. Only a strategy containing solely investments that aim at price appreciation and not at the distribution of returns contradicts the legislator’s basic ideas of the tax exemption for trusts and may lead to liability for taxation.

Lehmann (2010) argues that the tax law clearly answers the question of capital preservation which has been asked already in the chapters above, in favour of keeping the real capital and not only the nominal one because inflation provisioning could be seen as the reason for the regulation. He also states that small trusts will in many cases not be able to provision for inflation adjustment. Investing in volatile assets, like equities, that aim at price appreciation in order to strategically keep the real capital of the trust, means that the trust must also be willing to temporarily tolerate medium-sized losses.

Charitable trusts that do not only rely on income from their capital but are partially funded by donations, have the advantage of being able to add up to ten percent of the sum of donations to the capital reserves and provide for real capital

preservation .

The desirability of the tax-exempt status leads to the need to differentiate between “yield” and “distributable return” in practice. The study will simplify this issue for the elicitation of the utility curve and assume that the trusts are able to creatively manipulate how much of the attained yield can be used for distribution and how much allocated to the reserves. This simplification can be justified as it is not possible in the long-term to distribute more than the yield, if capital is to be preserved.

This chapter also shows that the individual circumstances can make a big difference for the investment policy. Trusts with huge reserves from gains might fear potential losses less than trusts with no such reserves. Another individual circumstance is the ratio of income from capital vs income from other sources.

Conjectures for investigation:

General: Trusts are risk-seeking in the domain of medium-sized losses.

Trust specific: There is an association between the existence of reserves and investment risk preferences.

Trust specific: There is an association between the sources of funding and risk preferences.

2.4.2 Losses on Investments and the Tax-Exempt Status

Carstensen (2005) points at a circular on the application of the Fiscal Code (AEAO Nr. 9, § 55 AO) which gives reason to fear losses on investments as a threat to the charitable status of a trust. AEAO Nr. 8 assumes that losses arise from miscalculations and are supposed to be compensated within a time period of three years. If this is not possible, the charitable status may be in jeopardy.

Some authors (e.g. Buchna, 2003) derive from the AO and court decisions that a charitable trust runs the risk of losing its charitable tax-exempt status in the case

of substantial losses, whereupon the word “substantial” remains undefined in the context. Hüttemann/Schön (2007) reply that this kind of interpretation is not all-embracing because it misses the point that losses do not generally breach the rules of the AO. They argue that it is foremost the way of compensation for the losses which may constitute a violation of the law. Furthermore, they state that a loss on the invested capital cannot damage the tax status as the capital itself is not defined as current resources to be used to fulfil the purpose. So, punishing a loss on that capital by revoking the tax-exempt status could not be justified. Benke/Maucher (2007) share the opinion that losses do not generally lead to the denial of tax-exemption.

The loss-bearing ability of a trust also depends on the amount of free reserves which have possibly been built in “good times.” After the surrogation principle (“Surrogationsprinzip”), capital gains from price appreciation have to be added to the reserves whereas losses must be deducted. On the one hand, a trust with high reserves may therefore fear losses to a lesser degree, since it is still possible to compensate them with the gains of earlier years. A trust that was not able to accumulate gains so far will on the other hand reach the point where the initial capital basis is threatened faster. It can therefore be reasoned that risk tolerance may again also depend on the amount of free reserves that has been built up in the past.

More severe than the sheer occurrence of losses can be a situation where losses are experienced as a consequence of investing in a way where losses could have been expected. In this case, the problem of a fair ex-ante consideration at a later stage occurs. It can be expected that only intentionally produced losses can fairly be judged as losses that must have been expected.

Conjecture for investigation:

General: Trusts are risk-averse for low-probability high losses.

Trust specific: There is an association between the existence of reserves and risk preferences.

2.4.3 Commercial Asset Management in a Trust and the Tax-Exempt Status

The adjudication in a variety of cases made more or less clear to what extent trusts are allowed to show trading activities without being marked as commercial asset managers and losing the tax-exempt status. The highest German court on tax affairs, the Bundesfinanzhof (BFH), judged (BFH, 1990) that transactions in fixed income securities cannot be regarded as compliant with a trust's normal trading activities, if the securities are bought only with the intention of a later sale within a short period of time. The BFH considers such kind of behaviour as speculative and therefore characteristic of commerce rather than normal trust activity in asset management. This judgement amends to the former BFH (1980) sentence which defined commerciality as professional specifics such as maintaining an extra office or a dedicated organisation for the transactions. In 1998, the BFH acknowledges that even a greater number and amount of transactions can be regarded as non-commercial asset management and also transactions aiming at price appreciation are acceptable in that sense. BFH (2000) state that trades in options are not generally of commercial nature.

The adjudication makes clear that charitable trusts are not expected to maximise their income by very active trading.

2.5 Previous Empirical Research on the Investment Behaviour of German Charitable Trusts

Previous empirical research has mainly concentrated on categorising trusts according to a multitude of criteria like size, legal form or distribution of assets under management. To the knowledge of the author, no attempt has yet been taken to investigate the trusts' investment behaviour on the background of decision theory. Also on international level, no comparable study is available.

Bundesverband Deutscher Stiftungen (BDS) is the largest collector and distributor of statistical data on German trusts. The annually published register of

trusts (BDS, 2011c) contains an extensive part on collected statistical data and analyses. Due to the large data base, BDS is able to give a representative overview on a variety of differentiating criteria of trusts on a regular basis.

BDS is also the issuer of the annual publication *StiftungsReport*. The 2010/2011 (BDS, 2011b) edition contains an empirical investigation on the capital investment of trusts, finding a statistically relevant association between the size of trusts (larger than € 1m vs. smaller than € 1m) and their investment results in two out of three years 2007-2009. This speaks in favour of heterogeneity in risk behaviour of trusts concerning this criterion. BDS suppose that the large trusts have rather diversified portfolios with higher portions of risky assets like equities, whereas the small ones have higher allocations in fixed income securities. This conjecture points to some association between risk preferences and the size of the trusts. It is supported also by the finding that the large trusts had significantly more depreciations on assets in 2008/09 (of all trusts that had depreciations). The realised losses amounted to about 6% in mean and 3-4% in median value in both of the years. Estimates for the aggregated book and realised losses are at about 6% in 2008 with respect to a sample of 431 trusts administered by Deutsches Stiftungszentrum (DSZ). The predominating asset class in the BDS study over all portfolios is fixed income securities (55%), followed by real estate (14%) and equities (7%). The rest of 24% is categorised as "other." The BDS study finds that 56% of trusts have no financial reserves. This again is particularly a phenomenon to be observed with small trusts rather than large trusts.

The 2012 survey of the Centre for Social Investment (CSI) at the University of Heidelberg (Then et al., 2012) that was conducted in cooperation with BDS ran parallel to the writing of this study. It focuses on the investment behaviour of the 200 largest German trusts by donated capital. With regard to the bodies of trusts, the CSI study finds that the management boards have most influence on investment decisions. Furthermore, the financial crisis of recent years has had no impact on the investment behaviour of the majority of trusts. Some trusts stated to put more emphasis on financial management as a result of the crisis and reduced the risk in investments. Only about one third of the trusts in the study

stated to be able to invest without any restrictions, whereupon most of the restrictions were not imposed by the statutes or the authorities but by the bodies of the trusts themselves. The most frequently stated definitions of the investment strategy involve the specification of asset classes and the general aim of capital preservation. The CSI study also looks at Mission Investing, i.e. investments in organisations that support the purpose of the trust, and finds that it is used by 30% of the largest trusts.³

PricewaterhouseCoopers (2009) investigate the impact of the financial crisis on German trusts with a sample of 110 trusts which is not representative for all charitable trusts in Germany. They find that one third of the trusts have suffered from losses. These losses amounted to 1 to 10% in most of the cases, in 19% of cases losses exceeded 10%. The study finds that investment management is regulated in the statutes of almost every second trust and that investment activities have been checked by the respective supervisory authorities for about every third trust.

Sandberg (2007) investigates the degree of economic orientation of trusts with asset management being one of six fields of interest. She finds that the size measured as the capital of trusts seems to be the decisive variable with respect to almost all questions, e.g. size is positively correlated with measures taken to avoid losses. In small trusts with an asset base of up to only € 50k, gilt-edged investments dominate. Other factors with particular relevance to the research question are the type of trusts with respect to the activity and the capital of the trust. In contrast to BDS (2011b), Sandberg (2007) does not directly provide an overall aggregated asset allocation of trusts. She names asset classes in trusts' portfolios independent of their weights and their weight if allocated. Indirectly, this gives an overall asset allocation consisting of fixed income (38%), term deposits (14%), real estate (10%), and equities (8%). A residual of about 30% remains. Adding the figures of fixed income and term deposits, the allocation is very similar to what is found by BDS (2011b).

³ A good overview on Mission Investing in German trusts can be found in Schneeweiß/Weber (2012)

Heissmann (2005) focus on the question of investing in assets that primarily aim at price appreciation instead of income on the background of low yields in the fixed income market. The study includes only trusts that have at least € 1m assets under management and/or expenses of at least € 100k per annum which limits the meaningfulness of the study for trusts in general. They find an overall asset allocation that is dominated by fixed income (58%), followed by equities (16%) and real estate (12%). Alternative investments like private equity (4%), hedge funds (0%) and structured products (0%) are of subordinated meaning. This again signals that trusts prefer the low volatility asset class, fixed income. The Heissmann study, which only contains large trusts, shows that in their sample equities are weighted much higher than in the other two studies with trusts of all sizes. This could indicate that large trusts are generally willing to take more risk. In Heissmann (2005), 94% of trusts state that the preservation of capital is a “very important” aim on a scale with five predefined answers reaching from “very important” to “very unimportant.” The achievement of risk-adjusted yields is considered “very important” only by 46% of subjects. Reaching a yield that covers the expenses is “very important” to 32% of trusts and “important” to another 37%. 62% of subjects see the avoidance of any kind of risk as a “very important” (33%) or at least “important” (29%) aim. The figures reveal that risk- and loss aversion seem to be considered super-ordinate in comparison to all other aims and being even more important than reaching yields to cover the expenses. This comes to a certain extent as a surprise as the fulfilment of the purpose is named in the literature (which is dominated by interpretation of the laws by jurists) most frequently as the real aim of a trust. Asked for a target yield on capital investments, trusts expect 5% per annum on average. It might be taken into consideration that the yield curves for fixed income securities were at a higher level (about 2 percentage points for German government bonds) compared to the time of writing of this study.

Schäfer (2002) finds as main specific restrictions to the investment policy named by the trusts: “only gilt-edged investments” (60%), “only fixed income” (30%), “no equities” (22%).

Timmer (2005) mainly examines the donors and finds that they usually exhibit great involvement. This does not only need to concern the purpose of the trust but also capital investment. It might potentially cause differences also regarding the risk preferences in comparison to trusts without such involvement.

The surveys show that trusts predominantly invest in financial assets. Among these, fixed income securities and cash are clearly favoured over equities. These findings point at a very conservative investment behaviour which exhibits a high degree of risk aversion, especially when considering that the trusts theoretically have an unlimited time horizon and could go for higher yielding but more volatile asset mixes.

Conjectures for investigation:

General: Trusts are risk-averse (in the domains of both gains and losses)

Trust specific: There is an association between the size of a trust and investment risk preferences.

Trust specific: There is an association between the existence of explicit restrictions in the statutes and investment risk preferences.

Trust specific: There is an association between the structure of the capital stock and investment risk preferences.

Trust specific: There is an association between the involvement of the donor in investment decisions and investment risk preferences.

2.6 Investments of Not-for-profit Organisations in an International Context

In the United Kingdom, the legal framework has long been criticised for its lacking adoption of academic research concerning modern portfolio theory (Dale and Gwinnell, 1995; Morris, 1995): (a) The Trustee Investment Act from 1961 as well as the guidance by the Charity Commission seemed to be too restrictive for an optimal long-term oriented allocation of funds. (b) An additional problem was

seen in the defensive mindset of trustees who were found reluctant to take risk. Thus, the analysis of trust investment in the United Kingdom in the 1990s shows to a certain degree similarities to the predominately low-risk and low-return investment approach that can be observed in Germany until today.

Nowadays in the United Kingdom, the Charity Commission as the independent regulator of charities in England and Wales provides trustees with a guide on investment matters (Charity Commission, 2011). The contents of the guide are based on the legislation (Trustee Act, 2000; Trustee Investment Act, 1961; Charities Act, 2011) and give very concrete advice on the framework of investing. The guide encourages trustees to take investment risks in a diversified portfolio in order to use the performance potential given by the long time horizon that trusts usually have. UK charities are explicitly allowed to invest also in volatile asset classes like equities, hedge funds, commodities and to make use of derivatives, provided that risks are diversified. In its guide, the Charity Commission explicitly acknowledges the risk of inflation and proposes a balanced portfolio that may include high risk assets and take into account the long-term fulfilment of the purpose of the trust. Temporary losses are explicitly accepted due to the long time horizon.

In the United Kingdom, the “Statement of Recommended Practice, Accounting and Reporting by Charities” (SORP, 2005) was developed by the Charity Commission for England and Wales and by the Scottish Regulator. It requires from trusts exceeding a certain size, inter alia, to present financial statements in a specific layout. It also requires a statement concerning risk management of the trust which can be regarded as a measure to increase the awareness of trusts regarding an appropriate understanding and management also of risks taken in investments. Bennett and Gage (2012) found in a study with a focus on risk management in charities that trustees have become more involved in risk management within the last decade and that the charity sector in the UK has developed its practice even before it became a requirement for the corporate sector. Nevertheless, they see further qualification of trustees as an important recommendation for the future. A survey by Wells (2008) shows that charities in

the UK have used their freedom also to invest in potentially volatile and illiquid asset classes like private equity and hedge funds. Wells finds the fear of volatility and risk as the trusts' major concern. Both findings are perfectly compatible taking into account the overall risk decreasing effect for the trust portfolio which can be given by adding these alternative investments even though they may be regarded as risky if regarded separately without the portfolio context.

The liberal governance through authorities that gives room to volatile investment strategies in countries like the United Kingdom and the United States also attracts critique. Charities which make use of their freedom of investing and suffer losses due to adverse movements of the capital market can be openly criticised in the public (Forbes, 2012). This exerts pressure on trustees who want to avoid any damage to the reputation of their charity and also of themselves. Trusts that are publicly questioned for their loss producing investment strategies may encounter difficulties in finding new sponsors and keeping the existing ones.

2.7 *Synthesis / Conclusions of Chapter 2*

The nature of German charitable trusts in combination with the given legal framework and prior empirical research leads to the assumption that the investment risk preferences may show typical commonalities between the trusts regarding some critical features. The conjectures are:

1. A reference point exists which divides investment results in gains and losses, and trusts are loss-averse.
2. Trusts are risk-averse in the domain of gains in general and also for low-probability high gains.
3. Trusts are risk-seeking in the domain of medium-sized losses, but risk-averse for low-probability high losses.

The conjectures for the domain of losses and loss aversion are not as clear as for the domain of gains. Regarding losses and loss aversion, the indications are

ambiguous as discussed in the chapter above and may depend to a high degree on the individual trust characteristics.

The literature review makes clear that individual circumstances can play a vital role for the investment behaviour of trusts and must therefore be considered in parallel to and in combination with the elicitation of preferences for trusts in general.

The characteristics found to be of potential relevance for investment risk preferences are:

1. Size of the trust (measured in terms of asset base)
2. Age of the trust
3. Donor and donor's influence on investment decisions
4. Type of trust
5. Structure of the capital stock
6. Sources of funding
7. Expected growth of the asset base
8. Existence of reserves
9. Statutes of the trust
10. Number, gender and age of decision makers

The list of criteria above to be examined cannot claim to be exhaustive. It is to a certain extent determined by the subjective rationality of the researcher.

For later conclusions it may be valuable also to consider how trusts are guided by authorities in other countries like in the example of the United Kingdom which is described in section 2.6.

2.7.1 The Definition of a Reference Point and Loss Aversion

The existence of a reference point for gains and losses can be expected in particular due to the widely accepted goal of capital preservation which is often described as a fundamental principle for the investment policy of trusts. Most LStiftG explicitly postulate to keep the capital of the trust “preferably undiminished.” Capital preservation is an implicit demand to distinguish between gains and losses from a reference point that depends on the definition of the term “capital preservation.” It can be argued that the LStiftG call for a real, i.e. inflation adjusted, preservation of capital which could be derived from the other claim concerning the sustainable realisation of the purpose of the trust. Other authors argue, and the experience with supervisory authorities indicates that nominal preservation can be accepted as well. Both concepts – nominal and real – capital preservation imply the existence of a reference point, no matter whether this is the original nominal value of the capital or the inflation adjusted one. Another question concerns the time horizon for which capital preservation is required. As the law is not precise in this respect either, indications can be sought in the reporting periods to the supervisory authority which demand for annual cycles. The author adopts the idea of looking at periods of one year for his study. The theoretically eternal time horizon of a trust must be divided into shorter periods in order to make the financial goals operationally usable. The time horizon can be regarded as a chain of annual performance periods because even in the case that the investment decisions may usually be taken for longer-term periods, the short-term consequences can be observed and must be acceptable for the investor and the supervisory authority.

Losses may be more undesirable per unit than respective gains are desirable. Therefore loss aversion can generally be anticipated, although there may be trusts that would accept potential losses accompanied with some return potential in order to circumvent a 0% performance which makes impossible (already ex ante) the fulfilment of the purpose through returns from capital.

The topic of inflation adjustment may be of particular relevance regarding the reference point of the utility function, if the assumptions of Prospect Theory (PT) or a derivative of it are used to describe the investment behaviour. The author takes this into account for the design of the elicitation methods to be used. A strategy that aims at keeping the inflation adjusted capital will need higher returns and can be supposed to be forced to adopt a higher risk. The high degree of individuality in the question of inflation adjustment makes it difficult to compare nominal return targets expressed by the trusts. In order to achieve comparability, the study normalises the results by implementing the assumption of zero inflation for all trusts.

2.7.2 Investment Risk Preferences in the Domain of Gains

The perceived utility of investment returns in the domain of gains can be expected to have a concave shape, i.e. increasing returns are accompanied by positive but decreasing marginal rates of utility. The need for additional returns may only theoretically be unlimited. It can be doubted whether the Civil Code and the LStiftG implicitly call for a maximisation of returns. In contrast, the durable and sustainable fulfilment of the purpose is formulated explicitly. In practice, trusts will usually be limited not only due to money, but also due to time constraints of the people involved and other ordinary operational restrictions.

Furthermore, the trust may require some objective minimum distributable return per unit of time (e.g. one year) in order to meet its recurring obligations like administrative costs and regular expenses like scholarships to fulfil the mission of the trust. This favours the view that the return units up to the point of reaching the minimum return will be perceived as more valuable than the additional return units which will be of use, too, but not that urgently be required. As the trust may additionally have a pipeline of promotion-worthy projects, there could be a targeted return needed to finance these projects which exceeds the point of the minimum return requirement. The marginal utility to finance these projects can be expected to be positive, but decreasing in comparison to the minimum returns.

The existence of the minimum return point and the targeted return point does not necessarily have to be given in every case. It will rather depend on the individual circumstances of each trust, where these points are located and whether they exist at all.

The personal liability of board members and the implicit prohibition of speculation with trust capital may add to the concavity of the curve in the domain of gains. If there existed an asymmetry of lacking incentivation for high returns and potential sanctions in case of negative ones, the conclusion for investment decision makers would possibly be to avoid high return, i.e. high volatility, strategies in favour of low yielding investments.

2.7.3 Investment Risk Preferences in the Domain of Losses

Despite the claim for the preservation of capital in the LStiftG, temporary losses are undesirable, but cannot completely be excluded. The moderate lower of cost or market principle may be taken as a guideline to distinguish between temporary and durable losses. Only sustainable losses can imply that the capital base has to be replenished in order to keep the performance capability of the trust. In the worst case, this would mean a temporary stop of charitable activities. Furthermore, the supervisory authority may take action in case of massive irregularities that endanger the existence of the trust.

With regard to taxes, charitable trusts do not generally breach the rules of the AO, if they suffer losses. They run the serious risk of losing their tax-exempt status only in cases of substantial losses, whereupon “substantial” remains undefined.

Since, especially in times of low yields in the bond market, the search for yield to fulfil the purpose of the trusts is connected with investment risk, i.e. volatility, moderate losses may be acceptable which supports risk-seeking behaviour in this area.

2.7.4 Individual Characteristics to be examined

It is not in all cases obvious to name the relevant criteria for an investigation of potential differences due to a lack of research in that area. Sandberg (2007) states that the sector of German charitable trusts is under-researched regarding business themes whereas most of the literature concentrates on legal aspects and on taxation. She sees possible reasons in the heterogeneity of the sector and the bad data basis which does not even allow stating the precise number of trusts, not to mention their asset base.

One exception is the criterion of “size” that is named frequently in the literature and has been tested for association with other variables (e.g. in BDS, 2011b). This indeed seems to be an important factor for a multitude of differences between trusts. Recommendations regarding the investment strategy often point to the size of the trust as the single most important criterion. Nonetheless, it has not been tested, yet, whether size is also responsible for significant differences in investment risk preferences. For the study, not only the current size, measured as volume of assets at market prices, of the trust is considered, but also additional inflows to the capital base that are foreseeable.

Some criteria are added to the catalogue also for the reason that there is evidence from studies of private investors that these factors can be relevant. Among these are different behaviour of genders and age. The relevance of gender was examined by various researchers, generally coming to the conclusion that women are more risk-averse than men. A good overview of existing studies is provided in Eckel/Grossmann (2008). Later studies like Borghans et al. (2009) come to similar conclusions. An early study of Palsson (1996) finds that risk aversion was only systematically correlated with age. Gächter (2007) observes age as an important factor with regard to loss aversion. These factors can be operationalised regarding the composition of decision making bodies in trusts. As far as gender is concerned, the conclusions can be drawn from questions concerning the founder and the composition of women and men in the decision making body.

In the case of “age” not only the age of the decision makers, but also the age of the trust is tested for association with risk behaviour. Young trusts may have preferences different from old ones due to different goals at an earlier point of the life cycle or less experience of the decision makers.

Income and wealth are factors that have also been influential on private investors’ risk behaviour (Hartog et al., 2002). Whereas wealth can potentially be translated into trust capital corresponding to the factor “size” again, for income, the sources of funding and the type of trust must be examined. A trust with high income from own operations or regular government funding and relying less on income from capital may have a different kind of risk perception than a trust of the same size (in trust capital terms) which fully depends on its returns from capital investments. Accordingly, the normal activities of the trust, e.g. simple promotion of the purpose, own operational activity like running a hospital, or both, may be relevant.

The question of existing reserves could be influential, especially with regard to the loss-bearing capabilities of a trust. Reserves may allow for taking more risk in comparable situations.

The most obvious factor that could influence risk preferences are the statutes of the trust. As described above, the statutes are the guiding light for every trust. They have to be obeyed and as they may include rules regarding the investment strategy, this can have tremendous implications for capital investment.

Referring to the analysis in the chapters above, some circumstances that are suspect to potentially influence the investment behaviour are included. Beyond the question of gender, it can make a difference who the founder is: company trusts may act differently from trusts that have been initiated by churches for instance. Potential differences may exist regarding the question whether people act differently when making decisions on other peoples’ money. It could be that a donor, who is still active, considers the trust capital in a way as “his” money. Active participation and influence of the donor shall therefore be examined.

Finally, the structure of the capital stock can be expected to mirror investment risk preferences.

3 The Power of Decision Theory as a Normative and Descriptive Tool for Investment Decision Making

3.1 *The Theoretical and Practical Problem of Measuring the Perceived Utility of Investment Returns*

In this study, the preferences for monetary outcomes of investment decisions shall be investigated. Outcomes are defined as the results of investment activity and may be measured in absolute monetary terms or in percentage gains and losses. It is important to distinguish between the expected value of an outcome and its expected utility. The expected value is easy to calculate, if the probabilities of the potential outcomes are known, and does not depend on the individual preferences. In contrast, the perceived utility of an outcome is purely subjective by definition. It depends on the individual (or group of people) whether an investment result is perceived as more or less favourable in comparison to potential alternatives.

Previous research (see Wakker, 2010, for an overview) has developed mathematical techniques to quantify and describe preferences by indirect elicitation which is the dominant approach in the literature. Direct assessment techniques which could alternatively be used were not adopted in this study. Analogous to previous research, the author divided the complexity of the parameter “utility” into small pieces being lotteries on easily understandable questions on investment return preferences.

This study does not aim at the elicitation of a full utility curve or a probability weighting function which would additionally be needed to give a complete picture under PT. The researcher instead focuses instead on some characteristic parts, the so-called 4FP plus the question of loss aversion, and assesses the behaviour as risk-seeking or risk-averse which already includes both components: the utility curve and the probability weighting function.

3.2 Overview of Important Theoretical Concepts in Decision Theory

Decision Theory has developed normative and descriptive concepts. The main findings from Expected Utility Theory to Cumulative Prospect Theory shall be discussed in order to apply the power of research on decision theory to the study. Particular attention is given to the so called “4FP” of PT.

3.2.1 Expected Utility Theory (EUT) as the Standard Normative Approach

Normative decision theory is not a new discipline in science. The beginnings of Expected Utility Theory (EUT) can be traced back to Daniel Bernoulli (1738) who solves the St. Petersburg Puzzle by distinguishing between “value” and “monetary value”. He proposes a logarithmic function to transform the pure monetary value of a lottery into value for human beings who usually experience a decreasing utility for any incremental monetary unit they receive.

In modern times, von Neumann and Morgenstern’s (VNM) publication “Theory of Games and Economic Behavior” in its second edition of 1947 was very influential. VNM state that decision makers (DM) should try to maximise expected utility and provide a normative solution of how DM ought to behave backed by the rationality of axioms on preference which they propose. The axiomatisation contains principles like completeness, transitivity, independence and continuity. The approach combines probabilities and consequences to provide a measure of utility expressed in a function with monotonic properties. Even though most researchers will probably agree with the rationality behind the axioms, the theory can be criticised upon the lack of practical applicability as a prescriptive decision rule.

Critique has been directed against the axiom of completeness (Starmer, 2000). The axiom postulates that DM already do have well-defined preferences over all possible consequences before they take a decision. This may be the case for simple lotteries, where all possible consequences can be overlooked easily. The argument of completeness loses credibility, however, the more complex the

decision case is.

The transitivity axiom has been criticised by Loomes and Taylor (1992). Their empirical tests show cyclical preference orderings which clearly contradict the validity of the transitivity axiom in practice.

There has been much debate concerning the independence axiom. Allais (1953) for example was the first who showed in his famous paradox that a majority of people would violate the axiom if put into a decision situation and therefore not act according to EUT.

The basic formula of EUT can be described by equation (1):

$$\mathbf{U(a,b) = p u(a) + (1-p) u(b)} \quad (1)$$

U is the overall utility of a lottery, a and b are the potential outcomes, p is the probability of outcome a and u is the utility of an outcome.

The typical EUT utility curve is concave as agents are usually considered to be risk-averse. EUT also permits risk neutrality (linear curve) and risk-seeking subjects (convex curve) as shown in figure 2.

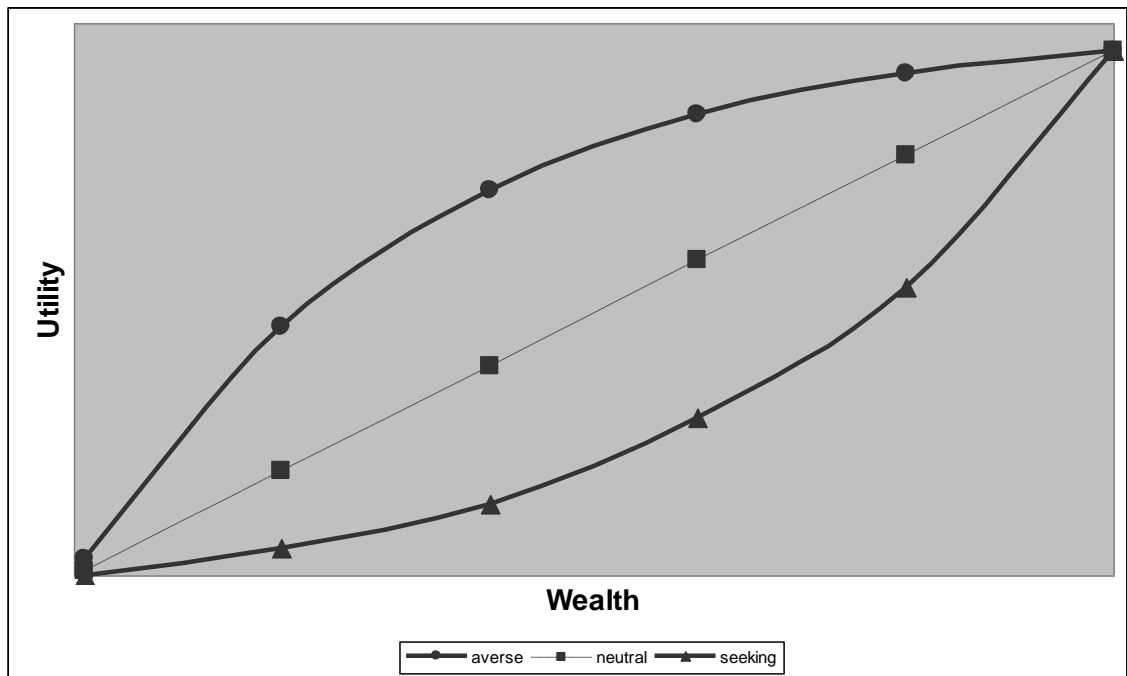


Figure 2: Curves for preference types under EUT

3.2.2 Inclusion of Behavioural Phenomena in Decision Theory

Many researchers have proposed modifications of EUT based on their experimental findings. The discussion of behavioural phenomena in this section partly follows the logic of Starmer (2000) who extensively describes the developments in non-expected utility theory and states that in contrast to EUT none of the non-conventional theories can be reduced to a single preference function defined over individual prospects.

Machina (1982) used a triangle (often referred to as the “Machina triangle”) to describe risk preferences of subjects. In his Generalized Expected Utility Analysis, he proposes local utility functions which allow indifference curves to be non-linear and also not parallel which accommodates the empirical observation that subjects tend to become more risk-averse the better the potential outcomes are. Chew and MacCrimmon`s (1979) Weighted Utility Theory paves a way to a weakened form of the independence axiom with indifference curves being linear without being parallel. Another weakened form of independence is the axiom of “betweenness” described by Gul (1991) and Neilson (1992). All the above approaches aim at healing the empirical shortcomings of EUT. They provide

solutions that can to a lesser extent be criticised for their theoretical concept but for their lack of practical applicability as descriptive models. They lack the intuition of a model that is originally built on empirical observation like Prospect Theory which is described later. Furthermore, they can be criticised for taking into account only objective probabilities and no subjective weightings of probabilities.

Empirical studies in various disciplines of study show that human beings tend to have a subjective rather than an objective perception of probabilities (Pidgeon et al., 1992). Taking this into account, an additional subjective parameter can have an essential influence on the description of risk behaviour. On the one hand, it can help to better understand and describe decision problems. On the other hand, systematic problems may arise if the weighting of probabilities distorts the utility function. This can happen in cases, where for example many objectively low probabilities add up to a total subjective probability of more than $p=1$. Handa (1977) for example sees the misperception of objective probabilities by the DM and introduces a subjective weighting of objective probabilities $\pi(p)$ which results in a probability weighting function (pwf). The consequence that monotonicity of that function is not necessarily given remains a problem for other theorists. Machina (1983) rejects any such theory violating monotonicity from a theoretical point of view, and also from a practical perspective any such concept is not deemed convincing for a consistent description of risk preferences.

Quiggin (1982) and Schmeidler (1989) experience broad acceptance for their work on rank dependence in probability weightings. Rank Dependent Expected Utility Theory (RDEUT) is a solution to the problem mentioned afore, a probability transformation that ensures monotonicity of the function by ranking the potential outcomes before assigning decision and probability weights. RDEUT is an important milestone in decision theory and it is able to accommodate (Wakker, 2010) Allais' paradox because of its probability weighting features. Segal (1990), Wakker (1994), and Yaari (1987) provide axiomatisations of RDEUT.

It must be noted that subjective probabilities carry information expressing risk attitudes. Risk aversion or -neutrality or -seeking must therefore be regarded as a product not only of preferences for outcomes but equally of probability

weightings.

Bell (1982, 1985) as well as Loomes and Sugden (1982, 1987) follow a psychological approach without axiomatisation. They focus on the investigation of the factors “regret” and “disappointment” in their studies. The basic assumption is that subjects were disappointed if the outcome of a prospect was not as good as they had expected. Agents would therefore strive to take actions and prefer options that avoid disappointment. This generally favours and explains risk aversion. The theory can be criticised for not satisfying the common theoretical postulates of monotonicity and transitivity. It also does not explain why agents can be risk-averse for gains but risk-seeking in the domain of losses.

Other researchers focus on the use of decision heuristics which takes into account the limited ability of subjects to objectively and completely analyse a complex decision problem. According to Payne et al. (1993), people have a tool-kit of heuristics and can apply the suitable one to the respective question. For predictive purposes, it unfortunately remains open, which heuristic will be used to answer the question. Kahneman and Tversky (1979) also refer to heuristics to describe the “editing phase.” Furthermore, in the Asian disease problem, they show how minor changes in presentation can have a significant impact on choices of decision makers (Tversky/Kahneman, 1981). The framing of a problem can be expected to influence risk perception and preferences.

3.2.3 Cumulative Prospect Theory (CPT) as the Most Influential Descriptive Theory

Kahneman and Tversky (1979) criticise EUT as a descriptive model and propose prospect theory which is supposed to overcome the shortcomings of EUT in particular with regard to the violations of the independence axiom. They find the certainty effect showing that people are exhibiting risk aversion in the domain of sure gains and risk-seeking behaviour in the domain of sure losses. They show by the isolation effect that decision makers’ preferences depend on the presentation of the problem as a potential gain or a potential loss. As a

consequence, in PT, they replace the traditional utility scale which takes into account the total level of wealth only, by a coordinate system which distinguishes between gains and losses versus a reference point, so that gains and losses can be treated separately. The reference point is found in the editing phase using heuristics and coding potential outcomes as gains or losses. The value function they establish is concave for gains and convex and steeper for losses as shown in figure 3⁴.

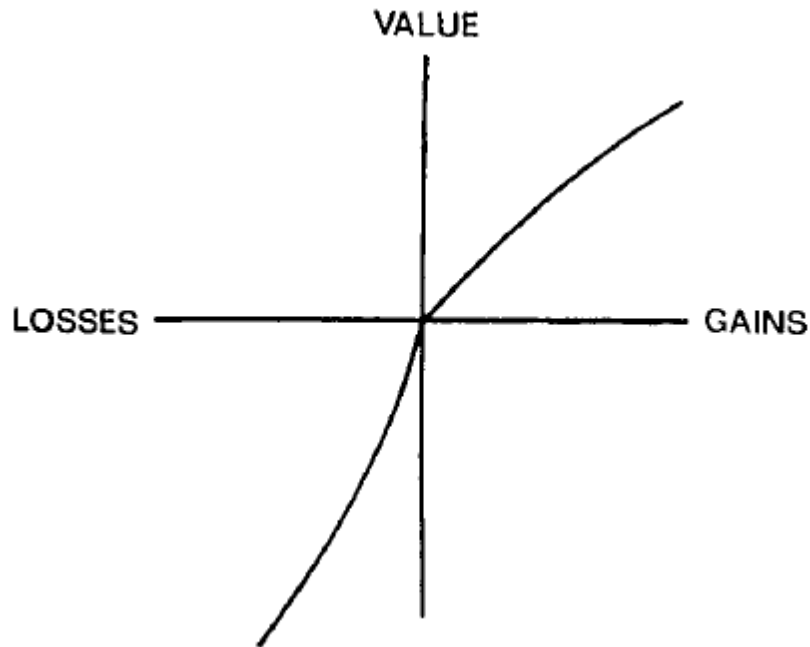


Figure 3: A typical value function (Kahneman and Tversky, 1979)

Tversky and Kahneman (1992) define the value function $v(x)$ that is divided into a gain and a loss section by

$$v(x) = \begin{cases} x^\alpha & \text{if } x \geq 0 \\ -\lambda(-x)^\beta & \text{if } x < 0. \end{cases} \quad (2)$$

with x as the outcome of a prospect. The parameter α determines the shape of the value function for gains and β for losses. Both are found to equal 0.88 for

⁴ The convention is to label the shape “concave” for a shape like the one shown for gains in figure 3 and to label it “convex” for a shape like the one shown for losses in figure 3. This convention is applied throughout this study.

Tversky and Kahneman's data. For the description of the steepness of the function in the domain of losses, the researchers additionally introduce a loss aversion parameter λ which is found to be 2.25 for their data.

Kahneman and Tversky (1979) replace the objective probabilities used in EUT by decision weights based on the observation that people tend to overestimate small probabilities and underestimate objectively high probabilities. A weakness of this approach is that the sum of the applied decision weights does not necessarily equal 1 as in the objective approach of EUT. In the case of more than two potential outcomes, the principle of state dominance may therefore be violated: If the probabilities of each respective outcome are all low, the assigned value calculated by PT may be higher than the certainty equivalent which is not only counterintuitive but also violates the rule of in-betweenness. In their later version of PT, called Cumulative Prospect Theory (CPT), Tversky and Kahneman (1992) introduce a cumulative weighting function based on the ideas of RDEUT which resolves the aforementioned problem.

Rieger and Wang (2006) address the same problem and offer an alternative solution named Normalised Prospect Theory, where decision weights are first added up and then normalised by dividing through the sum of the decision weights.

Tversky and Kahneman (1992) describe probability weighting in the following functional form,

$$w^+(p) = \frac{p^\gamma}{(p^\gamma + (1-p)^\gamma)^{1/\gamma}}, \quad w^-(p) = \frac{p^\delta}{(p^\delta + (1-p)^\delta)^{1/\delta}}. \quad (3)$$

separating between the subjective probability weightings in the case of gains $w^+(p)$ and losses $w^-(p)$ with p being the objective probability. For their data, they find $\gamma = 0.61$ and $\delta = 0.69$.

This gives the following shapes for their probability weighting function as shown in figure 4:

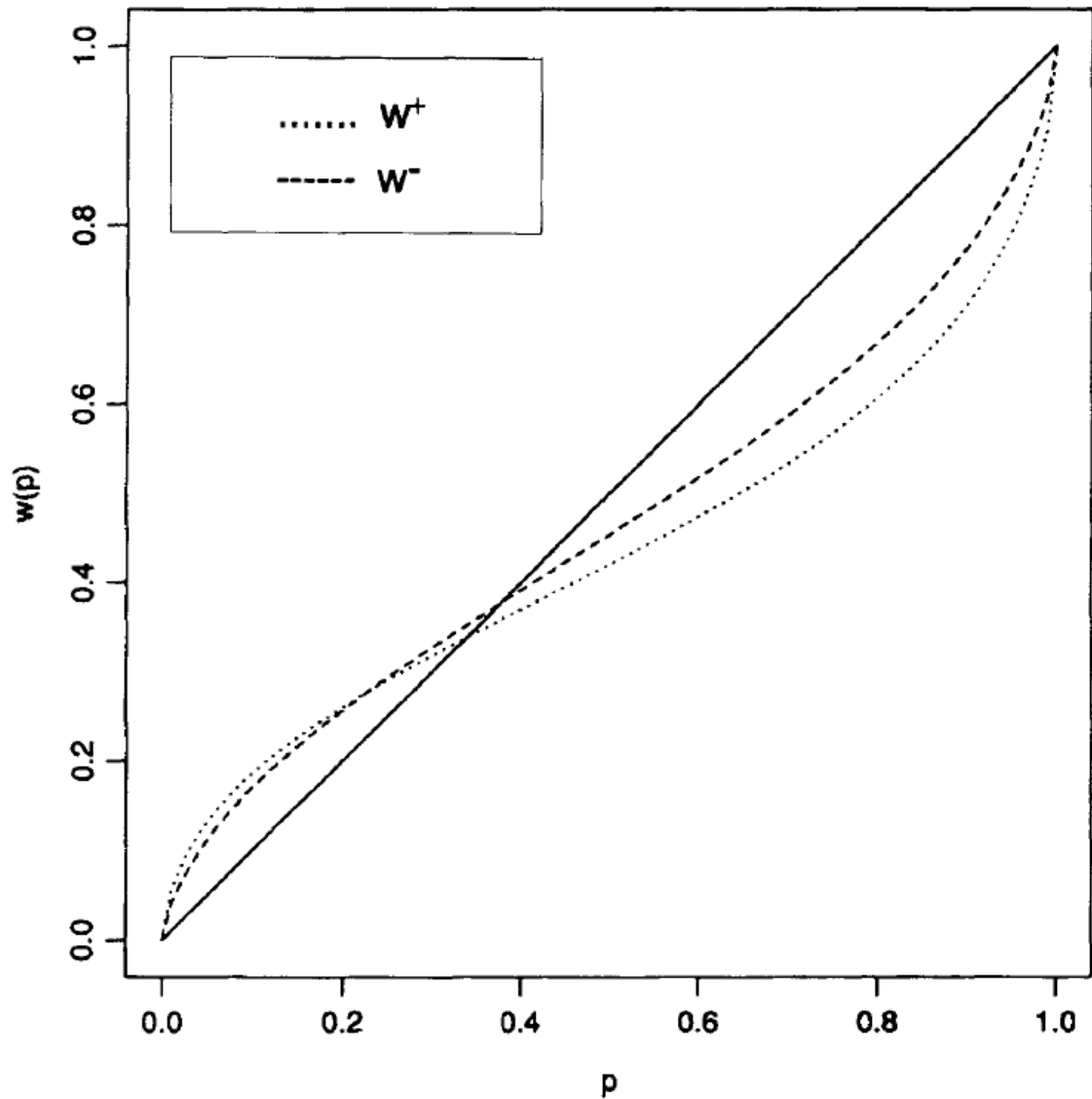


Figure 4: Estimates of the probability weighting functions in the domains of gains and losses separately (Tversky and Kahneman, 1992)

The value V of lotteries with two prospects A and B , where $A > B$, can then be computed by the equation

$$V = w(p)v(A) + [1-w(p)]v(B) \quad (4)$$

The main contributions of Kahneman and Tversky are first the introduction of reference dependence of outcomes instead of looking at the total wealth which is

intuitive and has been shown in their experiments. The second essential new feature is the demonstration of loss aversion which can only be shown with a given reference point. People tend to feel hurt more by a loss of X% than they feel happy by a respective gain of the same magnitude. That is why Kahneman and Tversky do not only divide the utility curve into two parts for gains and losses, but also introduce a loss aversion parameter for a better description of losses.

The findings of CPT have subsequently been used by many researchers (see Wakker, 2010, for an overview) in different areas of research and not only in finance.

3.2.4 The Fourfold Pattern (4FP) of Prospect Theory and Loss Aversion

Kahneman and Tversky (1979, 1992) found various phenomena in their research which have later on been confirmed by the empirical studies of numerous other scholars. With regard to risk preferences, their main observations can be formulated as the so called 4FP and loss aversion:

1. Individuals exhibit risk aversion over high-probability gains
2. Individuals exhibit risk-seeking behaviour over low-probability gains
3. Individuals exhibit loss aversion, i.e. losses loom larger than respective gains
4. Individuals exhibit risk-seeking behaviour over high-probability losses
5. Individuals exhibit risk aversion over low-probability losses

Tversky and Kahneman (1992) define low probability as $p \leq 0.1$ and high probability as $p \geq 0.5$.

The question of risk aversion vs. risk-seeking behaviour can be considered in all the above cases as having two components, namely the utility or value function on the one hand and the probability weighting function on the other hand. As individuals tend to overweight small probabilities, e.g. by assigning a subjective 10% probability to an objective 5% probability, this effect can overcompensate for the shape of the value function.

Figure 4 shows the estimated probability weighting functions in the domains of gains and losses on the basis of the data of Tversky and Kahneman (1992). The perceived subjective decision weights $w(p)$ can differ substantially from the objective probabilities p . Differences can also be observed between the weighting function $w+$ for gains and the function $w-$ for losses. Only for medium probabilities of around 0.4, the perceived probabilities can be considered to be close to the objective ones. The steepness of the subjective curves close to $p=0$ and the strong convexity close to $p=1$ are eye-catching.

Probability weighting can explain why people may at the same time buy lottery tickets and insurance contracts, as an extreme example. For investment decisions, risk-seeking behaviour over low-probability gains (above: 2.) can be explained by probability weighting being a curve steep enough for the low probabilities to overcompensate the concavity of the utility curve for gains. In the domain of losses, risk aversion over low probability losses (5.) is accommodated by an overestimation of the low-probability risk that overcompensates for the convexity of the value curve.

Most studies in the field confirm the finding of an inverse-S shaped probability weighting function (e.g. Abdellaoui, 2000; Bleichrodt/Pinto, 2000; Gonzalez/Wu, 1999; Tversky/Fox, 1995), but some scholars find rather convex patterns of the curve. For instance, the median probability weighting function found in the experiments of Van de Kuilen et al. (2006) is, in contrast to Tversky and Kahneman (1992), convex as for most subjects and concave for 25% of participants. They find that risk aversion is driven as much by probability weightings as by utility.

With respect to the value function, researchers overwhelmingly confirm concavity in the domain of gains (e.g. Laury/Holt, 2002; Baucells/Heukamp, 2006; Abdellaoui et al., 2007). Levy/Levy (2002) find contradictory results.

In the domain of losses, convexity as in Tversky and Kahneman (1992) is discussed more controversially based on differing empirical findings. Laury/Holt (2002) find risk-seeking behaviour only for imaginary losses. If real money is

involved, their subjects are risk-neutral on average. Abdellaoui et al. (2007) find concave utility also in the domain of losses, but preferences turn into risk-seeking behaviour due to probability weighting. Abdellaoui (2000) confirms convexity of the utility function for losses.

Empirical research on private individuals found that losses loom larger than gains. Tversky and Kahneman (1992) determined a loss aversion parameter of 2.25 based on their data. Other scholars came to similar conclusions: Schmidt/Traub (2002) find a loss aversion parameter of 1.43, Pennings/Smidts (2003) find 1.81, Abdellaoui/Bleichrodt/Paraschiv (2007) find a range of 1.53 – 4.99 and Booij/van de Kuilen (2009) find 1.79 on their data.

3.3 Group Decision Making

Previous empirical studies, as in chapter 2.2, that were aiming at eliciting a utility curve have treated individuals only. In the case of German charitable trusts, the investment behaviour may depend on one key individual that takes the factual responsibility, e.g. due to reasons of superior financial education, particular knowledge or interest. In these cases it seems appropriate to identify and select the relevant individual as a proxy for the overall behaviour of the trust.

It can as well be expected that investment decisions are in many trusts taken by groups of people rather than by individuals, i.e. by the trusts' responsible bodies. It must therefore be considered whether and, if so, how and to what extent group behaviour may deviate from the behaviour of the individuals or incomplete bodies that are examined in this study. The author does not have the opportunity of directly examining the behaviour of the complete responsible body. It must therefore be analysed whether conclusions for the whole body can be drawn from examining single persons of the respective bodies also in trusts that usually rely on more one factual decision maker. The results will show the extent of potential limitations of the research study.

3.3.1 Social Choice Theory as a Normative Attempt to Capture Group Behaviour

Analysing group decision making, Arrow (1951) stated in his Impossibility Theorem that there existed no generally valid social welfare function, e.g. a majority rule, to aggregate individuals' preferences into group preference meeting his four conditions, i.e. of non-dictatorship, ordering, Pareto principle and the independence of irrelevant alternatives. This means that a social decision could never be rationally justified without violating at least one of the above conditions except for cases where the group consists of only one individual or there were fewer than three states to choose from. Arrow's axioms have been discussed and criticised by other scholars (e.g. Fishburn, 1973; Wilson, 1975; Binmore, 1994) especially the very strong assumption of the independence of irrelevant alternatives. Arrow used simple ordinal measures for utility and avoided cardinal scales which is different from the theoretical approaches, EUT and CPT, described above.

Harsanyi (1979), in contrast, builds on the concepts of rationality of individual utility as in VNMs axioms which can be derived from preferences over lotteries and expressed on a cardinal scale. He introduces the idea of a "chairperson," who has two parallel preference orderings, the personal one and a moral attitude for the group – a constellation that can also very well be imagined in a German charitable trust. The moral attitude can best be described as the weighted average of the individual group members' preference orderings, where the weighting is a result of the respective moral weight the chairperson assigns to the orderings. In Harsanyi's second theorem, the same weight is given to all individual orderings. This premise is a very strong assumption. It must be questioned whether a moral ordering would in practice not consider the specifics of the individuals, such as their expertise, experience, moral rank in the group or other factors. Furthermore, the ability to learn from other peoples' reasoning and to change one's initial opinion should be considered. Nevertheless, the main contribution of Harsanyi was to disclose a way of aggregation of individual preferences that follows the axioms of rationality of VNM.

Group preferences can most easily be derived, if they are a result of dictatorship or if there is only one individual or if there are less than three alternatives to choose from. In reality, in a trust, there could be indeed only one decision maker, decisions could be dominated by one dictator and the lotteries to be used in a study on decision theory may contain only two alternatives to choose from. Following Harsanyi's ideas, the individual preferences can be aggregated in a consistent mathematical way to form the group's preferences.

3.3.2 Empirical Findings on Group Decisions

In empirical studies, Stoner (1968) found that group decisions can be more risky ("risky shift phenomenon") or more cautious ("cautious shift phenomenon") than the average of the initial individual decisions. The trend of groups making more extreme decisions than the average of the individuals as a general phenomenon is referred to as "group polarization" (Myers and Lamm, 1976). Cheng and Chiou (2008) observed group polarisation in investment decisions under framing as in PT.

Tindale, Kameda and Hinsz (2003) state that the finding of majorities being able to enforce their opinion was one of the more consistent and robust findings in previous research. Davis' (1996) Social Judgement Scheme (SJS) weights preferences of the members of a group by the centrality of the opinion in comparison to other members' opinions. The closer a member's position is to the other members' positions, the more weight is assigned. This also implies that low weight is given to outsider opinions. Empirical tests support the theory.

The literature identifies some aspects of particularly high relevance that shall be exploited for the intended research programme. Kameda, Tindale and Davis (2002) describe "social sharedness" as the main driver for decisions. Kameda, Ohtsubo and Takezawa (1997) argue that centrality in the socio-cognitive network is a key aspect. Voting rules can play a role as well as binding mechanisms, belief clusters and group norms in the organisation. In some charitable trusts, "groupthink," a phenomenon of avoiding conflicts and

maintaining unanimity, may prevail (Janis, 1972). Experts, group size and leadership can also play a role. The researcher therefore established criteria for the selection of subjects for the study.

3.3.3. Implications of Group Decision Making as a Limitation to the Study

From a purely normative point of view, following Harsanyi's (1979) second theorem, looking at individuals instead of the complete decision making bodies could easily be justified. Given that all individual views can be aggregated having the same weight, a sufficiently high number of randomly selected decision makers of different trusts will be acceptable for a representative elicitation of preferences for the participating trusts. This is fully compatible with the axioms of rationality postulated by VNM and therefore perfectly matches the theoretical framework of EUT.

Empirical studies have shown that group decisions can lead to results that are either more or in other cases less than the weighted sum of the individual constituents. Cheng/Chiou (2008) show in their study on polarisation in group investment decisions on the background of PT-like framing, which is the most related piece of research to this study as far as group decision making under PT is concerned, that group decisions exhibit stronger tendencies towards framing effects, i.e. risk aversion in the domain of gains and risk-seeking in the domain of losses, than individual decisions. On the basis of existing research, the researcher was unable to isolate and quantify the potential effects of group decisions. This is a limitation of the study.

3.4 *Synthesis / Conclusions of Chapter 3*

The literature on decision theory offers theoretical and practical concepts to measure utility. They reach from the early approaches of defining rational behaviour as a basis for decision making as in EUT to the more descriptively oriented concepts of CPT which are bound to capture also the seemingly irrational behaviour exhibited by human beings. The strength of the EUT concept

lies in its underlying rationality of the axioms. It has shortcomings in the description of real world behaviour. CPT has been developed to better describe human behaviour beyond the rationality of EUT. Its strengths are the characteristic features such as reference point dependence, loss aversion and probability weighting, which give more flexibility to the concept. Both concepts have commonalities in the way how utility is defined and presented, which is an advantage for the research programme as the results can be tracked against the theoretical background of both theories.

Group decisions can deviate from the ones that individuals would take. This is not so much a problem in the normative world of EUT, where an aggregation of individual preferences on the basis of VNM axioms can be justified. The limitation is rather the assumption of full compatibility between CPT and the descriptive findings on group behaviour.

4 Synthesis of the Literature Review: Applying Decision Theory to the Investment Behaviour of German Charitable Trusts

It can be expected that the research on the specific group of German charitable trusts as subjects which to the knowledge of the author has not been carried out before, may deliver results different from those of existing studies on the behaviour of students or the general public with regard to risk preferences. Previous research, also the descriptive works, has mainly been theoretically motivated and driven by the establishment of general assumptions on decision making. It offers normative solutions on the one hand and descriptions of real (or simulated) investment behaviour on the other. Normative theory exhibits the afore mentioned weaknesses in practical usage, whereas descriptive theory offers a “typical” value function as a result of the aggregation of individual utility perceptions of private persons which can empirically be measured, but may potentially show tremendous differences on the individual level.

The literature review led to numerous conjectures for investigation. These conjectures can be divided into two groups. The first group of conjectures deals with the general risk preferences of German charitable trusts and is summarised in the following section 4.1. These conjectures will be treated by the first of the two research questions to be asked.

The second group of conjectures concerns the individual characteristics of trusts and is summarised in section 4.2. These conjectures will be treated under the second research question.

4.1 *Testing the Risk Preferences of German Charitable Trusts for the Fourfold Pattern (4FP) of Prospect Theory and Loss Aversion*

The restrictive and binding legal framework for German charitable trusts may potentially affect decision making in such a massive way that these subjects will be much more of a homogeneous group than private individuals without these

restrictions can be and which have been subjects of prior research.

CPT is based on empirical observations that support the assumption of decreasing marginal utility leading to risk aversion in the domain of gains and risk-seeking behaviour in the domain of losses. Given the need of certain minimum and targeted returns to finance the purpose of the trust, it can be expected that risk aversion will prevail in the domain of gains, similar to the shape of utility which has been established in previous studies using students, scientists or the general public as subjects. In the domain of losses, it seems most interesting to investigate risk preferences of trusts which need to strive for capital preservation, and compare them to what is known about natural persons from prior research.

Special attention must be given to the question of loss aversion. The postulation of capital preservation speaks for risk aversion in mixed (gain/loss) situations. The study also tests whether –analogous to prior research – subjects are risk-seeking for small-probability high gains and risk-averse for small-probability high losses. Given the avoidance of gambling situations, it can be anticipated that trusts exhibit risk aversion for both cases.

The conjectures regarding the generally prevailing preferences of trusts with respect to the 4FP of PT and loss aversion are:

1. Risk aversion in the domain of gains. (analogous to prior PT observations)
2. Risk aversion also in the special case of low-probability high gain situations (different from the overweighting of small probabilities in prior observations with private individuals which led to risk-seeking behaviour)
3. Loss aversion (analogous to prior PT observations)
4. Risk-seeking behaviour in the domain of small to medium-sized losses (analogous to original PT, but mixed results in other research)
5. Risk aversion for the special case of low-probability high losses (analogous to prior PT observations)

Testing for the 4FP of PT allows the author also to compare the results to EUT prescriptions which would demand for a consistent pattern, e.g. risk aversion, for all questions. Theoretically, also consistent patterns of risk-neutral or risk-seeking preferences would be acceptable to EUT. In practice, it can be derived from the nature of trusts that of these three general patterns only risk aversion can have the potential to prevail for all questions.

It is possible that the preferences are too heterogeneous so that no characteristic preferences for trusts in general can be found. A finding of this kind would also be valuable as it would oppose the idea of standardised products like specialised mutual funds, which already exist in the market, as an investment vehicle that can satisfy the risk preferences of all trust investors in the same way.

4.2 Testing for the Association between Risk Preferences of Trusts and their Individual Characteristics

The analysis of trust characteristics in chapter 2 gives reason to conjecture that the risk preferences of trusts may in certain cases systematically deviate from the general pattern. The circumstances that are suspect to cause deviating risk attitudes are listed below:

1. Size of the trust (measured in terms of the asset base)
2. Age of the trust
3. Donor and donor's influence on investment decisions
4. Type of trust
5. Structure of the capital stock
6. Sources of funding
7. Expected growth of the asset base
8. Existence of reserves
9. Statutes of the trust
10. Number, gender and age of decision makers

The parameter values of these characteristics could be associated with differences in the preferences regarding one or more of the five PT features.

Re 1. Size of the trust (measured in terms of asset base)

The size of a trust measured by its total capital may play a role with regard to the perceived utility of investment returns and was named most frequently as a distinguishing factor in prior research. Large trusts are supposed to have more know-how and capacities to deal with investment risk.

Conjecture:

The bigger a trust, the more it will be able and willing to accept risks.

Re 2. Age of the trust

The age of a trust can be relevant for risk preferences for several reasons. The experience within an organisation can make a difference for risk attitudes. It may also have influence in an indirect way as old trusts had the opportunity to build reserves, a factor that will be discussed separately, for a longer period of time.

Conjecture:

The older a trust, the more it will be able and willing to accept risks.

Re 3. Donor and donor's influence on investment decisions

The donor and the donor's influence on financial decision making can evoke differences in risk attitudes. As an example, if public money is involved and public attention given to the trust, decision makers may be more risk averse than in other cases. A donor who is a natural person and still active and influential in decision making, may have a particularly strong commitment to the capital invested.

Conjecture:

Some types of donors will cause more risk-averse behaviour than others.

Re 4. Type of trust

The type of trust can have a significant meaning for the investment strategy. A trust that is predominantly involved in running its operational activities to fulfil the purpose may depend to a lesser degree on the financial capital for that mission and therefore be willing to accept more investment risk.

Conjecture:

The more a trust is involved in operational activities, the more it will be able and willing to accept risks.

Re 5. Structure of the capital stock

The structure of the capital stock can already be an expression of risk preferences. Depending on the volatility of assets in the portfolio, risk attitudes can be derived.

Conjecture:

The higher the portion of volatile assets in the portfolio, the more these trusts are willing to accept risks.

Re 6. Sources of funding

The behaviour of trusts may depend on the degree they rely on income from investments. Trusts that finance their activities partly or even predominantly by donations or other sources could possibly show less risk aversion on investments than trusts without alternative source of income.

Conjecture:

The more trusts rely on income from capital, the more risk-averse can they be expected to be.

Re 7. Expected growth of the asset base

Trusts expecting to grow by external factors may have a different attitude towards risks on the existing capital base. Expecting a growing capital base may be associated with more risk-seeking behaviour.

Conjecture:

Trusts that expect growth of assets through external factors will be more risk-seeking than others.

Re 8. Reserves

Reserves could be an important factor for risk preferences of trusts. Assuming that a trust usually has some fixed basis costs and potentially also recurring obligations, reserves can help to finance spending activities in times when current income from capital is low. Reserves can therefore allow for riskier investments.

Conjecture:

The more reserves are available in a trust, the less risk-averse will be their behaviour.

Re 9. Statutes of the trust

The statutes of the trust represent the will of the donor and have to be followed. Restrictions like “gilt-edged investments only” can therefore have significant consequences on preferences.

Conjecture:

Restrictions that are severely limiting risk like gilt-edged investment will be observable in risk-averse behaviour.

Re 10. Number, gender and age of decision makers

The number, gender and age of decision makers can be relevant for differences in risk attitudes as well. Evidence comes from research on private individuals.

Conjecture:

Risk aversion will increase with the number and age of decision makers and the involvement of female decision makers.

4.3 Capturing the Potential Limitations of the Study

Limitations to the study have different origins. The main potential limitations that were addressed are the question of group vs. individual behaviour and the comparability of trusts in the sample.

4.3.1 Potential Differences between Group and Individual Decisions

In order to mitigate the potential effects of group versus individual decisions (as discussed in chapter 2.3), the researcher must put emphasis on a careful selection of participants. The researcher therefore needed to predefine criteria in the sense of minimum requirements concerning the appropriateness of the subjects as representatives of the trusts on the basis of empirical research on group decision making. The criteria are:

1. Position of the subject within the trust
2. Influence on investment decisions

The author assumes that the careful selection of subjects by way of defining minimum requirements allowed for the elicitation of risk preferences that were characteristic of the respective charitable trusts and as an aggregate for German charitable trusts in general.

4.3.2 Potential Non-Comparability of Trusts in the Sample

Trusts were excluded from the study, if they did not meet the following requirements:

1. Charitable status from the fiscal authorities
2. Unlimited intended life time
3. No restrictions in the guidelines of the statutes that make investment decisions redundant

4.4 Research Questions, Aims, Objectives and Hypotheses

The literature review has identified research gaps with regard to the elicitation of risk preferences of German charitable trusts. This study therefore addressed these issues and investigated the investment risk preferences of decision makers acting on behalf of trusts based on decision theory, in particular on the 4FP of PT. The result is a description of the “typical” risk preferences of trusts in general concerning the 4FP and loss aversion.

Additionally, the analysis in the literature review has brought up differences in the characteristics of trusts that were suspect to influence investment preferences. Thus, the characteristics of trusts were tested for association with the stated risk preferences concerning the 4FP and loss aversion.

Research Questions:

1. What investment risk preferences do decision makers acting on behalf of German charitable trusts exhibit with regard to the features of the 4FP of PT and loss aversion?
2. Are there associations between the characteristics of German charitable trusts and their investment risk preferences concerning the features of the 4FP of PT and loss aversion?

Research Aims:

1. To elicit the investment risk preferences of decision makers acting on behalf of German charitable trusts with regard to the 4FP of PT and loss aversion
2. To elicit whether and which characteristics of German charitable trusts are associated with investment risk preferences concerning the features of the 4FP of PT and loss aversion

Research Objectives:

- To elicit and aggregate the preferences of all decision makers acting on behalf of trusts for the five features separately
- To identify the characteristics of German charitable trusts which are influential on their risk preferences
- To assess the most significant characteristics regarding their influence on risk preferences
- To evaluate and enrich the findings by judgements of stakeholders (triangulation of results)

Research Hypotheses:

1. H⁰: Decision makers acting on behalf of German charitable trusts do not exhibit investment risk preferences analogous to the 4FP and loss aversion typically found with natural persons by Tversky and Kahneman (1992).
H^a: Decision makers acting on behalf of German charitable trusts exhibit investment risk preferences analogous to the 4FP and loss aversion typically found with natural persons by Tversky and Kahneman (1992).
2. H⁰: The investment preferences of German charitable trusts are not associated with their characteristics.
H^a: The investment preferences of German charitable trusts are associated with their characteristics.

5 Pilot Study Report

5.1 Introduction

The pilot study was conducted in order to confirm the research paradigm, which is positivist, the appropriateness of the initial research theory and to test the intended research methodology. It concentrated on the part of cross-sectional data collection from trusts by a questionnaire, the backbone of the whole study, and was supposed to cover the main content that is subject for the corresponding cross-sectional part of the main study. The researcher tested a traditional mail survey as well as an online survey.

Addresses of trusts were selected from an official federal register.

The second part for the main study of interviewing trusts and experts by telephone for a triangulation of results was not part of the pilot. Instead, some participating trusts were called and asked for their experience with the questionnaire and further remarks.

The pilot study was conducted especially in order to ...:

- confirm the positivist research paradigm.
- confirm the appropriateness of the initial research theory.
- test the research methodology in general including also the technical aspects of feasibility.
- test the absolute and comparative response rate in mail and online surveys.
- test the understanding of questions by the respondents.
- test the quality of data to be obtained.

5.2 Methods of data collection

The pilot study included two methods of data collection, traditional mail and online, in order to allow for comparisons of advantages and disadvantages between the two. For the mail survey, 20 letters were sent out, including a cover letter, a letter of support from EBS, the one-pager questionnaire and a stamped envelope in order to facilitate response.⁵ One week after the mailing, a reminder postcard was sent. For the online survey, the text of the cover letter was used and a link embedded leading to the questionnaire. A reminder e-mail was sent four days after the initial e-mail. The questionnaire was created online on a scientific platform that is free of charge if used for scientific research work. The survey questionnaire can be found on the internet:

<https://www.soscisurvey.de/stiftungen>

password: 2012

Questions were identical for both surveys. The only deviations were the form of presentation and a more detailed scale in question 13 due to less problems of space in the online survey in comparison to the one-sheet-only approach followed in the mail survey. A further difference was that the online survey used random walk in question 17 with regard of positioning the “safe” vs. the “chance” options left or right on the screen. In the traditional mail survey, the “safe” option was always placed on the left side.

The trusts for this pilot study were selected by their expected size and age out of the official register of trusts in the federal state of Rhineland-Palatinate in order to include a variety of trusts. These criteria were applied because age is available in the official register and size could be anticipated due to entries in the directory itself or investigations on the homepages of the trusts if available.

The geographical limitation on Rhineland-Palatinate’s trusts in the pilot was due to the easy availability of this official register. For the main study on German trusts in general, the researcher relied on Maecenata Institute’s data base to

⁵ The cover letter and the one-pager questionnaire can be found in appendix A and appendix B.

avoid any potential bias caused by using a sample of one single state. The researcher expected no major shortcomings in using a geographically limited sample for the pilot study with regard to the issues being tested. It could be expected that the trusts in the pilot study have to a sufficient degree similar characteristics to those of the population of German trusts.

5.3 Construction of a Questionnaire

The questionnaire was constructed with the following objectives and under following propositions.

5.3.1 Elicitation of investment preferences

The researcher aimed at the basic elicitation of risk-averse vs. risk-seeking behaviour. Details on the shape of the utility curve were left out due to feasibility issues. Pre-tests by the researcher revealed that it would be hard to find a sufficient and representative number of trusts willing to participate in rather time consuming (approximately 1h) interviews answering a high number of questions (approximately 100) on their investment behaviour. This kind of methodology was used by other researchers in a similar way, but in the laboratory and mainly with students. However, it did not seem feasible with trusts in the field for this study. For that reason, there is no differentiation between probability weights and the utility curve. The answers to the questions revealed whether the subject is risk-averse or risk-seeking in the respective situation. No attribution was made regarding the contribution of the probability weighting and the utility curve. These issues are also interesting to elicit from an academic perspective, but were not essential to the research questions to be answered in this study.

This simplification allowed the researcher to get along with only five questions intended to investigate the basic PT characteristics:

- risk-averse or -seeking behaviour for gains with balanced probabilities (Q 17.1)
- risk-averse or -seeking behaviour for high gains with low probability (Q17.2)
- determine loss aversion yes/no (Q 17.3)
- risk-averse or -seeking behaviour for losses with balanced probabilities (Q 17.4)
- risk-averse or -seeking behaviour for large losses with low probabilities (Q 17.5)

5.3.2 Questions on Trusts' Characteristics

The researcher aimed at testing for association of certain distinguishing features of trust characteristics with their investment behaviour. The trust characteristics were identified in questions 1 – 16. These had been influenced by previous research questionnaires in the field of trusts (BDS, 2011; Sandberg, 2007; Heissmann, 2005). They had also been influenced by research on circumstances relevant for differing investment behaviour among private individuals like gender and age (Eckel/Grossmann, 2008; Gächter, 2007). Additionally, the questions had been influenced by the results of the literature review which pointed to some factors that might be relevant like the reserves of a trust.

5.3.3 Categorisation of Questions

The questions can be classified into five categories:

Cat. A: Questions aiming at gathering information on trust characteristics only (9, two of them elicit two characteristics)

Cat. B: "K.O. questions"⁶ to discard trusts that are not in the scope of the study and respondents that are considered to be not suited to answer the questions (3: Q4, Q5, Q13)

Cat. C: Questions that contain elements of both, A and B, i.e. collect information but can potentially be K.O. (2: Q11, Q12)

Cat. D: Questions to elicit the risk preferences (5: Q17.1 – Q17.5)

Cat. E: 3 Optional questions asking for contact details for allowing further questions via telephone (collection of contacts for the triangulation interviews),

⁶ K.O. stands for Knock-out and describes questions that were used to eliminate subjects from the study

comments to the study and asking for interest in receiving an executive summary of the study after completion.

BDS as well as Prof. Sandberg were so kind to make available the results and the questionnaire used in their surveys for StiftungsReport 2010/11 (BDS, 2011) and Sandberg (2007). This gave important indications for the construction of the questionnaire and some questions were adopted. It also gave ideas about the potential distribution of criteria between trusts and was therefore helpful in defining clusters for tick-box questions like the ones used to identify the size of a trust.

Dr. Graf Strachwitz, who is in responsible position at Maecenata Institute, Humboldt University Berlin, and very actively publishing in the field of German trusts (e.g. Strachwitz, 2010, 2011) as well as Dr. Münschener, a researcher from CSI, University of Heidelberg, who was running a study on trusts parallel to this pilot study (Then et al., 2012), gave very concrete and helpful comments on the construction of the questionnaire.

As an expert on decision theory, Prof. Rieger from University of Trier, who publishes in the field of Prospect Theory (e.g. Rieger, 2011), gave comments in particular regarding the appropriateness of questions 17.1. – 17.5 to assess the risk behaviour of trusts.

5.4 Results of the Pilot Study

5.4.1 Technical Comparison of Online vs. Mail Survey

In order to find the most appropriate method of data collection for the main study, mail and online pilot were compared.

Online Survey Statistics		
Invitations sent out:	20	
Clicks on the internet survey:	12	
Complete and usable questionnaires:	6	
Complete but discarded for K.O. questions:	0	
Incomplete and unusable:	1	(person left after p. 1)
Click on the link and log-in only:	5	
Response rate:	30%	
Usable response rate:	30%	
Time for completion: average = 8 min. ; range: 5-12 min.		

Table 1: Technical results of the pilot study online survey

Table 1 shows that the online response rate as well as the quality of complete answers was very good, with all questions answered. No subject had to be discarded for the reason of not meeting the researcher's predefined criteria. The high number of log-ins without completion of the questionnaire could have had several reasons:

- Subjects might have felt not attracted by the design or content and therefore quit early
- Curiosity of subjects
- Double counts: it could not be traced whether these subjects have completed the questionnaire at a later point of time
- Forwarding to a more suitable addressee after having had a first glance on the kind of questions

As a consequence, the researcher strived to optimise the design of the first page for the main study and also re-arranged the sequence of questions with "more attractive" questions appearing on the first page.

The time range for completion was considered acceptable by the researcher.

Mail Survey Statistics		
Invitations sent out:	20	
Complete and usable questionnaires:	3	
Incomplete but usable questionnaires:	2	
Complete but discarded for K.O. questions:	2	no capital inv./low infl.
Incomplete and unusable:	1	Q17.1-17.5 all left out
Response rate:	40%	
Usable response rate:	25%	

Table 2: Technical results of the pilot study mail survey

Table 2 shows that the response rate in the mail survey was high with a rate of 40%, whereas the quality of responses was rather mixed: only three questionnaires were both complete and usable. The incomplete questionnaires had different questions missing (Q1, Q6, Q15 / Q8, 10, 14, 15) with the exception of Q 15. This pointed at no systematic problems with the missing questions. Question 15, asking for the average age of decision makers, seemed to be a particular challenge for two subjects and was not answered by them.

The other questions left out by the two subjects did not coincide. So, it seemed less an issue of quality of the questions, rather arbitrary and subject specific.

One subject missed to tick the preference questions 17.1 – 17.5. Reasons for this behaviour could be sought in a variety of potential fields: failure to turn the page (because these questions were placed on the back side of the sheet), questions too difficult to understand, no willingness to answer these questions, lack of time, or other reasons.

The number of questionnaires that had to be discarded by the researcher for the criteria set in the study was high but not unexpected. It was on the other hand remarkable that most letters that were answered found an appropriate addressee within the trust.

Comparison (summarised in table 3):

The response rate in both surveys was good and even very good in the mail survey. As far as the quality of answers is concerned, both methods delivered good results, online was better than mail. The online survey might have had some bias because not every trust had an e-mail address in the register of trusts. Mail addresses were available for all trusts.

The researcher strived to reduce the number of questions to the trusts to a minimum in order to be able to achieve a high response rate with a one-sheet-only approach. As a consequence, space for open questions was limited. The online questionnaire did not encounter these problems. As a useful feature, the online survey additionally offered the possibility to alternate the positioning of answer alternatives for Q 17.1 – 17.5 which may have prevented subjects from ticking systematically only the safe options on the left side or the risky options on the right side.

The expenses for the two pilot study surveys differed significantly. Whereas the online survey could be conducted without generating any costs on a platform for scientific studies that is free of charge, the traditional mail survey required:

- postage: € 1.45 + € 0.75 for the return letter stamp + € 0.45 for the reminder postcard = € 2.65 per trust
- copies of paper: ca. € 0.28
- envelopes: € 0.05
- postcards: € 0.10

This summed up to expenses of ca. € 3.08 per invited trust.

The time for the preparation of the survey would be shorter for online. Sending out standardised invitation e-mails is much less time consuming than handling with envelopes, stamps and paper. Time can also be saved, if the data is already available in a format to be processed by a computer.

Criterion	Online	Mail
Potential bias / availability of addresses	-	+
Response rate	+	++
Quality of responses	++	+
Layout / space for answers, e.g. for semi-open questions	++	-
Random walk questions possible 17.1 -17.5	++	--
Time for preparation	+	-
Cost efficiency	++	--
Time for structured analysis	+	-

Table 3: Comparison of online vs. mail survey in the pilot study

The researcher favoured the online version for data collection in the main study as a result of the above analysis.

5.4.2 Analysis of Data and Consequences for the Main Study

No obvious systematic differences in contents of the data had been detected between online and mail which would have made necessary a separate presentation of the analysis of data. Therefore the data of both collection methods was aggregated for further analysis.

First of all, the answers in the risk preference section of the questionnaire (Q 17.1 – 17.5) were analysed.

Q 17.1 Domain of high probability ($p=0.5$) gains

91% of subjects voted in favour of the safe alternative. This clearly shows risk aversion in the domain of gains with equal probabilities. This could be expected from the literature review. The result is so clear that it must be questioned whether the risky alternative should be made more attractive to get a more balanced result that gives room for analysing potential association of answers to the trusts' characteristics. The researcher added a question with an increased favourable outcome of the "chance" alternative in the main study. The expected

value of the “chance” option was then higher.

Q 17.2 Domain of low probability ($p=0.05$) high gains

100% of the subjects voted in favour of the safe alternative, even the subject that chose the risky alternative in the first question. The question was implemented in order to investigate potential risk-seeking behaviour due to overweighting of small probabilities in a choice between alternatives with equal expected value. The result was so clear that the researcher tried an alternative question in a further pilot study to investigate this phenomenon that may to a certain degree also exist with trusts. It could be that trusts regarded the question as pure gambling which should be avoided under all circumstances, a behaviour well supported by the literature review. Another possible explanation for the result is that the utility curve of trusts is very steep for low positive returns (as 0.4%) and then flattens towards high returns (as 8%), so that even in the case of overweighting small probabilities, the effect is simply overcompensated by the comparatively high utility of the small gain.

Q 17.3 Loss Aversion

60% of the subjects voted in favour of the safe alternative, 40% chose the risky one. The postulation of capital preservation, elaborated in the literature review, speaks for the safe alternative. On the other hand, the preservation of capital is not a purpose of its own. In order to fulfil the will of the donor, the trust needs returns on its investment and may therefore opt for the risky alternative which at least offers a fair chance (50%) of a return.

One subject who had answered 17.1 and 17.2 refused to answer this question as well as the two following ones, considering them as “nonsense”. This could indicate reluctance to deal with losses and an investment strategy that is limited to assets with no volatility like time deposits.

Q 17.4 Domain of high probability ($p=0.5$) losses

50% of subjects answering the question decided in favour of the safe alternative, the other 50% chose the risky one. This supports the results from the literature review. It is not clear whether a trust should better realise losses early or rather wait and see for improvement of the situation. Risk-averse behaviour supports the avoidance of large(r) losses and is a step to protect the capital base. On the other hand, risk-seeking behaviour can be a rational option for a trust that wants to avoid write-downs on its assets that would incur with the realisation of losses. The risk-seeking option may, as a detailed analysis including a breakdown of asset classes would possibly show, be found more often with trusts that are used to invest in volatile markets like equities and know that they have to accept temporary book losses to some degree. For the main study, the researcher specified question 6 concerning “financial assets” to gather more detailed information (equities, bonds, derivatives for protection, etc.).

Q 17.5 Domain of low probability ($p=0.05$) high losses

The risk-averse option was favoured by 60% of the answering subjects, 40% chose the risky option. This question aimed at the willingness to buy protection against large losses and how trusts deal with low risk for large losses. This is particularly relevant with regard to investment decisions that involve at least some risk of large losses like equities and the willingness to buy protection, e.g. by a put option. Given the mixed picture, it was interesting to investigate in a detailed analysis whether certain trust characteristics are relevant for the decision on this question. Here again, the asset allocation on a more detailed asset class level could be helpful.

5.5 Pilot Study Summary and Conclusions

The positivist research paradigm was confirmed. Nevertheless, the pilot study also revealed that some qualitative elements – as intended for the main study – would help to understand results better and give explanations.

The initial research theory was considered appropriate.

The research methodology worked in practice. Technical aspects of feasibility had been tested successfully.

Online was considered to be the appropriate method of data collection for the main study after having conducted a comparison with traditional mail.

The quantity as well as the quality of responses was good. Understanding of questions by the respondents was regarded as confirmed.

Some open issues could be identified, meaning that questions should be modified and tested in another pilot study for fine-tuning.

5.6 Amendments after the Pilot Study for Fine-Tuning

The fine-tuning pilot studies had shown that the questionnaire could carry a few more questions without provoking a significantly declining response rate. These additional questions were mainly used for more lottery questions in order to be able not only to reach conclusions about risk-averse vs. risk-seeking behaviour but also to compare the results of Tversky and Kahneman (1992) on individuals with the preferences of trusts exhibited in this study.

The more detailed question on the allocation of financial assets was tested successfully.

Another question was successfully implemented asking for the investment results of the past five years. This gave a longitudinal element to the study, even if the question was not answered by all the participating subjects.

5.7 *Synthesis of Literature Review and Pilot Study Results*

The literature review exhibited a variety of questions to be answered. These can be put into two categories.

The first category of questions concerns the general investment preferences of trusts in the domain of gains, losses and for mixed outcomes.

The conjectures derived from the literature regarding the generally prevailing preferences of trusts with respect to the 4FP of PT and loss aversion are stated as in chapter 4:

- 1 Risk aversion in the domain of gains. (analogous to prior PT observations)
2. Risk aversion also in the special case of low-probability high gain situations (different from the overweighting of small probabilities in prior observations with private individuals which led to risk-seeking behaviour)
3. Loss aversion (analogous to prior PT observations)
4. Risk-seeking behaviour in the domain of small to medium-sized losses (analogous to original PT, but mixed results in prior research)
5. Risk aversion for the special case of low-probability high losses (analogous to prior PT observations)

The pilot study gave very clear confirming indications for the first two points. As expected, the indication for the other three conjectures was less clear. The main study should give evidence about the preferences of trusts in these questions.

The literature review identified ten circumstances that could be responsible for deviating risk preferences. They are named in chapter 4 as

1. Size of the trust (measured in terms of asset base)
2. Age of the trust
3. Donor and donor's influence on investment decisions
4. Type of trust

5. Structure of the capital stock
6. Sources of funding
7. Expected growth of the asset base
8. Existence of reserves
9. Statutes of the trust
10. Number, gender and age of decision makers

The size of the pilot study was not sufficiently large to determine meaningful indications regarding the circumstances. The test for association of variables by chi square was not conducted for that reason. A first visual analysis spoke for the existence of at least some associations.

The study would also have yielded a substantial contribution to research, if it had not found any association between characteristics and preferences. This would have shown that trusts were either very homogeneous (for example in the domain of gains) or so heterogeneous that no association was possible.

The analysis of the pilot study gave confidence to the researcher that meaningful results on the investment preferences of German charitable trusts could be generated in the main study.

6 Main Study Methodology

6.1 Overview of the Mixed Methods Research Design

The research design followed the path of a mixed methods sequential explanatory approach (Creswell, 2003; Ivankova et al., 2006; Tashakkori/Teddlie, 1998). The methodology comprised quantitative and qualitative elements with a strong focus on the quantitative measurement of investment risk preferences and linking them to the characteristics of trusts.

A central methodological question was the measurement of subjective risk preferences which was the essential part of the quantitative data collection. Thus, the author discusses first and extensively the works of researchers in the field of decision theory as a basis for this study. Subsequently, the phases of quantitative data collection and analysis are described. The results of the cross-sectional internet survey were used to inform the qualitative phase: Interview questions were developed and participants were selected on the basis of the quantitative data. Qualitative data was then collected by semi-structured telephone interviews and analysed in order to triangulate and to explain the quantitative results. Finally, quantitative and qualitative results were integrated for interpretation with regard to decision theoretical aspects and implications for investment products for trusts.

The first research question

“What investment risk preferences do decision makers acting on behalf of German charitable trusts exhibit with regard to the features of the 4FP of PT and loss aversion?”

was answered by assessing the distribution of the stated answers regarding risk-seeking and risk-averse behaviour for the five settings.

The second research question

“Are there associations between the characteristics of German charitable trusts and their investment risk preferences concerning the features of the 4FP of PT and loss aversion?”

was answered by testing for association of the single characteristics of the trusts (e.g. in the case of “age” three brackets labelled “old”, “medium”, “young”) to the answers to the risk preference questions by a chi square test for each of the five settings and each of the characteristics.

Figure 5 gives an overview of the research design.

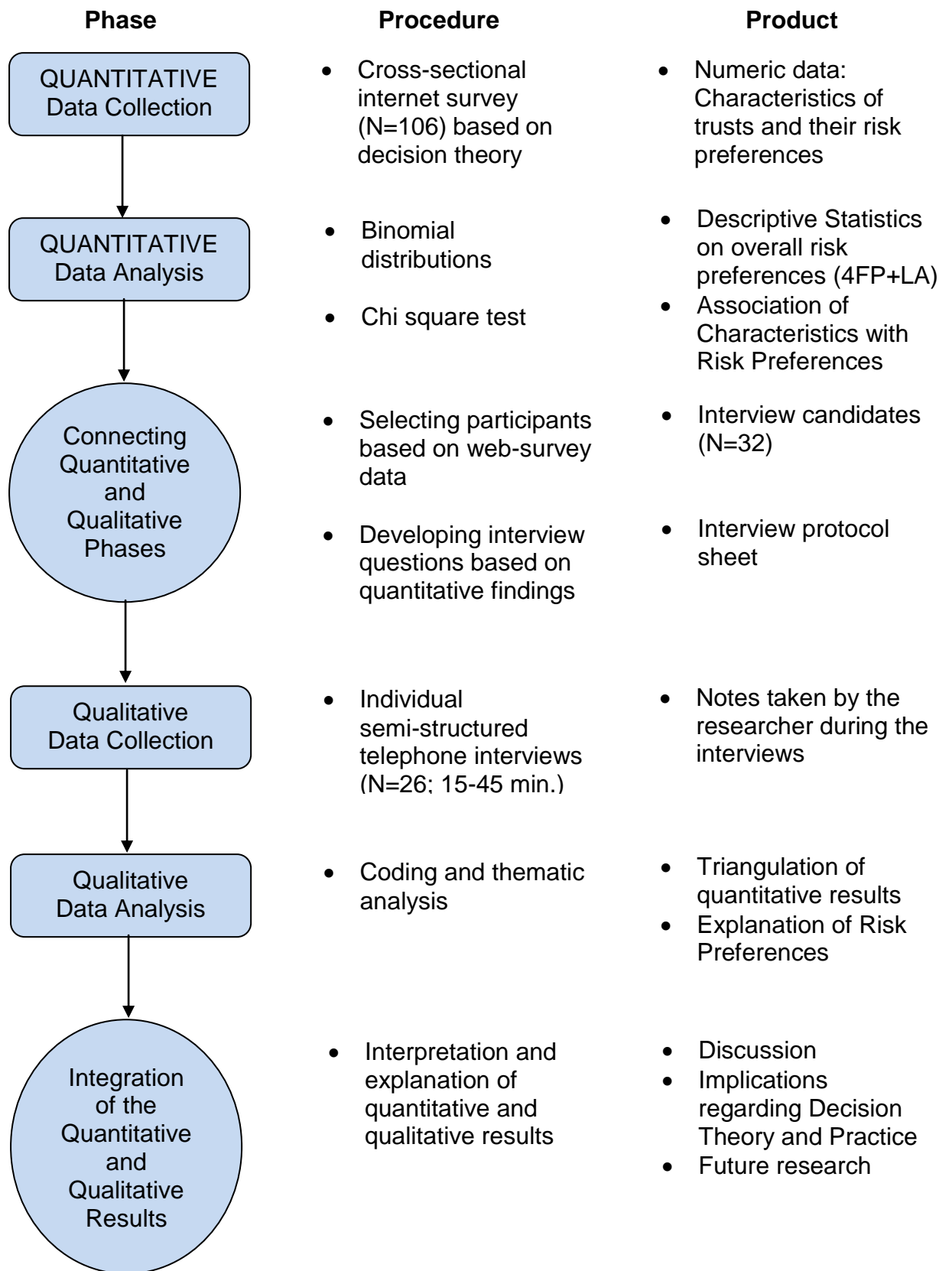


Figure 5: Overview of research design, analogous to Ivankova et al. (2006)

6.2 *The Methods of Measuring Risk Preferences in Decision Theory*

There are several well tested methods to determine risk preferences in the sense of decision theory. There is no single best method to choose. All of them have their advantages and disadvantages. The author of this study aimed at selecting the optimal elicitation method suited for his work and therefore first of all defined the following criteria:

1. The method (or variations of it) should have been successfully tested in research studies.
2. The method must be feasible in terms of technical complexity for the researcher himself as well as for the respondents.
3. Applicability both under EUT and PT should be given in order not to be restricted to one of the mentioned theories for later theoretical assessment

6.2.1 General Categorisation of Methods to Measure Risk Attitudes

Previous research has proposed a variety of methods for the elicitation of utility and later on also for the elicitation of probability weighting functions with regard to PT. Farquhar (1984) listed the most popular ones under EUT which was the predominating theory at that time. Among the standard gamble methods, there are two that have been discussed and used more than others: the Certainty Equivalence Method (CEM) and the Probability Equivalence Method (PEM). McCord and De Neufville (1986) proposed the Lottery Equivalence Method (LEM) and Wakker and Deneffe (1996) came up with the Tradeoff Method (TOM) which has been used frequently in the recent past (e.g. Fennema and van Assen, 1998; Abdellaoui, 2000; Etchart-Vincent, 2004; Schunk and Betsch, 2006; Booij and van de Kuilen, 2009). Many other methods in the literature are variations of the ones mentioned afore.

The CEM and the PEM both compare a lottery with a certain outcome. As far as the CEM is concerned, the researcher usually varies the certain outcome until indifference is reached in comparison to the lottery. For example, the researcher may find that a subject is indifferent between a lottery that promises either GBP 0 and GBP 10 both with a probability of 0.5 and a certain outcome of GBP 4. In the PEM, the analyst varies the probability p until the point of indifference is reached. (The researcher may find that a subject is indifferent between a certain outcome of GBP 5 and a lottery that promises GBP 0 with $p=0.3$ and GBP 10 with $p=0.7$).. Both methods were tested in a variety of studies, in particular under EUT. The CEM has a big advantage in its simplicity: it is easy for the subject to understand that a choice between a preferably 50/50 gamble and a certain outcome shall be given as response. The tasks for the subjects are more complex in the PEM, where some basic understanding of probabilities is needed. Both methods can generally be applied under both theories.

Mc Cord and De Neufville (1986) criticised the conventional methods including the traditional CEM and PEM upon several reasons including dependence on the probability level, chain responses magnifying potential errors and range effects. They proposed the LEM which does no longer compare lotteries with certain outcomes, but lotteries with lotteries and therefore claims a significant reduction of the certainty effect. The basic idea of the LEM, comparing lotteries in order to avoid the above mentioned shortcomings of the traditional methods, is also incorporated in Wakker and Deneffe's (1996) TOM. The authors argue that their method is valid under EUT and PT and robust against the issue of probability distortions. Despite the fact that the TOM has been used in a multitude of studies in highly ranked academic journals, it has some major shortcomings with regard to the criteria defined above. First of all, it is harder to understand for the subjects which has already been remarked in Wakker and Deneffe's study. Even though they used 14 researchers in finance and 28 undergraduate students in economics as respondents for their "monetary experiment", a rather high calibre group of respondents, they had six subjects being discarded for violations of monotony (five) and incomplete answers (one) respectively.

A high percentage of discarded subjects reveals that the tasks were complex and difficult to understand even for these “educated” groups of participants. It must be questioned whether financially rather “uneducated” subjects - like many of the decision makers in charitable trusts - would do better. A positive example of using the TOM with the broad population is Booij and van de Kuilen (2009) who investigated the utility of money for the general public in the Netherlands.

6.2.2 Discussion of Methods used by other Researchers in Decision Theory

Kahneman and Tversky (1979, 1992), the originators of PT and CPT, used simple lottery questions in their studies in order to elicit preferences of subjects and find the 4FP. Based on a high number of lotteries, they calculated a utility function as well as a probability function. Booth and Nolen (2012) investigated risk preferences by using only one gamble question, the “fiver lottery,” with a risky option having a higher expected monetary value (50% chance for GBP11 and 50% chance for GBP 2) than the safe alternative (GBP 5 for sure). Harbough et al. (2009) examined the robustness of the 4FP of PT using two different elicitation procedures, a choice based gamble to some extent similar to Booth and Nolen (2012), and the willingness-to-pay-method (WTP) which asks for a reservation price for a gamble. They could show the 4FP only when using WTP. The choice-based gamble did not deliver these results. In a prior study (Harbough et al, 2001), they already failed to demonstrate existence of the 4FP for high and low probability outcomes using a choice-based method. At that time, they argued that the WTP was very complicated and hard to understand for participants, an opinion that is shared by the author of the present study.

Hartog et al. (2002) who also used WTP describe one disadvantage of WTP as the gap between WTP and willingness-to-accept (WTA). They ran a regression to link the personal characteristics to the outcomes of the risk elicitation. For the elicitation of risk preferences, they used low-probability-questions with p varying between 0.01 and 0.2 that would possibly be regarded as speculation by trusts and only in the domain of gains.

Holt and Laury (2002) proposed a method that was subsequently widely used by a number of other researchers in later studies (e.g. Harrison et al., 2007). For each question, it involves ten decisions between gambles with probabilities being changed and ranging from 0.1 to 0.9 to elicit risk attitudes. The questions are not self-explanatory and therefore potentially a challenge to the respondent if used in a mail or online survey. Dave et al. (2007) compared it to Eckel and Grossman (2002, 2007) who used only a simple single choice among six gambles, all with 0.5 probability. They found that in the more complex method, subjects exhibited noisier behaviour, especially if their mathematical ability was low. The overall predictive accuracy was better for the complex method, but not so for the subjects with low mathematical abilities.

Burks et al. (2009) measured risk preferences by letting subjects choose between fixed payments and a 50/50-lottery with four sets of six choices including also loss questions, i.e. another variation of the certainty equivalent method. Döbeli and Vanini (2010) used a questionnaire asking subjects to state preferences for a 50/50-lottery vs. five predefined alternative choices with certain outcomes. Different from most other studies, they used percentage gains and losses which was also intended by the author of the present study.

Donkers et al. (2001) analysed which factors influence an individual's risk attitude based on lottery questions. The survey relied on data that was inserted by the subjects on their personal computer and no personal interviews were held, so that interviewer bias was not possible, a set-up similar to the online survey of the present study. A disadvantage was considered to be that no incentives could be paid to the subjects as is the case for many other related studies. Beattie and Loomes (1997) investigated differences between giving and not giving incentives to subjects in lotteries of simple pairwise choices and came to the conclusion that differences in results are small. The author of this study did not give incentives to the trusts except for sending them a summary of the results of the study after completion.

A simple approach to investigate risk attitudes is the one proposed by Dohmen et al. (2009). The researchers used the question "How willing are you to take risks,

in general?” and asked the subjects to state this willingness on a scale from 0 to 10. The authors found that this simple question was a reliable predictor of real behaviour when they compared the results to those of lottery questions within the same study. The authors divided the subjects after their choice for less than the fair certainty equivalent (CE) as risk-averse, for choosing the fair CE as risk-neutral and for a higher than the fair CE as risk-seeking, found risk aversion for an overwhelming majority of individuals and regarded the result as comparable to Holt and Laury (2002). A main difference between their work and Holt and Laury (2002) is that the former changed the CE in the questions whereas the latter changed the probabilities. Due to their use of comparatively fine grids, Dohmen et al (2009) needed up to 20 lotteries to elicit this information. Daly et al. (2010) examined how attitudes to risk relate to other psychological constructs of personality and to debt. They used the single general measure of risk taking following Dohmen et al. (2009) arguing that the subjective risk willingness question was free from framing effects and numeracy demand of the traditional lottery questions which appears as a clear advantage.

6.2.3 Conclusions with Regard to the Research Questions of this Study

The author was faced with a situation different from the above mentioned researchers in the field of decision theory. Whereas most studies were based on interviewing subjects like undergraduate students at university on campus, the access to trusts was much more limited than for this kind of studies. The author found in an analysis of potential access that trusts were generally not willing to invest one hour or more of their time for an interview which would be necessary for a detailed study of the utility curve and probability weighting. Since it was not possible to have the experiment with a representative number of trusts at a time and at the same place, one more obstacle was the geographical distance to overcome. The researcher therefore strived to collect data in a different way from the studies above, allowing him to reach a sufficient number of trusts to make the study representative of the population of German trusts and to connect information about their risk preferences to their characteristics.

The author of the present study had to weigh arguments of precision in the elicitation of risk attitudes on the one hand versus the issue of feasibility on the other hand. As he strived to elicit only the general question of risk-averse vs. risk-seeking behaviour of trusts in the domains of gains, losses and loss aversion, he could forgo methods that aim at a precise mathematical definition of the behaviour. The researcher favoured a data collection method that is robust and sufficiently tested by other researchers in the field of trusts. The elicitation of a probability weighting function and a utility function for the subjects was beyond the scope of this study.

The researcher therefore decided in favour of an online survey for the study in order to generate sufficient quantitative data for analysis. This was at the cost of precision in the elicitation of risk attitudes because the survey methodology lacked the opportunity of giving verbal explanations to the subjects and needed to simplify questions in order to be comprehensive and attractive to respond to.

Using a measure that relies only on one general question asking for the willingness to take risks like Dohmen et al. (2009) seemed not appropriate as the researcher in the present study wanted to investigate the behaviour of trusts in different domains. The simplification of Dohmen et al., therefore, goes too far for the purpose of this study, especially under the conjecture that risk behaviour differs between the domains of gains and losses.

50/50-lotteries compared to certain outcomes are very popular in the literature. This may be caused by the intuitive way of understanding these probabilities also for subjects with generally limited mathematical understanding. The researcher therefore decided to also using simple 50/50-choice questions except for the questions where high or low probabilities were explicitly needed to investigate the 4FP and loss aversion. The type of questions was designed to be intuitively easy to understand and not to overstrain participants in an online survey.

The depth of investigation of the five patterns was limited to assessing in a binary way whether a subject behaves risk-averse or risk-seeking in the five respective task blocks. Subjects choosing the certain alternative in fair gamble questions

were labelled “risk-averse,” subjects choosing the lottery were considered “risk-seeking” for the respective task. One question concerning loss aversion differed from the predominant method and asked for the price of the willingness to accept a lottery where a loss was possible. It allowed determining a loss aversion coefficient for trusts.

The other questions could not be used to further determine separate utility functions and probability weighting functions that would have allowed for a more precise description of risk attitudes as conducted in most of the large studies in decision theory. Nevertheless, the questions sufficed to answer the research questions of this study, i.e. to determine the risk preferences for trusts in general under the five settings described above and to test for association of trust characteristics to risk attitudes.

The elicitation method could potentially be biased. The author assumed that if a bias existed in the elicitation, it would not depend on the trusts’ characteristics. Therefore the results of the test for association could be regarded as valid even though there was no correction for bias.

6.3 Quantitative Data Collection

Quantitative data for the study was collected by a questionnaire in a cross-sectional internet survey. The survey produced numeric data regarding the characteristics of trusts and their risk preferences.

The quantitative data collection followed general recommendations of literature on the design of surveys (Ghauri/Gronhaug, 2010; Mayer, 2008; Dillman, 2000).

As a main contributor of empirical research on German trusts, responsible persons in the association of trusts, Bundesverband Deutscher Stiftungen (BDS), were interviewed and asked for their experiences with methodologies. In data collection, BDS have generally switched from previously used traditional mail to online for most surveys (e.g. BDS, 2011). Response rates for the online surveys

usually were in a range between 15 and 35%. Other researchers in the field of trusts (Sandberg, 2007) successfully used a traditional mail survey for data collection. As an advantage to traditional mail, online surveys are comparatively cheap as no postal charges have to be paid. They are easy to handle with regard to the analysis of responses as the data is already in a form to be processed by a computer.

6.3.1 Questionnaire

The questions referred to the characteristics of the trusts (e.g. age) and the risk preferences of the decision makers when acting on behalf of the trust. Risk preferences were measured for various hypothetical returns on the trust's capital in the domain of gains, losses and mixed, using a simple choice-based technique analogous to previous research in the field of decision theory. The risk preference questions intended to test for the typical characteristics of Kahneman and Tversky's (1979, 1992) fourfold pattern (4FP) and loss aversion, applied to trusts, i.e.:

- risk-averse or -seeking behaviour for gains with balanced probabilities
- risk-averse or -seeking behaviour for high gains with low probabilities
- loss aversion
- risk-averse or -seeking behaviour for losses with balanced probabilities
- risk-averse or -seeking behaviour for large losses with low probabilities

The answers to the questions could also be used for comparisons to EUT prescriptions.

The questionnaire that was created by the researcher and pilot-tested comprised a total of 32 questions which can be classified into five categories:

Cat. A: Questions aiming at gathering information on trust characteristics only (13)

Cat. B: "K.O. questions" to discard trusts that are not in the scope of the study and respondents that are considered to be not suited to answer the questions (3: intended life time of the trust, charitable status, personal influence of participant)

Cat. C: Questions that contain elements of both, A and B, i.e. collect information but can potentially be K.O. (2: statutes of the trust and position of participant)

Cat. D: Questions to elicit the risk preferences with respect to the 4FP and loss aversion (11)

Cat. E: Optional questions asking for contact details for allowing further questions via telephone (collection of contacts for the triangulation interviews), comments to the study and asking for interest in receiving an executive summary of the study after completion (3).

The risk preference questions (Cat. D above) asked for simple preference of a safe option versus a risky option with the exception of one question which asked for the desired minimum yield for the risky option. The guiding principle was to determine risk preferences with respect to the 4FP and loss aversion:

1. Risk preferences for gains with high probabilities were investigated by two choice questions:
 - a) 3% safe return vs. 50/50 chance for 0% and 6% return respectively (“fair game” with equal expected return)
 - b) 3% safe return vs. 50/50 chance for 0% and 8% return respectively (with expected return > safe choice; chosen parameters equal the average risk preference in the domain of gains found by Tversky and Kahneman, 1992)

2. Risk preferences for high gains with low probability were investigated by two choice questions:
 - a) 0.25% safe return vs. 2.5% chance for 10% return and 97.5% chance for 0% return (“fair game” with equal expected return)
 - b) 1% safe return vs. 10% chance for 10% return and 90% chance for 0% return (“fair game” with equal expected return)

3. Risk preferences for losses with high probabilities were investigated by two choice questions:
 - a) -3% safe loss vs. 50/50 chance for 0% and -6% loss respectively (“fair game” with equal expected return; parameters chosen to mirror 1.a)

- b) -3% safe loss vs. 50/50 chance for 0% and -7.35% loss respectively (with expected return < safe choice; chosen parameters equal the average risk preference in the domain of losses found by Tversky and Kahneman, 1992)
4. Risk preferences for large losses with low probabilities were investigated by two choice questions:
- a) -0,25% safe loss vs. 2.5% chance for -10% loss and 97.5% chance for 0% return (“fair game” with equal expected return; parameters chosen to mirror 2.a)
 - b) -1% safe loss vs. 10% chance for -10% loss and 90% chance for 0% return (“fair game” with equal expected return; parameters chosen to mirror 2.b)
5. Risk preferences for mixed outcomes (gains/losses) were investigated by two choice questions and one which asked for the desired minimum yield for the risky option
- a) 0% safe return vs. 50/50 chance for 3% and -3% return respectively (“fair game” with equal expected return)
 - b) 0% safe return vs. 50/50 chance for 6% and -6% return respectively (“fair game” with equal expected return, but higher potential gain/loss than 5.a)
 - c) 0% safe return vs. 50/50 chance for -3% and X% respectively. State what minimum X would make you prefer the risky over the safe option. (Question to determine the loss aversion parameter.)

The original questionnaire is in German. The author therefore wants to point out the precise wording of the questions that were used. “Safe” was translated as “sicher.” For the 50/50 chances, the author used the words “Chance” for the favourable outcome and “Risiko” for the negative chance which is commonly used for an adverse outcome in German language.

6.3.2 Type and Selection of Subjects to Participate

The researcher used a representative sample of German charitable trusts generated by Maecenata Institut, Humboldt University, Berlin. Maecenata owns the second biggest data base on trusts in Germany and provided the researcher with a list of trusts including their e-mail-addresses and contact persons which was an advantage over the use of the public registers as the latter did not in all federal states contain the e-mail-addresses of trusts.

Maecenata claimed that their data base can be expected to contain more than 70% of the relevant trusts in Germany. According to the Maecenata official, their sample was taken by random choice and with the intended restrictions that were set in the above chapter 2.1.

The researcher addressed the questionnaire to the people responsible in the trusts for making investment decisions. In order to minimise the impact of the potential limitations that were named in the above chapter 4.3, the questionnaire contained several K.O. questions to be able to eliminate the answers of trusts and persons that were not in the scope of this research. This way, trusts could be excluded from the study if they were not recognised as charitable by the fiscal authorities or if they had a limited life time or if their guidelines included regulations which make redundant any investment decisions. Furthermore, answers of persons who were not in a responsible position or who stated that they have low influence on investment decisions were discarded.

6.3.3 Size of the Sample and Participation Rate

A sample of 400 trusts were invited via individual personalised e-mails to participate in the online survey.

The respective survey web-page was opened 160 times.

15 subjects left immediately. 27 were discarded for completely lacking answers to the PT questions. One subject was discarded for the K.O. question regarding eternal life time of the trust. No subjects had to be discarded for the K.O.

questions regarding charitability or restrictive investment guidelines. Eleven subjects were discarded for too low influence on the investment decisions in the trust.

106 answers could be used for the purpose of the study which gave an effective participation rate of 26.5% relative to the number of trusts invited.

6.3.4 Procedure of the Online Survey

For the online survey, trusts were invited by e-mail to participate.⁷ Contact persons were addressed personally and assured confidentiality. The research project was briefly described and the aims were stated. Addressees were assured that their participation was very important for the success of the study. Participants were offered a free copy of a summary of major findings after completion of the study. A link was embedded leading to the questionnaire. The addressees were encouraged to ask any questions directly to the researcher either by the e-mail address that was provided or by telephone.

17 trusts responded telling that they would for different reasons not participate. No use was made of the offer to assist with understanding of questions.

Five trusts asked for details on the background of the study. They were sent a letter of support from Edinburgh Business School. This letter was intentionally not attached to the first e-mail in order to circumvent spam filters.

A reminder e-mail was sent out one week after the initial e-mail. The questionnaire was created online on a scientific platform that is free of charge if used for scientific research work, <https://www.soscisurvey.de>.⁸ The same platform had already successfully been used in the pilot study. Its advantages over a traditional mail survey are described in chapter 5.

⁷ The text of the e-mail invitation follows the one used in the pilot study, which can be found in appendix A.

⁸ The internet survey questions can be found in appendix C.

6.4 Quantitative Data Analysis

The data was analysed to determine the overall risk preferences of trusts for the five settings and association of trust characteristics with preferences.

6.4.1 Analysis of Overall Risk Preferences

Descriptive statistics were used to illustrate the distribution of preference statements regarding the eleven questions. The proportion of risky choices for each question was presented in a bar chart. For question 5c), the distribution of answers was presented in a bar chart and an arithmetic mean as well as the median value was provided.

The results were compared to findings of previous CPT research on private individuals and to EUT prescriptions.

Proportions of risky answers were compared for the mirror questions in the domains of gains vs. losses and tested for statistically significant differences.

6.4.2 Analysis of Associations of Characteristics with Preferences

For the test of association of trust characteristics, chi square tests and a t-test respectively were applied.⁹ Hasenpflug (2009) used chi square to test for association in his DBA thesis on German non-profit organisations as well.

The chi square tests referred to questions 1a) to 5b), where each of 14 characteristics was tested for association with each of the 10 binary choice questions. A total of 140 tests were conducted on Excel. The confidence levels for the tests had been defined in advance as 90%, 95% and 99%.

For question 5c) which asked for a percentage value without predefined clusters, a t-test was used to determine significance in the difference of arithmetic means.

For characteristics which were found to be associated with risk preferences, the proportion of risky choices for each question was presented in a bar chart for comparison of clusters.

With regard to question 5c), for these characteristics the high/low/mean/median values were presented in a chart.

6.5 *Connecting Quantitative and Qualitative Phases*

Due to the sequential design of the study, data and results from the quantitative part could be used to inform the qualitative part (Onwegbuzie/Leech, 2006). This happened on two levels: the selection of candidates for the interviews and the development of interview questions for triangulation.

6.5.1 Selecting Interview Participants based on the Quantitative Survey

The internet survey contained a question regarding the availability of the subjects for a telephone interview. People who agreed were asked to leave their names and telephone numbers. The personal data could be connected with the survey responses in order to allow for a selection of interviewees which was balanced with regard to stated characteristics and preferences. Due to the low number of subjects, all participants were selected.

6.5.2 Developing Interview Questions based on the Quantitative Survey

After the analysis of the quantitative part, interview questions were developed in order to triangulate the main quantitative findings. Following the research questions, the areas of general risk preferences of trusts were covered as well as

⁹ Examples for the chi squared tests and the t-tests can be found in appendix D and appendix E.

the association of risk preferences with trust characteristics.

6.6 Qualitative Data Collection

In contrast to the major empirical studies in the field of decision theory, the researcher strived to triangulate the quantitative results by a qualitative assessment. The qualitative data was collected by individual semi-structured telephone interviews and generated non-numeric data.

The general theoretical basis for conducting the interviews was given following concepts of Kvale (2007), Turner (2010) and Mc Namara (2012). Researchers in the field of trusts have used interviews as part of their research methodology in order to generate qualitative data (Köszegi, 2009; Lang/Schnieper, 2006, Schneider et al. 2010). Opdenakker (2006) compared four interview techniques and found that social cues, like body language, were the main potential advantage of face-to-face interviews over telephone interviews. This advantage can on the other hand be regarded as a potential disadvantage as far as biases produced by the interviewer are concerned.

6.6.1 Questions

The questions were based on the results of the quantitative part of the study.

Fields of particular interest were:

- Why is risk aversion clearly more pronounced in the domain of gains than in the domain of losses?
- Why do trusts hardly accept risk in the domain of gains, even if the expected return of the risky choice is higher than for the safe choice?
- What are the reasons for risk-seeking behaviour for losses, especially in the domain of low-probability high losses?
- Comments on the degree of loss aversion

- Why are certain trust-specific characteristics associated with risk preferences while others are not?

The questions were slightly modified in their wording after a pilot study with one person.¹⁰

6.6.2 Type and Selection of Subjects to Participate

Due to the small absolute number, all decision makers in trusts who had left their contact details in the online survey were selected to be interviewed by telephone. The researcher investigated for potential biases in the selection with regard to the characteristics and preferences stated in the online survey. The group of participants in the interviews contained a higher portion of risk seekers than the sample of all trusts that took part in the online survey.¹¹

6.6.3 Size of the Sample and Participation Rate

The sample consisted of 32 persons. Four persons could not be contacted after three attempts at different times of the day (morning/afternoon/evening). One person could be contacted but decided not participate. One interview was temporarily interrupted but resumed later that day. One person took part in the pilot study. No interviewees had to be discarded. 26 persons were interviewed for the main study.

6.6.4 Procedure of the Telephone Interviews

The interview style was designed to be semi-structured in order to minimise potential bias effects emerging from the sequence of questions, omission of questions, unrepresentative sampling and uncontrolled over- or under-

¹⁰ The wording of the questions can be found in the text and protocol sheet in appendix F.

¹¹ A detailed overview of characteristics and preferences of the interviewees compared to all participants of the online survey is provided in appendixes G, H and I.

representation of subgroups among respondents (Ghauri/Gronhaug, 2010).

The semi-structured interviews consisted of a set of predetermined open-ended questions. The interviewees were free to answer according to their own thoughts. The researcher departed from the planned itinerary with other questions emerging from the dialogue only in cases where additional information provided by interviewees deemed useful for the purpose of the study. All interviews were conducted by the person of the researcher.

The interviewees were presented the highlights of the aggregated quantitative research results, asked to give statements on the validity of findings and to explain the risk preferences stated by trusts.

The researcher prepared an interview protocol sheet as provided in appendix F and took notes during the telephone interviews (Hasenpflug, 2009). The process of note taking hardly interrupted the flow of the interview (Kvale, 2007). Data was entered into a computer and prepared for analysis directly after the telephone interview. The duration of the interviews was in a time range between 15 and 45 minutes.

6.6.5 Ethical Issues in Interviews

In order to protect the interviewees, their data will be deleted after the study and subjects will remain anonymous. Participants were informed about the purpose of the study and encouraged to ask questions about the research and the researcher. Questions were answered correctly and exhaustingly. The researcher accepted that one individual declined to participate in the interview and a few subjects refused to answer single questions.

6.7 Qualitative Data Analysis

The qualitative analysis phase aimed at structuring the obtained data and set it into context with the quantitative results for the purpose of later integration (see

chapter 6.8) of the quantitative and qualitative part.

6.7.1 Implications of the Transcription Method for Analysis

The researcher relied on his notes which were taken during the interviews. The process of note taking can be considered as a first stage of analysis (Rapley, 2007). The researcher did not note down the complete verbatim conversation but only the general agreement or disagreement of the subject with the quantitative findings as well as comments which he considered as key terms, key sentences and potentially useful information with regard to the research problem.

6.7.2 Categorisation of Data

The interview protocol sheet which listed the four categories "Yes"/"No"/"Ambiguous"/"No Comment" was used to assess systematically whether the statement generally supported the quantitative findings. The answer to the question was investigated for potential contradictions.

Responses to the open questions were further reduced from the interview protocol sheet and sorted into categories and sub-categories (Gibbs, 2007). Answers to each sub-category were counted, sorted for their relative importance and presented with respect to three domains: gains, losses and mixed. The categorisation of data was helpful in the sense of analytic quality to identify the main issues articulated by the subjects, to avoid an overweighting of minority opinions and to reassemble responses in the context of the three domains.

Regarding the trusts' characteristics, data was reduced, categorised and counted analogously.

6.7.3 Interpretation of Data

Beyond the listing of categories that were identified, the researcher strived to set the data into context with the research problem and the quantitative results which had served as a basis for developing the interview questions. The richness of qualitative data was used to critically examine whether the quantitative findings can be confirmed and to provide explanations for risk preferences of trusts. This can be regarded as the first step of the integration of results.

6.8 *Integration of the Quantitative and Qualitative Results*

The results of both phases were integrated in the Conclusions section in order to develop a more robust and meaningful picture of the research problem (Ivankova et al., 2006). The integration enabled the researcher to confirm the quantitative results and to provide explanations for risk preferences of trusts reaching beyond the original research questions. The integration of results provided a solid ground for the discussion regarding decision theory applied to trusts and of implications for practical investment policy.

7 Results and Analysis of the Survey Data

7.1 Overall Risk Preferences

7.1.1 Results

Referring to the questionnaire described in chapter 6.3.1, the eleven risk preference questions yielded the results indicated in table 4:

Risk Preference Questions	safe	risky	n	conf*
1. Gains with high probabilities (p=0.5)				
a) (survey: question 7)	88%	12%	106	>99%
b) (survey: question 10)	82%	18%	103	>99%
2. High gains with low probabilities (p=0.025/0.1)				
a) (survey: question 11)	84%	16%	102	>99%
b) (survey: question 8)	89%	11%	103	>99%
3. Losses with high probabilities (p=0.5)				
a) (survey: question 13)	65%	35%	99	>99%
b) (survey: question 15)	72%	28%	96	>99%
4. Large losses with low probabilities (p=0.025/0.1)				
a) (survey: question 14)	48%	52%	99	
b) (survey: question 16)	61%	39%	97	>95%
5. Mixed outcomes (gains/losses; p=0.5)				
a) (survey: question 9)	66%	34%	103	>99%
b) (survey: question 12)	76%	24%	102	>99%
	mean X	median X		
c) (survey: question 17)	6.68	6	76	

*: level of confidence that the portion of "safe" answers is significantly higher than the portion of "risky" answers, binomial distribution, expected value 50%; calculation provided in appendix J

Table 4: Answers to the risk preference questions

Figure 6 shows that most subjects were risk-averse for most questions. This holds true especially for the domain of gains and diminishes significantly for the

domain of losses. For one loss question, there was even a slight majority opting for the risky choice.

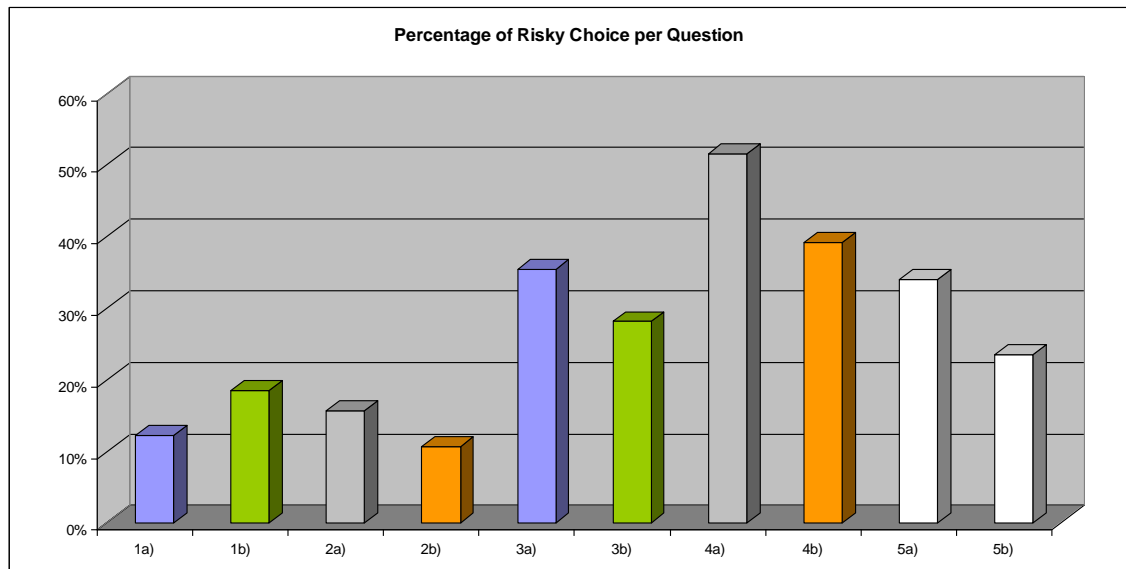


Figure 6: Portion of risky choices for the respective questions

It is eye-catching that trusts tend to the risky choice significantly more often in the domain of losses in comparison to the domain of gains.¹² The bars of the respective mirror questions, i.e. the corresponding questions in the domains of gains and losses (e.g. 1a and 3a), have the same colour.

7.1.2. Risk Preferences for Gains with High Probabilities

The stated preferences show that risk aversion is predominant with the investment behaviour of trusts. The “fair game” risky option was overwhelmingly (88%) rejected by participants. Even the risky option with an expected value which is 1% higher than the safe option was overwhelmingly (82%) –almost as much as the “fair game”- rejected. The point of indifference between the safe yield and the risky option must therefore require a higher (presumably much higher) expected yield.

¹² For details on statistical significance: appendix K

The shape of the value function under CPT can be regarded as concave under the assumption that the subjective probability weighting of $p=0.5$ is higher than $w(p)=0.375$. This figure is derived from question 1b):

If subjects consider

$$3 > w(0.5) \cdot 8 + (1-w(0.5)) \cdot 0 \quad (5)$$

Then follows

$$w(0.5) > 0.375 \quad (6)$$

For comparison, Tversky and Kahneman (1992) computed the subjective probability weight $w(0.5) = 0.4206$ on the basis of their data.

Applying the parameters of average risk preferences of individuals found by Tversky and Kahneman (1992), most trusts (82%) behave more risk-averse.¹³

The result is compatible with classic risk-averse behaviour under EUT.

7.1.3 Risk Preferences for High Gains with Low Probabilities

The stated preferences show that risk aversion predominates. Both “fair game” risky options were overwhelmingly (89% and 84% respectively) rejected by the participants. Most subjects preferred low (1%) and very low (0.25%) but safe yields over low probability high (10%) yields.

Under CPT, the value function is concave and/or subjective probability weighting leads to risk aversion for the vast majority of subjects. There are no signs of overweighting of small probabilities as suggested by PT literature. If existent, which cannot be ruled out, probability weighting does not overcompensate for the concavity of the value function.

¹³ For an overview of all corresponding calculations with T&K (1992) parameters, see appendix M

Compared to the parameters of average risk preferences found by Tversky and Kahneman (1992), most trusts behave more risk-averse. Applying the 1992 parameters, the respective certainty equivalents for the risky choice are 0.66% for question 2a) and 1.48% for 2b). The broad majority of subjects in this study refused to accept the risky choice even in favour of lower certainty yields of 0.25% and 1% respectively.

The result is compatible with classic risk-averse behaviour under EUT.

7.1.4 Risk Preferences for Losses with High Probabilities

The answers show a mixed picture of preferences. The “fair game” risky option was accepted by 35% of participants which is significantly higher than the 12% acceptance for the mirror question 1a) that asks for the respective positive outcomes. A portion of 28% is willing to take the risky option for losses even if the expected value of the lottery is lower (-3% safe vs. -3.675% expected) than fair value.

Under CPT, the value function is concave and/or subjective probability weighting lead to risk aversion for the majority of subjects.

Compared to the average risk preferences found by Tversky and Kahneman (1992), most trusts (72%) behave more risk-averse.

Depending on the shape of the probability weighting function, which is beyond the scope of this research paper, the value function could be convex for more subjects than those 35% in question 3a). If $w(p=0.5) < 0.5$, the proportion of agents with a convex value function could be higher. Convexity can be found for those 28% of agents which opted for the risky choice in 3b), under the weak assumption that $w(0.5) < 0.59$.

This figure is derived from question 3b):

If subjects consider

$$-3 < w(0.5) \cdot 0 + (1-w(0.5)) \cdot -7.35 \quad (7)$$

Then follows

$$w(0.5) < 0.5918 \quad (8)$$

For comparison, Tversky and Kahneman (1992) computed the subjective probability weight $w(0.5) = 0.4206$ on the basis of their data.

The results only partly correspond to the 4FP and previous PT studies which in many cases found convexity of the utility curve prevailing in the domain of losses.

The result is for 65% of trusts compatible with classic risk-averse behaviour under EUT. This is only partly supportive for EUT as a general theory to be prevailing.

7.1.5 Risk Preferences for Large Losses with Low Probabilities

The answers show a mixed picture of preferences. The two “fair game” risky options were accepted by 52% and 39% respectively of participants which is significantly higher than the 16% and 11% acceptance for the mirror questions 2a) and 2b) that ask for positive outcomes.

The low probability of a high loss of -10% does not seem to be overestimated by a great portion of participants and/or the threat of a high loss not be assigned a utility low enough to prevent these participants from choosing the risky option. The concept of an insurance premium does not apply to the stated behaviour of many trusts.

Compared to 4a), the still low (but four times higher) probability in 4b) of 10% to suffer a 10% loss leads to significantly less preference (39% vs. 52%) for the risky choice even though the safe loss is also four times higher at 1%.¹⁴ On this basis, it can be concluded that there is a tendency of increasing relative overweighting of the very high probabilities between $p=0.9$ and $p=0.975$ and/or convexity of the utility curve between the yields of -1% and -0.25%.

There is no general evidence of overweighting of small probabilities as suggested by PT literature.

The mixed result does not exclusively support classic risk-averse behaviour under EUT. This is only partly supportive for EUT as a general theory to be prevailing. Given the almost equal distribution of safe and risky choice, linearity of the utility function could be assumed.

7.1.6 Risk Preferences for Mixed Outcomes / Loss Aversion

The answers predominantly show risk aversion in the two “fair game” questions. This is significantly more the case for the question with the higher potential loss (-6%) than for the “-3%-question.” The stated risk aversion of most subjects can possibly be a consequence of loss aversion.

The result of 5a) and 5b) is for 66% of trusts compatible with classic risk-averse behaviour under EUT. This is only partly supportive for EUT as a general theory to be prevailing.

The loss aversion question 5c) finds that trusts require on average 6.68% yield for the 50/50 chance, where the potential negative outcome is -3% and the safe alternative 0%. Figure 7 shows that the distribution is skewed. The median answer is at 6%.

¹⁴ For statistical calculations regarding neighbour questions: see appendix L.

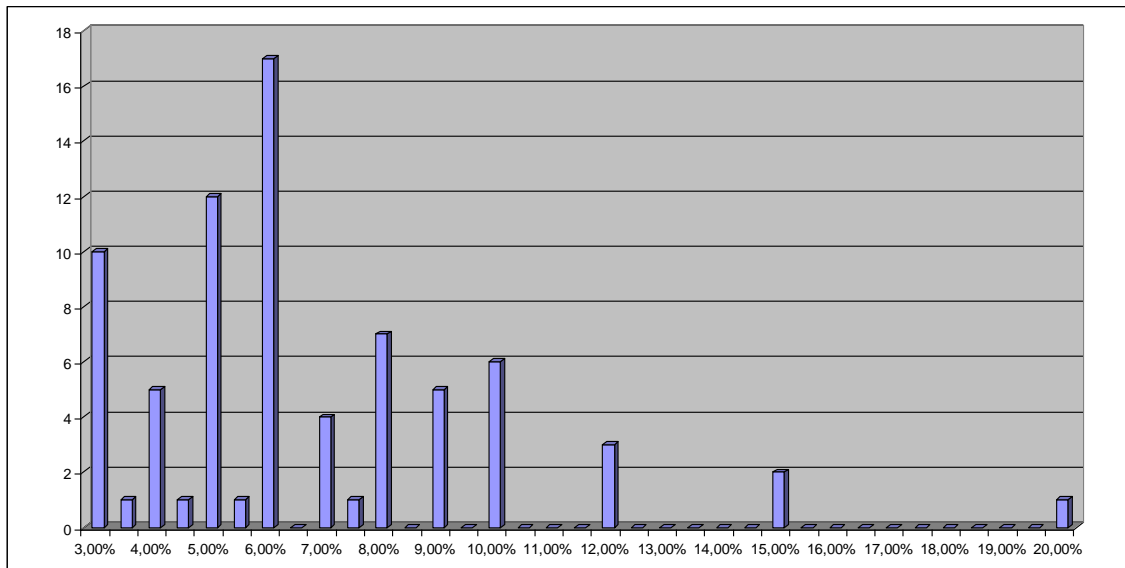


Figure 7: Distribution of stated answers to question 5c); n=76

Defining the loss aversion parameter as

$$\text{Loss aversion} = -U(-x) / U(x) \tag{9}$$

according to Bleichrodt et al. (2001) and Abdellaoui et al. (2007), and under the assumption of all other parameters equalling Tversky and Kahneman’s data, the parameter is 1.875 (mean) and 1.705 (median) respectively.¹⁵

These outcomes are within the range of previous research results on individuals (Abdellaoui et al, 2008, for an overview).

The answers to question 5c) revealed inconsistencies with the answers to question 5a):

Subjects that opt for the safe alternative (0% yield) in 5a) must be expected to state a yield higher than 3% under 5c). Four individuals do not comply with this postulation.

Subjects that opt for the risky alternative (50/50 chance for -3% or 3% yield) in 5a) must be expected to state a yield lower than 3% under 5c). 30 individuals do not comply with this postulation.

¹⁵ Calculation Details can be found in appendix N.

Prior studies of Harbough et al. (2002, 2009) which aimed at the 4FP also included two methodological approaches (simple choice and “willingness to pay”, WTP). They found answers to the simple choice questions delivering results significantly different from WTP and only WTP delivered results supporting the 4FP. Harbough et al. (2009) reason that the WTP method may support extreme findings since the “cognitive load” is far higher than with the simple choice based questions. Older studies (Slovic and Lichtenstein, 1968) also found inconsistencies between the two methods. An additional issue is the use of the “willingness-to-accept” methodology in this study which may also lead to “overbidding” according to Harbough et al. (2009).

A practical explanation for the inconsistencies between questions 5a) and 5c) could be seen not only in overbidding in 5c), but also in the possibly extremely low perceived value of an outcome of 0% which is the safe alternative scenario in 5a). Many trusts may feel caught in a challenging situation when facing the safe option (0%) offering no yield at all to fulfil the purpose of the trust and the mixed one (-3%/+3%) which includes a potential loss. The mixed alternative at least gives a 50%-chance on a return to finance the trust’s activities whereas the safe one would cancel out financing of any activity of the trust immediately. With regard to characteristics of trusts, those which source their funding primarily or exclusively by returns on the capital have opted for the risky (-3%/+3%) option significantly more often which is supportive to the idea of avoiding 0% in order to fulfil the purpose.

The participation rate for question 5c) was lower (n=76) than for all other questions (between n=96 and n=106). The reason for the lower response rate could be the higher complexity of the question which seems more difficult to answer than a simple choice question. Six participants gave comments that they would not enter an option like the one in 5c), implicitly stating infinite loss aversion.

7.1.7 Comparison of the Choices for Gains vs. Losses at High Probabilities

For the mirror questions 1a) and 3a) in the domains of gains and losses, figure 8 shows that most of the trusts (59%) prefer the safe option in the case of gains as well as in the case of respective losses. Nevertheless, it is remarkable that 28% of all participants opt for the safe alternative in the domain of gains, but choose the risky alternative for respective losses. This shows a tendency to riskier behaviour in the domain of losses (3a) in comparison to the domain of gains (1a) which is statistically significant at the 99% level.

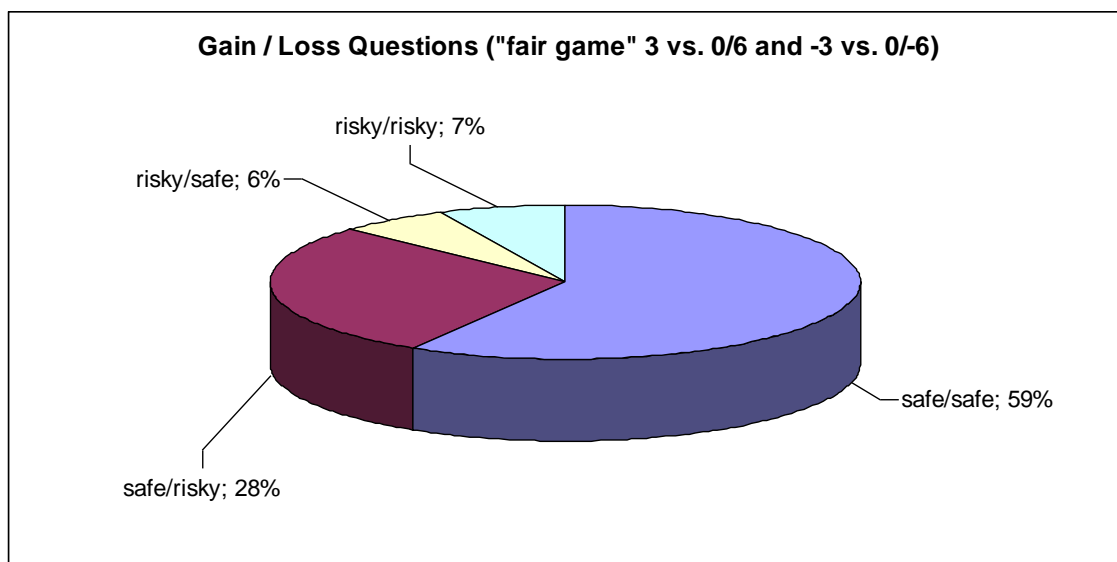


Figure 8: Safe and risky choice for questions 1a) and 3a)

With regard to decision theory, 59% of trusts state preferences in line with classic risk-averse behaviour under EUT. 28% of trusts exhibit behaviour supporting CPT.

The two questions where the expected value of the risky option does not correspond to the safe option support this tendency and show a statistically significant result as well.

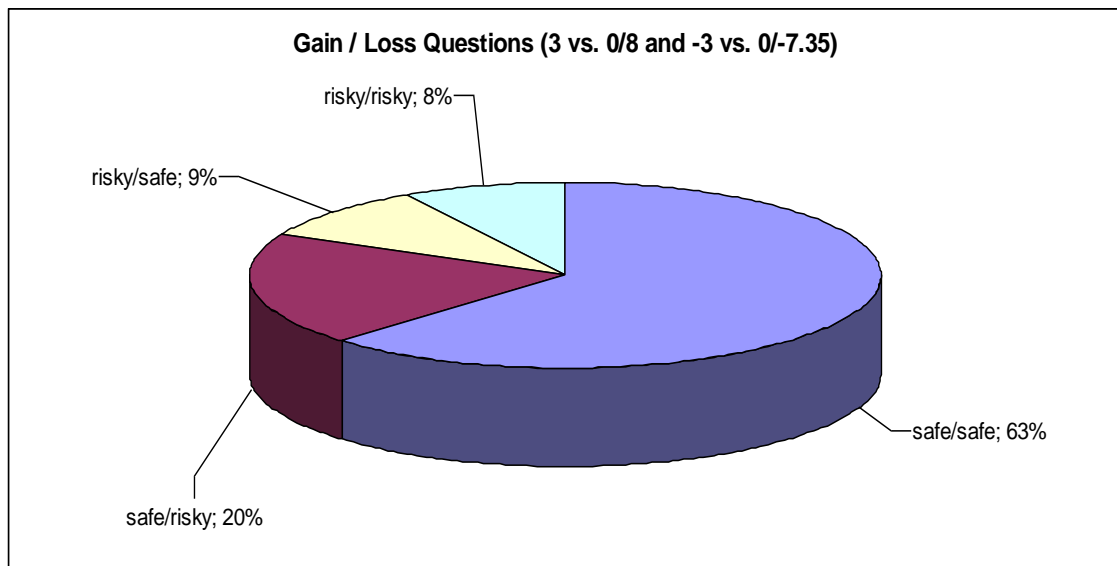


Figure 9: Safe and risky choice for questions 1b) and 3b)

As shown in Figure 9, 20% of all participants opt in both questions for the alternative with the lower expected value: They prefer a safe 3% yield over the 50/50 chance on 0%/8% in the domain of gains and gamble for the losses even though the expected negative value of the risky option is lower than for the safe loss. Their preferences reflect the descriptions of typical PT behaviour in a particularly strong form.

Only 9% of all participants opt for the alternatives with the higher expected value in both cases which would be the only rational combination of answers to optimise the expected monetary value (with linear utility and no subjective probability weighting).

7.1.8 Comparison of the Choices for Gains vs. Losses at Low Probabilities

For the low probability gains and losses, the picture is mixed as shown in figure 10: 41% of all participants opt for the safe choice for the low gain of 0.25% yield and in parallel they take the low probability risk of losing 10% instead of accepting a 0.25% safe loss. The high probability (97.5%) of losing no money at all that is connected with the risky option in the loss question looks more appealing to trusts than the risky option in the domain of gains, which offers a 2.5% chance on a high

yield. For both questions, a majority of subjects prefer the high probability option which is not supportive for the overweighting of small probabilities postulated in the 4FP. For the gain question, the 0% yield is avoided, whereas it is sought in the loss question.

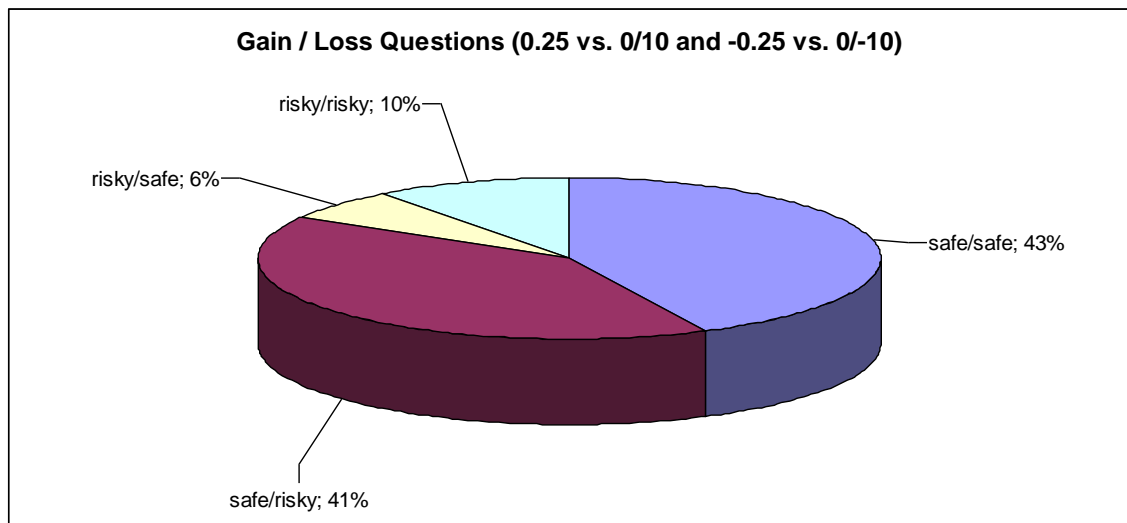


Figure 10: Safe and risky choice for questions 2a) and 4a)

The difference in proportions between the two corresponding questions 2a) and 4a) is significant at the 99% level with significantly more risk takers in the domain of losses.

It is noteworthy that only 6% of the subjects act according to the 4FP, i.e. are risk-seekers for the low-probability gain and risk-averse for the potentially high loss.

A portion of 43% follows the path of being risk-averse in both situations in accordance with classic risk-averse behaviour under EUT.

The second set of low probability questions shows a similar pattern as indicated in figure 11, although the observed preference for the safe/risky combination is not as high as with questions 2a) and 4a).

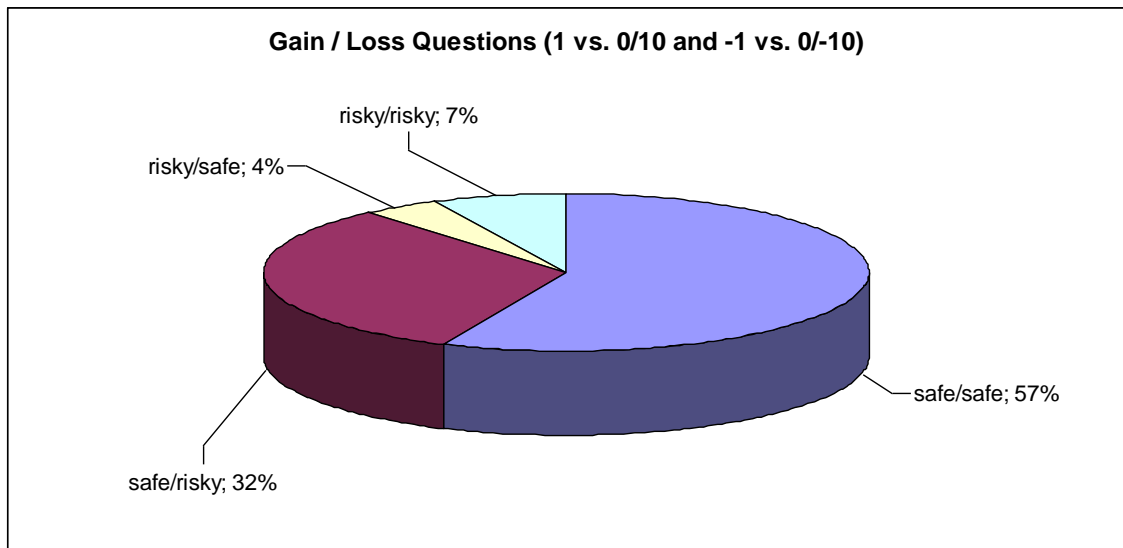


Figure 11: Safe and risky choice for questions 2b) and 4b)

The difference in proportions between answers in 2b) and 4b) is significant at the 99% level with significantly more risk takers in the domain of losses.

Here, only 4% of the subjects act according to the 4FP.

A portion of 57% follows the path of being risk-averse in both situations in accordance with classic risk-averse behaviour under EUT.

7.1.9 Comparison of the Choices for the Mixed Questions

For the mixed questions which included gains and losses of different magnitudes, figure 12 shows that most trusts prefer the safe 0% option over a potential 50/50 chance on a 3% gain/loss as well as over a 6% gain/loss. 89% of the subjects are consistent for both decisions. 12% choose the risky option for the lower gain/loss but switch to the safe 0% option when higher losses are possible. The difference in proportions is significant at the 99% level.

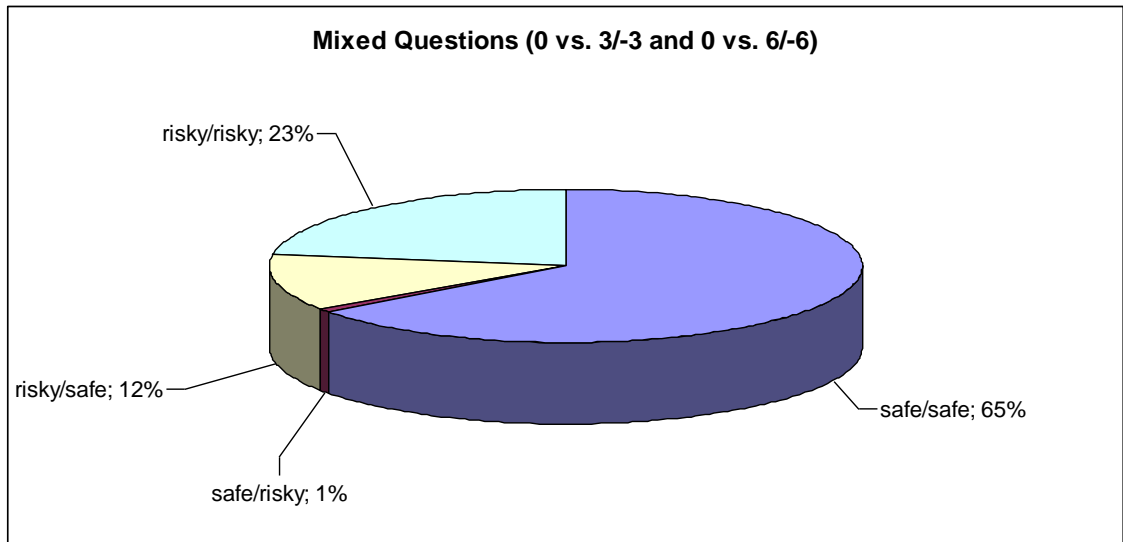


Figure 12: Safe and risky choice for questions 5a) and 5b)

7.2 Tests of Associations with Trust Characteristics

7.2.1 Results

The tests of association by chi square were conducted for every single pair of trust characteristic (14) and risk preference question (10) except for question 5c) which has been tested for differences in mean values. Table 5 shows the level of confidence for the respective associations tested.

Most associations are found for questions 1 a/b, 2a/b and 5a/b, i.e. in the domains of gains and mixed results. Fewer associations are found for questions 3a/b and 4a/b, i.e. in the domain of losses.

The study finds that trusts which invest a portion of their capital in equities are significantly more prone to take the risky choice for most of the questions. The same pattern is found for trusts that expect an increase of capital by external factors like donations in the coming years.

Risk Takers are found significantly more often among trusts where the donor is a natural and not a legal person and where the donor has influence on investment decisions.

The age of decision makers is found to be positively associated with the willingness to take risks in the domain of gains. The position of the decision makers is associated as well with risky behaviour, i.e. donors and management board members being rather prone to risk than others.

Various of the tested characteristics are not associated at all with risk preferences. With regard to the literature review, it appears most surprising that association is hardly found for the factors “size,” “reserves” and “statutes.”

The loss aversion question 5c) was tested for differences with regard to trust characteristics. As shown in table 6, only few statistically significant associations could be found: with regard to the characteristics of the person of the donor, “age of decision maker” and “size.”

The most influential characteristics shall be analysed in more detail in the subsequent sub-chapters.

Characteristic / Question	1a)	1b)	2a)	2b)	3a)	3b)	4a)	4b)	5a)	5b)
Equity Portion	99%	99%	95%	99%	-	-	99%	90%	95%	95%
Expected Asset Growth	99%	-	-	99%	-	95%	90%	99%	99%	99%
Donor natural/legal	99%	90%	95%	95%	-	-	-	95%	90%	90%
Position of DM	95%	90%	90%	-	-	-	-	-	99%	95%
Age of DMs	95%	95%	99%	95%	-	-	-	-	-	-
Donor Influence	90%	-	99%	99%	-	-	-	-	90%	-
Sources of Funding	-	-	90%	-	-	-	95%	-	90%	95%
Size	-	-	95%	-	-	-	-	-	-	-
Reserves	90%	-	-	-	-	-	-	-	-	-
Statutes	-	-	-	-	-	-	-	-	90%	-
Age of Trust	-	-	90%	-	-	-	-	-	-	-
Number of DMs	-	-	-	-	-	-	-	-	90%	-
Sex of DMs	-	-	-	-	-	-	-	-	-	-
Promotional Activity	-	-	-	-	-	-	-	-	-	-

Table 5: Association of trust characteristics with risk preferences, level of confidence (90%, 95%, 99%) indicated only in case of statistically significant association

The definition of clusters is provided in appendix O.

Characteristic / Cluster	A vs. B	A vs. C	B vs. C	Description of clusters
Donor men/rest	99%	99%	-	A=men, B=women, C=rest
Age of DMs	99%	-	-	A=young, B=medium, C=experienced
Size	90%	-	-	A=small, B=medium, C=large
Reserves	-	-	-	
Statutes	-	-	-	
Donor Influence	-	-	-	
Expected Asset Growth	-	-	-	
Age of Trust	-	-	-	
Number of DMs	-	-	-	
Sex of DMs	-	-	-	
Promotional Activity	-	-	-	
Position of DM	-	-	-	
Equity Portion	-	-	-	
Sources of Funding	-	-	-	

Table 6: t-tests for differences in the means for loss aversion question 5c), level of confidence (90%, 95%, 99%) indicated only in case of statistically significant differences

7.2.2 Investments in Equities

The current positioning of the trusts' portfolio is mirrored by the risk preferences exhibited in the survey. Trusts that own equities in their portfolio can be considered to have risk preferences different from those trusts which do not invest in this asset class.

The tests for association revealed that trusts with an equity portion in the portfolio tend to opt for the risky choice in significantly more cases than trusts that do not invest in equities as shown in figure 13. This is particularly the case in the domain of gains.

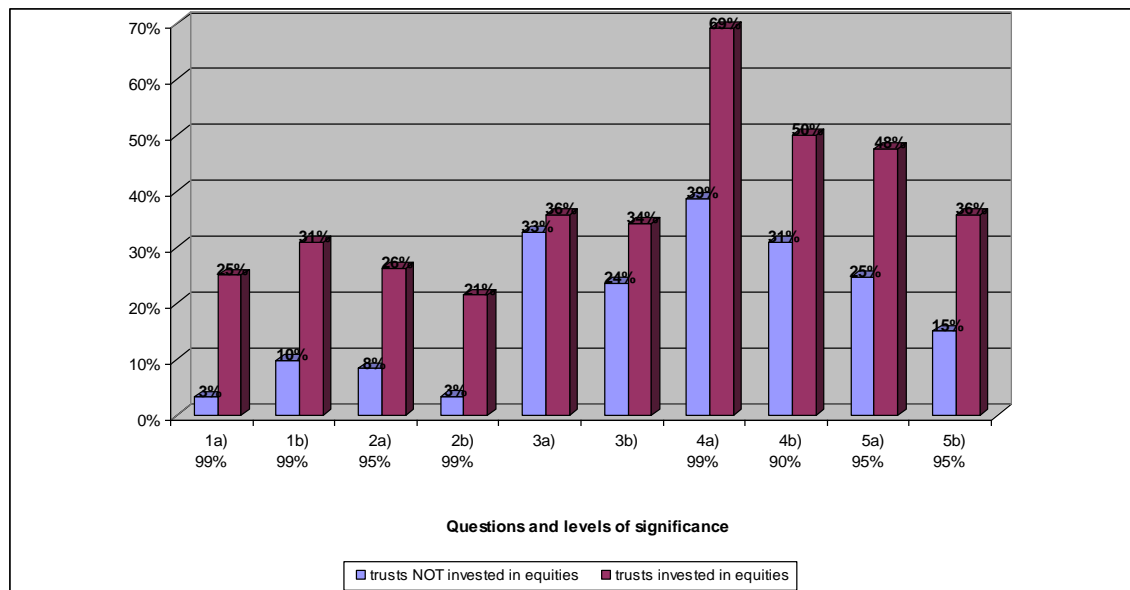


Figure 13: Portion of trusts opting for the risky choice sorted by the criterion of owning equity positions in their portfolios

7.2.3 Expected Asset Growth from External Sources

Trusts which expect asset growth in the coming years from external sources have a statistically significant tendency to opt for the risky alternative in comparison to trusts with no expected external growth as shown in figure 14.

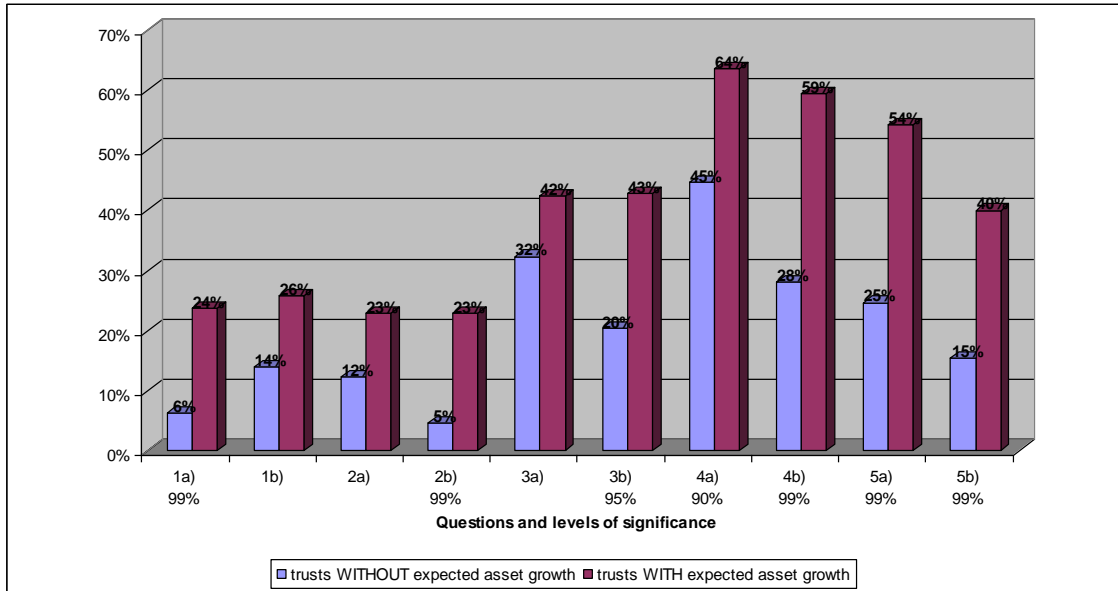


Figure 14: Portion of trusts opting for the risky choice sorted by the criterion of expected asset growth from external sources

7.2.4 Person of Donor (Natural vs. Legal Persons)

If the donor is a natural person, the trusts are rather prone to risky decisions, especially in the domain of gains as shown in figure 15.

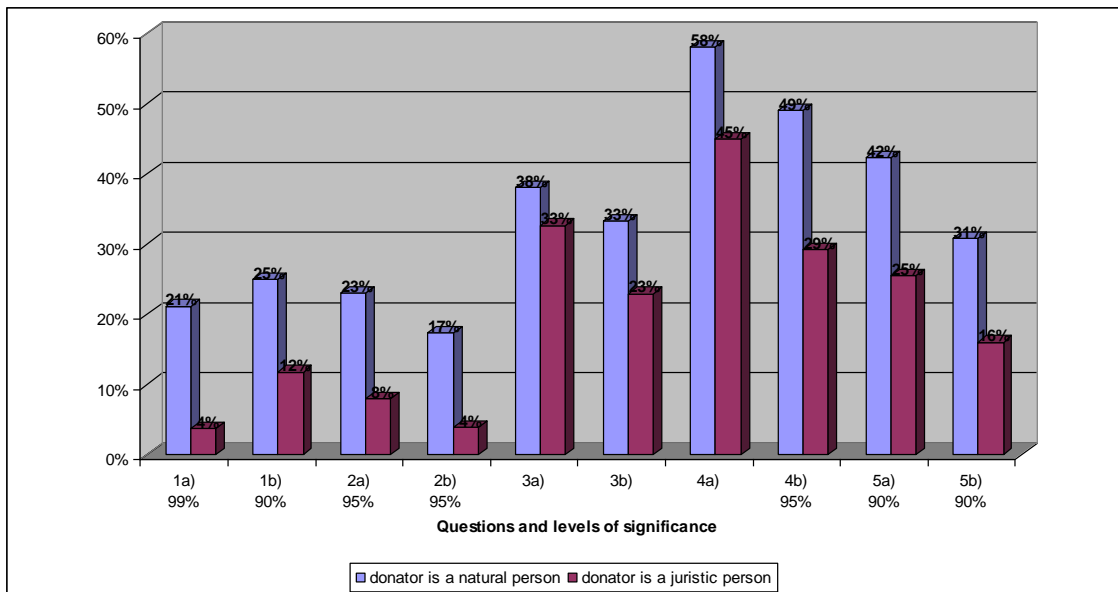


Figure 15: Portion of trusts opting for the risky choice sorted by the criterion of the nature of donors

Regarding question 5c), the trusts which have a male donor exhibit loss aversion that is significantly lower than trusts that were founded by women or legal persons as shown in figure 16. Some extreme votes can have very high impact on the overall result given the small number of subjects in each bracket.

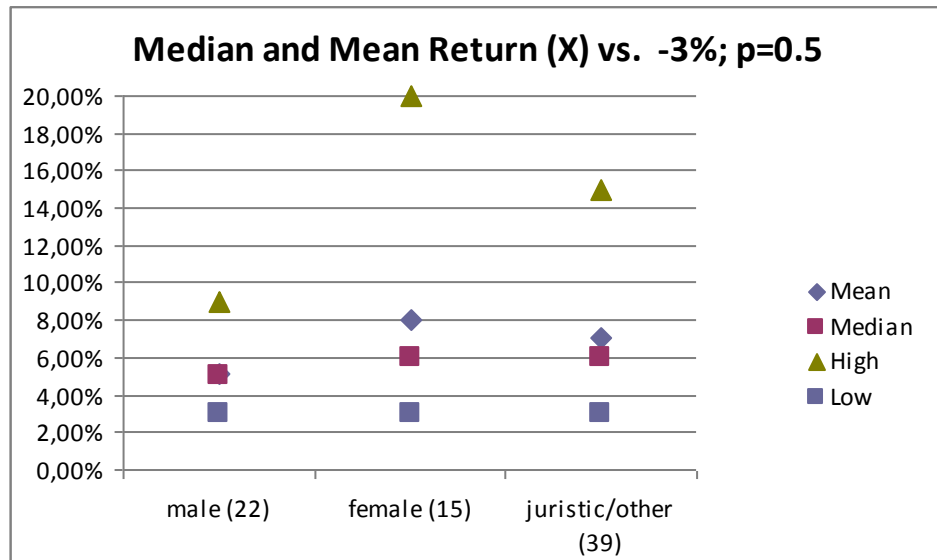


Figure 16: Stated minimum returns for $X=?$ with $p=0.5$, if $(1-p)$ means -3% return, sorted by the nature of donors

7.2.5 Position of the Interviewee in the Trust

If the interviewee is the donor or/and a member of the management board, the trust more often tends to take the risky choice for gains and also in the mixed question as shown in figure 17. It is remarkable that for the loss questions the other group of subjects is more prone to take the risky choice, even if not to a level of statistical significance.

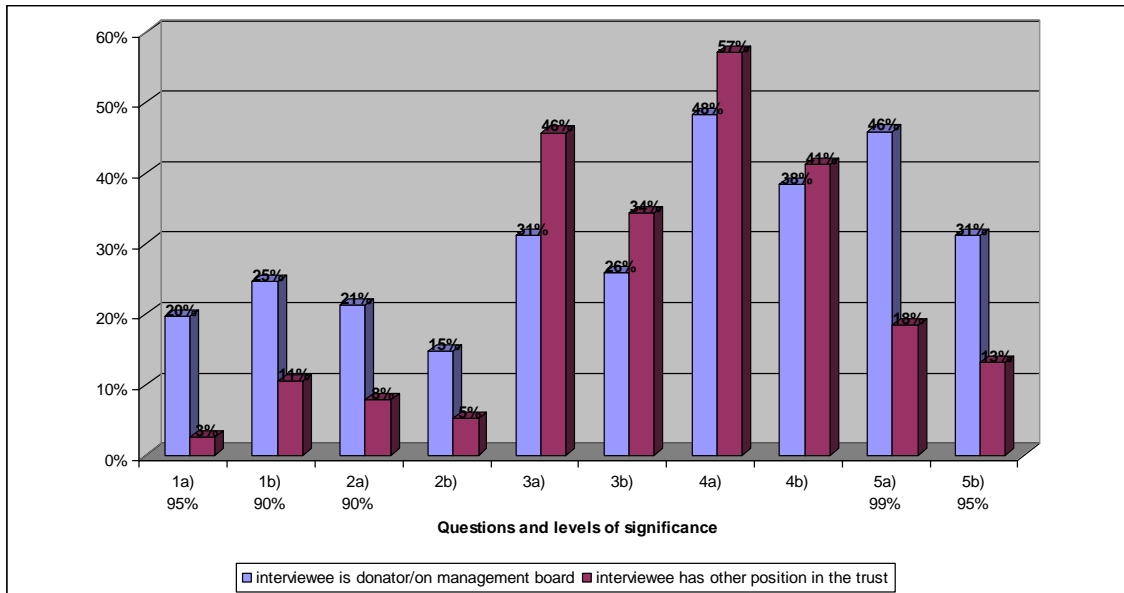


Figure 17: Portion of trusts opting for the risky choice sorted by the criterion of the position of the interviewee in the trust

7.2.6 Age of Decision Makers in the Trusts

Figure 18 refers to the finding that older decision makers in trusts tend to take risky choices more often for 50/50- questions and low probability gambles than their younger peers. This kind of differing behaviour cannot be observed for the loss questions.

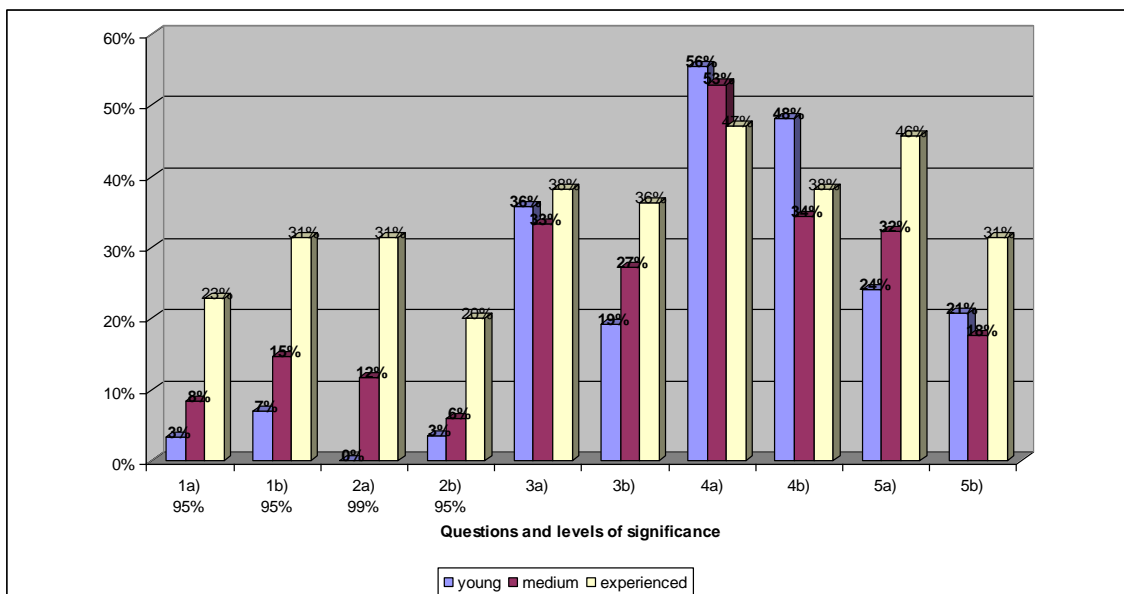


Figure 18: Portion of trusts opting for the risky choice sorted by the criterion of the age of decision makers

With regard to the loss aversion question 5c), figure 19 shows the mean value is significantly higher in the medium range than for the young decision makers. The youngest group of decision makers exhibits a lower degree of loss aversion. The low number of answers to question 5c) gives comparatively high weight to single extreme votes.

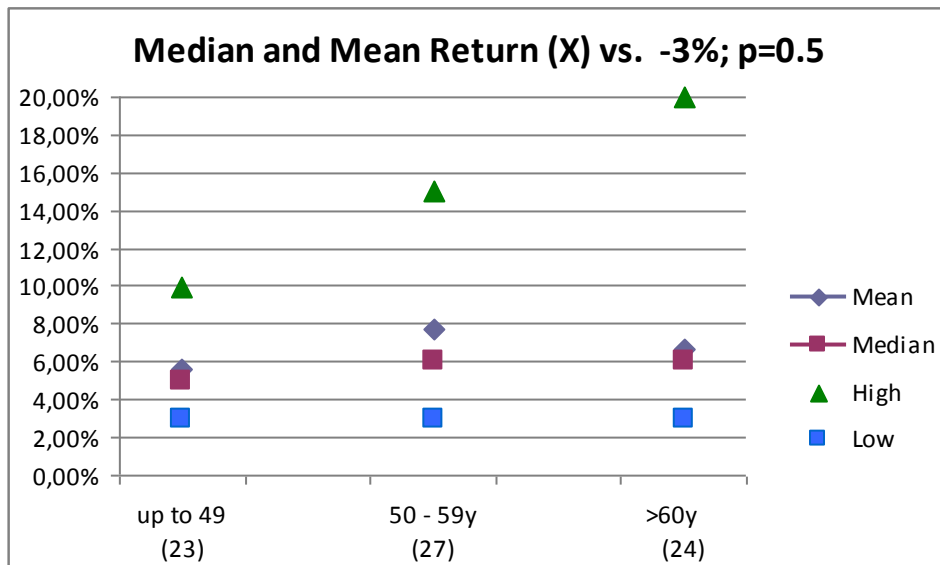


Figure 19: Stated minimum returns for $X=?$ with $p=0.5$, if $(1-p)$ means -3% return, sorted by the characteristic of age of decision makers

7.2.7 Donors' Influence

Donors' influence is found to be associated with the willingness to take significantly more risk in positive high chance gambles as shown in figure 20.

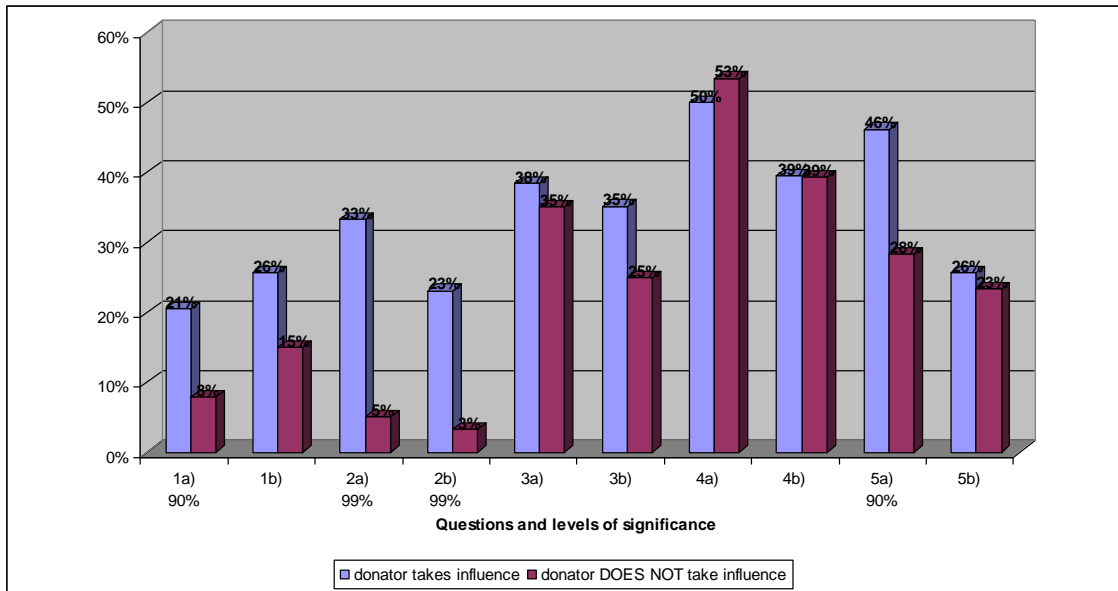


Figure 20: Position of trusts opting for the risky choice sorted by the criterion of donors' influence on investment decisions

7.2.8 Sources of Funding

Figure 21 shows that trusts that source their funding primarily or completely from capital returns rather tend to take the risky decision for some questions.

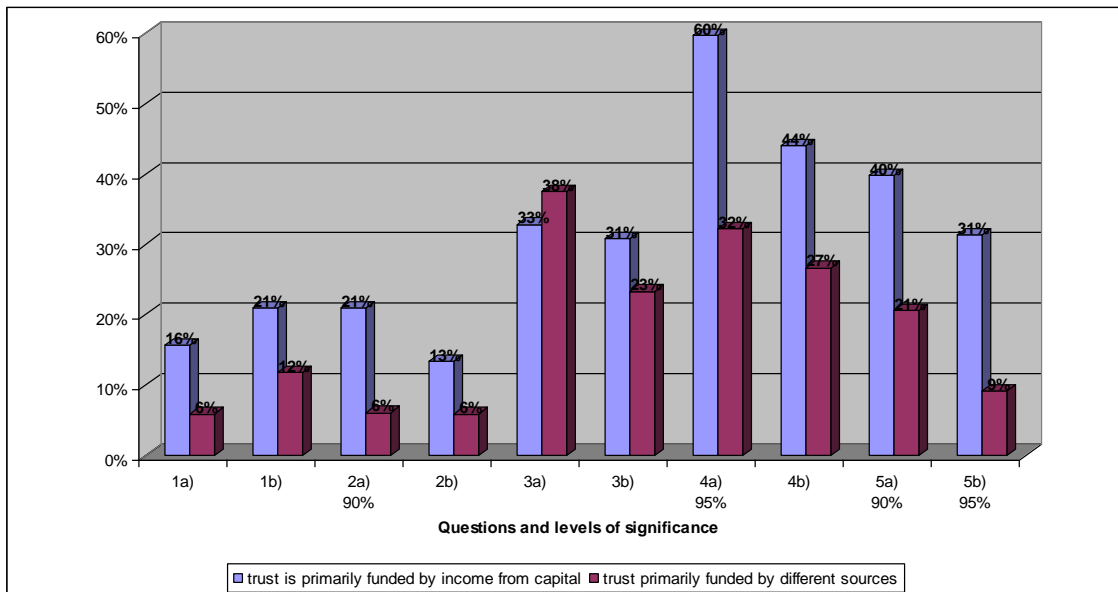


Figure 21: Portion of trusts opting for the risky choice sorted by the criterion of the sources of funding

7.2.9 Size

With regard to question 5c), small sized trusts (< € 500k in assets) exhibit significantly less loss aversion than medium sized trusts (€ 500k - € 2.5m) as shown in figure 22. Due to the small number of trusts participating in this question, the result is strongly influenced by a single subject that stated a figure of 20% which is far above the average of 6.68%. If this one subject was discarded, the significant difference would disappear.

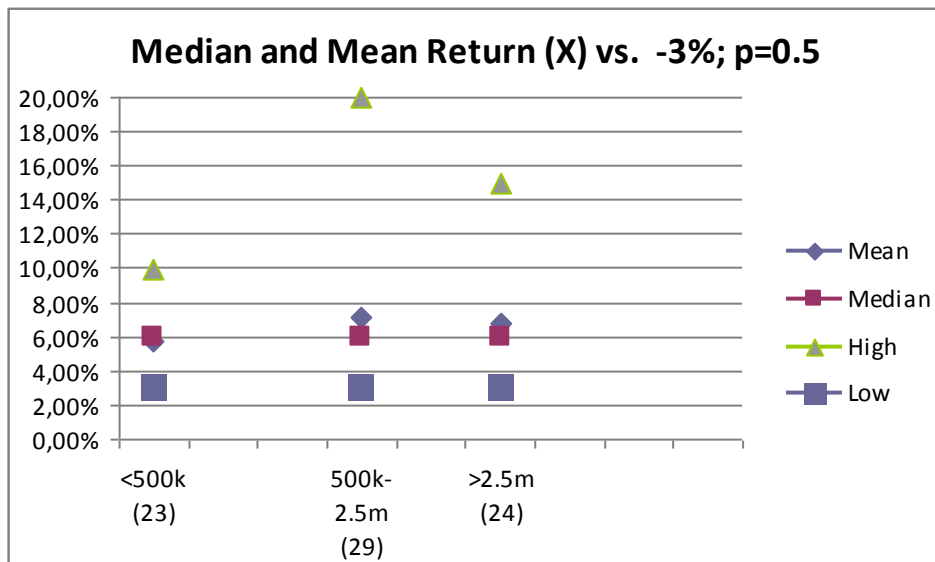


Figure 22: Stated minimum returns for X=? with p=0.5, if (1-p) means -3% return, sorted by the characteristic of size

7.2.10 Inter-Correlations between Trust Characteristics

The characteristics found significant with regard to investment preferences were checked for correlations between each other.

Trusts with a natural person as a donor hold equities in significantly more cases than average (52% vs. mean 42%). In these trusts, the answers were given by the donor or a member of the management board in significantly more case than the average (75% vs. 61%) and significantly more of the subjects fall in the group of older decision makers (48% vs. 35%).

In trusts where the respondent was the donor or a member of the management board, there was a significantly higher portion of natural person donors than average (64% vs. 49%), decision makers were significantly older (43% vs. 35%) and the donor had influence in significantly more cases (48% vs. 38%).

In trusts with older decision makers, a significantly higher portion of natural person donors was observed (71% vs. 49%) and the respondents were significantly more often the donor or member of the management board (74% vs. 61%).

In trusts where the donor has influence, natural person donors were identified in significantly more cases (59% vs. 49%) and the respondent was in more cases than average the donor or a member of the management board (74% vs. 61%).

Trusts that hold equities have a natural person as a donor in significantly more cases than average (61% vs. 49%).

For the trusts with expected asset growth and those where income primarily stems from capital, no correlations with one of the other characteristics could be observed.

The analysis gives reason to assume that some of the characteristics do not necessarily influence investment preferences as single factors as found in the tests of associations (chapter 7.2). They might be influential only in combination with other characteristics. Questionable to some extent as single factors of influence are therefore in particular the following characteristics:

- Donor: natural person
- Respondent is donor or member of management board
- Donor influence
- Age of the decision makers

In general, it cannot be ruled out that other characteristics which have not been investigated in this study could have a meaningful influence on investment

preferences and the characteristics found to be significant only accidentally heavily correlate with these non-identified characteristics.

Appendix P provides details of the investigation.

7.3 Summary of Main Findings from the Online Survey

7.3.1 Findings with regard to the 4FP of PT and to EUT

1. Most trusts are risk-averse for gains with high probabilities which is in accordance with the 4FP and with EUT.
2. Most trusts are risk-averse also for high gains with low probabilities. This contradicts the traditional PT phenomenon of risk-seeking behaviour in situations where high gains are possible (lottery ticket) but is consistent with EUT.
3. Most trusts are loss averse, i.e. requiring a positive yield that must be higher in absolute terms than the potential negative outcome, if they are willing to take the risk of a loss at all. The ratio for an acceptable gain/loss situation is at around two times. These parameters are comparable to those found in other PT studies with private individuals. The result accommodates EUT.
4. The higher the loss potential in a “fair game” option with balanced probabilities, the more risk-averse behave trusts.
5. There is a statistically significant tendency to risk-seeking behaviour in the domain of losses in comparison with the domain of gains. This is true for high as well as for low probability outcomes.
6. High losses at low probabilities are accepted by a large portion of trusts. The 4FP calls for the concept of insurance premium, i.e. subjective overweighting of the small probability leading to risk aversion. This is not generally the case with trusts. Classic EUT would also imply the safe option which is only partly mirrored by the results.

7.3.2 Findings with regard to the Association of Characteristics to Risk Preferences

1. The most obvious association is found with effective positioning of the trust's capital. Trusts that are already invested in equities, which can traditionally be regarded as carrying risk, state risk-seeking preferences significantly more often.
2. Expected asset growth from external sources is associated with risk preferences in all three domains, i.e. gains, losses and mixed. Trusts that expect growth of assets are more willing to take risk.
3. If the donor is a natural person, risk is more easily taken. This holds true especially in the domain of gains and for mixed outcomes.
4. Respondants who stated to be the donor and/or member of the management board exhibited more risk preferences in the domain of gains and for mixed outcomes.
5. The age of decision makers is associated with risk preferences, but only in the domain of gains. Older decision makers are more prone to take risk.
6. If the donor has influence on investment decisions, risk is rather taken, especially in the domain of (low probability) gains.
7. Many other characteristics are not associated with risk preferences. This partly comes as a surprise because especially the factor of "size" is named frequently as a distinguishing feature in the literature.

8 Qualitative Assessment of Survey Results by Interviews

Telephone interviews were conducted in order to triangulate the quantitative findings of the internet survey. The structured qualitative analysis of telephone interviews supports the validity of the outcomes of the quantitative part. The interviewees broadly confirmed the findings and gave explanations for the risk preferences of trusts. Whereas the picture regarding most of the features of the 4FP and loss aversion as well as the characteristics of trusts is rather unambiguous, the structured qualitative analysis also revealed that others are more controversial and call for closer examination and discussion.

One feature of the 4FP, low probability high losses, which already gave an ambiguous result in the quantitative part of the analysis, was discussed controversially in the qualitative part as well and shall be examined closer below on the basis of the qualitative arguments of trusts.

With regard to the characteristics of trusts and their association with preferences, most of the quantitative findings could be underpinned by rationales from the interviewees. Other findings leave room for further controversial discussion. Associations of significant parameters like “age of decision makers” may partly have come as a surprise to respondents but could be explained by qualitative arguments.

The interviewees were informed about the results of the quantitative analysis which was the basis for the questions. The majority of interviewees stated that these results were useful for them as responsible persons in a trust.

Table 7 is the aggregated product of the notes taken by the researcher on the prepared interview protocol sheets as elaborated in the methodology section (chapter 6). It summarises agreement and disagreement of the subjects to the main quantitative findings.

Findings of the quantitative part / Validation	Is the quantitative finding confirmed ?			
	<u>Yes</u>	<u>No</u>	<u>Ambiguous</u>	<u>No Comment</u>
a) with regard to the 4FP of PT and loss aversion				
1. Most trusts risk-averse for high probability gains	92%	0%	8%	0%
2. Most trusts risk-averse for low probability high gains	80%	12%	8%	0%
3. Most trusts are loss averse	100%	0%	0%	0%
4. Risk aversion is positively correlated with loss potential	92%	0%	4%	4%
5. Trusts rather risk-seeking for losses than for gains	62%	15%	19%	4%
6. Low probability high losses acceptable for half the trusts	27%	19%	50%	4%
b) with regard to the association of characteristics				
1. Equity investors rather risk-seeking than others	100%	0%	0%	0%
2. Trusts that expect external asset growth rather risk-seeking	42%	12%	31%	15%
3. Natural person donors rather risk-seeking than legal person	80%	0%	8%	12%
4. Trusts with donor influence rather risk-seeking	84%	0%	8%	8%
5. Older decision makers rather risk-seeking	38%	20%	38%	4%
6. Donors/management board members rather risk-seeking	77%	0%	19%	4%
7. Size has no significant influence on preferences	65%	8%	19%	8%
8. Reserves have no significant influence on preferences	46%	19%	23%	12%
9. Restrictions in statutes have no significant influence	50%	19%	27%	4%
c) with regard to usefulness of findings for the trusts				
The results are useful for me as a responsible person in a trust	65%	15%	20%	0%

Table 7: Validation of quantitative results, portion of subjects' statements categorised by structured assessment

8.1 Overall Risk Preferences

The structured analysis of the telephone interviews yielded categories and sub-categories of key terms and issues. The most important categories as measured by the frequency of mentions are listed in table 8. Some of the categories may be considered overlapping regarding their content. They are listed separately for the reason of the high number of mentions of these specific key terms.

From the statements of the trusts as shown in table 8, four main categories and 19 sub-categories emerged. They coincide to a large extent with the contents of the conjectures made in the literature review which were leading to the research questions.

The category of “safety (in general)” was mentioned by the trusts in particular with regard to the questions referring to the domain of positive yields. This outcome is supportive for the conjecture made in the literature review regarding risk-aversion in the case of gains in general and also for the special case of low-probability high gains with regard to the frequent mentions of “speculation.”

The “Purpose of the trust” category collected statements made mainly with respect to potential gains or mixed results. Whereas the sub-category “avoid 0%” was mentioned as a concern regarding gains and mixed results, “avoid safe losses,” which explicitly included achieving 0% as a favourable outcome, was named as a major topic concerning the domain of losses. It can be concluded that it depends on the reference point whether an outcome is perceived as positive or negative which is in line with the conjecture in the literature review.

The justification of results plays a very important role for trusts, especially if the domain of losses is concerned. The responsibility of decision makers in front of the bodies of the trust was a major issue, but also the supervisory authority and the fiscal authorities were mentioned in this context. This supports the conjectures made in the literature review with regard to an influence of authorities

and their potential actions on the investment behaviour of trusts.

In total, the category of “Preservation of Capital” found most entries. Trusts mention most frequently in this category the fear of “dauntingly high losses,” which shall be discussed especially with regard to the ambiguous quantitative results concerning low probability high losses.

Counting of Key Terms and Issues (n=26) Categories and Sub-Categories	Mentions after Questions concerning...			
	<u>Gains</u>	<u>Losses</u>	<u>Mixed</u>	<u>Total</u>
<u>Safety (in general)</u>				
Safe outcome generally preferred	16	10	9	35
Speculation / Gambling	13	6	1	20
<u>Purpose of the Trust</u>				
Fulfilment of the Purpose / Distributable Returns	11	2	8	21
Avoiding 0%	7	0	9	16
(Safe) Calculation Basis	12	1	0	13
Need to Finance Projects continuously	9	0	4	13
Minimum Return for Projects	6	0	2	8
<u>Justification of Results</u>				
Responsibility in front of Bodies of the Trust	9	17	8	34
Supervisory Authority	6	14	5	25
Financial Authority / Charitable Status	3	8	6	17
General Fear to do wrong	3	6	4	13
<u>Preservation of Capital</u>				
Avoid Dauntingly High Losses	0	12	12	24
Sitting out Losses	0	10	7	17
Risk = Potential Downside	0	7	10	17
Multi-year Horizon	2	6	4	12
Avoiding (safe) Losses	0	11	0	11
Hope for Recovery of Asset Prices	0	9	2	11
Realising / Limiting Losses	0	7	3	10
Asset Class Dependency	0	5	2	7

Table 8: Categorisation of key terms and issues, number of mentions with regard to gains / losses / mixed outcomes

The analysis in the following sub-chapters will assess the qualitative information on the basis of the single quantitative findings and constitutes the first part of integration of results.

8.1.1 Risk Preferences for Gains with High Probabilities

The answers of the trusts showed a predominant picture of risk aversion in the online survey (as described in chapter 7.1.2) which was confirmed by the interviews and is in line with the typical corresponding feature of the 4FP.

Analogous to the analysis of the literature, interviewees stressed that the safe choice looked more appealing to them as they generally preferred a safe outcome for the trust and strongly favoured a safe calculation basis for their planned expenditures. The fulfilment of the purpose in every single year had high utility for trusts. Interviewees stated that they needed to finance projects continuously and therefore aimed at generating steady investment results. In this context, also a constant minimum return was targeted. Following the argumentation of interviewees, the risky choice in the online survey, which included a 50% chance on a 0% return, was overwhelmingly refused also for the reason that 0% was hardly acceptable to trusts because at least a small positive contribution from the capital base to the running expenditures was expected by the bodies of the trust.

In the online survey, the safe choice was preferred by more than four out of five trusts when the riskier alternative offered a higher expected monetary value than the safe choice. Even those trusts which stated to have reserves for one or more years, i.e. which could “afford” to prefer the mathematically superior risky choice, did not exhibit significantly more risk-seeking behaviour than those without reserves. This indicates that the continuous fulfilment of the purpose of the trust may not be the only reason for risk aversion.

Interviewees gave further reasons for their risk-averse preferences, which can be regarded in conjunction with the legal framework as assumed in the literature

review analysis. Decision makers in the interviews mentioned the burden of responsibility for the trust's capital. This was especially the case where the founder is a juristic person. Interviewees that are the founders and still active in investment decision-making were significantly more risk-seeking in their decisions. The risk-averse subjects particularly stressed the need to justify investment results in front of the bodies of the trusts and in front of the supervisory authority. A founder-decision maker may have less a problem with these kinds of issues as she possibly still considers the trust's capital as her own money and at least does not need justification in front of internal bodies.

8.1.2 Risk Preferences for High Gains with Low Probabilities

In contrast to the typical 4FP, the answers of the trusts in the online survey (as described in chapter 7.1.3) showed a predominant picture of risk aversion which was confirmed by the interviews.

The questions in the quantitative part aimed at investigating the preferences of trusts in cases where a high return of 10% is offered at a low probability of 0.025 (risky choice) vs. a safe but low return of 0.25%. The 4FP predicts for individuals that people in average strongly overweight the low probability and therefore prefer the risky alternative. This is not the case with the majority of trusts. More than four out of five decision makers in the online survey preferred the safe low yielding alternative.

The interview comments of participants gave rationales why the trusts' behaviour is different from typical 4FP. Decision makers stated that they associated the prospect of a 10% yield with a high risk which they did not want to bear. Others pointed out that the probability of 0.025 was too low to be taken serious. Both issues together, the high yield prospect in combination with a low probability of success looked like speculation or gambling to interviewees and were rejected for that reason. In this context, subjects named the problem of explaining decisions to internal bodies of the trust and the supervisory authority as a difficult issue.

Interviewees stated that safety was generally preferred in order to have a positive return at all, even if it was as low as 0.25%. With regard to the fulfilment of the purpose of the trust, the very low return could at least deliver a small contribution to finance activities. A return of 0% instead should be strictly avoided for this reason. Decision makers also stated that in the worst case the chain of consequences could be that 0% investment return led to zero financing of activities and finally threatened the charitable status that is granted by the financial authorities.

Decision makers pointed to the fear to do wrong which might be much larger than the greed for high gains. They argue that persons acting on behalf of a trust needed to justify their decisions and were therefore particularly risk-averse. As decision makers would on the one hand not personally benefit from an extraordinarily high return like 10% but on the other hand have difficult discussions in case of zero returns, the decision must be for the safe low yielding alternative in the majority of cases. Several interviewees stated that they would have decided differently for their own wealth. This line of argumentation coincides with Schindler (2003) who criticises the lacking inducement for high returns.

8.1.3 Risk Preferences for Losses with High Probabilities

In the online survey, the answers of the trusts (as described in chapter 7.1.4) showed a predominant picture of risk aversion in contrast to the typical 4FP. Nevertheless, it must be noted that in comparison to the results of the mirror question in the domain of gains, significantly more trusts chose the risky alternative. The respective question in the interview was built on the latter finding and generated mostly supportive comments.

A general objection to the investigation of this issue is that a significant portion of trusts may have been confronted with the question of losses for the first time. In the quantitative part of this work, only 8.5% of trusts stated that they had suffered from losses at least once within the last five calendar years from 2007 – 2011 which included years of financial crisis and high volatility on capital markets. 25%

of trusts did not answer to the question.

In the qualitative assessment of the quantitative results, trusts stated that the safe alternative was not unambiguously the superior one. Supporters of the safe alternative, who generally tended to favour the safe outcome for all questions, pointed out that it would be appropriate for a trust to limit losses and to avoid speculation. These interviewees argued that a trust should always take the safe alternative, no matter whether in the domain of gains or losses. This philosophy appears to be wide-spread among trusts.

Supporters of the risky alternative stated that even though trusts were not allowed to speculate, things would be different if the investment result was already in the domain of losses (as given by the question in the survey) and the decision maker could just opt for the better of two adverse choices. This explanation coincides with Thaler and Johnson (1990), who found that people strive to break even if decision problems are framed in the domain of losses.

Interviewees argued that sitting out losses, i.e. opting for the risky alternative, could be favourable for trusts which state the purchase price and not the current market price in their reporting to the supervisory authority. This could be acceptable to the supervisory authority especially in cases where losses appear to be temporary as with bonds of good quality. The eternal time horizon of a trust was also given as an argument why temporary losses were tolerable.

The questions in the survey intentionally did not refer to a particular asset class in order to avoid any potential psychological association of risk that could be caused for example by naming equities. The interview answers make the important point that a loss in bonds could be perceived and treated different from a loss in equities of the same magnitude. Interview partners stressed that in general, trusts were reluctant to realise losses.

For decision makers in trusts, interview partners argued, reporting losses to the internal bodies of the trust could be so undesirable that they would try to take the chance to cover the losses, even if this behaviour could result in higher losses.

Furthermore, interviewees defending the risky behaviour pointed out that trust executives may partly be led by typical human behaviour, i.e. in the case of losses, the hope for a recovery of asset prices. Finally, some risk must be taken to come back from losses into gain territory, they argue.

8.1.4 Risk Preferences for Large Losses with Low Probabilities

The answers of the trusts in the online survey (as described in chapter 7.1.5) showed a mixed picture of risk aversion and risk-seeking behaviour. Typical 4FP calls for an overweighting of small probabilities and therefore risk aversion to prevent a potential high loss of -10%. The question can be regarded as asking for the willingness to pay an insurance premium against high losses. In comparison to the results of the mirror question in the domain of gains, significantly more trusts (for question 4a slightly more than 50% of all trusts) chose the risky alternative. In the interview, trusts were confronted with the quantitative finding that about half of the trusts would prefer the risky choice. Comments were ambiguous and pointed in a balanced way to the various issues to be considered in that difficult decision problem to trusts.

Supporters of the risky option stated that there was always tail risk in all investments. They focused on the high chance ($p=0.975$) of completely avoiding losses, which they regarded as an important goal. Realising a loss, even a small one, could cause difficulties in explaining this result to the bodies of the trust and the supervisory authority. Psychologically, a loss would mean admitting a mistake. This argumentation coincides with Thaler and Johnson (1990) who found that subjects exhibited a strong tendency to favour risky options that offered the chance to break even in the framing of a loss situation.

Supporters of the safe option argued that they could not engage in an investment that would offer a downside potential of that magnitude. A loss of 10% would threaten the activities of trusts for several years and may also lead to consequences not only with regard to internal bodies of the trust but also the supervisory authority and the fiscal authority. The charitable status of the trust

could be jeopardised.

The controversial discussion mirrors the split result of the quantitative part. It points in particular to two main issues that are considered to be of similarly great importance to trusts: avoidance of any negative yields on the one hand and avoidance of high losses on the other hand.

8.1.5 Risk Preferences for Mixed Outcomes / Loss Aversion

According to the quantitative analysis, trusts in average perceive the negative utility of losses about twice as strong as the positive utility from gains (as described in chapter 7.1.6). The answers of the interviewees unanimously confirmed that loss aversion was predominant among trusts. This is in line with what could be expected from Prospect Theory.

Interviewees stated that losses could be regarded as failure of the board or the responsible persons. Avoiding losses was a must for trusts. Positive yields on the other hand were regarded as self-evident. In case of doubt, they would nevertheless generally prefer the safe outcome instead of a potential loss, even if it were 0%.

A portion of 34% of all trusts in the quantitative survey stated that they would prefer to agree entering an investment that offered either a 3% yield ($p=0.5$) or a yield of -3% ($q=1-p$) over a safe yield of 0%. The preference of these subjects contradicts the assumption of loss aversion. Interviewees gave rationales why this behaviour could be reasonable to trusts.

Interviewees argued that a yield¹⁶ of 0% implied no possibility for distribution. In the long term, 0% could not be an option for trusts. The postulation of fulfilment of the purpose of the trust would therefore be led ad absurdum. This explanation coincides with Hüttemann/Schön (2007) who claim that there was a duty for the trusts represented by their management boards to aim for a yield from

investments which would implicitly prohibit any investment strategy that could ex ante already be considered unprofitable.

A safe yield of 0% could therefore be regarded as a pain barrier to enter risky investments. The risky alternative offered at least a 50% chance for distribution of a return and in the worst case the trust would sit out the loss.

The current environment on capital markets must be regarded as challenging since also in real life the yields of “safe investments” are close to 0% already before adjusting for inflation. (At the time of writing, German government bonds with a maturity of two years trade at a yield of about 0.00%.)

The discussion revealed that a reference point of 0% yield plays an important role if used as alternative outcome to risky choice.

In the internet survey, when asked the same question as above but with increased absolute figures of 6% yield (instead of 3%) and -6% yield (-3%) respectively, fewer trusts preferred the risky alternative. Interviewees explained that a yield of -6% seemed daunting to trusts. A loss of this magnitude would be difficult to catch up in the following years. Furthermore, a yield of -6% was difficult to justify in front of the trust’s bodies, the supervisory authority and also the financial authority. Interviewees pointed to the issue that legal discharge from liabilities must be obtained and that grossly negligent behaviour led to personal liability.

Interviewees stated that a yield of -3% could still be justified, whereas -6% was “just too much.” More than 3-4% loss would also be psychologically difficult because they could hardly be recovered in later years.

Subjects stated that the focus of trusts was on the potential downside and not so much on the chance for gains: the higher the absolute numbers were, the less the risky option was acceptable.

¹⁶ In the survey, trusts were told that the yield was up to 100% distributable upon their discretion.

8.2 Associations with Trust Characteristics

Analogous to the above analysis regarding the 4FP and loss aversion, the key terms with regard to the association of characteristics were analysed as well. Table 9 shows the key terms and issues that emerged from the interviews.

The number of categories per characteristic varies. While the finding of association regarding equity holdings were explained and commented by arguments from two main categories only, arguments regarding other characteristics were sorted into more categories and were partly contradictory as in the case of “Expected Asset Growth.”

Characteristics: Key Terms and Issues (n=26)

Categories	# of Mentions
<u>Equities</u>	
equities as a synonyme for risk	16
equity investments require qualification	8
<u>Expected Asset Growth</u>	
further donations not usable to cover losses	11
potential losses can be covered	6
further donations increase ability to generate returns	5
<u>Decision Makers' Age</u>	
wisdom / experience	13
generally more cautious	12
relaxed	7
different from private wealth: eternal life time of the trust	6
<u>Natural vs. Legal Person</u>	
different type of people responsible	14
entrepreneurial thinking	11
balance of powers	9
<u>Donor Influence / Position of the Interviewee</u>	
donor can inject more money	15
justifies decisions mainly in front of himself	12
"my money" mentality	10
<u>Size</u>	
for percentage gains/losses not important	13
differences only on single investment level	11
large trusts have more financial competence	7
lower costs of investment for large trusts	6
<u>Reserves</u>	
trusts do not easily change their investment philosophy	11
type of reserves is important	11
reserves should allow for more risk	9
<u>Investment Restrictions by Statutes</u>	
statutes not concrete	13
statutes are binding	8
gilt-edged outdated / "safety" difficult to define	7

Table 9: Categorisation of key terms and issues, number of mentions with regard to trust characteristics

8.2.1 Rationales for the Associations found in the Quantitative Part

The quantitative analysis (as described in chapters 7.2.2 – 7.2.9) showed that there are associations between various trust characteristics and investment risk preferences.

Interviewees were not surprised to learn that trusts which invest a portion of their capital in equities exhibit risky behaviour in significantly more cases than other trusts. Equity investing itself was regarded as risky, partly even as a synonym for risky behaviour, by trust representatives. Interviewees argued that trusts that invest in equities were supposed to be more competent in financial matters and therefore rather able to take risk.

The discussion was more ambivalent for the finding that risky preferences are found significantly more often for trusts which expect their assets to grow by donations, inheritances or other external factors within the coming years. Various interviewees stated that they were not surprised by the finding, but it would be the wrong approach for these trusts as fresh money was no substitute for potential losses or missed out gains. Other subjects supported the finding but were not able to give arguments why this characteristic was relevant for risk preferences. An interviewee explained that these trusts might want to be more attractive for their prospect new co-donors.

The finding that elder decision makers rather tend to take risky investment decisions than younger ones was not expected by the majority of interviewees as increasing age was connected with cautiousness rather than with risk. Interviewees explained that the wisdom and experience would be a very important asset for trusts. Qualifications found with elder people would lead to the potential to invest riskier. Elder people were supposed to better be able to capture investment risk on the basis of their experience. They would be more relaxed than younger decision makers. Interviewees argued that age of decision makers was not relevant “in the conventional way” because they had to think for an eternal life time of the trust, whereas they may personally rather prefer to

switch to safer investments the older they get.

The finding that trusts tend to riskier behaviour if the donor is a natural person and still active in investment decision making did not come as a surprise to interviewees. The contacted trust representatives argued that natural persons becoming donors often had obtained their wealth by taking risk and exhibited a rather entrepreneurial thinking. The assignment of power in trusts founded by legal persons would in many cases be more balanced leading to more risk aversion.

Interviewees stated in the same line of argumentation as above that donors that are still active in decision making could take higher risks because they must justify it mainly in front of themselves, whereas other trusts had bodies that created some balance of powers leading to take decisions together as a group without much risk. Donors would also not fear not to be re-elected into a body of a trust. Interviewees also argued that a donor could cover losses himself by injecting more money if necessary. The difference between a trust which was founded by a natural person vs. trusts established by legal persons would be the “my money”-mentality.

8.2.2 Rationales for Non-Association of Characteristics

The quantitative analysis (as described in chapters 7.2.2 – 7.2.9) showed that there are no associations between some trust characteristics and investment risk preferences in contrast to the conjectures made in the literature review.

In the quantitative part, the size of a trust was found to have no significant impact on risk preferences. Interviewees explained that the absolute size of a trust was irrelevant as the questions in the survey concerned the whole capital which gave comparability on a relative level. Small and large trusts had the same general aim, which is to finance their projects, and therefore the same general needs with regard to investment preferences. Differences may be observed on the level of single investments, where large trusts were better able to diversify their portfolio

risks. Interviewees also pointed at potential differences of investment competences between large trusts which could afford to employ investment professionals and the majority of laymen in small trusts, where in many cases only one person was involved in financial decision making. Expenses that are associated with investments would also be lower for the large trusts.

Following from the literature review, it was assumed that the existence of reserves could play a role with regard to risk preferences. The survey could not evidence that to a degree of significance. Interviewees were partly surprised by this finding as they expected trusts with some reserves being able to absorb more risk than others. On the other hand, trusts that had built high reserves may have done so because of particular risk aversion and were reluctant to change their investment behaviour. Subjects added to the discussion that the type of reserves would be of importance as not all reserves would be easily available for distribution.

In the literature review, it was conjectured that the statutes might have significant impact on risk preferences, especially if they contain the restriction of gilt-edged investment only. The survey did not find a significant association.

Interviewees argued that the statutes of trusts were in most cases not concrete enough to derive actual behaviour that would be mirrored in the preferences to be measured in this study. The question of gilt-edged investment was regarded as outdated as the current situation on capital markets showed that with regard to the sovereign debt crisis in Europe no investment can be considered as completely safe.

9 Integration of Results and Conclusions

The study yielded conclusions with regard to the applicability of the theoretical framework and also with respect to the practical questions concerning appropriate investment products for German charitable trusts.

9.1 Answers to the Research Questions

Research Question:

1. What investment risk preferences do decision makers acting on behalf of German charitable trusts exhibit with regard to the features of the 4FP of PT and loss aversion?

Research Hypotheses:

H⁰: Decision makers acting on behalf of German charitable trusts do not exhibit investment risk preferences analogous to the 4FP and loss aversion typically found with natural persons by Tversky and Kahneman (1992).

H^a: Decision makers acting on behalf of German charitable trusts exhibit investment risk preferences analogous to the 4FP and loss aversion typically found with natural persons by Tversky and Kahneman (1992).

The five features are:

1. Individuals exhibit risk aversion over high-probability gains.
2. Individuals exhibit risk-seeking behaviour over low-probability gains
3. Individuals exhibit loss aversion, i.e. losses loom larger than respective gains
4. Individuals exhibit risk-seeking behaviour over high-probability losses
5. Individuals exhibit risk aversion over low-probability losses

H^0 is rejected for features 1 and 3. For these features, H^a is not rejected.
 H^0 is not rejected for features 2 and 4. For these features, H^a is rejected.
 H^0 and H^a are both not rejected for feature 5.

Overall result:

The research hypothesis H^0 is not rejected. H^a is rejected.

Research Question:

2. Are there associations between the characteristics of German charitable trusts and their investment risk preferences concerning the features of the 4FP of PT and loss aversion?

Research Hypotheses:

H^0 : The investment preferences of German charitable trusts are not associated with their characteristics.

H^a : The investment preferences of German charitable trusts are associated with their characteristics.

The tested characteristics are:

- Size of the trust (measured in terms of asset base)
- Age of the trust
- Donor and donor's influence on investment decisions
- Type of trust
- Structure of the capital stock
- Sources of funding
- Expected growth of the asset base
- Existence of reserves
- Statutes of the trust
- Number, gender and age of decision makers

H^0 is rejected for the following characteristics:

- Structure of the capital stock
- Expected growth of the asset base
- Donor and donor's influence on investment decisions
- Age of decision makers
- Sources of funding

For these characteristics, H^a is not rejected.

H^0 is not rejected for all other characteristics named above.

H^a is rejected for all other characteristics named above.

Overall result:

The research hypothesis H^0 is rejected. H^a is not rejected.

9.2 Conclusions with Regard to the Applicability of PT and EUT to the Preferences of German Charitable Trusts

9.2.1 Conclusions with Regard to PT, the 4FP and Loss Aversion

There is evidence that a yield of 0% plays a particular role as a reference point as suggested by PT. The reference point is strictly avoided in lotteries in the domain of gains, even where the alternative positive yields are tiny and hardly contributing to financing the purpose of the trust. The reference point is increasingly sought after when losses are the only alternative, for more than one fourth of trusts even in a situation where the expected monetary value lies below the monetary value of the safe loss. The reference point is also sought after in situations with mixed potential outcomes. Preference for the reference point is positively correlated with the potential loss potential, signalling loss aversion in accordance with PT.

The basic PT feature of distinguishing between positive and negative yields instead of looking at absolute wealth can be considered to be the suitable approach in describing trust preferences. The significantly different distribution of safe vs. risky behaviour in the domain of gains vs. the domain of losses supports the feature.

Concavity of the utility function in the domain of positive yields can be regarded as given under the assumption that the subjective weight of $p=0.5$ is higher than $w(p)=0.375$. Risk aversion for gains in general is found also without that assumption.

There is no evidence of overweighting of small probabilities as postulated by PT. This pattern can neither be confirmed for gains nor for losses. If small probabilities were overweighted by agents, this would imply concavity of the value function in domain of gains which is strong enough to overcompensate the subjective probability effect.

For trusts, there are indications that the opposite effect is in place: In the qualitative assessment, subjects stated that they regarded a low probability for a high yield as a form of gambling that should be avoided. In the domain of losses, the slight majority of trusts accepted a low probability high loss. The telephone interviews supported the willingness to enter investments with this kind of tail risk in order avoid (small) losses. These findings point to an overweighting of high probabilities, the opposite of the PT postulation.

Depending on the shape of the probability weighting function, which is beyond the scope of this research piece, the value function could be convex for more subjects than those 35% in question 3a). If $w(p=0.5) < 0.5$, the proportion of agents with a convex value function could be higher. Convexity can be found for those 28% of agents which opted for the risky choice in 3b) under the weak assumption that $w(0.5) < 0.59$.

The significantly higher portion of risk-takers in the domain of losses speaks for a different shape of the value curve in comparison to gains. The value curve may in

the case of losses in average tend to be closer to linear with a substantial portion of subjects having a convex curve.

9.2.2 Conclusions with Regard to EUT

29% of trusts behave in accordance with risk-averse EUT for all the single questions 1a) to 5b). Answers to question 5c) were not considered because the question type is different.

When dividing the utility curve into several sections like under PT above, the analysis shows for all but one (4a) section that the preferences of the majority are compliant with EUT. The significantly increasing portion of risk seekers for the loss section is a strong indication that the average curvature could be different between the sections. Following this line of thought, no simple concave utility function like the logarithmic function proposed by Bernoulli is to be expected. If the utility curve were concave and could be described by a single function like Bernoulli's between the yield points of -6% and 6%, it would be expected that a similar portion of subjects opted for the risky choice in mirror questions 1a) and 3a). This is not the case. The current asset base seems to play a role as a reference point.

The analysis suggests strong concavity for gains but in average a curvature closer to linearity for losses. As the analysis showed, the utility curve may partially even be convex such as in the case of small losses.

The low portion of trusts exhibiting risk-seeking behaviour in the domain of gains, which is deviating from classic risk-averse EUT, can be explained as noise. The significantly higher portion of risk-seekers for losses and for the mixed questions challenges the general validity of EUT for trusts.

More than one fourth of all trusts in loss question 3b) aggressively violate risk-averse EUT by accepting the risky choice even at a lower expected monetary value than the safe choice.

A yield of 0%, as the analysis revealed, could be a reference point for decisions, a concept which is unknown in EUT. The level of absolute wealth is not important for trusts in decision making, contradictory to EUT. Trusts are only able to fulfil their mission if they generate sufficient income under the restriction of preservation of capital.

9.2.3 Adapting the Existing Theories to Trust Preferences

The potential utility curve that could be expected on the basis of the above analysis may show some striking points as indicated in figure 23.

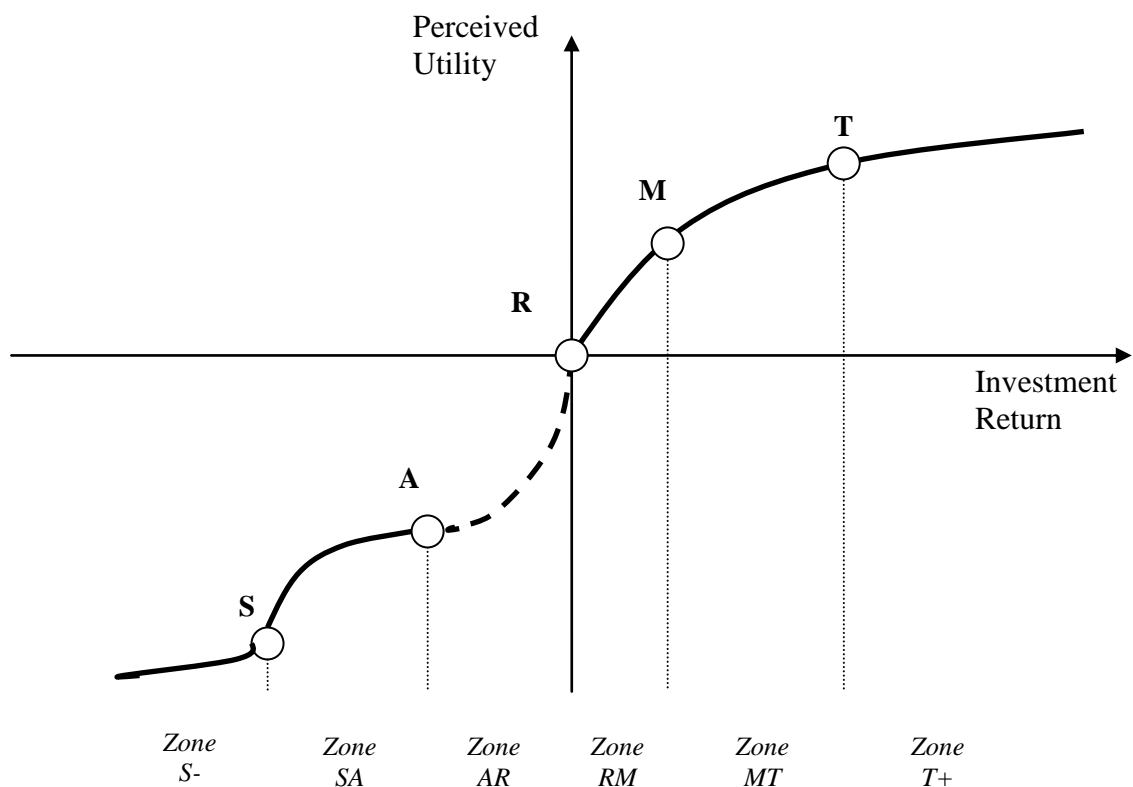


Figure 23: Potential shape of a “typical” utility curve for German charitable trusts

The reference point R is located in the centre of the chart. On the abscissa, R divides positive (gains) and negative returns (losses), whereupon R does in practice not necessarily equal 0% investment return. The location of R could as well be determined by the concept of inflation adjusted preservation of capital. Only for reasons of simplification in the study, zero inflation was assumed. On the

ordinate, R divides between positive and negative perceived utility, a scale chosen according to the distinction between gains and losses on the X-axis.

M represents the point of the minimum return that is absolutely needed to cover administrative costs and other recurring expenses. As trusts stated in the interviews, they consider it very important to reach at least some return as a safe calculation base to cover their basic expenses. A potential yield of 0% is hardly acceptable to trusts, if alternatively (small) safe gains are possible. The utility curve in the zone RM can therefore be expected to show a particular steepness in comparison to most other zones.

T represents the point of targeted return which is desired for the intended realisation of the trust's purpose. Every additional unit of return in zone MT will increase the utility for the trust, but with a decreasing marginal utility. This accommodates the idea that the importance of projects can be ranked and the most important ones will be followed first.

Any additional investment return beyond point T, in the zone T+, will create additional utility. Due to the definition that all intended projects have already been financed, the returns could be used for the promotion of more projects, which are considered less important than the originally intended ones, or for the building of reserves. It can be expected that the marginal utility decreases again in comparison to zones RM and MT. This implication is supported by trust comments considering the prospect of high returns as inappropriate risk and gambling. Furthermore, decision makers in trusts have no incentive for greed as they usually do not have personal benefits from high returns.

The shape of the trust in the domain of losses is harder to describe and vague as trusts generally lack experience with negative returns and have in seldom cases or not at all been confronted with this kind of question before.

The interviews showed that an "always safe"-philosophy is wide-spread among trusts. However, its applicability for losses seems more questionable when only negatively framed outcomes are at choice and trusts strive to break even.

In the domain of losses, the curve can be expected to be about twice as steep due to loss aversion. For slight losses, the study pointed at indications for convexity as complete avoidance of losses is regarded a more important issue than a reduction of small losses. Trusts have named “sitting out” as an appropriate strategy. A represents the point of a harmful but still acceptable loss. The interviews gave indications that for many trusts this point could be found in the area of about -3% to -4%.

S marks the point that is considered a substantial loss. In zone SA, the shape of the curve can be expected to be concave as the definition of substantial losses is a scenario which is to be avoided including not only the potential loss of the tax-exempt status and a temporary stop of charitable activities but even potentially questions the further existence of the trust and personal liability of its decision makers. After having passed point S, in zone S-, any further percentage point loss does not seem to loom as much as before, indicating convexity of utility.

The researcher does not extensively comment on the potential shape of a probability weighting function. The analysis pointed at a high subjective weighting of high probabilities and found no evidence for overweighting low probabilities. The probability weighting function could possibly be slightly s-shaped.

9.3 Conclusions with Regard to the Suitability of Investment Products

The study yielded general criteria for investment products that reflect the special needs of trusts. They will be discussed with regard to the historic and current capital market environment, modern portfolio theory, asymmetry of the risk-/return profile, institutional risk factors and the principal-agent problem and finally provide an outlook. Furthermore, the study revealed that the preferences of trusts may vary depending on their specific characteristics. It shall therefore be discussed what this could mean for their investment strategy.

The general preferences for investments as derived from the analysis of the quantitative and qualitative part of the study can be summarised as follows:

- Positive (real) yields
- Steady returns to provide a safe calculation basis
- Sufficient returns to sustainably fulfil the purpose of the trust
- Returns must be distributable
- Avoid losses
- In case of losses, provide arguments to sit out losses
- Avoid dauntingly high losses
- Easy to justify in front of bodies and authorities (comprehensible also to laymen)

9.3.1 Investment Preferences and Evidence of the Past

In the quantitative part, trusts were asked to state the asset allocation of their capital base.

Asset Class	This study	H. (2005)	S. (2007)	B. (2011b)
Cash equivalents	12%		14%	
Bonds	56%	58%	38%	55%
Equities	11%	16%	8%	7%
Real Assets (RE, Art)	13%	12%	10%	14%
Shareholdings	5%			
Other	3%	14%	30%	24%

Table 10: Average composition of trust portfolios by asset classes

Table 10 shows that most of the capital is invested in bonds and in cash equivalents. The asset allocation is similar to the averages of previous research (Heissmann, 2005; Sandberg, 2007; BDS, 2011b) in former years.

The holdings in bonds may have met the above investment criteria in the past 20 years. As a proxy for top quality issuers' bond yields, figure 24 shows how yields of German government bonds with a 10 year maturity have developed since

1992. For simplification, inflation is measured by the official German consumer price index that is calculated by the German Federal Statistical Office. The figure also shows the real yield at the respective time of a potential investment decision under the assumption that inflation would have remained the same for the whole period.¹⁷

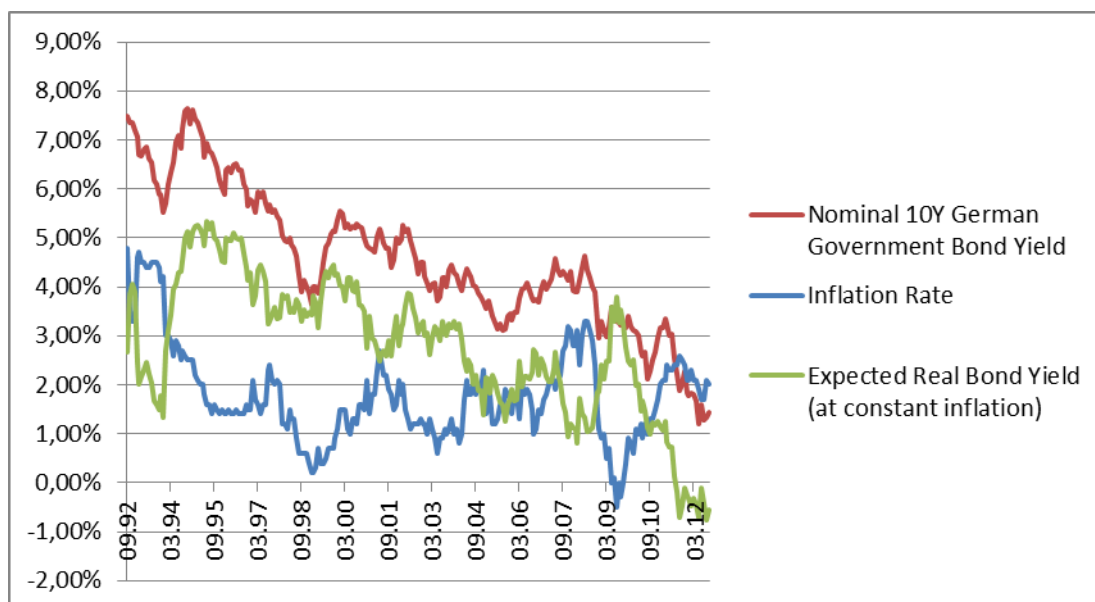


Figure 24: Nominal and real bond yields and inflation for German 10-year government bonds

The expected real bond yield at the time of investment ranged between 1% and 5% until 2010. For Buy-and-hold investors, the returns stemming from coupons can be regarded as steady and distributable income in the sense of a safe calculation basis, meeting trusts' general preferences. With regard to market price fluctuations, due to sharply rising yields in single years like 1994 and 1999, the change of the net wealth position would have temporarily been negative, even if the payment of the coupon was taken into account. In most of the years nominal yields were falling and provided additional valuation gains. Realising

¹⁷ Data source: Bloomberg; German government bond yields are the generic rates (Bloomberg function: GDBR10 Index) on a month end basis from 09/1992 to 09/2012, the consumer price index (GRCP20YY Index) is published monthly for the respective past month and refers to annual rates of change in the consumer price index in the period from 09/1992 to 09/2012. The expected real bond yield is calculated as Nominal Bond yield – Inflation rate. It represents the information available to decision makers at the respective point of time between 09/1992 and 09/2012 and assumes that inflation was expected to remain at the level of purchase of the bond for the whole period until maturity of the bond.

these gains, for example annually, and reinvesting into a new 10 year bond would have been a successful strategy in most of the years. The gains from price appreciation could be used to provide for inflation and the coupon could be distributed for the purpose of the trust. The sufficiency of returns depends on the trust-specific targets. In the rare case of single years of losses by price depreciation, the quality of the bond issuer provided good arguments to sit out losses and wait for the outstanding coupons and redemption payment. Dauntingly high losses could only incur temporarily if the bond was priced at market value in times of sharply rising yields. Finally, bond investments with top quality issuers appear to be justifiable both in front of internal bodies and in front of the authorities as well. An investment strategy that was predominantly or even fully based on bonds within the past 20 years can ex post be considered appropriate to suit the identified investment preferences of trusts. Decision makers who have to decide on the investment strategy in 2012 are confronted with negative expected real yields on bond investments.

In the average of trusts, other asset classes are considered less in the overall asset allocation. In the case of equities, reasons can be the higher volatility of stock prices compared to bonds, the fear of (dauntingly high) losses and the question of justifying potentially negative results for an asset class without guaranteed payment of dividends and without a redemption date for the repayment of the initial investment. Additionally, equities measured by the German blue chip index DAX could for most of the period not deliver dividend expectations that compare to the coupons of bonds.¹⁸ Decision makers who have to decide on the investment strategy in 2012 face a dividend yield of equities which is higher than the coupon of a bond investment as shown in figure 25.

¹⁸ Data Source: Bloomberg; German government bond yields are the generic rates (Bloomberg function: GDBR10 Index) on a month end basis from 09/1997 to 09/2012, Equities dividend yields refer to the DAX (DAX Index) and represent the sum of DAX-weighted dividends paid within the past 12 months divided by the DAX index level at the respective point of time (EQY_DVD_YLD_12M) on a month end basis in the period from 09/1997 to 09/2012. The Excess Distribution is calculated as Nominal Bond Yield- Equities Dividend Yield.

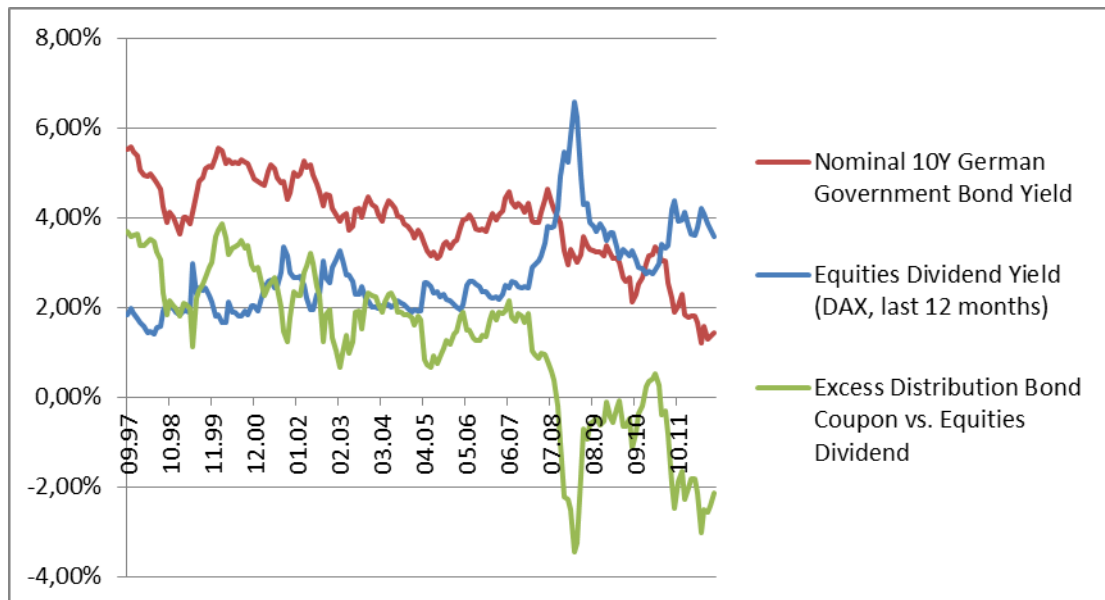


Figure 25: Bond yields vs. dividend yields 09/1997 – 09/2012

Other asset classes in trust portfolios are more heterogenous and evidence on their ability to fulfil the trusts’ criteria is therefore difficult to generalise. Real estate can in some cases play an important role, especially for trusts which use their premises to fulfil the mission of the trust, e.g. as hospitals.

9.3.2 Investment Preferences, Risk Management and Modern Portfolio Theory (MPT)

Markowitz’ (1952) idea of portfolio diversification, still predominant in portfolio theory and practice, in order to optimise the risk-/return-profile of a portfolio and to adjust it to the preferences of individuals must be considered under the constraints of trusts. Markowitz defines risk mathematically as the standard deviation of returns (δ) around an expected mean return (μ). He assumes a Gaussian distribution as shown in figure 26 which is generally questionable for capital market returns (for critique, e.g. Rom/Ferguson, 1994).

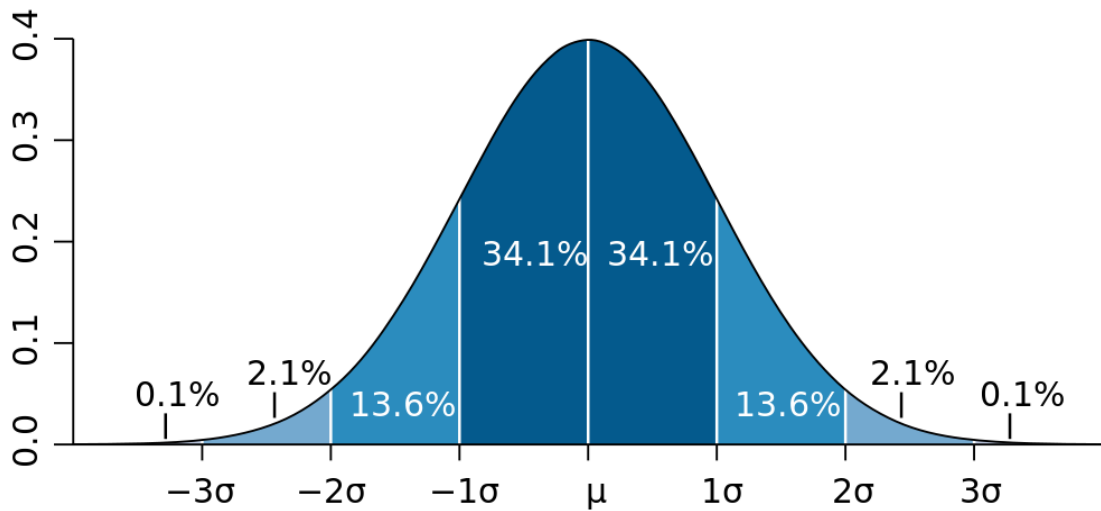


Figure 26: Probability density of returns following a Gaussian distribution (Wikipedia, 2012)

The distribution can be used by practitioners to approximate the risk of portfolios, e.g. by value-at-risk models. Trusts may use it in the sense of the above identified investment preferences in order to estimate the probability of falling short of a certain minimum yield, falling below 0% yield or suffering from a “dauntingly” high loss. The validity of the calculation depends on the quality of forecasts concerning the expected mean return (μ) and the portfolio’s standard deviation of returns (δ). Practitioners often refer to historic data to make (best guess) predictions of the future.

The correlation of assets in the portfolio is of major importance as the magnitude of the diversification effect relies on that variable. It is as hard to predict as the other variables concerning the future, not stable over time and may move to an adverse direction, i.e. complete positive correlation, for investors in times of crises.

For decision makers, it could generally be difficult to explain the methodology to laymen in the bodies of trusts and the supervisory authority. This may especially be true, if losses are suffered in the portfolio. Despite its shortcomings, MPT provides a powerful tool to describe the estimated risk-/return-characteristics of a portfolio and could therefore be used by trusts to develop an understanding of their risk positions and potential returns.

As far as risk management in trusts is concerned, the results of this study help to understand that only a diversification of risks will create a portfolio that meets the long-term needs of trusts. Trusts should not evaluate the inherent risks of investments separately with a sole focus on loss avoidance. Risks need to be evaluated in a portfolio context as the single risks do not simply sum up but can be diversified in a portfolio and contribute to a higher expected return.

9.3.3 Asymmetric Risk-/Return- Profiles

The classic MPT approach to optimise the expected risk-/return- profile of a portfolio is the diversification of assets. This must also be advocated to trusts. From the results of the study, the identified preferences of trusts call for a distribution of returns which is different from the assumed bell-shaped one in MPT. Beyond the strive for diversification, trusts may seek for paths that lead to asymmetric risk-/return- profiles, i.e. to increase the probability for moderate gains at the cost of giving up the chance of very high yields. Referring to the illustration of the bell-shaped distribution of returns in figure 26, trusts would generally prefer a distribution which is more leptokurtic and left-skewed. A leptokurtic form mirrors the demand for a steady return and left skewness accommodates the abandonment of high returns in favour of a higher mode value.

Taking these theoretical ideas into consideration, a trust may in practice use derivatives to manipulate the risk-/return profile of the portfolio. Trusts may follow the well-established principle of covered call writing which is popular especially among equity investors. The trust can sell call options on asset holdings which has the consequences that potential gains will be limited but the option premium received will add to the yield of the underlying asset and also buffer any adverse price movements meaning that the probability of a loss for the combined position will be lower than that for the pure underlying. This principle can be applied not only to equities but to bonds as well. In the latter case, it will usually require a fund solution for the trust as the strategy cannot be implemented with low volumes in

assets and without financial expertise. As far as equities are concerned, the direct implementation of the strategy also requires a minimum volume which should in practice exceed € 1 million. For lower volumes, mutual funds can be used as vehicles.

Another well-known strategy to protect assets by derivatives is the purchase of put options. Protective put options are used to protect the investor from adverse price movements of the underlying security. The main disadvantage of the strategy is that a premium for the option is to be paid. The study reveals that many trusts are not willing to pay an insurance premium to prevent from losses.

Guaranteed investment products which promise to at least repay the invested capital and additionally offer a certain participation rate with capital market movements, are popular investment vehicles in the German market. Although offering a capital guarantee, they do not comply with the preferences of trusts stated in this study. Trusts would prefer even very low yields to the chance of potentially high yields. The general concept of guarantee products usually works just the other way round: The interest for the life time of the product is invested into call options that will lose their complete value in case of adverse movements of the underlying security.

9.3.4 Investment Preferences and Institutional Risk

Charitable trusts have an important role in the society. In fulfilling their purpose, they contribute to the social and cultural well-being of the people which is increasingly important in times of austerity of the state and public institutions.

Trusts face the risk of not being able to fulfil their purpose, if they do not generate sufficient funds which are stemming mainly from capital investments.

The study revealed that supervisory by the federal states is a major topic for the trusts regarding their investment decisions. The state as a legislator sets a regulatory framework and provides supervision by the respective authorities of the federal states. Chapter 1 discussed the wide room for interpretation of the

applicable laws. By its activities of regulation, the state creates institutional risk (Rothstein, 2006; Rothstein et al., 2006). The main risk that emerges from regulation is that trusts may be misguided in their investment decision making towards suboptimal decisions. The influence of authorities can be negative if investment decisions are impacted in a way that is leading to irrational risk- and loss aversion, reduced potential for returns and therefore hindering the optimal fulfilment of the purpose which is the original and socially desirable aim of a trust.

The definition of risk by the authorities is of essential importance to trusts. Problems may arise if trusts anticipate the perception of risk by the authorities defined as the loss potential of investments. If trusts state the subjective impression that they have to defend their investment decisions in front of authorities and fear potential consequences arising from losses, supervision will incentivise risk aversion at the cost of investment strategies that are appropriate to ensure the long-term fulfilment of the purpose. Authorities should be aware of their responsibility and make clear to trusts that they will explicitly tolerate temporary losses and concentrate their assessment on the eternal life-time horizon of trusts.

Trusts should be encouraged to use the wide room for interpretation of the legal texts and concentrate primarily on the target of the fulfilment of the purpose. This may lead to higher volatility in returns, but increases the ability of trusts to optimise their investment strategies towards the generation of returns which are needed instead of focusing on capital preservation which limits the return potential and should be regarded as a secondary aim to the fulfilment of the purpose.

9.3.5 The Importance of Trust Specific Characteristics and Agency Theory

The analysis of trust characteristics in association with their risk preferences signals that a “one-size-fits-all” investment approach will not succeed in meeting the needs of trusts. Even though there are a lot of commonalities, trusts that meet

certain characteristics identified in the study can be expected to be prone to accept investment solutions which offer higher yield prospects at the price of higher risk.

The study revealed that trusts with legal person founders and no influence by the donors are significantly more prone to risk-averse behaviour than those which were founded by private individuals who are active in investment decision making. This finding can be regarded in parallel to Agency Theory (AT), where agents are risk-averse whereas principals are considered to be risk-neutral (Eisenhardt, 1989). The trusts that are subject to this study are all independent legal entities without an owner. The classic principal-agent conflict between an owner and the top management of a company (Jensen/Meckling, 1976) is therefore formally not applicable to these trusts. Fama and Jensen (1983) state that in absence of alienable residual claims, which they define as the difference between inflows of resources and promised payments to agents, board members of non-profit organisations were protected against ouster by outside agents.

Despite the formal missing of an owner, trusts with natural person donors who are involved in decision making rather behave in a more risk-seeking way. The study found that founders of trusts can be inclined to behave like owners in the sense of AT and consider the assets of the trust independent of the legal status as their property. Under this assumption, there exists no agency problem for these trusts. This in turn stands in stark contrast to the aforementioned category of trusts which are dominated by risk-averse agents. Their tendency to take risky decisions will be limited due to lacking incentives (Wiseman/Gomez-Mejia, 1998). The main long-term risk for these trusts is that their agents are reluctant to take investment risks to generate income. Since it is hardly possible to give further positive incentives on risk taking beyond the legal postulation of the fulfilment of the purpose, this issue could possibly be overcome by reducing the negative prospects for decision makers in the case of losses, e.g. supervisory which prioritises the generation of income and not the preservation of capital in each calendar year (compare 9.3.4, institutional risk).

9.3.6 Consequences for Future Investment Practice

The current low yield environment exerts tremendous pressure on trusts. Investments like bank deposits and investment grade bonds which have in the past considered to be safe and therefore highly appropriate for trusts offer a yield potential for the coming years that will hardly suffice to cover inflation. A portfolio strategy that consists only of these traditional safe assets with an expected yield lower than expected inflation is implicitly set to subsequently destroy parts of the real capital base of the trust. This is even the case if no distribution of returns takes place. This unfavourable scenario has already become reality for many trusts but it seems that it has partly not yet been detected by them, e.g. because of rising bond prices resulting from decreasing capital market yields which simulate satisfying returns especially if disguised in investment products like mutual funds.

Taken strictly, the legal framework does not support a “safe” investment strategy as the one described above. It does neither comply with the postulation to preserve the capital base nor does it support the criterion to fulfil the purpose of the trust. The responsible members engage in a strategy that can already ex ante be regarded as capital destructive.

The question of “safety” must be asked anew and regarded from a different angle than in former years of splendid income from bonds. Given that trusts claim to have an eternal time horizon as stipulated by the law, they have reason to orientate their investment strategy towards assets that promise to equally exist for long time, deliver steady income and are prepared to endure also periods of war, changing currency systems and high inflation. Paper money in form of bank deposits, bonds and alike does not comply with these criteria. Blue chip equities can be expected to serve these criteria better. The question of longevity can practically be answered very easily even for small trusts, e.g. by investing in exchange traded funds which are based on blue chip indices like the German DAX or the EuroStoxx 50 index. These funds automatically replace constituents following predefined criteria. Companies pay dividends which can completely be used for distributions to fulfil the purpose of the trust as inflation provisioning does

not seem necessary for real assets like equities. At the time of writing, the dividend yields of the above mentioned indices are between 3 and 5% whereas “safe” AAA-rated bonds yield between close to 0% and 2% (see figure 25) depending on their maturity and the specific debtor.

It has to be considered that dividends can be reduced or in the worst case completely cancelled depending on the economic situation and the dividend policy of the company and therefore provide only limited visibility of future income streams for trusts. Nevertheless, a well-diversified portfolio of blue chip equities can ex-ante be expected to deliver higher distributable returns than a AAA bond portfolio within coming years. Diversification across asset classes will be the key to investment success.

In the low-yield environment of recent years discussion of the costs of investments gains importance. This is particularly the case when external asset managers and brokers are involved in the management of trust assets and execution of orders. Commonfund Institute (2005) recommend trustees to continuously ask the question of getting the same investment results at less costs. This is strongly connected to the question of active versus passive investing (Guardian, 2013). The fund industry provides exchange traded funds which replicate indexes of the major asset classes like equities and bonds at costs that are usually much lower than the charges of traditional mutual investment funds. These financial instruments provide a cost-efficient way to invest in diversified securities portfolios and are accessible also for small trusts.

The community of German charitable trusts has discovered two new and partly related topics that are widely discussed in the literature: Sustainability and Mission Investing (e.g. Schneeweiß/Weber, 2012). These topics are also valid for equities as trusts can support “good” behaviour of companies beyond the scope of the original purpose of the trust by investing in their equities. Mission Investing can be regarded as an alternative school of thought which takes into consideration not only the traditional yield on assets but in particular how the capital itself is used to serve purpose. In the United Kingdom, the Charity Commission dedicates a separate chapter to programme related investment

(PRI) in their guide to trustees (Charity Commission, 2011) describing how trusts can use their funds to invest directly in projects that are related to their mission. On the international level, the related topic of ethical investments is widely discussed. Kreander et al. (2009) state that almost two thirds of the charities in their UK sample had an ethical policy which was typically limited to the use of negative ethical screens like the avoidance of tobacco and weapon producing companies. They postulate that charities should further align their aims and their investment practices. These alternative approaches may also gain further attention in Germany especially from trusts that are indeed able to realise a part of their purpose by the investment activity itself.

In these times of low yields from traditionally safe investments, German charitable trusts will be forced to envisage a changing paradigm. They will have to redefine their investment strategies taking into consideration that the combination of sufficient income from high quality debtors has virtually disappeared from the market. These sources of income can subsequently be replaced by investments that offer the advantage of being real assets at the price of higher fluctuations of the market price and less visibility of future distributions.

Finally, also the supervisory authorities need to be convinced to accept temporary volatility in portfolios in order to enable trusts to fulfil their purposes which are important not only to the direct beneficiaries but also and increasingly to society as a whole.

9.3.7 Summary of Contributions and Limitations of the Study

The author uses decision theory to analyse the investment preferences of German charitable trusts. This approach allows for an addition to the literature on decision theory as well as to practical knowledge in the field of investment preferences of trusts.

As a contribution to decision theory, the author proposes a utility function representing the preferences of trusts based on decision theoretical

backgrounds. Unlike previous studies, this research does not refer to the preferences of private individuals for their own wealth but extends the knowledge base to the preferences stated by people acting on behalf of German charitable trusts.

As a contribution to practical investment implications for trusts, the author analyses the legal framework and risk preferences and puts both into context with the current capital market environment. As a result, the study proposes to redefine the question of “safe investments.” In spite of the current capital market environment with negative yields on traditional safe assets, the author proposes that trusts use the wide room for interpretation granted by the legal and supervisory framework and focus on distributable yields generated by a higher equity portion in trust portfolios. Additional income could be generated by a risk-reducing and at the same time income-generating derivatives strategy, the so-called covered call writing. Both measures would help to correspond to what is implicitly and explicitly postulated by the law: real capital preservation and the durable fulfilment of the purpose of the trust. The author argues that the prevailing investment strategies of trusts which heavily focus on high quality bonds at low nominal yields and negative real yields do neither serve the purpose of generating sufficient income nor do they protect the real asset base of the trust.

The author proposes that legislators and supervisory authorities encourage trusts to invest in real assets like equities and real estate. It can be argued that the current framework already leaves sufficient freedom to trusts for applying the instruments proposed above. The study revealed that nonetheless trusts seriously take into consideration potential negative consequences by authorities resulting from price fluctuations that might arise due to volatile assets. The same phenomenon of fear of trustees to defend adverse outcomes was found with regard to the internal bodies of the trust. For the benefit of optimising the financial resources in the German trust sector it is time to proceed in a direction of a greater general acceptance of potentially volatile real asset strategies among all stakeholders in German charitable trusts and to reduce the fear for losses that systematically dampens investment returns. Important steps could be to help trusts and authorities in building financial expertise and to clearly focus on long

time horizons for investments and strategies that are well-aligned with the purpose of the trust and which may include ethical as well as mission investing. The supervisory authorities of the 16 federal states could help to overcome irrational risk aversion of trusts by concretely guiding them in investment matters in a document analogous to that published by the authority in the United Kingdom (Charity Commission, 2011). This would ideally result in one document for all German charitable trusts but requires a joint effort of all federal states.

There are several limitations to the study. Chapter 4.3 extensively discusses shortcomings yielding from collecting data from individuals rather than from groups of decision makers. Another limitation in the methodology is that the simple lottery questions used to elicit risk preferences are not a perfect substitute for the complexity of real behaviour. Furthermore, they cannot give a complete picture of risk preferences as they only capture the areas that were considered most important by the researcher based on the literature review and the pilot study. Due to the limited number of eleven questions on preferences, there is no precision in computing a utility curve and a curve for probability weightings.

It cannot be ruled out that other characteristics which have not been investigated in this study could have a meaningful influence on investment preferences. The characteristics found to be significant could accidentally heavily correlate with these non-identified characteristics.

In order to ensure the validity of the quantitative results and to mitigate potential weaknesses, the researcher implemented the qualitative stage in the design of the study. The quantitative data was supported by the qualitative analysis which leads the researcher to the assumption that the answers to the questions in the quantitative part are a sound surrogate for actual investment decisions.

Bias may arise from selecting only participants with an e-mail address. The researcher had no direct control of subjects filling in the online questionnaire and could only offer assistance via telephone and mail which was both not used by the participants.

Bias may as well arise from non-respondents. This group of the sample could not be analysed for their characteristics as the data was not available to the researcher.

In the telephone interviews, participants were exclusively volunteers who had stated in the online survey that they were available for further questions. Their characteristics and risk preferences differed from the average of all subjects in the online survey as shown in appendixes G, H and I. The questions may have been leading participants in their answers, even though it was explicitly made clear to the subjects that there are no “right” and “wrong” answers.

9.3.8 Ideas for Future Research

Further research may focus on the following topics:

From a decision theoretical point of view, it would be valuable to determine mathematically precise utility and probability weighting functions within a study analogous to for example Booi/van de Kuilen (2009). The results of the present study provide a basis for a more detailed investigation by giving indications on the critical points.

Furthermore, the results of this study raise questions regarding the influence of the organisational structure in trusts on decision making and the balance of powers. Trusts stated to be concerned about the justification of results in front of internal bodies. Further research may look close into board decision processes, building on the respective basic results of Then et al. (2012) regarding the composition of bodies, internal and external financial experts and mechanisms of control. Particular reference could potentially be made to Fama and Jensen (1983) regarding ouster and managers in trusts.

From a methodological point of view, the knowledge gained in this study could be supplemented by studies conducted in a phenomenological paradigm using case studies in order to generate in-depth knowledge of decision making processes in

trusts.

With respect to institutional risks in conjunction with the supervisory authorities, future research may address the question of how to optimise state supervisory with regard to the fulfilment of the trusts' purposes for the society.

The present study is intentionally limited to Germany because of its particular legal framework. Later studies could replicate the methodology but focus on other countries in order to compare the results. This could be particularly insightful for countries with a less restrictive legislation than Germany.

Financial researchers may be interested in optimising the proposals for a strategic asset allocation on the basis of the results of the present study.

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