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My grandfather shared my interest in economics. And while he could not chase this dream himself I am honored by knowing that he would be extremely happy for and proud of me.

Contents

Introduction

Choices reveal preferences. This way an economist is able to draw conclusions from observational data. This fundamental concept of revealed preferences works fine as long as the choice environment is stable. However, often this is not the case and the choice might be dependent on seemingly irrelevant factors. As one example, adding a dominated alternative to the choice set might influence decisions. Explanations for this are that the choice set might influence which attributes of the choice are focused on (Kőszegi and Szeidl, 2013) or which are more salient (Bordalo et al., 2015). This example shows that it is crucial to observe the choice environment and to have a clear understanding of how the choice environment or context interact with the question at hand. Importantly, even when the choice set is hold constant, choices might be influenced by other environmental factors.

One prominent environmental factor, framing has been shown to have a strong impact on decision making. Examples include the labeling of one option as the default, a different form of presentation of the choice problem or describing outcomes as losses instead of gains.

This dissertation consist of three self-contained chapters in each of which I discuss the effects of an environmental change in the form of framing on decision behavior. Further, while providing more evidence for framing effects particular interest lies on uncovering the channels through which framing works. In all three chapters I use laboratory experiments which allow tight control on the decision environment.

The concept of *framing* in itself is very broad. One definition is given by Salant and Rubinstein (2008): "[A frame is additional,] observable information, other than the set of feasible alternatives, which is irrelevant in the rational assessment of the alternatives but nonetheless affects behavior". The dependence of the choice on behavior is then defined as a framing effect. In the chapters of this dissertation, I discuss different types of frames in different domains which fall in this definition. In the first chapter I discuss a visual frame, e.g., the appearance or layout of a document on investment decisions. In the second chapter, I discuss altruistic behavior under different valence frames, and in the third chapter, I study the effect of institutional framing on leadership effectiveness.

Framing poses an important challenge to the concept of revealed preferences which shows that a better understanding of these effects is crucial. Given that choices are subject to framing, this hampers the predictive power of economic models. In particular, purely outcome based modes that fit behavior quite well in one frame might fail to predict behavior in another frame. Consequently, even when one would be able to precisely elicit preferences under one frame, this does not automatically translate into behavior in another frame. Specifically, cooperative or individual behavior might not be fixed but the outcome of an underlying mechanism which is influenced by framing. Thus, some researchers suggest that in order to develop a complete theory of choice, "ancillary conditions" like frames need to be taken into account (Bernheim and Rangel, 2007).

In the first chapter we study the influence of a visual frame on financial decision making[1]. In particular we are interested in the effectiveness of disclosures documents. Financial disclosure documents provide investors with product details to facilitate informed investment decisions. We investigate whether the appearance – the visual frame – of disclosure documents impacts risk and return expectations and investment behavior. In our experiment, subjects decide about investments into real-life mutual funds. We find that subjects expect a smaller return variance, invest more and gather less correct information if visual distractors are present in the visual frame. Results are in line with the distracted attention mechanism and suggest that disclosure policies should take the visual frame into account.

There is rich empirical evidence that framing influences social decisions. However, little is known about the underlying mechanisms behind framing effects. In Chapter 2 we study gain-loss framing in a binary modified dictator game[2]. Our main result is that subjects choose the selfish option more often in the loss frame compared to the gain frame. We use eye-tracking as an additional and complementary source of information. Eye-fixations provide us with detailed insights on the process level of decision making and show that dictators facing losses focus more on their own outcomes i.e., losses to their own account compared to the losses to another subject. This suggests that losses to own outcomes are weighted more than losses to another player.

In chapter 3 we study the effect of institutional framing on leadership in a public good setting.[3] Leadership mechanisms provide a potential means to mitigate social dilemmas, but empirical evidence on the success of such mechanisms is mixed. In this chapter, we explore the institutional frame as a relevant factor for the effectiveness of leadership. In public-goods experiments that are either framed positively (give-some game) or negatively (take-some game), we observe that leadership decisions are sensible to the institutional frame. Moreover, we find that the marginal impact of leaders' action on followers' behavior differs significantly between frames. Additionally, using a strategy method to elicit followers' reactions at the individual level, we find evidence for the malleability of followers' revealed cooperation types. Taken together, the leadership institution is found to be less efficient in the take- than in the give-frame, both in games that are played only once and repeatedly.

[1]This chapter is based on Hillenbrand and Schmelzer (2015) and is joint work with André Schmelzer.

[2]This chapter is based on joint work with Susann Fiedler

[3]This chapter is based on Frackenpohl et al. (2016) and is joint work with Gerrit Frackenpohl and Sebastian Kube.

1 Beyond Information: Disclosure, Distracted Attention and Investor Behavior

1.1 Introduction

Good investment decisions require the consideration of relevant information. However, processing this information is a demanding exercise. Most investors have limited capacities for handling it. Providing information in disclosure documents can help facilitate access to and reception of pertinent information.

One regulatory response to the financial crisis of 2007-08 was aiming at improving consumer financial decision-making by simplifying disclosures (see also Campbell et al., 2011). More precisely, key investor documents (henceforth KIDs) were introduced as a requirement for investment funds in the European Union (UCITS 2009/65/EC). These mandatory documents aim at increasing understandability and comparability of financial products for retail investors. Present rules regulate content and structure of the information document.

Loewenstein et al. (2014) highlight the role of attention in decision-making based on information disclosures. They state that psychological factors such as limited attention can severely undermine the efficacy of disclosure as a public policy. Bhargava and Loewenstein (2015) argue that policy makers should protect consumers from firms exploiting their inattention. We examine one consequence of limited attention: the possibility of being distracted. Salience can be regarded as the other side of that coin (Bordalo et al., 2015). In general, distracted attention and salience presuppose the limited resource of attention studied for instance by Hirshleifer and Teoh (2003) and DellaVigna and Pollet (2009).

If attention is key, we claim that the visual frame of disclosure documents becomes crucial. We define *visual frame* as the frame encompassing information which does itself not contain additional informational value about the product. This visual frame could include firm-specific visual distractors. *Visual distractors* are parts of the frame that distract attention from the content of the document. These could be banners or colors in the document. Attention is prone to distraction in tasks requiring a high working memory load (mental effort), such as reading disclosures (Lavie et al., 2004). By distracting attention, the visual frame could impact decision-making.

In this paper we investigate whether standardizing the visual frame of disclosures impacts risk and return expectations and investment behavior. We standardize the visual frame by removing firm-related visual distractors. We employ a between-subjects design. In our experiment, we compare investments in real-life mutual funds based on original documents (*original*) with investments based on standardized documents (*neutral*). We use real-life documents complying with the EU regulations. The laboratory setting enables us to control the information environment and exclude additional distractors. This allows us to infer a causal relation from changing the visual frame of disclosures on investment

behavior.

We find that investments are significantly higher if visual distractors are present in the document. Further, we elicit beliefs about expected returns. While the expected values are on average similar in both treatments, the expected variance of returns is found to be significantly smaller for investors facing visual distractors.

Our theoretical framework encompasses two potential psychological mechanisms: distracted attention and reinforced familiarity. Results are in line with the distracted attention mechanism: Individuals spent more time acquiring more correct information when reading standardized documents. The documents are perceived as equally informative, i.e., subjects reading the original documents are not aware that they capture less information. Importantly, we find no evidence for familiarity interacting with the treatment variation. In particular, we find no larger treatment differences concerning expected rate of return and investments for familiar firms.

The main contribution of this paper is to provide experimental evidence that the visual frame itself impacts expectations and choice behavior. Recent literature finds that changing information in the document influences investment behavior (Bertrand et al., 2010; Bertrand and Morse, 2011; Beshears et al., 2015). In this paper we change the visual frame, while holding information constant.

Our work is related to the financial decision-making and portfolio choice literature. In particular, we contribute to the literature on determinants of mutual fund investment behavior. Here, it is commonly found that individuals do not invest optimally. Current research finds that mutual fund investors disregard costs (Barber et al., 2006; Pontari et al., 2009; Choi et al., 2010). Sirri and Tufano (1998) regard search costs to be a major determinant of investment behavior. Search costs are argued to explain general advertising effects in the mutual fund market (Sirri and Tufano, 1998; Jain and Wu, 2000; Lee et al., 2012). Also, the marketing literature suggests that strong and familiar brands are able to generate an advantage through advertising (e.g., Hoeffler and Keller, 2003; Stahl et al., 2012). In contrast, we find no interaction between familiarity and including visual distractors (e.g., the logo) in our study.

One particular line of research focuses on the impact of changing the quality of information by presenting it in different formats. There is evidence that individuals focus on graphical and salient information (Jarvenpaa, 1989). The perception of risk information in graphical presentations is also found to impact portfolio choice by the degree of aggregation of risk and return information (Kaufmann and Weber, 2013). In line with these findings, de Goeij et al. (2014) claim that graphical representation of risk and return may also have a debiasing effect. Bateman et al. (2016) find that the presentation of risk disclosure influences choices. Weber et al. (2005) find that the presentation format of historical returns and asset name familiarity impact expectations.

A second line of research focuses on the effect of changing the quantity of information by comparing short and long disclosures. In particular, there is evidence specifically on

KID disclosure documents. Results on the impact of a decreasing quantity of information on mutual fund choice are mixed. Beshears et al. (2011) find that there is no effect on portfolio choice comparing short and long disclosures. In contrast, Walther (2015) finds that there is a positive effect of short information on perceived information quality and a negative impact on information overload. The findings of Kozup et al. (2008) on short disclosures are consistent with the literature on mutual funds. That is, investors are found to discard costs and to focus on historical information. Again, we depart from both lines of literature. We do not change information, but the visual frame.

From a policy perspective, our results indicate that the visual frame needs to be considered in designing disclosure policies. On behalf of the European Commission (EC), specific KID testings have been carried out (IFF Research and YouGov, 2009). The report indicates that individuals prefer a risk indicator, ten years of past performance in a bar chart, and costs displayed in a separate table. These suggestions have been implemented in disclosure policies. The report of Chater et al. (2010), also prepared for the EC, provides representative experimental evidence across EU countries that retail investors are prone to biases and do not decide optimally. However, both reports are silent about the visual frame.

The remainder of this paper is organized as follows. Section 1.2 introduces the theoretical framework and the hypotheses. Our experimental design and the treatment variation is explained in section 1.3. Section 1.4 presents the main findings. Section 1.5 concludes.

1.2 Theoretical framework

In this section we provide a theoretical framework to give our research question analytical structure and to derive concise hypotheses. We adapt a model similar to Ko and Huang (2007); Peress (2010) and Alti and Tetlock (2014). In contrast to these studies, we focus on investor decision-making only. That is, we propose a three-period model in a one-sided market setting. Since we are interested in the role of visual frames, we concentrate on the updating process of integrating new information. We further depart from the literature by integrating the perception of information in this information search model. Investment choice can be influenced by various factors. In our setting, we include two behavioral factors: Reinforced familiarity and distracted attention.

1.2.1 Setup

In line with the literature, an investor faces a portfolio choice between a risky and a safe asset. Before making her decision, the investor can search for information about the risky asset. In our experiment, this would correspond to reading a disclosure document. Given the outcome of the information search, the investor updates her belief about the risky asset. This translates into three time periods in figure 1 (as in Peress, 2010).
In $t = 0$, the investor has a subjective prior belief $\mu_0 \sim N(P, 1/p)$ about the rate of return

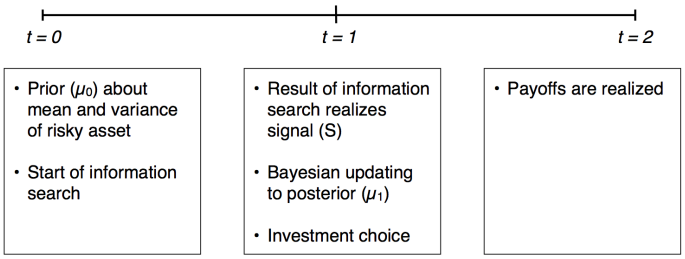

Figure 1: Timing of actions.

of the risky asset, where P defines the subjective prior expected return of the risky asset and p defines the precision of her prior (the inverse of the variance). Information search starts in $t = 0$. In $t = 1$, the result of her search is realized as a signal. This corresponds to the investor's evaluation of the product based on the information obtained from reading the disclosure document. The signal S is normally distributed around the actual rate of return of the risky asset π with $S \sim N(\pi, 1/s)$, where s defines the precision of the signal. In $t = 1$, the investor combines the information of her signal and her prior to form her posterior belief $\mu_1 \sim N(\tilde{\pi}, \sigma^2)$ about the rate of return of the risky asset in $t = 2$. Given this posterior, the investor chooses the optimal portfolio, i.e., the share x of money that she invests in the risky asset. In $t = 2$, uncertainty is resolved and payoffs are realized.

1.2.2 Optimal portfolio choice

In line with Ko and Huang (2007) and Peress (2010), we assume that the investor has CARA utility over final wealth $U[W] = -e^{-\rho W}$ with risk aversion parameter $\rho > 0$. That is, we focus on risk aversion. In $t = 1$, the investor maximizes expected utility. Since the posterior (μ_1) is assumed to be normally distributed, final wealth is also normally distributed. Due to these assumptions, we obtain the following mean-variance objective function:

$$\max_x EU(W|\mu_1) = E[W] - \frac{\rho}{2} Var[W]. \tag{1}$$

Final wealth (W) consists of the payoff from investment in the risky asset and the payoff from investment in the safe asset:

$$W = xW_0\pi + (1 - x)W_0, \tag{2}$$

where $W_0 > 0$ is the initial wealth in $t = 0$, x is the share invested in the risky asset, π is the actual rate of return of the risky asset, and $1 - x$ is the share invested in the safe asset. We assume that the safe asset pays no interest. Substituting (2) in (1) leads to

$$xW_0\tilde{\pi} + (1 - x)W_0 - \frac{\rho}{2}\sigma^2 x^2 W_0^2, \tag{3}$$

where $\tilde{\pi} = E[\pi]$ and σ^2 is the variance of the posterior. We assume no short selling ($x \in [0, 1]$).

Then, the optimal investment amount in the risky asset $X^* = xW_0^*$ is given by

$$X^*(\rho, \tilde{\pi}, \sigma^2) = \begin{cases} 0 & \tilde{\pi} \leq 1, \\ min\{W_0, \frac{\tilde{\pi}-1}{\rho\sigma^2}\} & \text{else.} \end{cases} \tag{4}$$

As we see, the investor does not invest if the expected rate of return is below one. The optimal amount invested in the risky asset is increasing in the posterior belief (bounded by initial wealth) and decreasing in the risk aversion parameter and the variance.

1.2.3 Information signal

Information search realizes a signal $S \geq 0$ in $t = 1$. This signal takes the following form (compare Peress, 2010):

$$S = \pi + \epsilon \text{ with } \epsilon \sim N(0, 1/s), \tag{5}$$

where π is the actual rate of return in $t = 2$. The error term ϵ reflects that the signal is not perfect. For mathematical tractability, the error is assumed to be normally distributed. Its variance depends on the precision of the signal s. It follows that the signal is normally distributed with $S \sim N(\pi, 1/s)$.[4]

According to Bayes' Rule for normally distributed variables, combining the prior μ_0 with the signal S results in the posterior $\mu_1 \sim N(\tilde{\pi}, \sigma^2)$ with the following mean and variance:

$$\tilde{\pi} = E[\pi|S, \mu_0] = \frac{p \cdot P + s \cdot S}{p + s}, \tag{6}$$

$$\sigma^2 = Var[\pi|S, \mu_0] = \frac{1}{p + s}. \tag{7}$$

The signal enters the posterior in two ways. First, a higher signal leads to a higher expected rate of return. Second, a higher precision of the signal increases the weight of the signal in determining the posterior expected rate of return and also decreases the posterior variance.

1.2.4 Behavioral assumptions

In our experiment, we investigate how different visual frames influence investment choices. We compare a standardized visual frame with a visual frame containing visual distractors. Visual distractors can have an impact on choices. First, from the psychology literature we know that visual distractors influence choices if the working memory load is high (de Fockert et al., 2001; Lavie et al., 2004). Visual distractors automatically draw attention. Shifting attention voluntarily from these features to relevant information costs

[4]For tractability, the distribution of the signal of the rate of return is not truncated at 0. This does not influence our theoretical results.

effort (Itti and Koch, 2001). We call this effect "distracted attention". Second, we know from the behavioral finance literature that investors subject to familiarity bias expect a higher expected rate of return for firms that they are familiar with (Huberman, 2001). Further, the literature on visual salience shows that individuals are attracted by graphical representations in financial decisions (de Goeij et al., 2014). Then, visual distractors related to a firm (e.g., a logo) are assumed to trigger familiarity bias more than if one simply reads firm names. We call this second mechanism "reinforced familiarity".

We include these findings by explicitly modelling distracted attention and reinforced familiarity as parameters in the updating process (equations (6) and (7)). Biases are modeled to impact choices through updated beliefs (see also Alti and Tetlock, 2014). In the model, beliefs are influenced by the signal. This signal and its precision follow from information search. We assume that the perception of the search result, i.e., the signal, is influenced by distracted attention and reinforced familiarity[5]. Investors are assumed not to be aware of the impact of these factors. That is, they cannot deliberately influence perception, nor can they take the impact of the factors into account during the decision.

In our framework, we model distracted attention as overweighting the precision of the signal (s). Investors reading information have a high working memory load which makes them prone to visual distractors (Lavie et al., 2004). We claim that by being distracted, investors gather less information. In particular, relevant information such as disclaimers are less likely to be read. For example, KIDs contain a disclaimer stating that the risk indicator is only based on past development and does not necessarily extrapolate to the future. Not reading this information leads to overweighting the information content of the risk indicator. This implies that the precision of the signal is overestimated. In our model, this is reflected by the weighting parameter ψ of the signal precision s. If $\psi > 1$, then the precision is overweighted.

Reinforced familiarity is modelled as biasing the signal S. Investors link their prior knowledge about the firm to their evaluation of the mutual fund. For example, viewing information of the firm triggers a positive perception of the particular product. Viewing a logo triggers this perception more strongly than reading only the name of the firm, i.e., it reinforces the familiarity bias. We assume that reinforced familiarity leads investors to expect the product to have a higher return. Investors are not aware of this overestimation. We model this overestimation as the weighting parameter θ in the signal S. If $\theta > 1$, then the signal is biased upwards.[6] Then, the signal with reinforced familiarity S_r takes the following form:

$$S_r = \theta\pi + \epsilon \text{ with } \epsilon \sim N(0, 1/s), \tag{8}$$

where the rate of return π is pre-multiplied by reinforced familiarity parameter θ. If

[5]In Peress (2010) the precision of the signal is an endogenous choice variable. We take the signal precision as given. More precisely, we assume that the treatment variation only changes the perception of the signal.

[6]We focus on a positive effect of reinforced familiarity. In principle, familiarity can have a negative effect.

$\theta = 1$ the signal is unbiased and the formula is identical to (5). Applying Bayes' rule and including the distracted attention parameter in equations (6) and (7), we arrive at the following mean and variance of the posterior:

$$\tilde{\pi} = E[\pi|S, \mu_0] = \frac{p \cdot P + \psi s \cdot S_r}{p + \psi s}, \tag{9}$$

$$\sigma^2 = Var[\pi|S, \mu_0] = \frac{1}{p + \psi s}. \tag{10}$$

Reinforced familiarity distorts the signal and distracted attention leads investors to overestimate the precision of the signal. Investors put higher weight on the signal and its precision than in the unbiased posterior in equations (6) and (7). We can see that the posterior expected value is increasing in θ through the signal S_r. The posterior variance is decreasing in ψ. For the posterior expected value, we can also see that both parameters reinforce each other. That is, the influence of reinforced familiarity on the investment decision is higher when the signal is over-weighted. Note that the model reduces to the standard case for $\theta = 1$ and $\psi = 1$. Beliefs are predicted to impact choices. That is, a higher weight on the signal increases the weight the distorted signal has on the investment decision.

1.2.5 Experimental hypotheses

Our model predicts investment behavior through updated beliefs. Reinforced familiarity and distracted attention parameters differ between familiar (f) and unfamiliar (u) firms and between the *original* (O) and *neutral* (N) treatment. Therefore, expectations and choices are predicted to differ between treatments.

Concerning the reinforced familiarity parameter, we assume that $\theta_f > 1$ for familiar firms and $\theta_u = 1$ for unfamiliar firms. That means familiarity bias only impacts expectations if firms are known. Familiarity bias is reinforced if firm-specific visual distractors are present ($\theta_{O-f} > \theta_{N-f}$). Then, on average, reinforced familiarity leads to more positive signals over the expected value:

$$\tilde{\pi}_{O-f} > \tilde{\pi}_{N-f} > \tilde{\pi}_{N-u} = \tilde{\pi}_{O-u}. \tag{11}$$

Larger expected values result in higher investments for familiar firms.

Hypothesis 1. *If reinforced familiarity is the driving factor, we observe a larger treatment difference in expected values and investments for familiar firms compared to unfamiliar firms.*

For the distracted attention parameter, we assume $\psi = 1$ in the *neutral* treatment and $\psi > 1$ in the *original* treatment. That is, the presence of visual distractors leads to attention distraction in the *original* treatment. The precision of the signal is overestimated

($\psi s > s$). Thus, the expected variance of the posterior is predicted to be smaller in the *original* treatment:

$$\sigma_O^2 < \sigma_N^2. \tag{12}$$

A lower variance induces higher investments.

Hypothesis 2. *If distracted attention is the driving factor, we observe a lower expected variance and higher investments in the original compared to the neutral treatment.*

Distracted attention and reinforced familiarity interact with each other as can be seen from (9). Distracted attention leads to an overestimation of the signal precision and fosters overweighting of the signal. Therefore, the effect of reinforced familiarity is increased. If, on average, the signal is more positive, this leads to a higher expected value ($\tilde{\pi}$) for familiar firms. This impact is even larger if visual distractors are present (e.g., in *original*). Given the posterior belief predictions from equations (9) and (10) and the optimal share of the risky asset in equation (4), we arrive at the following predictions for investment behavior:

$$X^*_{O-f} > X^*_{N-f} > X^*_{N-u}, \qquad X^*_{O-f} > X^*_{O-u} > X^*_{N-u}. \tag{13}$$

The predicted invested amount ($X^* = xW_0^*$) is higher in the *original* treatment than in the *neutral* treatment. Within each treatment, the invested amount is predicted to be larger for familiar compared to unfamiliar firms.

Hypothesis 3. *If both, reinforced familiarity and distracted attention are present, we observe*

(i) lower expected variance in original than in neutral,

(ii) larger treatment difference in expected value for familiar firms,

(iii) higher investments for firms in original compared to neutral and

(iv) larger treatment differences in investment for familiar firms.

1.3 Experimental design

We investigate the impact of changing the visual frame on expectations and investment behavior. Our hypotheses are tested in a controlled laboratory experiment resembling properties of financial decision-making in the field. In our setting, subjects face an investment problem based on real-life mutual fund investor information documents.

We employ a between-subjects design. Participants are randomly assigned either to the *original* or the *neutral* treatment group. The groups receive different documents containing the same information. Subjects in the *original* treatment group are given the real investor document of a mutual fund. Precisely, we employ KIDs under EU regulation UCITS IV Directive 2009/65/EC. That is, firm-related visual distractors are present in *original*. Participants in the *neutral* treatment group get the same information. The only variation is the visual frame of the documents. In *neutral*, the visual frame is standardized (see appendix 1.6.3). That is, firm-related visual distractors are removed. We regard banners, logos, and colors to be firm-related visual distractors. Information in the documents is constant across both treatment groups. Also, instructions are equivalent for both groups (see appendix 1.6.5).

Figure 2 presents the experimental setup with two parts: expectation elicitation and investment choice. First, individuals state their beliefs about the funds' future return. Second, they face an investment decision. Both are repeated in four stages. In each stage, a different fund is considered. We vary the familiarity of the firms across stages. The order of the stages is randomized individually to control for order effects.

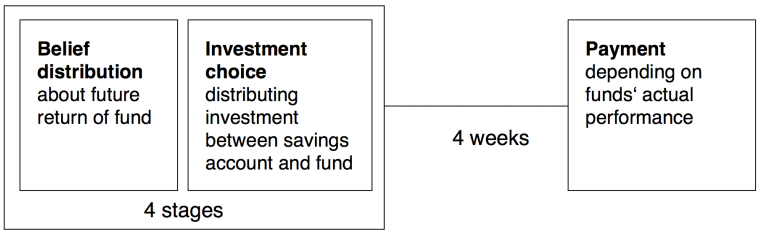

Figure 2: Experimental setup.

Information documents are distributed before each stage. After completion of each stage, documents are recollected. Note that we elicit the expected value ($\tilde{\pi}$), the expected variance (σ^2), and the investment choice (X) from the subjects.

The fund sample consists of mutual funds investing in bonds (see table 3 in appendix 1.6.1). Two funds from familiar firms (DekaBank and Allianz Global Investors) and two funds from unfamiliar firms (ACM Bernstein and Pioneer Investments) are included in the sample.[7]

[7]Based on the literature, we select funds according to front-end load, annual expenses, return history, and the risk indicator (1-7), which we consider to be reasonable for an investment with a 4-week horizon. Additionally, mutual funds containing the term "Euro" in the title as well as funds denominated in euro are selected to control for the impact of home bias.

Participants are incentivized in both tasks. They receive their payment four weeks after the experiment. In order to determine the payment, one stage out of four is chosen randomly for each subject. Then, either the expectation or the investment task is chosen randomly to be payoff relevant for each individual subject. In this way, hedging effects between stating beliefs and choices are avoided. Subjects earn points during the experiment which are exchanged at a rate of 1/800 to euros. Participants face no time constraints. We track their "reading time" of the information documents for the complete stage. That is, total reading time includes reading the documents, the expectation, and the investment task. Participants can leave the laboratory after they have finished the tasks. This induces the dilemma we observe in the field, namely that individuals may not want to sacrifice their leisure time to read the documents.

Following the main experiment, participants answer a questionnaire. Questions include a portfolio allocation task between all funds as well as participants' demographic characteristics, income, familiarity with the fund and investment experience as well as possible background factors impacting the decision, debriefing questions, financial literacy and a cognitive reflection test. Thus, we can control for additional explanatory factors. Additionally, we also ask multiple choice questions about the content of the documents in order to get insights into how well the information documents were read. We elicit risk and ambiguity aversion using multiple choice lists following the approach of Gneezy et al. (2015).

1.3.1 Part 1: Expectation elicitation

Expectations are elicited as a subjective belief distribution based on a variation of Harrison et al. (2013b). A twelve-binned histogram is used. Each interval encompasses a two percentage range. Subjects distribute 100 tokens on intervals according to their expectation about the funds' future return.

The subjective belief distribution is incentivized by a randomized version of the quadratic scoring rule (Harrison et al., 2013a; Hossain and Okui, 2013);(see also Drerup et al., 2014). Under this scoring rule, participants have an incentive to truthfully report their subjective probability distribution. Participants can either earn a fixed payoff of 20 or 0 euros (Hossain and Okui, 2013). Their payoff depends on their stated belief distribution, a random number and the funds' net return after four weeks.

In order to determine the payoff from the belief task (w_i) for each individual i, a random number r is drawn independently from $U[0,1]$. The corresponding belief payoff function is described by the following equation:

$$w_i = \begin{cases} 20 & \text{if} \quad \sum_{k=1}^{12}(b_k - \mathbb{1}_k)^2 \leq r, \\ 0 & \text{else,} \end{cases} \tag{14}$$

where b_k represents the stated number of normalized tokens in each bin $k \in (0,1)$. The

indicator function $\mathbb{1}_k$ equals 1 if the actual net return of the fund lies in bin k and 0 otherwise.

The payoff w_i depends on the accuracy of the belief estimate. Accuracy is captured by $a_i = \sum_{k=1}^{12}(b_k - \mathbb{1}_k)^2$. If a_i is small, then accuracy with regard to the actual return is high. This score a_i determines the chance of getting a high payoff independently of the amount of payment. If the random number r independently drawn from $U[0, 1]$ is larger than or equal a_i, then the participant receives 20 euros and nothing otherwise. Participants practice this procedure and answer control questions at the start of the experiment.

1.3.2 Part 2: Investment decision

We consider the standard portfolio choice problem in finance (Markowitz, 1952). Individuals choose how much of their endowment they want to invest in a risky fund (Huck et al., 2014). Participants invest by distributing 12000 points (15 euros) between a safe asset with a rate of return of 0.1% per year and the fund with an ambiguous rate of return. The safe asset is framed as a savings account and its rate of return resembles the interest rate in the market.

1.3.3 Procedure

The experiment was conducted at the BonnEconLab on 14 and 15 April 2015. In sum, $N = 182$ participants took part in the experiment: $n = 87$ in the *original* and $n = 95$ in the *neutral* treatment. Participants needed between 55 and 140 minutes to complete the session. They earned on average 14.20 €. The experiment was programmed using the experimental software z-Tree (Fischbacher, 2007a). Participants were recruited from the BonnEconLab subject pool (more than 6000 subjects) using hroot (Bock et al., 2014).

1.4 Results

1.4.1 Investment behavior

We predict differences in investment behavior and in expectations between treatment groups. To start, we look at investment behavior. Our experimental hypotheses claim that individuals invest more in the *original* treatment than in the *neutral* treatment condition. We find supporting evidence.

Result 1. *Individuals invest on average more into the fund in the original compared to the neutral treatment.*

Support. Figure 3 displays investment amounts into the fund by treatment pooled across all four funds. We reject the null hypothesis that investments into funds do not differ between treatments based on the ranksum test (two-sided, $p = 0.0509$). Directly testing our directional hypothesis indicates that individuals invest significantly more in *original* (one-sided ranksum, $p = 0.0255$).

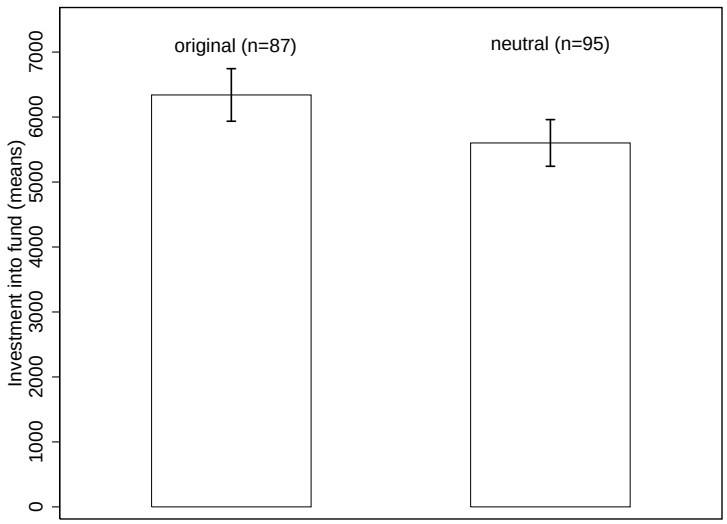

Figure 3: Investments pooled across funds by treatment (error bars: 95% confidence intervals).

On average, participants invest 14% more in the fund in the *original* (6340 points) than in the *neutral* (5602 points) disclosure treatment. This overall direction holds across funds.

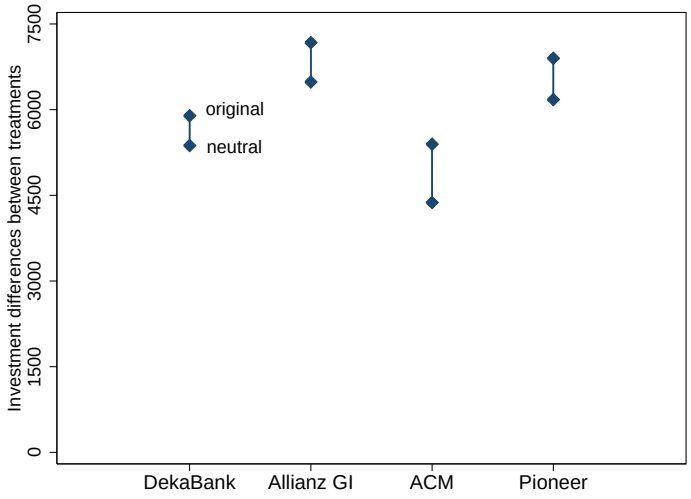

Figure 4: Investment differences between treatments by fund.

Figure 4 plots investment differences between treatments for each fund. The lower point represents mean investment in the *neutral* treatment, whereas the upper point plots the mean in the *original* treatment across individuals. At the individual fund level, investments differ in the hypothesized direction, i.e., investments are on average lower in *neutral*. According to the one-sided ranksum test, mean investments (*neutral*, *original*) are significantly larger in *original* for ACM (4374, 5396) ($p = 0.032$), Pioneer (6176, 6898) ($p = 0.076$) and Allianz GI (6485, 7173) ($p = 0.081$). The treatment difference for DekaBank fund (5372, 5894) is not significant ($p = 0.196$).

DekaBank and Allianz Global Investors are denoted as familiar, ACM Bernstein and

Pioneer Investments as unfamiliar firms.[8] Across both treatments, individuals invest on average more in familiar firms (Wilcoxon signed-rank test, $p = 0.0038$). However, Figure 4 suggests that familiarity does not play a role for the size of the treatment effect. Hypothesis 1 states that treatment *differences* are larger for familiar firms due to reinforced familiarity. We do not find evidence supporting this prediction.

In order to reach a better understanding of the investment behavior, we look at the pooled distribution of investments. Figure 5 shows kernel density estimates by treatment. The black solid line plots the kernel density estimate of the pooled investments in the *original* treatment, whereas the red dashed line shows the corresponding kernel estimate of pooled investments in the *neutral* treatment. Assuming continuous distribution of investment on a metric scale, the two-sample Kolmogorov-Smirnov test for equality of distribution functions indicates that the investment distributions differ significantly ($p = 0.012$).

Most participants invest around half of their endowment into the ambiguous fund. This corresponds to a $1/n$ diversification strategy (Benartzi and Thaler, 2001). Compared to the *original* kernel estimate, the *neutral* kernel is narrower in the center and left-shifted. The kernel estimate of investment in the *original* treatment condition has larger tails on the right of the distribution. We find more positive extreme fund investments in the *original* treatment.

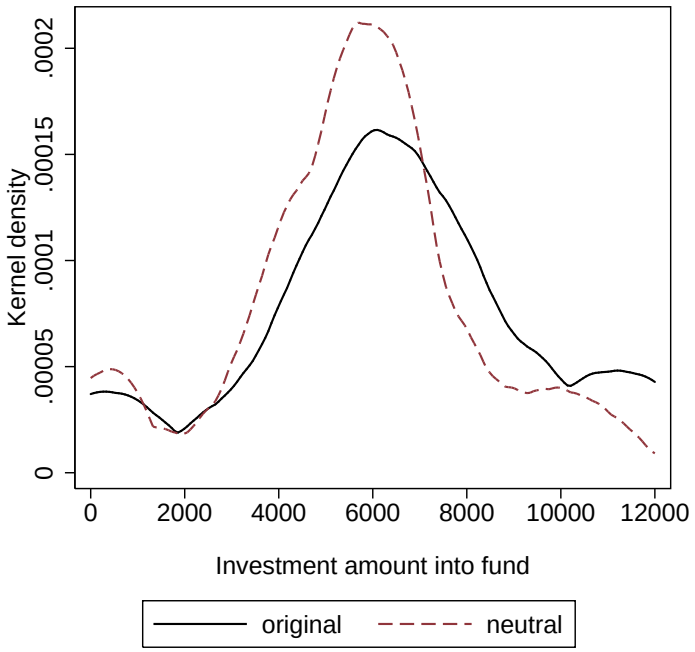

Figure 5: Kernel density estimates of investment by treatment. Estimates based on the Epanechnikov kernel function and Sheather-Jones plugin bandwidth selection criterion.

Determinants of the investment choice are investigated in a multiple linear regression. Table 1 presents the results. The dependent variable is the individual investment amount

[8] Answers from subjects in the questionnaire are consistent with this classification. Subjects had to rate for each firm how well they know it. Subjects knew the familiar firms better than the unfamiliar firms (Wilcoxon signed-rank test, $p < 0.001$).

into the mutual fund for each of the four rounds. In this way, we obtain a panel data structure with 182 x 4 = 728 observations. The main treatment effect is estimated by including a dummy variable that indicates 0 if investments are made in the *original* treatment condition and 1 if they are made in the *neutral* treatment. We find a significant main effect of our treatment on investment under various specifications controlling for a large number of explanatory factors. This result is in line with our descriptive findings.

Table 1: Random Effects Estimation Results for Investment.

	(1)	(2)	(3)	(4)	(5)
Treatment (*neutral*)	-738.7*	-738.7*	-872.2*	-775.6*	-1086.1**
	(420.7)	(420.7)	(467.1)	(461.3)	(478.1)
Familiar		525.7***	386.3	335.6	133.3
		(202.8)	(293.5)	(261.0)	(358.2)
Treatment$X$familiar			267.1	215.9	286.1
			(406.2)	(361.5)	(363.3)
Expected value				475.1***	469.9***
				(39.69)	(40.07)
Expected variance				-16.87	-20.09
				(18.98)	(19.36)
Risk aversion				145.3	-70.31
				(889.1)	(942.6)
Ambiguity aversion				-1645.0	-1586.0
				(1127.3)	(1193.4)
Priors					Yes
Rounds					Yes
Set of controls +					Yes
Constant	6340.3***	6077.4***	6147.2***	-41508.8***	-39633.1***
	(303.9)	(320.4)	(337.5)	(4145.2)	(5928.3)
Observations	728	728	728	728	728
$AdjR^2$	0.0099	0.0149	0.0152	0.1010	0.210

+ Set of controls includes demographic characteristics, attitude towards financial markets, firm knowledge, (prospective) fund ownership, reading time, financial literacy, cognitive reflection, time inconsistency, impression of documents, and macroeconomic environment.

Random effects (GLS) estimation. Standard errors in parentheses.
Dependent variable: investment amount (points) into mutual fund.
Familiar is a dummy which takes the value 1 for familiar firms and 0 otherwise.
Significance level: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

All explanatory variables have the expected sign. The *neutral* treatment is significantly negatively associated with investment into the fund. Being in the *neutral* group, participants invest significantly less in the fund. Expected value is positively significantly related with investing into the fund. The impact of variance is negative but not significant. In line with the literature, risk and ambiguity aversion could also explain investment behavior. However, we do not find a significant influence of risk or ambiguity.[9] The results

[9]We elicit the parameters with multiple choice lists and the method used by Gneezy et al. (2015).

are in line with our hypotheses concerning the overall treatment effect on investments. The main treatment effect stays significant after including further explanatory variables into the model. The full model (5) includes in total 32 explanatory factors that could possibly also influence investment behavior. Results on individual investments are robust and consistent.

Result 2. *Familiarity does not impact the size of the treatment effect on investments.*

Support. Estimation results in table 1 suggest that there is no evidence for a significant interaction effect between familiarity and treatment. The treatment difference in investments is not significantly higher for familiar firms. This is in line with descriptive finding from figure 4 that the largest treatment difference in investments is found for an unfamiliar fund.

1.4.2 Expectations

Subjective expectations are predicted to be a major determinant of investment choices by our model. We predict that expected return values are larger conditional on familiarity (hypotheses 1 and 3) and that posterior return variances will be smaller (hypothesis 2) in the *original* treatment compared to the *neutral* treatment. Indeed, we find evidence that expected return variance is smaller in *original*.

Result 3. *There is an average treatment effect on expected return variance. Individuals expect a smaller return variance in the original treatment.*

Support. Table 2 presents participants' expectations from the prediction task. Mean expected return variance across funds is found to be significantly different in the *neutral* compared to the *original* treatment (two-sided, $p = 0.036$).

Table 2: Subjective expectations: expected value and variance.

Treatment	Obs.	Mean EV	Mean Variance	Probability Mass (+)	P-value ranksum test EV	P-value ranksum test Variance	P-value ranksum test Mass (+)
Original	87	102.12	3.75	78.16	0.576	0.036	0.082
Neutral	95	101.97	4.91	74.89			

Expected value and variance are derived from the subjective belief distribution about the return of the funds. Average values are pooled across funds. Positive probability mass (+) is defined as the probability mass (0 to 100) in intervals with a positive rate of return.

On average, individuals expect returns to have a smaller variance in *original*. Then, we find evidence supporting hypothesis 2. According to hypothesis 3, the expected value

Since we elicited the parameters after the main experiment, this might introduce background risk leading to increased risk-aversion, confounding our measurement results (see, e.g., Harrison et al., 2007).

should be higher for familiar firms and even higher when visual distractors are present. We do not find evidence for the hypothesis on expected value.[10]

Result 4. *There is no average treatment effect on expected values. Also, familiarity does not play a role for the expected value.*

Support. Difference in mean expected values in table 2 is not statistically significant (two-sided, $p = 0.576$). We use a random effects regression of the expected value on the treatment, familiarity, and the interaction term between treatment and familiarity. The expected value is lower in the *neutral* treatment (coefficient -0.189, $p = 0.567$), higher for familiar firms (coefficient 0.097, $p = 0.714$), and even higher for familiar firms in the *neutral* treatment (coefficient interaction term 0.079, $p = 0.831$). However, none of these factors are significant.

As an additional observation we find that subjects in *original* put on average significantly more probability mass into the positive domain of the expectation distribution. That is, individuals expect on average more positive net returns in *original*. In sum, we find empirical evidence for our model predictions based on expected variance, but not based on average expected value.

1.4.3 Mechanism

Based on the analysis of choice and expectation data, we reject hypotheses 1 and 3. We do not find evidence of the treatment effect being conditional on familiarity. Familiarity provides only a level effect on investment. There is no interaction effect with the treatment.

We find evidence in line with hypothesis 2. Therefore, distracted attention provides a potential explanation for our results. Now, we provide additional evidence based on reading times and comprehension questions supporting this hypothesis.

Result 5. *Individuals take more time reading the neutral documents and gather more correct information from reading it.*

Support. Figure 6 presents reading times by round for each treatment. Average reading times over all rounds are longer in the *neutral* treatment (6.6 minutes) compared to the *original* treatment (5.7 minutes; ranksum test, $p = 0.0129$). Employing evidence from post-experimental questions, we find that participants in the *neutral* treatment group gather on average significantly more correct information compared to the *original* treatment group.

[10] We calculate the expected value as a joint product of the midpoints of the intervals and its corresponding probability mass. We thereby assume that the open outer intervals end at 89 and 111, respectively. As a robustness check, the expected value is also calculated using cubic spline interpolation with Hyman filter leading to the same result (Bellemare et al., 2012).

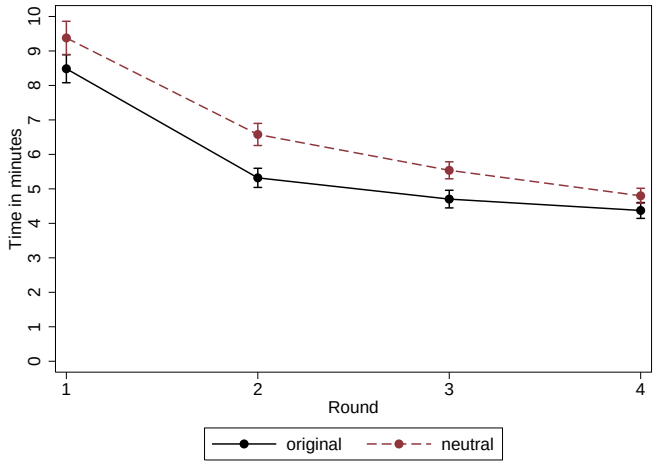

Figure 6: Reading times by round (95% confidence intervals)

The red dashed line in Figure 6 corresponds to the *neutral* treatment and the solid black line corresponds to the *original* treatment. Difference between treatments persists across rounds. Average reading time decreases sharply after the first round and converges in the following rounds.

Additionally, we asked participants multiple choice questions (one out of four) about the content and understanding of the documents (after making sure that they were not keeping any documents on their desks). In particular, we find that participants recognize the KIDs to be legal documents more often in the *neutral* treatment (77%) compared to the *original* treatment (64%; ranksum, $p = 0.065$). The risk indicator in the documents is based on historical data and may be subject to substantial change in the future. This fact is more often correctly understood in *neutral* (65%) compared to *original* (53%; ranksum, $p = 0.090$). Further, the nature of past return data is also better understood in the *neutral* condition (ranksum, $p = 0.066$). Past returns are provided annually and are not predictive for future earnings. In sum, we find that individuals gather more correct information in the *neutral* treatment.

This provides additional evidence in favor of the distracted attention hypothesis 2. Interestingly, subjects perceive the documents as equally informative in *original* (4.05 on a 6-point Likert scale) as in *neutral* (4.15, ranksum, $p = 0.618$) suggesting that they are not aware of being distracted. Multiple choice questions were asked after subjects read four different documents. Each of these documents contained all the relevant information to answer all questions correctly. Then, the treatment effect is found to be persistent and does not vanish due to learning. In combination with the decreasing reading times, this suggests that subjects focus only on specific parts of the documents and keep this pattern constant across trials. That is, subjects do not improve by experience.

1.5 Discussion and Conclusion

In this paper, we study whether changing the visual frame of disclosure documents influences expectations and investment behavior. We used a laboratory experiment to examine the causal effect from changing the documents by controlling the information setting. The visual frame in the document is varied by removing visual distractors. We find that subjects in the *original* treatment invest more in the mutual funds. Individuals expect returns of the funds to be less risky in the *original* treatment (visual distractors being present) compared to the *neutral* treatment, but do not expect a lower rate of return (Shefrin, 2001).

Our results are in line with the distracted attention mechanism. Reading times and questionnaire data provide additional evidence for the distracted attention hypothesis. Participants take more time to read documents and comprehend them better if confronted with a standardized visual frame without visual distractors. Further, individuals in the *neutral* treatment put on average less probability mass in the positive domain of the expectation distribution. Subjects in *neutral* are more likely to read information, which makes them more cautious in their decision. Being more cautious, negative outcomes are more often considered in *neutral*, leading to a larger expected return variance in *neutral*.

The results provide limited empirical support for our theoretical framework. Although we find higher investments and a lower expected variance in the estimates of the individuals in the *original* treatment, we do not find a significant relation between expected variance and investment. Also, familiarity does not affect the treatment difference.

An alternative explanation for our results could be perceived trustworthiness of the documents. That is, the documents featuring firm logo and layout in the *original* treatment could, in principle, signal more trustworthiness compared to the documents in the *neutral* treatment. Participants would invest because they have the impression that the *original* document is more reliable than the *neutral* one. However, we find from questionnaire data that impressions of the documents do not differ between treatments. Both treatment documents are found to be equally reliable (ranksum, $p = 0.403$) and credible (ranksum, $p = 0.670$). Moreover, brand perception as a decision factor does not differ significantly between treatments (ranksum, $p = 0.144$).

From the actual development of the funds (see table 4 in appendix 1.6.1), we can see that actual returns are volatile and lie below participants' expectations. In our four-week investment horizon, net returns decrease up to -5.53%. Participants are paid according to net returns (including fees and expenses) in expectation and choice tasks. Net return is negative for all funds. That is, in our experiment, and given the specific development of the funds, investors would have *ex post* optimally invested their whole endowment in the safe asset.

KID documents were introduced in order to help retail investors make better-informed decisions. Our results show that in reaching this goal the visual frame is not innocent. Indeed, we find evidence that limited attention negatively affects efficacy of mandatory

disclosure policies as suggested by Loewenstein et al. (2014). Investors are distracted, which leads them to gather less correct information. Importantly, information search experience does not improve the situation. On the contrary, individuals seem to miss the same important information over and over again, leading to a constant overvaluation of the fund. If policy makers aim at information disclosures which inform investors best, then they have to go beyond information. Removing visual distractors, by standardizing the visual frame, can help to improve disclosure efficacy.

1.6 Appendix

1.6.1 Tables

Table 3: Fund characteristics.

Mutual fund (ISIN)	Asset category	Average return (2012-2014)	Front-end load	Back-end load	Annual expense	Risk (1-7)
DekaBank EuroFlex Plus (LU0192794724)	ABS	9.2%	1.5%	0%	0.46%	3
Allianz GI Euro Bond Fund (LU0212861099)	Bonds	9.9%	2.0%	0%	0.82%	3
ACM Euro High Yield (LU0119429891)	Bonds	14.8%	1.5%	0%	0.94%	4
Pioneer Fund Euro Bond (LU0496389064)	Bonds	7.6%	1.0%	0%	1.96%	3

Notes: Average return is calculated for the years 2012, 2013 and 2014.

Table 4: Actual fund development.

	DekaBank	Allianz GI	ACM	Pioneer
Return	0.08%	-3.57%	1.10%	-2.81%
Net return (incl. fees)	-1.44%	-5.53%	-0.48%	-3.93%

Notes: The relevant investment horizon in our experiment is between 14 April 2015 and 12 May 2015 and 15 April and 13 May 2015, respectively.

1.6.2 Questionnaire

Factors	*original*	*neutral*	Total	rank-sum p
Document quality	3.4 (4)	3.67 (3)	3.54 (3)	.2943
Brand	2.67 (5)	2.39 (5)	2.52 (5)	.1441
Experience with firm	1.97 (6)	2.13 (6)	2.05 (6)	.7674
Cost	3.41 (3)	3.56 (4)	3.49 (4)	.4873
Historical data	5 (1)	5.13 (1)	5.07 (1)	.3158
Risk indicator	4.82 (2)	4.86 (2)	4.84 (2)	.8777
Background Risk				
Greek debt crisis	3.38	3.16	3.26	.3275
EZB monetary policy	3.43	3.08	3.25	.1018
DAX development	3.05	3.05	3.05	.9519

Table 5: Factors important for decision. Answers on a 6-point likert scale ranging from 'not important at all' to 'very important'. Cardinal rank in parentheses. Ranksum shows p-value of a Mann-Whitney ranksum test.

	original	*neutral*	Total	rank-sum p
Would you change your decision if advised by a professional?	5.41	5.37	5.39	.7838
Information was sufficient to make an investment decision.	2.98	2.89	2.93	.9862
I did not understand the information.	2.87	2.81	2.84	.9655
How competent do you think you are in making investment decisions?	2.74	2.32	2.52	.0567
How sure are you that you made the right investment decision?	3.03	2.62	2.82	.0615

Table 6: General debriefing questions. Answers on a 7-point likert scale.

	original	*neutral*	Total	rank-sum p
Useful	4.03	3.85	3.94	.242
Informative	4.05	4.15	4.1	.6184
Reliable	4.43	4.31	4.36	.4033
Credible	4.22	4.18	4.2	.6697

Table 7: Impression of the information sheets. Answers on a 6- point likert scale ranging from 'do not agree' to 'do fully agree'.

	original	*neutral*	Total	rank-sum p	χ^2
Legal document	64%	77%	71%	.065	.064
Risk indicator not reliable indication for future development	53%	65%	59%	.0901	.089
Total loss possible	47%	55%	51%	.3062	.305
Past development does not contain front-end load	43%	35%	38%	.2818	.280
Past development not reliable indication for future development	80%	81%	81%	.9195	.919
Liability-relevant	38%	34%	36%	.5514	0.550
Past development contains yearly data	92%	98%	95%	.0656	.065

Table 8: Correct answers to questions about the information document in percent.

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Allianz Euro Bond Fund Anteilklasse P (EUR)

Verwaltet durch Allianz Global Investors GmbH, Teil von Allianz Global Investors

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Der Fonds zielt darauf ab, auf langfristige Sicht eine überdurchschnittliche Rendite in Euro zu erwirtschaften.

Wir investieren mindestens 2/3 des Fondsvermögens direkt oder über Derivate in auf Euro lautende verzinsliche Wertpapiere, die über eine gute Bonität verfügen und von Emittenten aus Industriestaaten stammen. Zudem dürfen wir bis zu 20% des Fondsvermögens in sogenannte hochverzinsliche Wertpapiere, die ein höheres Ausfallrisiko (sogenannte "High-Yield Bonds") haben, investieren. Die Wertpapiere haben eine durchschnittliche Duration (Restlaufzeit) zwischen 3 und 9 Jahren.

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Derivate können in einem erheblichen Umfang zum Ausgleich von Preisbewegungen der Vermögensgegenstände (Absicherung), zur Ausnutzung von Preisdifferenzen zwischen zwei oder mehr Märkten (Arbitrage) oder zur Vermehrung von Gewinnchancen, auch wenn hierdurch auch Verlustrisiken vermehrt werden (Leverage), eingesetzt werden.

Risiko- und Ertragsprofil

← Typischerweise geringere Rendite
← Geringeres Risiko

Typischerweise höhere Rendite →
Höheres Risiko →

1	2	**3**	4	5	6	7

Dieser Risiko- und Ertragsindikator wird aus Wertentwicklungen der Vergangenheit berechnet. Er erlaubt keine verlässlichen Aussagen über das zukünftige Risikoprofil des Fonds.

Die Einstufung des Fonds ist nicht garantiert und kann sich in der Zukunft verändern.

Selbst die niedrigste Kategorie 1 bietet keine risikofreie Anlage.

Warum ist der Fonds in dieser Kategorie?

Fonds der Kategorie 3 hatten in der Vergangenheit eine geringe bis mittlere Volatilität. Die Volatilität beschreibt, wie stark der Wert des Fonds in der Vergangenheit gestiegen und gefallen ist. Auf Grundlage der in der Vergangenheit beobachteten Volatilitäten können Anteile eines Fonds der Kategorie 3 geringen bis mittleren Preisbewegungen ausgesetzt sein.

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Allianz Global Investors

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Diese Kosten werden zur laufenden Verwaltung des Fonds, einschließlich der Vermarktung und des Vertriebs verwendet. Sie können das potenzielle Wachstum Ihrer Anlage beschränken.

Einmalige Kosten vor und nach der Anlage	
Ausgabeaufschlag	2,00%
Rücknahmeabschlag	0,00%

Dabei handelt es sich um den Höchstbetrag, der von Ihrer Anlage vor der Anlage oder vor Auszahlung Ihres Rückgabeerlöses abgezogen werden darf.

Kosten, die vom Fonds im Laufe des Jahres abgezogen werden	
Laufende Kosten	0,82%

Der aufgeführte Ausgabeaufschlag und Rücknahmeabschlag sind Maximalbeträge. In bestimmten Fällen zahlen Sie weniger. Den für Sie gültigen Betrag erfahren Sie von Ihrem Berater.

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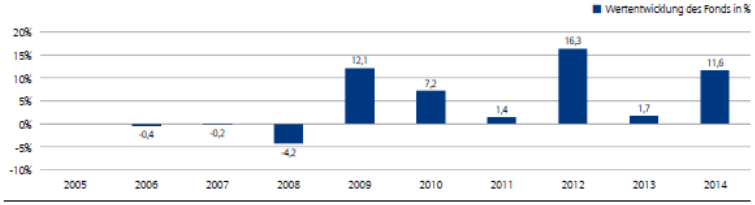

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Die Wertentwicklung des Fonds ist in EUR berechnet.

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Der Fonds unterliegt dem Steuerrecht von Luxemburg. Dies kann einen Einfluss auf Ihre persönliche Besteuerung haben. Für Details wenden Sie sich bitte an Ihren Steuerberater.

Allianz Global Investors GmbH kann lediglich auf der Grundlage einer in diesem Dokument enthaltenen Erklärung haftbar gemacht werden, die irreführend, unrichtig oder nicht mit den einschlägigen Teilen des Prospekts vereinbar ist.

Dieser Fonds ist in Luxemburg zugelassen und wird durch die Commission de Surveillance du Secteur Financier reguliert. Allianz Global Investors GmbH ist als OGAW-Kapitalverwaltungsgesellschaft sowie als AIF-Kapitalverwaltungsgesellschaft gemäß Kapitalanlagegesetzbuch (KAGB) in Deutschland zugelassen und wird durch die Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin) reguliert. Allianz Global Investors GmbH hat unter anderem in Luxembourg eine Zweigniederlassung errichtet, die Allianz Global Investors GmbH , Zweigniederlassung Luxembourg, für deren Überwachung - je nach zugewiesen der Zuständigkeit - entweder die Commission de Surveillance du Secteur Financier oder die BaFin verantwortlich ist.

Diese wesentlichen Informationen für den Anleger sind zutreffend und entsprechen dem Stand vom 18.02.2015.

Figure 7: Treatment *original* for Allianz.

Wesentliche Anlegerinformationen

Gegenstand dieses Dokuments sind wesentliche Informationen für den Anleger über diesen Fonds.
Es handelt sich nicht um Werbematerial. Diese Informationen sind gesetzlich vorgeschrieben, um Ihnen die Wesensart dieses Fonds und die Risiken einer Anlage in ihn zu erläutern. Wir raten Ihnen zur Lektüre dieses Dokuments, so dass Sie eine fundierte Anlageentscheidung treffen können.

Allianz Euro Bond Fund Anteilklasse P (EUR)

Verwaltet durch Allianz Global Investors GmbH, Teil von Allianz Global Investors

ISIN: LU0212861099
WKN: A0DQ0V

Ziele und Anlagepolitik

Der Fonds zielt darauf ab, auf langfristige Sicht eine überdurchschnittliche Rendite in Euro zu erwirtschaften.

Wir investieren mindestens 2/3 des Fondsvermögens direkt oder über Derivate in auf Euro lautende verzinsliche Wertpapiere, die über eine gute Bonität verfügen und von Emittenten aus Industriestaaten stammen. Zudem dürfen wir bis zu 20% des Fondsvermögens in sogenannte hochverzinsliche Wertpapiere, die ein höheres Ausfallrisiko (sogenannte "High-Yield Bonds") haben, investieren. Die Wertpapiere haben eine durchschnittliche Duration (Restlaufzeit) zwischen 3 und 9 Jahren.

Sie können Anteile an dem Fonds grundsätzlich bewertungstäglich zurückgeben.

Wir schütten die laufenden Erträge des Fonds grundsätzlich jährlich aus.

Empfehlung: In die Anteilklasse des Fonds sollte mindestens mit einem mittelfristigen Anlagehorizont investiert werden.

Derivate können in einem erheblichen Umfang zum Ausgleich von Preisbewegungen der Vermögensgegenstände (Absicherung), zur Ausnutzung von Preisdifferenzen zwischen zwei oder mehr Märkten (Arbitrage) oder zur Vermehrung von Gewinnchancen, auch wenn hierdurch auch Verlustrisiken vermehrt werden (Leverage), eingesetzt werden.

Risiko- und Ertragsprofil

← Typischerweise geringere Rendite
← Geringeres Risiko

Typischerweise höhere Rendite →
Höheres Risiko →

1	2	**3**	4	5	6	7

Dieser Risiko- und Ertragsindikator wird aus Wertentwicklungen der Vergangenheit berechnet. Er erlaubt keine verlässlichen Aussagen über das zukünftige Risikoprofil des Fonds.

Die Einstufung des Fonds ist nicht garantiert und kann sich in der Zukunft verändern.

Selbst die niedrigste Kategorie 1 bietet keine risikofreie Anlage.

Warum ist der Fonds in dieser Kategorie?

Fonds der Kategorie 3 hatten in der Vergangenheit eine geringe bis mittlere Volatilität. Die Volatilität beschreibt, wie stark der Wert des Fonds in der Vergangenheit gestiegen und gefallen ist. Auf Grundlage der in der Vergangenheit beobachteten Volatilitäten können Anteile eines Fonds der Kategorie 3 geringen bis mittleren Preisbewegungen ausgesetzt sein.

Die folgenden wesentlichen Risiken werden nicht vollständig durch den Risiko-Ertrags-Indikator erfasst:

Wir können direkt oder indirekt einen wesentlichen Anteil des Fonds in verzinsliche Wertpapiere oder Geldmarktinstrumente anlegen. Sofern deren Aussteller insolvent wird oder in wirtschaftliche Schwierigkeiten gerät, kann das Kapital und/oder die Zinsen nicht oder nicht vollständig zurückgezahlt werden und/oder deren Wert kann fallen.

Kosten

Diese Kosten werden zur laufenden Verwaltung des Fonds, einschließlich der Vermarktung und des Vertriebs verwendet. Sie können das potenzielle Wachstum Ihrer Anlage beschränken.

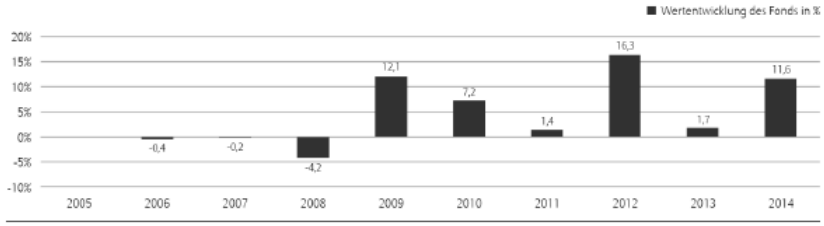
Einmalige Kosten vor und nach der Anlage	
Ausgabeaufschlag	2,00%
Rücknahmeabschlag	0,00%
Dabei handelt es sich um den Höchstbetrag, der von Ihrer Anlage vor der Anlage oder vor Auszahlung Ihres Rückgabeerlöses abgezogen werden darf.	
Kosten, die vom Fonds im Laufe des Jahres abgezogen werden	
Laufende Kosten	0,82%

Der aufgeführte Ausgabeaufschlag und Rücknahmeabschlag sind Maximalbeträge. In bestimmten Fällen zahlen Sie weniger. Den für Sie gültigen Betrag erfahren Sie von Ihrem Berater.

Die hier angegebenen laufenden Kosten fielen im letzten Geschäftsjahr des Fonds an, das am 31.12.2014 endete. Sie können von Jahr zu Jahr schwanken. Sie beinhalten keine Transaktionskosten für den Kauf oder Verkauf von Vermögensgegenständen für den Fonds.

Nähere Informationen über die Berechnung der Kosten finden Sie in dem entsprechenden Abschnitt des Prospekts.

Wertentwicklung in der Vergangenheit



Die Wertentwicklung der Vergangenheit ist kein verlässlicher Indikator für die Zukunft.

Die Wertentwicklung der Vergangenheit berücksichtigt alle Kosten und Gebühren mit Ausnahme des Ausgabeaufschlags und Rücknahmeabschlags.

Der Fonds wurde in 2002 aufgelegt.

Die Wertentwicklung des Fonds ist in EUR berechnet.

Praktische Informationen

Depotbank: State Street Bank Luxembourg S.A.

Sie können kostenlos den Prospekt sowie den letzten Jahres und Halbjahresbericht in Englisch und Deutsch bei Allianz Global Investors GmbH, Zweigniederlassung Luxembourg, 6A,route de Trèves, L-2633 Senningerberg anfordern oder unter www.allianzglobalinvestors.de erhalten.

Die Anteilpreise und weitere Informationen zu dem Fonds (einschließlich weiterer Anteilklassen des Fonds) finden Sie unter www.allianzglobalinvestors.de.

Der Fonds unterliegt dem Steuerrecht von Luxemburg. Dies kann einen Einfluss auf Ihre persönliche Besteuerung haben. Für Details wenden Sie sich bitte an Ihren Steuerberater.

Allianz Global Investors GmbH kann lediglich auf der Grundlage einer in diesem Dokument enthaltenen Erklärung haftbar gemacht werden, die irreführend, unrichtig oder nicht mit den einschlägigen Teilen des Prospekts vereinbar ist.

Dieser Fonds ist in Luxemburg zugelassen und wird durch die Commission de Surveillance du Secteur Financier reguliert. Allianz Global Investors GmbH ist als OGAW-Kapitalverwaltungsgesellschaft sowie als AIF-Kapitalverwaltungsgesellschaft gemäß Kapitalanlagegesetzbuch (KAGB) in Deutschland zugelassen und wird durch die Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin) reguliert. Allianz Global Investors GmbH hat unter anderem in Luxembourg eine Zweigniederlassung errichtet, die Allianz Global Investors GmbH , Zweigniederlassung Luxembourg, für deren Überwachung - je nach zugewiesen der Zuständigkeit - entweder die Commission de Surveillance du Secteur Financier oder die BaFin verantwortlich ist.

Diese wesentlichen Informationen für den Anleger sind zutreffend und entsprechen dem Stand vom 18.02.2015.

Figure 8: Treatment *neutral* for Allianz.

Wesentliche Anlegerinformationen
Deka-EuroFlex Plus

Gegenstand dieses Dokuments sind wesentliche Informationen für den Anleger über diesen Fonds. Es handelt sich nicht um Werbematerial. Diese Informationen sind gesetzlich vorgeschrieben, um Ihnen die Wesensart dieses Fonds und die Risiken einer Anlage in ihn zu erläutern. Wir raten Ihnen zur Lektüre dieses Dokuments, so dass Sie eine fundierte Anlageentscheidung treffen können.

Anteilklasse CF (WKN / ISIN: DK0AYD / LU0192794724);
verwaltet von Deka International S.A. (Deka-Gruppe).
Investmentfonds: Alternative Fondsstrategien, ABS-Fonds

1. Ziele und Anlagepolitik

- Das Hauptziel der Anlagepolitik des Fonds besteht in der Erwirtschaftung einer die jeweiligen Sätze am Euro-Geldmarkt übertreffenden Rendite bei Inkaufnahme gewisser wirtschaftlicher und politischer Risiken.
- Das Fondsmanagement verfolgt die Strategie, überwiegend in mit Forderungen besicherte Wertpapiere (Asset Backed Securities) zu investieren. Der Schwerpunkt liegt dabei auf Verbriefungen, die durch europäische Hypotheken und Unternehmenskredite besichert sind. Ergänzend können auch kurz laufende fest- sowie variabel verzinsliche Wertpapiere erworben und Bankguthaben gehalten werden. Der Sitz der Aussteller unterliegt keiner regionalen Beschränkung. Die Anlage erfolgt in auf Euro lautende oder gegen Euro gesicherte Vermögensgegenstände.
- Weiterhin können Geschäfte in von einem Basiswert abgeleiteten Finanzinstrumenten (Derivate) getätigt werden.
- Die Erträge eines Geschäftsjahres werden bei dieser Anteilklasse wiederangelegt (thesauriert).
- Die Anleger können börsentäglich die Rücknahme der Anteile verlangen. Die Verwaltungsgesellschaft kann die Rücknahme aussetzen, wenn außergewöhnliche Umstände dies zur Wahrung der Anlegerinteressen erforderlich erscheinen lassen.

2. Risiko- und Ertragsprofil

← Typischerweise geringere Rendite — Typischerweise höhere Rendite →
← Geringeres Risiko — Höheres Risiko →

1	2	**3**	4	5	6	7

Der Indikator gibt die Schwankung des Fondsanteilpreises in Kategorien von 1 bis 7 auf der Basis der Entwicklung in der Vergangenheit an. Er beschreibt das Verhältnis der Chancen auf Wertsteigerungen zum Risiko von Wertrückgängen, das durch Kursschwankungen der investierten Anlagegegenstände oder eine Fokussierung der im Fonds enthaltenen Anlagen beeinflusst werden kann.

Die Einstufung ist kein verlässlicher Indikator für die künftige Entwicklung und kann sich im Laufe der Zeit ändern. Eine Einstufung in 1 bedeutet nicht, dass es sich um eine risikofreie Anlage handelt. Die Einstufung stellt auch kein Ziel und keine Garantie dar.

Der Fonds ist in 3 eingestuft, weil sein historischer Anteilpreis als Fonds mit Anlageschwerpunkt in Asset Backed Securities mäßig schwankte und Verlustrisiken und Ertragschancen moderat sind.

Folgende Risiken haben auf die Einstufung keinen Einfluss, können aber trotzdem von Bedeutung sein:

Der Fonds legt wesentliche Teile in mit Forderungen besicherte Wertpapiere (Asset Backed Securities) an. Deren Aussteller können insolvent werden, wodurch die Anleihen ihren Wert ganz oder zum Teil verlieren.

Durch den Ausfall eines Ausstellers eines der Finanzinstrumente (Derivate) im Fonds kann die Beteiligung an der Entwicklung des Basiswerts ausbleiben oder verringert werden.

Der Fonds legt in Papieren an, bei denen es trotz Börsenhandels in bestimmten Marktlagen schwierig sein kann, kurzfristig einen Käufer für diese Papiere zu finden. Dadurch kann das Risiko einer Aussetzung der Anteilscheinrücknahme steigen.

Durch die Anlage in mit Forderungen besicherte Wertpapiere (Asset Backed Securities) kann es zu erhöhten Kredit- und/oder Liquiditätsrisiken kommen.

3. Kosten

Aus den Gebühren und sonstigen Kosten wird die laufende Verwaltung und Verwahrung des Fondsvermögens sowie der Vertrieb der Fondsanteile finanziert. Anfallende Kosten verringern die Ertragschancen des Anlegers.

Einmalige Kosten vor und nach der Anlage:

Ausgabeauf- und	1,50 %
Rücknahmeabschläge	0,00 %

Dabei handelt es sich um den Höchstsatz, der von Ihrem Anlagebetrag bei Kauf bzw. Verkauf abgezogen wird und somit Ihre Rendite mindert. Im Einzelfall können diese Kosten niedriger ausfallen. Den tatsächlich für Sie geltenden Betrag können Sie jederzeit in Ihrer Sparkasse erfragen.

Kosten, die vom Fonds im Laufe des Jahres abgezogen werden:

Laufende Kosten	0,46 %

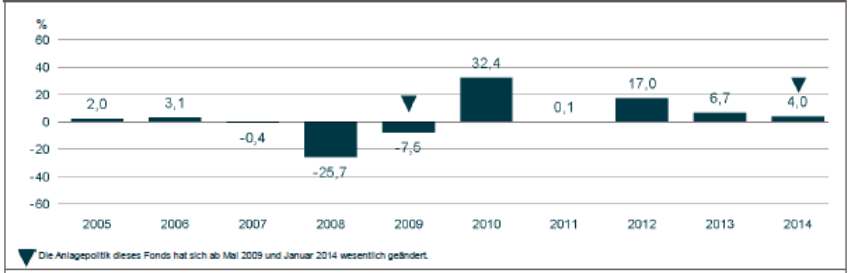
Die hier angegebenen laufenden Kosten fielen im Geschäftsjahr des Fonds an, das im Dezember 2013 endete. Sie können von Jahr zu Jahr schwanken und enthalten weder Kosten für den An- und Verkauf von Wertpapieren (Transaktionskosten) noch ggf. anfallende, an die Wertentwicklung des Fonds gebundene Gebühren. Sie beinhalten jedoch alle Kosten, die bei der Anlage in andere Fonds anfallen, sofern diese einen wesentlichen Anteil am Fondsvermögen ausmachen (z.B. bei Dachfonds).

Kosten, die der Fonds unter bestimmten Umständen zu tragen hat:

keine

Wesentliche Anlegerinformationen
Deka-EuroFlex Plus

4. Wertentwicklung in der Vergangenheit



Die Wertentwicklung in der Vergangenheit ist keine Garantie für die künftige Entwicklung.

Bei der Berechnung wurden sämtliche Kosten und Gebühren mit Ausnahme des Ausgabeaufschlags und gegebenenfalls anteilig anfallender Kosten der Verwahrung im Kundendepot abgezogen.

Die Darstellung der Wertentwicklung der Kalenderjahre basiert auf der Fondswährung EUR.

Diese Anteilklasse wurde im Jahr 2004 aufgelegt.

5. Praktische Informationen

- Anteilklassen: Dieser Fonds ist ein Anteilklassenfonds. Es sind 2 verschiedene Anteilklassen erhältlich.
- Die Ausgabe- und Rücknahmepreise werden bewertungstäglich im Internet unter www.deka.de veröffentlicht.
- Verwahrstelle: DekaBank Deutsche Girozentrale Luxembourg S.A.
- Verwaltungsgesellschaft: Deka International S.A. 5, rue des Labours, 1912 Luxembourg
- Der Fonds unterliegt dem Luxemburger Recht. Dies kann Auswirkungen darauf haben, wie Sie bezüglich Ihrer Einkünfte aus dem Fonds besteuert werden. Die Besteuerung der Erträge aus den Fondsanteilen richtet sich nach den Steuervorschriften Ihres Heimatlandes, denen Sie als dort ansässiger Anteilinhaber unterliegen.
- Dieser Fonds ist in Luxemburg zugelassen und wird durch die Commission de Surveillance du Secteur Financier (CSSF) reguliert.
- Der Verkaufsprospekt enthält weiterführende Angaben - insbesondere eine detaillierte Beschreibung der Risiken und Kosten, die mit der Anlage in diesem Fonds in Verbindung stehen. Die Wesentlichen Anlegerinformationen sollten gegebenenfalls in Verbindung mit dem Verkaufsprospekt verwendet werden.
- Der Verkaufsprospekt mit dem Verwaltungsreglement, die Wesentlichen Anlegerinformationen und die Jahres- und Halbjahresberichte in deutscher Sprache sind jederzeit kostenlos bei der Verwaltungsgesellschaft, jeder Zahl- und Vertriebsstelle und bei der DekaBank Deutsche Girozentrale sowie im Internet auf www.deka.de erhältlich.
- Sonstige Informationen für die Anleger werden in der "Börsen-Zeitung", die in Frankfurt am Main erscheint, bekannt gemacht.

Deka International S.A. kann lediglich auf der Grundlage einer in diesem Dokument enthaltenen Erklärung haftbar gemacht werden, die irreführend, unrichtig oder nicht mit den einschlägigen Teilen des Verkaufsprospektes vereinbar ist. Diese wesentlichen Informationen für den Anleger sind zutreffend und entsprechen dem Stand vom 09.02.2015.

Figure 9: Treatment *original* for DekaBank.

Wesentliche Anlegerinformationen

Gegenstand dieses Dokuments sind wesentliche Informationen für den Anleger über diesen Fonds.
Es handelt sich nicht um Werbematerial. Diese Informationen sind gesetzlich vorgeschrieben, um Ihnen die Wesensart dieses Fonds und die Risiken einer Anlage in ihn zu erläutern. Wir raten Ihnen zur Lektüre dieses Dokuments, so dass Sie eine fundierte Anlageentscheidung treffen können.

Deka-EuroFlex Plus

verwaltet von Deka International S.A. (Deka-Gruppe)
Investmentfonds: Alternative Fondsstrategien, ABS Fonds, Anteilklasse CF

ISIN: LU0192794724
WKN: DK0AYD

Ziele und Anlagepolitik

Das Hauptziel der Anlagepolitik des Fonds besteht in der Erwirtschaftung einer die jeweiligen Sätze am Euro-Geldmarkt übertreffenden Rendite bei Inkaufnahme gewisser wirtschaftlicher und politischer Risiken.

Das Fondsmanagement verfolgt die Strategie, überwiegend in mit Forderungen besicherte Wertpapiere (Asset Backed Securities) zu investieren. Der Schwerpunkt liegt dabei auf Verbriefungen, die durch europäische Hypotheken und Unternehmenskredite besichert sind. Ergänzend können auch kurz laufende fest- sowie variabel verzinsliche Wertpapiere erworben und Bankguthaben gehalten werden. Der Sitz der Aussteller unterliegt keiner regionalen Beschränkung. Die Anlage erfolgt in auf Euro laufende oder gegen Euro gesicherte Vermögensgegenstände.

Weiterhin können Geschäfte in von einem Basiswert abgeleiteten Finanzinstrumenten (Derivate) getätigt werden.

Die Erträge eines Geschäftsjahres werden bei dieser Anteilklasse wiederangelegt (thesauriert).

Die Anleger können börsentäglich die Rücknahme der Anteile verlangen. Die Verwaltungsgesellschaft kann die Rücknahme aussetzen, wenn außergewöhnliche Umstände dies zur Wahrung der Anlegerinteressen erforderlich erscheinen lassen

Risiko- und Ertragsprofil

← Typischerweise geringere Rendite — Typischerweise höhere Rendite →
← Geringeres Risiko — Höheres Risiko →

1	2	**3**	4	5	6	7

Der Indikator gibt die Schwankung des Fondsanteilpreises in Kategorien 1 bis 7 auf der Basis der Entwicklung in der Vergangenheit an. Er beschreibt das Verhältnis der Chancen auf Wertsteigerungen zum Risiko von Wertrückgängen, das durch Kursschwankungen der investierten Anlagegegenstände oder eine Fokussierung der im Fonds enthaltenen Anlagen beeinflusst werden kann.

Die Einstufung ist kein verlässlicher Indikator für die künftige Entwicklung und kann sich im Laufe der Zeit ändern. Eine Einstufung in 1 bedeutet nicht, dass es sich um eine risikofreie Anlage handelt. Die Einstufung stellt auch kein Ziel und keine Garantie dar.

Der Fonds ist in 3 eingestuft, weil sein historischer Anteilpreis als Fonds mit Anlageschwerpunkt in Asset Backed Securities mäßig schwankte und Verlustrisiken und Ertragschancen moderat sind.

Folgende Risiken haben auf die Einstufung keinen Einfluss, können aber trotzdem von Bedeutung sein:

Der Fonds legt wesentliche Teile in mit Forderungen besicherte Wertpapiere (Asset Backed Securities) an. Deren Aussteller können insolvent werden, wodurch die Anleihen ihren Wert ganz oder zum Teil verlieren.

Durch den Ausfall eines Ausstellers eines der Finanzinstrumente (Derivate) im Fonds kann die Beteiligung an der Entwicklung des Basiswerts ausbleiben oder verringert werden.

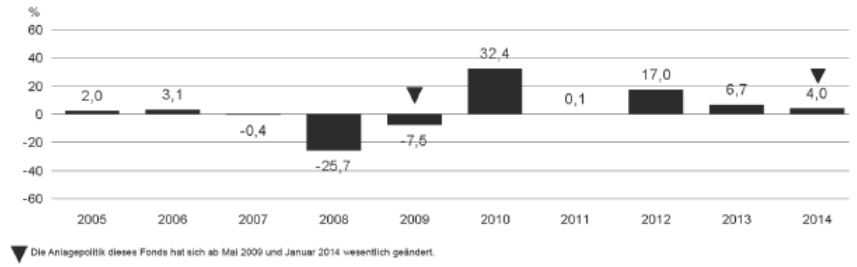
Der Fonds legt in Papieren an, bei denen es trotz Börsenhandels in bestimmten Marktlagen schwierig sein kann, kurzfristig einen Käufer für diese Papiere zu finden. Dadurch kann das Risiko einer Aussetzung der Anteilscheinrücknahme steigen.
Durch die Anlage in mit Forderungen besicherte Wertpapiere (Asset Backed Securities) kann es zu erhöhten Kredit und/ oder Liquiditätsrisiken kommen.

Kosten

Aus den Gebühren und sonstigen Kosten wird die laufende Verwaltung und Verwahrung des Fondsvermögens sowie der Vertrieb der Fondsanteile finanziert. Anfallende Kosten verringern die Ertragschancen des Anlegers.

Einmalige Kosten vor und nach der Anlage:	
Ausgabeaufschlag	1,50%
Rücknahmeabschlag	0,00%
Dabei handelt es sich um den Höchstsatz, der von Ihrem Anlagebetrag bei Kauf bzw. Verkauf abgezogen wird und somit Ihre Rendite mindert. Im Einzelfall können die Kosten niedriger ausfallen. Den tatsächlich für Sie geltenden Betrag können Sie jederzeit in Ihrer Sparkasse erfragen.	
Kosten, die vom Fonds im Laufe des Jahres abgezogen werden:	
Laufende Kosten	0,46%
Die hier angegebenen Kosten fielen im Geschäftsjahr des Fonds an, das im Dezember 2013 endete. Sie können von Jahr zu Jahr schwanken und enthalten weder Kosten für An- und Verkauf von Wertpapieren (Transaktionskosten) noch ggf. anfallende, an die Wertentwicklung des Fonds gebundene Gebühren. Sie beinhalten jedoch alle Kosten, die bei der Anlage in andere Fonds anfallen, sofern diese einen wesentlichen Anteil am Fondsvermögen ausmachen (z.B. bei Dachfonds).	
Kosten, die der Fonds unter bestimmten Umständen zu tragen hat:	
keine	

Wertentwicklung in der Vergangenheit



▼ Die Anlagepolitik dieses Fonds hat sich ab Mai 2009 und Januar 2014 wesentlich geändert.

Die Wertentwicklung der Vergangenheit ist keine Garantie für die zukünftige Entwicklung.

Bei der Berechnung wurden sämtliche Kosten und Gebühren mit Ausnahme des Ausgabeaufschlags und gegebenenfalls anteilig anfallender Kosten der Verwahrung im Kundendepot abgezogen.

Die Darstellung der Wertentwicklung der Kalenderjahre basiert auf der Fondswährung EUR.

Dieser Fonds wurde im Jahr 2004 aufgelegt.

Praktische Informationen

Anteilklassen: Dieser Fonds ist ein Anteilklassenfonds. Es sind 2 verschiedene Anteilklassen erhältlich.

Die Ausgabe- und Rücknahmepreise werden bewertungstäglich im Internet unter www.deka.de veröffentlicht.

Verwahrstelle: DekaBank Deutsche Girozentrale Luxembourg S.A.

Verwaltungsgesellschaft: Deka International S.A.
5, rue des Labours, 1912 Luxembourg

Der Fonds unterliegt dem Luxemburger Recht. Dies kann Auswirkungen darauf haben, wie Sie bezüglich Ihrer Einkünfte aus dem Fonds besteuert werden. Die Besteuerung der Erträge aus den Fondsanteilen richtet sich nach den Steuervorschriften Ihres Heimatlandes, denen Sie als dort ansässiger Anteilinhaber unterliegen.

Dieser Fonds ist in Luxemburg zugelassen und wird durch die Commission de Surveillance du Sector Financier (CSSF) reguliert.

Der Verkaufsprospekt enthält weiterführende Angaben – insbesondere eine detaillierte Beschreibung der Risiken und Kosten, die mit der Anlage in diesem Fonds in Verbindung stehen. Die Wesentlichen Anlegerinformationen sollten gegebenenfalls in Verbindung mit dem Verkaufsprospekt verwendet werden.

Der Verkaufsprospekt einschließlich der Anlagebedingungen, die Wesentlichen Anlegerinformationen und die Jahres- und Halbjahresberichte in deutscher Sprache sind jederzeit kostenlos bei der Verwaltungsgesellschaft, jeder Zahl- und Vertriebsstelle und bei der DekaBank Deutsche Girozentrale sowie im Internet auf www.deka.de erhältlich.

Sonstige Informationen für die Anleger werden in der „Börsen-Zeitung", die Frankfurt am Main erscheint, bekannt gemacht.

Deka International S.A. kann lediglich auf der Grundlage einer in diesem Dokument enthaltenen Erklärung haftbar gemacht werden, die irreführend, unrichtig oder nicht mit den einschlägigen Teilen des Verkaufsprospektes vereinbar ist. Diese wesentlichen Informationen für den Anleger sind zutreffend und entsprechen dem Stand vom 09.02.2015.

Figure 10: Treatment *neutral* for DekaBank.

WESENTLICHE ANLEGERINFORMATIONEN

Gegenstand dieses Dokuments sind wesentliche Informationen für den Anleger über diesen Fonds. Es handelt sich nicht um Werbematerial. Diese Informationen sind gesetzlich vorgeschrieben, um Ihnen die Wesensart dieses Fonds und die Risiken einer Anlage in ihn zu erläutern. Wir raten Ihnen zur Lektüre dieses Dokuments, so dass Sie eine fundierte Anlageentscheidung treffen können.

Euro High Yield Portfolio

ein Teilfonds des ACMBernstein SICAV
Anteilklasse I2 (LU0496389064)

Die Verwaltung dieses Fonds erfolgt durch AllianceBernstein (Luxembourg) S.à r.l., ein Unternehmen der AllianceBernstein Gruppe

ZIELE UND ANLAGEPOLITIK

Anlageziel
Der Fonds strebt an, eine hohe Rendite für Ihre Anlage zu erwirtschaften – und zwar sowohl durch die Erzielung von Erträgen als auch die Erhöhung des Werts Ihrer Anlage auf lange Sicht.

Anlagepolitik
Unter normalen Umständen investiert der Fonds hauptsächlich in hochverzinsliche Schuldtitel von Unternehmen und Staaten, die ein niedrigeres Rating (unter Investment Grade) aufweisen und entsprechend riskanter sind. Der Fonds strebt an, Ineffizienzen der globalen Anleihemärkte aufzuspüren und zu nutzen. Der Fonds kann bis zu 20% seines Vermögens in Schuldtitel von staatlichen Emittenten in Schwellenländern investieren. Mindestens 85% des Nettovermögens des Fonds lauten auf europäische Währungen bzw. werden gegenüber diesen abgesichert.

Im Hinblick auf (i) Erhöhung des Engagements, (ii) ein effizientes Portfoliomanagement und (iii) die Verringerung potenzieller Risiken kann der Fonds Derivate einsetzen.

Währung des Fonds
Die Referenzwährung des Fonds ist EUR.

Währung der Anteilsklasse
Die Referenzwährung der Anteilsklasse ist EUR.

Ausschüttungspolitik
Diese Anteilsklasse ist eine thesaurierende Anteilsklasse. Entsprechend werden Erträge und Kapitalgewinne des Fonds reinvestiert.

Häufigkeit der Transaktionen
Anteile können an allen Tagen, an denen sowohl die New Yorker Börse als auch die Luxemburger Banken geöffnet sind, zurückgegeben werden.

Glossar
Schuldtitel: Wertpapiere, die den Anspruch auf Rückzahlung einer Schuld einschließlich Zinszahlungen beinhalten.

Derivate: Finanzinstrumente, deren Wert von einem oder mehreren Zinssätzen, Indizes, Aktienkursen oder sonstigen Werten abhängt.

Schwellenländer: Länder, deren Wirtschaft und Wertpapiermärkte noch nicht voll entwickelt sind.

RISIKO- UND ERTRAGSPROFIL

Niedrige Risiken ◂ Potenziell niedrigere Erträge — ▸ **Hohe Risiken** Potenziell höhere Erträge

1	2	3	**4**	5	6	7

Was bedeutet dieser Risikoindikator?
Die Einstufung gemäß dem synthetischen Risiko-Ertrags-Indikator (SRRI) zeigt auf, wie die Wertentwicklung des Fonds aussehen kann und wie hoch das Risiko ist, dass Sie einen Teil Ihres Kapitals oder Ihr gesamtes Kapital verlieren. Mit der Aussicht auf höhere Gewinne ist generell auch ein höheres Verlustrisiko verbunden. Die niedrigste Kategorie impliziert nicht, dass es sich um eine risikofreie Anlage handelt.

Die oben genannte Einstufung ist lediglich eine Schätzung und keine Garantie. Sie wird nach branchenüblichen Verfahren errechnet und beruht auf der mittelfristigen Volatilität (d.h. in welchem Ausmaß der tatsächliche bzw. geschätzte Anteilskurs des Fonds über einen 5-Jahres-Zeitraum nach oben und unten schwankt).

Historische Daten stellen unter Umständen keinen zuverlässigen Indikator für das zukünftige Risikoprofil des Fonds dar. Die Risiko-Ertrags-Kategorie dieses Fonds wird nicht garantiert und kann sich im Laufe der Zeit ändern.

Gründe für die Einstufung des Fonds in diese Kategorie
Der Fonds ist mit keiner Kapitalgarantie ausgestattet. Der Fonds investiert in Schuldtitel, die Schwankungen nach oben oder unten unterliegen und zu Gewinnen oder Verlusten führen können.

Risiken, die für den Fonds von beträchtlicher Relevanz sind, jedoch vom SRRI nicht angemessen berücksichtigt werden:
In der Einstufung spiegeln sich nicht die möglichen Auswirkungen ungewöhnlicher Marktbedingungen oder großer unvorhergesehener Ereignisse wider, die die üblichen Risiken verstärken und weitere auslösen könnten, darunter:

Gegenparteirisiko: Sofern eine juristische Person, mit der der Fonds eine Geschäftsbeziehung unterhält, zahlungsunfähig wird, können dem Fonds geschuldete Zahlungen aufgeschoben, verringert oder annulliert werden.

Liquiditätsrisiko: Bei bestimmten Wertpapieren könnte es sich als schwierig erweisen, diese zum gewünschten Zeitpunkt bzw. Kurs zu kaufen oder zu verkaufen.

KOSTEN

Mit den von Ihnen gezahlten Gebühren sollen die Kosten der Geschäftstätigkeit des Fonds, darunter Kosten für Vermarktung und Vertrieb, gedeckt werden. Diese Kosten reduzieren die potenzielle Wertsteigerung Ihrer Anlage.

Einmalige Kosten vor und nach der Anlage	
Ausgabeaufschlag	1,50%
Rücknahmeabschlag	nicht anwendbar
Dabei handelt es sich um den Höchstbetrag, der von Ihrer Anlage vor der Anlage und vor der Auszahlung Ihrer Rendite abgezogen wird.	
Kosten, die vom Fonds im Laufe des Jahres abgezogen werden	
Laufende Kosten	0,94%
Kosten, die der Fonds unter bestimmten Umständen zu tragen hat	
Performancegebühr	nicht anwendbar

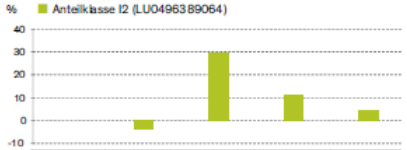
Bei den ausgewiesenen Ausgabeauf- und Rücknahmeabschlägen handelt es sich um Höchstbeträge. In bestimmten Fällen können diese Kosten niedriger sein – befragen Sie hierzu Ihren Finanzberater.

Der Betrag der laufenden Kosten basiert auf den Ausgaben des im Dezember 2014 beendeten Geschäftsjahres. Er kann von Jahr zu Jahr unterschiedlich ausfallen. Darin nicht enthalten sind:

- Portfolio-Transaktionskosten, sofern es sich dabei nicht um Ausgabeauf- bzw. Rücknahmeabschläge handelt, die der Fonds für den Kauf bzw. Verkauf von Anteilen an anderen Organismen für gemeinsame Anlagen entrichten muss.

Weitere Informationen zu den Kosten enthält der Fondsprospekt, der einsehbar ist unter **www.abglobal.com**.

FRÜHERE WERTENTWICKLUNG



2010	2011	2012	2013	2014
	-3,6	29,4	10,8	4,3

Bitte beachten Sie, dass die frühere Wertentwicklung keine zuverlässigen Rückschlüsse auf künftige Ergebnisse zulässt.

Die frühere Wertentwicklung versteht sich nach Abzug laufender Kosten. Ausgabeauf- bzw. Rücknahmeabschläge werden bei der Berechnung nicht berücksichtigt.

Der Fonds wurde aufgelegt am 15.03.2010.
Die Anteilsklasse des Fonds wurde lanciert am 15.03.2010.

Ertragszahlen werden nur bei Vorliegen von Daten für das gesamte Kalenderjahr aufgeführt.

Die frühere Wertentwicklung wurde in EUR errechnet und wird als prozentuale Veränderung des Nettoinventarwerts des Fonds am Ende jedes Jahres angegeben.

PRAKTISCHE INFORMATIONEN

Depotbank & Verwaltungsstelle:
Brown Brothers Harriman (Luxembourg) S.C.A.
2-8, avenue Charles de Gaulle
L-1653 Luxemburg

Verwaltungsgesellschaft:
AllianceBernstein (Luxembourg) S.à r.l.
2-4, rue Eugène Ruppert, L-2453 Luxemburg

Die Schweizer Vertretung und Zahlstelle des Fonds ist BNP Paribas Securities Services, Paris, succursale de Zurich, Selnaustrasse 16, 8002 Zürich, Schweiz. Der Prospekt, die Dokumente mit den wesentlichen Anlegerinformationen, die Satzung sowie die Jahres- und Halbjahresberichte des Fonds können kostenlos von der Schweizer Niederlassung bezogen werden.

Der Prospekt in Englisch, Französisch und Deutsch sowie der aktuelle Jahres- und Halbjahresbericht in Englisch und Deutsch sind kostenlos beim eingetragenen Sitz der Verwaltungsgesellschaft erhältlich, bei der ebenfalls der Nettoinventarwert (NAV) der Anteile erfragt werden kann (auch online möglich unter **www.abglobal.com**).

Besteuerung: Der Fonds unterliegt den Steuergesetzen und -verordnungen von Luxemburg. Je nach Ihrem Wohnsitzland kann sich dies auf Ihre persönliche Steuersituation auswirken. Weitere Informationen erhalten Sie von einem Steuerberater.

Umtausch von Anteilen: Der Fonds ist ein Teilfonds des ACMBernstein SICAV, der sich wiederum aus anderen Teilfonds zusammensetzt. Die Vermögenswerte und Verbindlichkeiten jedes Teilfonds sind von anderen Teilfonds des ACMBernstein SICAV getrennt. Unter bestimmten Bedingungen können Sie Ihre Anteile in Anteile eines anderen Teilfonds des ACMBernstein SICAV umtauschen. Weitere Einzelheiten zum Umtausch finden Sie im Abschnitt „Umtausch oder Austausch von Anteilen" im Prospekt. Dieser ist online unter **www.abglobal.com** sowie am eingetragenen Sitz der Verwaltungsgesellschaft verfügbar.

Der Fonds ermöglicht Anlagen in den Fonds in den nachfolgenden Währungen. Bitte beachten Sie, dass die nachfolgenden verfügbaren Währungen (und ihre entsprechenden ISIN-Codes) jeweils keine unterschiedlichen Anteilklassen darstellen. Diese ISIN-Codes sollen lediglich die Fondsanlage in einer anderen Währung als der Basiswährung des Fonds erleichtern. Ferner sollten Sie beachten, dass die Wertentwicklung in der Vergangenheit und der in diesem Dokument angegebene SRRI (synthetischer Risiko-Ertrags-Indikator) in der Basiswährung des Fonds berechnet werden. Potenzielle Auswirkungen durch Schwankungen zwischen der Basiswährung des Fonds und der Anlagewährung des Anlegers bleiben dabei unberücksichtigt. Verfügbare Währungen: LU0496389221 (USD).

Haftungshinweis: AllianceBernstein (Luxembourg) S.à r.l. kann lediglich auf der Grundlage einer in diesem Dokument enthaltenen Erklärung haftbar gemacht werden, die irreführend, unrichtig oder nicht mit den einschlägigen Teilen des Fondsprospekts vereinbar ist.

Außerhalb von Deutschland, Österreich und der Schweiz führt ACMBernstein SICAV ihre Geschäfte unter dem Namen AllianceBernstein.

ACMBernstein SICAV ist eine offene Investmentgesellschaft mit variablem Kapital (*société d'investissement à capital variable*).

Dieser Fonds ist in Luxemburg zugelassen und wird reguliert durch die Commission de Surveillance du Secteur Financier (Großherzogtum Luxemburg). AllianceBernstein (Luxembourg) S.à r.l. ist zugelassen in Luxemburg und wird reguliert durch die Commission de Surveillance du Secteur Financier (Großherzogtum Luxemburg). Diese wesentlichen Informationen für den Anleger sind zutreffend und entsprechen dem Stand von 06.02.2015.

Figure 11: Treatment *original* for ACM.

Wesentliche Anlegerinformationen

Gegenstand dieses Dokuments sind wesentliche Informationen für den Anleger über diesen Fonds.
Es handelt sich nicht um Werbematerial. Diese Informationen sind gesetzlich vorgeschrieben, um Ihnen die Wesensart dieses Fonds und die Risiken einer Anlage in ihn zu erläutern. Wir raten Ihnen zur Lektüre dieses Dokuments, so dass Sie eine fundierte Anlageentscheidung treffen können.

Euro High Yield Portfolio, ein Teilfonds des ACMBernstein SICAV
Die Verwaltung dieses Fonds erfolgt durch AllianceBernstein (Luxembourg) S.à r.l.,
ein Unternehmen der AllianceBernstein Gruppe, Anteilklasse I2

ISIN: LU0496389064

Ziele und Anlagepolitik

Anlageziel
Der Fonds strebt an, eine hohe Rendite für Ihre Anlage zu erwirtschaften – und zwar sowohl durch die Erzielung von Erträgen als auch die Erhöhung des Werts Ihrer Anlage auf lange Sicht.

Anlagepolitik
Unter normalen Umständen investiert der Fonds hauptsächlich in hochverzinsliche Schuldtitel von Unternehmen und Staaten, die ein niedrigeres Rating (unter Investment Grade) aufweisen und entsprechend riskanter sind. Der Fonds strebt an, Ineffizienzen der globalen Anleihemärkte aufzuspüren und zu nutzen. Der Fonds kann bis zu 20% seines Vermögens in Schuldtitel von staatlichen Emittenten in Schwellenländern investieren. Mindestens 85% des Nettovermögens des Fonds lauten auf europäische Währungen bzw. werden gegenüber diesen abgesichert.

Im Hinblick auf (i) Erhöhung des Engagements, (ii) ein effizientes Portfoliomanagement und (iii) die Verringerung potenzieller Risiken kann der Fonds Derivate einsetzen.

Währung des Fonds
Die Referenzwährung des Fonds ist EUR.

Währung der Anteilsklasse
Die Referenzwährung der Anteilsklasse ist EUR.

Ausschüttungspolitik
Diese Anteilsklasse ist eine thesaurierende Anteilsklasse. Entsprechend werden Erträge und Kapitalgewinne des Fonds reinvestiert.

Häufigkeit der Transaktionen
Anteile können an allen Tagen, an denen sowohl die New Yorker Börse als auch die Luxemburger Banken geöffnet sind, zurückgegeben werden.

Glossar
Schuldtitel: Wertpapiere, die den Anspruch auf Rückzahlung einer Schuld einschließlich Zinszahlungen beinhalten.

Derivate: Finanzinstrumente, deren Wert von einem oder mehreren Zinssätzen, Indizes, Aktienkursen oder sonstigen Werten abhängt.

Schwellenländer: Länder, deren Wirtschaft und Wertpapiermärkte noch nicht voll entwickelt sind.

Risiko- und Ertragsprofil

Niedrige Risiken — Hohe Risiken
Potenziell niedrigere Erträge — Potenziell höhere Erträge

1	2	3	**4**	5	6	7

Was bedeutet dieser Risikoindikator?
Die Einstufung gemäß dem synthetischen Risiko-Ertrags-Indikator (SRRI) zeigt auf, wie die Wertentwicklung des Fonds aussehen kann und wie hoch das Risiko ist, dass Sie einen Teil Ihres Kapitals oder Ihr gesamtes Kapital verlieren. Mit der Aussicht auf höhere Gewinne ist generell auch ein höheres Verlustrisiko verbunden. Die niedrigste Kategorie impliziert nicht, dass es sich um eine risikofreie Anlage handelt.

Die oben genannte Einstufung ist lediglich eine Schätzung und keine Garantie. Sie wird nach branchenüblichen Verfahren errechnet und beruht auf der mittelfristigen Volatilität (d.h. in welchem Ausmaß der tatsächliche bzw. geschätzte Anteilskurs des Fonds über einen 5-Jahres-Zeitraum nach oben und unten schwankt).

Historische Daten stellen unter Umständen keinen zuverlässigen Indikator für das zukünftige Risikoprofil des Fonds dar. Die Risiko-Ertrags-Kategorie dieses Fonds wird nicht garantiert und kann sich im Laufe der Zeit ändern.

Gründe für die Einstufung des Fonds in diese Kategorie

Der Fonds ist mit keiner Kapitalgarantie ausgestattet. Der Fonds investiert in Schuldtitel, die Schwankungen nach oben oder unten unterliegen und zu Gewinnen oder Verlusten führen können.

Risiken, die für den Fonds von beträchtlicher Relevanz sind, jedoch vom SRRI nicht angemessen berücksichtigt werden:

In der Einstufung spiegeln sich nicht die möglichen Auswirkungen ungewöhnlicher Marktbedingungen oder großer unvorhergesehener Ereignisse wider, die die üblichen Risiken verstärken und weitere auslösen könnten, darunter:

Gegenparteirisiko: Sofern eine juristische Person, mit der der Fonds eine Geschäftsbeziehung unterhält, zahlungsunfähig wird, können dem Fonds geschuldete Zahlungen aufgeschoben, verringert oder annulliert werden.

Liquiditätsrisiko: Bei bestimmten Wertpapieren könnte es sich als schwierig erweisen, diese zum gewünschten Zeitpunkt bzw. Kurs zu kaufen oder zu verkaufen.

Kosten

Mit den von Ihnen gezahlten Gebühren sollen die Kosten der Geschäftstätigkeit des Fonds, darunter Kosten für Vermarktung und Vertrieb, gedeckt werden. Diese Kosten reduzieren die potenzielle Wertsteigerung Ihrer Anlage.

Einmalige Kosten vor und nach der Anlage	
Ausgabeaufschlag	1,50%
Rücknahmeabschlag	nicht anwendbar
Dabei handelt es sich um den Höchstbetrag, der von Ihrer Anlage vor der Anlage undvor der Auszahlung Ihrer Rendite abgezogen wird.	
Kosten, die vom Fonds im Laufe des Jahres abgezogen werden	
Laufende Kosten	0,94%
Kosten, die der Fonds unter bestimmten Umständen zu tragen hat	
Performancegebühr	nicht anwendbar

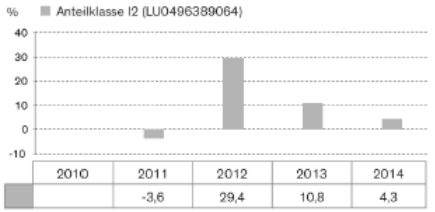
Bei den ausgewiesenen Ausgabeauf- und Rücknahmeabschlägen handelt es sich um Höchstbeträge. In bestimmten Fällen können diese Kosten niedriger sein – befragen Sie hierzu Ihren Finanzberater.

Der Betrag der laufenden Kosten basiert auf den Ausgaben des im Dezember 2014 beendeten Geschäftsjahres. Er kann von Jahr zu Jahr unterschiedlich ausfallen. Darin nicht enthalten sind:

- Portfolio-Transaktionskosten, sofern es sich dabei nicht um Ausgabeauf- bzw. Rücknahmeabschläge handelt, die der Fonds für den Kauf bzw. Verkauf von Anteilen an anderen Organismen für gemeinsame Anlagen entrichten muss.

Weitere Informationen zu den Kosten enthält der Fondsprospekt, der einsehbar ist unter www.abglobal.com.

Wertentwicklung in der Vergangenheit



2010	2011	2012	2013	2014
	-3,6	29,4	10,8	4,3

Bitte beachten Sie, dass die frühere Wertentwicklung keine zuverlässigen Rückschlüsse auf künftige Ergebnisse zulässt.

Die frühere Wertentwicklung versteht sich nach Abzug laufender Kosten. Ausgabeauf- bzw. Rücknahmeabschläge werden bei der Berechnung nicht berücksichtigt.

Der Fonds wurde aufgelegt am 15.03.2010.
Die Anteilsklasse des Fonds wurde lanciert am 15.03.2010.

Ertragszahlen werden nur bei Vorliegen von Daten für das gesamte Kalenderjahr aufgeführt.

Die frühere Wertentwicklung wurde in EUR errechnet und wird als prozentuale Veränderung des Nettoinventarwerts des Fonds am Ende jedes Jahres angegeben.

Praktische Informationen

Depotbank & Verwaltungsstelle:
Brown Brothers Harriman (Luxembourg) S.C.A.
2-8, avenue Charles de Gaulle
L-1653 Luxemburg

Verwaltungsgesellschaft:
AllianceBernstein (Luxembourg) S.à r.l.
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Besteuerung: Der Fonds unterliegt den Steuergesetzen und –verordnungen von Luxemburg. Je nach Ihrem Wohnsitzland kann sich dies auf Ihre persönliche Steuersituation auswirken. Weitere Informationen erhalten Sie von einem Steuerberater.

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Der Fonds ermöglicht Anlagen in den Fonds in den nachfolgenden Währungen. Bitte beachten Sie, dass die nachfolgenden verfügbaren Währungen (und ihre entsprechenden ISIN-Codes) jeweils keine unterschiedlichen Anteilklassen darstellen. Diese ISIN-Codes sollen lediglich die Fondsanlage in einer anderen Währung als der Basiswährung des Fonds erleichtern. Ferner sollten Sie beachten, dass die Wertentwicklung in der Vergangenheit und der in diesem Dokument angegebene SRRI (synthetischer Risiko-Ertrags-Indikator) in der Basiswährung des Fonds berechnet werden. Potenzielle Auswirkungen durch Schwankungen zwischen der Basiswährung des Fonds und der Anlagewährung des Anlegers bleiben dabei unberücksichtigt. Verfügbare Währungen: LU0496389221 (USD).

Haftungshinweis: AllianceBernstein (Luxembourg) S.à r.l. kann lediglich auf der Grundlage einer in diesem Dokument enthaltenen Erklärung haftbar gemacht werden, die irreführend, unrichtig oder nicht mit den einschlägigen Teilen des Fondsprospekts vereinbar ist.

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Figure 12: Treatment *neutral* for ACM.

WESENTLICHE ANLEGERINFORMATIONEN

Gegenstand dieses Dokuments sind wesentliche Informationen für den Anleger über diesen Fonds. Es handelt sich nicht um Werbematerial. Diese Informationen sind gesetzlich vorgeschrieben, um Ihnen die Wesensart dieses Fonds und die Risiken einer Anlage in ihn zu erläutern. Wir raten Ihnen zur Lektüre dieses Dokuments, so dass Sie eine fundierte Anlageentscheidung treffen können.

PIONEER Investments

Pioneer Funds - Euro Bond

Teilfonds des Pioneer Funds
Verwaltungsgesellschaft: Pioneer Asset Management S.A.

WESENTLICHE ANLEGERINFORMATIONEN

Klasse C EUR thesaurierend - LU0119429891

Ziele und Anlagepolitik

Anlageziel: Strebt mittel- bis langfristig eine Wertsteigerung Ihrer Anlage sowie Erträge an.

Portfoliowertpapiere: Der Teilfonds investiert hauptsächlich in auf Euro lautende europäische Staatsschuldverschreibungen. Der Teilfonds kann bis zu 30% seines Vermögens in europäische Unternehmensanleihen investieren, die entweder auf Euro oder auf andere Währungen lauten können, sofern in letzterem Fall das Währungsrisiko im Wesentlichen gegenüber dem Euro abgesichert ist. Der Teilfonds investiert nicht in Aktien oder wandelbare Wertpapiere. Der Teilfonds darf zur Reduzierung verschiedener Risiken, zur effizienten Portfolioverwaltung und als Mittel zum Eingehen von Engagements (sowohl long als auch short) in verschiedenen Anlagegegenständen, Märkten oder Zahlungsströmen Derivate einsetzen. Hierdurch kann eine hohe Hebelwirkung erzeugt werden. Insbesondere wird der Teilfonds in kurz- und mittelfristige Zinsswaps investieren.

Anlageprozess: Der Investmentmanager verfolgt zwei unterschiedliche Strategien, um Reinertrag und Marktertrag voneinander zu trennen. Zunächst wird ein Kernportfolio zur Abbildung des Ertrags und der Volatilität der Benchmark gebildet. Dann werden weitere Anlagestrategien zur Erzielung zusätzlicher Erträge mithilfe von Derivaten sowie ein disziplinierter Risikomanagementansatz verfolgt.

Benchmark: Der Teilfonds wird bezogen auf den JP Morgan GBI EMU Index gemanagt. Allerdings ist das Management des Teilfonds diskretionär, und der Investmentmanager ist durch die Zusammenstellung der Benchmark nicht eingeschränkt.

Wichtige Begriffe

Schuldverschreibung: Wertpapiere, die eine Verpflichtung zur Rückzahlung einer Schuld (Verbindlichkeit) einschließlich Zinsen darstellen.

Wandelbare Wertpapiere: Wertpapiere, die zwar wie Anleihen strukturiert sind, aber deren Wert sich im Falle eines Anstiegs des Aktienkurses des Emittenten steigern kann.

Derivate: Finanzinstrumente, deren Wert auf einem oder mehreren Zinssätzen, Indizes, Aktienkursen oder sonstigen Werten beruht.

Aktien: Wertpapiere, die einen Anteil an einem Unternehmen darstellen.

Long-Position: Besitz eines Wertpapiers oder anderweitige Haltung einer Position, die von einem Wertanstieg des Wertpapiers profitiert.

Short-Position: Eine Anlageposition, deren Wert sich umgekehrt zum Kurs eines Wertpapiers entwickelt.

Geeignet für: Anleger, die sich der Risiken des Teilfonds bewusst sind und eine mittel- bis langfristige Anlage suchen.

Es handelt sich um eine thesaurierende Anteilsklasse. Die Anlageerträge werden wieder angelegt. Die Anleger können auf Wunsch an jedem Geschäftstag in Luxemburg verkaufen.

Risiko-Renditeprofil

Was bedeutet dieser Risikoindikator?

Der oben stehende Risikoindikator misst potenzielle Risiken und Erträge und basiert auf der mittelfristigen Volatilität (d. h. darauf, wie schnell der tatsächliche oder geschätzte Anteilskurs des Teilfonds in einem Zeitraum von fünf Jahren gestiegen und gesunken ist). Historische Daten, wie diejenigen, die zur Berechnung dieses synthetischen Indikators verwendet wurden, sind unter Umständen kein verlässlicher Hinweis auf das künftige Risikoprofil des Teilfonds. Der Risikoindikator des Teilfonds wird ohne Gewähr angegeben und kann im Laufe der Zeit schwanken. In der Risikokategorie des Teilfonds spiegelt sich die Tatsache wider, dass Anleihen mit Investment Grade als Anlageklasse in der Regel weniger volatil sind als Anleihen ohne Investment Grade. Bei nicht währungsabgesicherten Anteilsklassen können Wechselkursschwankungen den Risikoindikator beeinflussen, sofern die zugrundeliegenden Anlagen auf eine andere Währung lauten als jene der Anteilsklasse.

Weitere wesentliche Risiken

Der Risikoindikator spiegelt die Marktbedingungen der vergangenen Jahre wider und trägt den weiteren wesentlichen Risiken des Teilfonds unter Umständen nicht adäquat Rechnung:

Ausfallrisiko: Bei Derivatkontrakten, die der Teilfonds abgeschlossen hat, kann es vorkommen, dass die Vertragspartner ihren Zahlungsverpflichtungen nicht nachkommen.

Kreditrisiko: Es kann vorkommen, dass die Emittenten von Anleihen, die vom Teilfonds gehalten werden, ihre Tilgungs- und Zinszahlungen nicht leisten.

Operationelles Risiko: Es kann zu Verlusten aufgrund von menschlichem Versagen, Unterlassungen, fehlerhaften Abläufen, Systemproblemen oder äußeren Einflüssen kommen.

Derivaterisiko: Derivate führen zu einer Hebelwirkung im Teilfonds und können hervorrufen, dass Wertveränderungen in den zugrunde liegenden Anlagen die Erträge oder Verluste im Teilfonds deutlich erhöhen.

Kosten

Einmalige Kosten vor und nach der Anlage		
Ausgabeaufschlag	1,00%	Höchstbeträge, die anfallen können, bevor Ihr Geld angelegt oder die Erlöse aus Ihrer Anlage ausbezahlt werden.
Rücknahmeabschlag	entfällt	
Kosten, die vom Teilfonds im Laufe des Jahres abgezogen werden		
Laufende Kosten	1,96%	Auf Gründlage der Ausgaben für das Geschäftsjahr bis 31. Dezember 2014
Kosten, die auf den Teilfonds unter bestimmten Bedingungen anfallen		
Performancegebühr	entfällt	

Diese Kosten decken die Verwaltungskosten des Teilfonds, einschließlich der Kosten für dessen Vermarktung und Vertrieb, und verringern die Ertragschancen Ihrer Anlage.

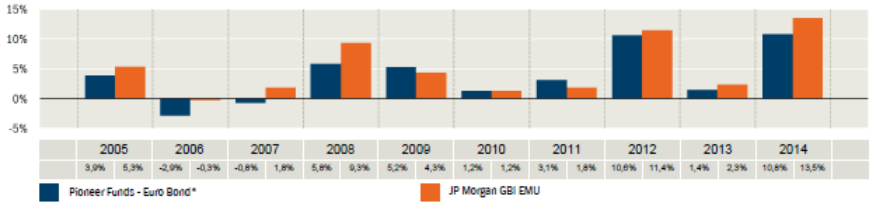
Für Ausgabeaufschläge/Rücknahmeabschläge fallen unter Umständen geringere Beträge als die angegebenen Höchstbeträge an. Wenden Sie sich bitte an Ihren Anlageberater oder die Vertriebsgesellschaft. Der Ausgabeaufschlag ist nur zahlbar, wenn ein Anleger innerhalb eines Jahres nach Anlage verkauft.

Laufende Kosten schwanken von Jahr zu Jahr. Sie enthalten keine Portfolio-Transaktionskosten und Performancegebühren.

Weitere Informationen zu den Kosten finden Sie im Prospekt des Pioneer Funds; dieser ist unter www.pioneerinvestments.eu verfügbar.

Bisherige Wertentwicklung

Bei der unten angegebenen Wertentwicklung des Teilfonds (in EUR) sind alle laufenden Gebühren miteinberechnet, nicht aber der Ausgabeaufschlag und Rücknahmeabschlag. Die Wertentwicklung in der Vergangenheit ist kein zuverlässiger Indikator für die künftige Wertentwicklung.



Teilfondsauflegung: 2000 Auflegung der Anteilsklasse: 2000 *Vor 2005 und 2010 wies der Teilfonds andere Eigenschaften auf.

Praktische Informationen

Depotbank: Société Générale Bank & Trust

Weitere Informationen: Der Prospekt des Pioneer Funds, sowie weitere praktische Informationen wie die aktuellen Jahres- und Halbjahresberichte, die aktuellen Anteilskurse und die Wesentlichen Anlegerinformationen auf Deutsch sind beim eingetragenen Sitz der Verwaltungsgesellschaft sowie online unter www.pioneerinvestments.eu erhältlich.

Besteuerung: Der Teilfonds unterliegt den luxemburgischen Steuergesetzen und -verordnungen. Je nach Wohnsitz hat das luxemburgische Steuerrecht unter Umständen Auswirkungen auf Ihre eigene steuerrechtliche Position.

Informationszuständigkeit: Die Verwaltungsgesellschaft Pioneer Asset Management S.A. kann nur auf Grundlage von im vorliegenden Dokument getätigten Aussagen haftbar gemacht werden, die irreführend oder unzutreffend sind oder im Widerspruch zu den entsprechenden Informationen im Fondsprospekt stehen.

Fondsstruktur: Der Teilfonds ist ein Teilfonds des Pioneer Funds, eines Fonds Commun de Placement mit einer Reihe von Teilfonds. Die Vermögenswerte und Verbindlichkeiten jedes Teilfonds sind aufgrund gesetzlicher Vorschriften von jenen anderer Teilfonds getrennt. Der Prospekt sowie die Jahres- und Halbjahresberichte des Pioneer Funds betreffen sämtliche Teilfonds.

Auftragserteilung: Die Modalitäten für Kauf, Umtausch und Rückgabe von Anteilen sind im Prospekt beschrieben. Die Anteilseigner haben unter Umständen das Recht, Anteile am Teilfonds in Anteile derselben Klasse an einem anderen Teilfonds des Pioneer Funds umzutauschen.

Zulassung: Der Fonds und seine Verwaltungsgesellschaft sind in Luxemburg zugelassen und werden von der Finanzmarktaufsichtsbehörde Commission de Surveillance du Secteur Financier (CSSF) reguliert.

Eingetragener Sitz: Pioneer Asset Management S.A., 8-10, rue Jean Monnet, L-2180 Luxemburg

Datum: Die vorliegenden Wesentlichen Anlegerinformationen geben den Stand vom 09. Februar 2015 wieder.

Figure 13: Treatment *original* for Pioneer.

Wesentliche Anlegerinformationen

Gegenstand dieses Dokuments sind wesentliche Informationen für den Anleger über diesen Fonds.
Es handelt sich nicht um Werbematerial. Diese Informationen sind gesetzlich vorgeschrieben, um Ihnen die Wesensart dieses Fonds und die Risiken einer Anlage in ihn zu erläutern. Wir raten Ihnen zur Lektüre dieses Dokuments, so dass Sie eine fundierte Anlageentscheidung treffen können.

Pioneer Funds - Euro Bond

Teilfonds des Pioneer Funds, Klasse C EUR thesaurierend
Verwaltungsgesellschaft: Pioneer Asset Management S.A.

ISIN: LU0119429891

Ziele und Anlagepolitik

Anlageziel: Strebt mittel- bis langfristig eine Wertsteigerung Ihrer Anlage sowie Erträge an.

Portfoliowertpapiere: Der Teilfonds investiert hauptsächlich in auf Euro lautende europäische Staatsschuldverschreibungen. Der Teilfonds kann bis zu 30% seines Vermögens in europäische Unternehmensanleihen investieren, die entweder auf Euro oder auf andere Währungen lauten können, sofern in letzterem Fall das Währungsrisiko im Wesentlichen gegenüber dem Euro abgesichert ist. Der Teilfonds investiert nicht in Aktien oder wandelbare Wertpapiere. Der Teilfonds darf zur Reduzierung verschiedener Risiken, zur effizienten Portfolioverwaltung und als Mittel zum Eingehen von Engagements (sowohl long als auch short) in verschiedenen Anlagegegenständen, Märkten oder Zahlungsströmen Derivate einsetzen. Hierdurch kann eine hohe Hebelwirkung erzeugt werden. Insbesondere wird der Teilfonds in kurz- und mittelfristige Zinsswaps investieren.

Anlageprozess: Der Investmentmanager verfolgt zwei unterschiedliche Strategien, um Reinertrag und Marktertrag voneinander zu trennen. Zunächst wird ein Kernportfolio zur Abbildung des Ertrags und der Volatilität der Benchmark gebildet. Dann werden weitere Anlagestrategien zur Erzielung zusätzlicher Erträge mithilfe von Derivaten sowie ein disziplinierter Risikomanagementansatz verfolgt.

Benchmark: Der Teilfonds wird bezogen auf den JP Morgan GBI EMU Index gemanagt. Allerdings ist das Management des Teilfonds diskretionär, und der Investmentmanager ist durch die Zusammenstellung der Benchmark nicht eingeschränkt.

Wichtige Begriffe

Schuldverschreibung: Wertpapiere, die eine Verpflichtung zur Rückzahlung einer Schuld (Verbindlichkeit) einschließlich Zinsen darstellen.

Wandelbare Wertpapiere: Wertpapiere, die zwar wie Anleihen strukturiert sind, aber deren Wert sich im Falle eines Anstiegs des Aktienkurses des Emittenten steigern kann.

Derivate: Finanzinstrumente, deren Wert auf einem oder mehreren Zinssätzen, Indizes, Aktienkursen oder sonstigen Werten beruht.

Aktien: Wertpapiere, die einen Anteil an einem Unternehmen darstellen.

Long-Position: Besitz eines Wertpapiers oder anderweitige Haltung einer Position, die von einem Wertanstieg des Wertpapiers profitiert.

Short-Position: Eine Anlageposition, deren Wert sich umgekehrt zum Kurs eines Wertpapiers entwickelt.

Geeignet für: Anleger, die sich der Risiken des Teilfonds bewusst sind und eine mittel- bis langfristige Anlage suchen.

Es handelt sich um eine thesaurierende Anteilsklasse. Die Anlageerträge werden wieder angelegt. Die Anleger können auf Wunsch an jedem Geschäftstag in Luxemburg verkaufen.

Risiko-Renditeprofil

Was bedeutet dieser Risikoindikator?

Der oben stehende Risikoindikator misst potenzielle Risiken und Erträge und basiert auf der mittelfristigen Volatilität (d. h. darauf, wie schnell der tatsächliche oder geschätzte Anteilskurs des Teilfonds in einem Zeitraum von fünf Jahren gestiegen und gesunken ist). Historische Daten, wie diejenigen, die zur Berechnung dieses synthetischen Indikators verwendet wurden, sind unter Umständen kein verlässlicher Hinweis auf das künftige Risikoprofil des Teilfonds. Der Risikoindikator des Teilfonds wird ohne Gewähr angegeben und kann im Laufe der Zeit schwanken. In der Risikokategorie des Teilfonds spiegelt sich die Tatsache wider, dass Anleihen mit Investment Grade als Anlageklasse in der Regel weniger volatil sind als Anleihen ohne Investment Grade. Bei nicht währungsabgesicherten Anteilsklassen können Wechselkursschwankungen den Risikoindikator beeinflussen, sofern die zugrundeliegenden Anlagen auf eine andere Währung lauten als jene der Anteilsklasse.

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Der Risikoindikator spiegelt die Marktbedingungen der vergangenen Jahre wider und trägt den weiteren wesentlichen Risiken des Teilfonds unter Umständen nicht adäquat Rechnung:

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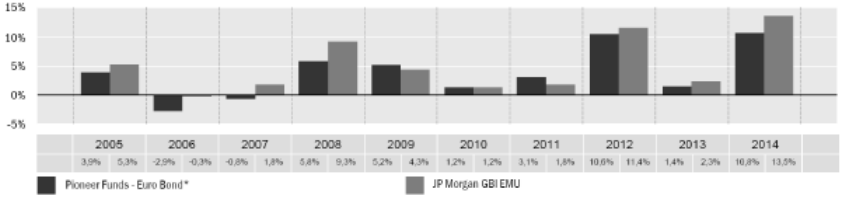

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Zulassung: Der Fonds und seine Verwaltungsgesellschaft sind in Luxemburg zugelassen und werden von der Finanzmarktaufsichtsbehörde Commission de Surveillance du Secteur Financier (CSSF) reguliert.

Eingetragener Sitz: Pioneer Asset Management S.A., 8-10, rue Jean Monnet, L-2180 Luxemburg

Datum: Die vorliegenden Wesentlichen Anlegerinformationen geben den Stand vom 09. Februar 2015 wieder.

Figure 14: Treatment *neutral* for Pioneer.

1.6.4 Screens

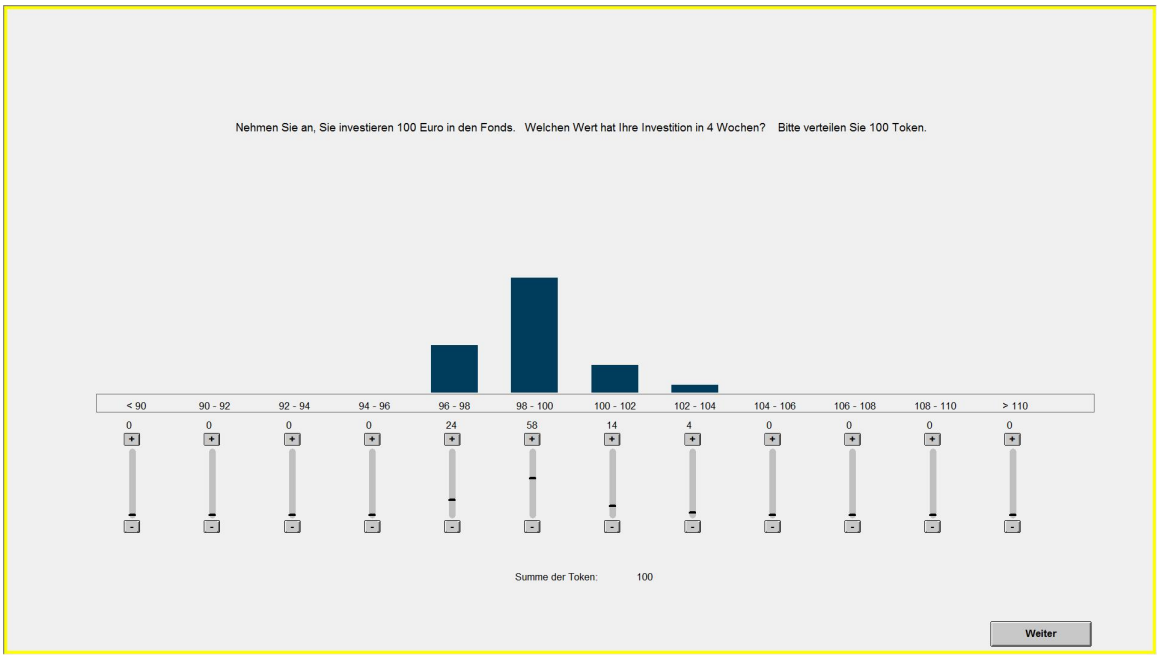


Figure 15: Screen: belief stage.

Figure 16: Screen: investment stage.

1.6.5 Instructions

Instructions (translated from German)

Welcome to our experiment!

You are going to take part in an economic study. This study is part of a project financed by the Max Planck society. If you read the following explanations carefully, you will be able to earn a substantial sum of money. It is therefore crucial that you read these explanations carefully. During the experiment it is prohibited to use electronic devices. Please use only the experimental program on the computer. During the experiment there shall be absolutely no communication between participants. If you have any questions, please raise your hand. We will then come over to you. Any violation of these rules means you will be excluded from the experiment and from any payments.

For participating in the experiment you receive a show-up fee of 5 euros. Additionally, you will be able to earn additional money. Your payment depends on your decisions, the future development of an investment and on chance. Instructions are identical for all participants. The procedure and the payment details are described below.

Procedure

- Practicing period
- 4 rounds with two tasks each
- Questionnaire
- 1. payment: directly after the experiment
- 2. payment: via bank transfer at the 18th of may 2015

Before the experiment starts you will have the opportunity to practice and to get used to the decision environment.

The experiment consists of 4 rounds. Each round consists of two tasks: an estimation task and an investment task. In the end *one* out of two tasks in *one* round will be chosen randomly and is then relevant for your payment. Since you do not know which task is going to be chosen for payment, you should decide carefully. Payment consists of two parts. The second part of the payment will be paid 4 weeks after the experiment.

During the experiment we will not calculate in euro, but instead in points. The total number of points you earn in the course of the experiment will be transferred into euro at the end, at a rate of

800 Punkte = 1 €.

Following the tasks, we ask you to answer a questionnaire. Please also answer these questions carefully. After you have finished the experiment, you receive your payment for today and leave the laboratory.

Task 1

In the first task, we ask you to predict the value of an investment into a fund in four weeks. You are dealing with real-world funds in this experiment. Your prediction will be compared to the actual development of the fund investment. Your payment depends on your performance at this prediction.

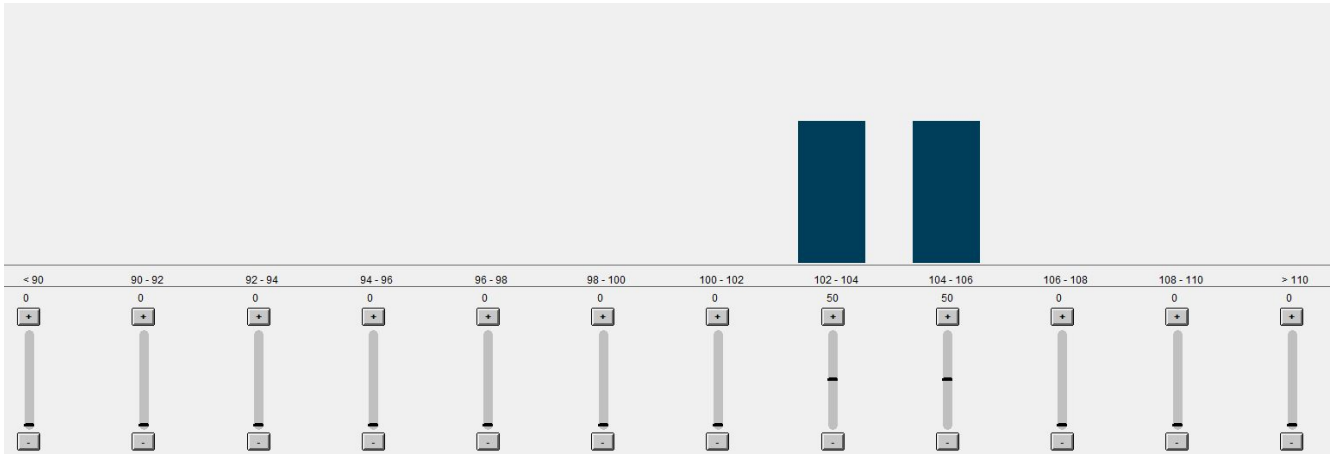
We calculate your payment four weeks after you have made your prediction. Precisely, we calculate how much an investor would actually get back from a 100 euro investment into the fund. Such an investor takes costs and expenses on a monthly level into account. We assume that you invest today 14/04/2015(15/04/2015) at 5:59pm in shares of the fund. We further assume that shares are sold on Wednesday 13/05/2015 (Tuesday 12/04/2015) at 5:59pm. Your prediction is compared to the actual value from selling this investment.

What is a fund?
A fund is a way of investing money. An investment company collects money of investors, pools it and invests it in one or more areas of investment. Shares may be traded each trading day. Money is invested according to certain investment guidelines, e.g. in stocks, bonds, in the money market or in real estate. Usually funds need to spread risks when investing. That is, a fund cannot invest everything in one stock or one real estate property.

The selection of funds in this experiment is no recommendation for investments outside this experiment. This research is not financed by these fund companies. Fund companies do not get data from this study.

You will get the opportunity to read information about the funds. This is actual information from the real-world fund. The two-page information will be distributed before each round. You can choose between different intervals in your prediction. Specifically, you can distribute 100 tokens between up to 12 intervals. You determine the number of tokens by switching the slider with the cursor. Tokens are displayed as bars. Please consider the following example. The picture below shows the decision screen of the computer.

Decision screen



Assume you are investing 100 euros today into the fund. Please answer the following question:

What will be the value of your investment after 4 weeks?

In other words, please predict the likelihood that the actual value of your investment will be in the interval. Inflation can be disregarded. Assume for instance, that your are completely sure that the future value from the investment will lie in the interval between 102 and 104 euros. Then, you would answer the question above by distributing 100 tokens in the interval “102-104”. If you would think it is equally likely that the future value will lie between 102 and 104 or between 104 and 106 euros, then you would distribute, as in the example above, 50 tokens in the interval “102-104” and 50 tokens in the interval “104-106”.

In the following, we explain precisely the calculation of your payment.
First, we scale the number of tokens to 1, i.e. we divide them by 100. That is, 30 tokens correspond to 30/100 = 0,3; 40 tokens correspond to 40/100 = 0,4 and so on. Second, we determine the interval which contains the actual value. We call this the target interval. Third, we calculate your payment based on three parts:

- The deviation of your estimate from the actual value is calculated as follows:
  (tokens in target interval - 1)^2
  + (tokens in 1st interval outside the target interval)^2
  + (tokens in 2nd interval outside the target interval)^2
  + ...
  + (tokens in 11th interval outside the target interval)^2

- A random number between 0 and 1 is drawn.
- If your deviation is smaller or equal to the random number, then you receive 16.000 points. If your deviation is larger than the random number, then you receive 0 points. The smaller your deviation, the larger is your chance to receive 16.000 points.

Please consider the following 3 examples to illustrate how your payment is calculated.

Assume for instance, that your think it is likely that the future value will lie between 102 and 104 euros. Further, you think it is less likely that the future value will lie between 104 and 106 euros. You think it is even less likely that the future value will lie between 106 and 108 euros. Then, you distribute 60 tokens in the interval „102-104“, 30 tokens in the interval „104-106“, 10 tokens in the interval „106-108“ and 0 tokens in the remaining intervals.

1. Example: If the actual value after 4 weeks is 103 euros, then your deviation is calculated as follows

   $(0,6 - 1)^2 + (0,3^2 + 0,1^2) = 0,26$.

   The deviation is 0,26. The payment is:
   If 0,26 $\leq$ random number between 0 and 1, then you receive 16.000 points.
   If 0,26 > random number between 0 and 1, then you receive 0 points.

2. Example: If the actual value after 4 weeks is 105 euros, then your deviation is calculated as follows

   $(0,3 - 1)^2 + (0,6^2 + 0,1^2) = 0,86$.

   The deviation is 0,86. The payment is:
   If 0,86 $\leq$ random number between 0 and 1, then you receive 16.000 points.
   If 0,86 > random number between 0 and 1, then you receive 0 points.

Next, assume you are distributing 12 tokens on the interval „102-104“ and equal amount of tokens (8 tokens) on each other interval.

3. Example: If the actual value after 4 weeks is 103 euros, then your deviation is calculated as follows

   $(0,12 - 1)^2 + (0,08^2 + 0,08^2 + 0,08^2 + 0,08^2 + 0,08^2 + 0,08^2 + 0,08^2 + 0,08^2 + 0,08^2 + 0,08^2 + 0,08^2) = 0,93$.

   The deviation is 0,93. The payment is:
   If 0,93 $\leq$ random number between 0 and 1, then you receive 16.000 points.
   If 0,93 > random number between 0 and 1, then you receive 0 points.

Attention: The numbers of tokens and expressions such as “likely” or “very likely” in the above examples have been chosen arbitrarily. They are no guidance for your decisions in the experiment. The examples indicate that your chance to earn 16.000 points increases with the precision of your estimate.

You may ask yourself why we selected such a calculation rule as above. The reason is, that under such a calculation rule, your expected payment is highest if you distribute tokens according to your true belief.

Task 2

In the second task, we ask you to make an investment decision. You are endowed with 12.000 points. You have the opportunity to invest in the following investments:

- into the fund
- into a savings account with interest rate of 0,1% per year

Please answer the following question: How many of the 12.000 points are you investing into the funds and how many in the savings account? Please decide by switching the slider below the two options. We calculate your payment based on the actual value of your investments after 4 weeks.

That is, we calculate how much an investor would actually get back from a 100 euro investment into the investments. Such an investor takes costs and expenses on a monthly level into account. We assume that you invest today 14/04/2015 (15/04/2015) at 5:59pm in shares of the fund. We further assume that shares are sold on Wednesday 12/05/2015 (13/05/2015) at 5:59pm.

Payment

Your payment consist of 2 parts. Today, you receive the first part right after the experiment. You will receive the second part after 4 weeks. After the experiment, one out of four rounds is randomly selected for you by the computer. Then, one out of two tasks is randomly selected for you. This task is relevant for your payment in 4 weeks.

You will receive your payment either by bank transfer or cash. Please choose one of the payment options.

If you choose bank transfer, then you may type your IBAN in the corresponding field on the screen after the experiment has started. Make sure you have your IBAN with you. Your payment details are treated as confidential. We only use them to make sure you will receive your payment. Of course, data and publication of results are anonymized.

If you choose the cash payment, then we would ask you to type the six-digit code at your place into the screen once the experiment is started. Payment is only possible based on this code. Therefore, you should store it safely. Payment will take place on Monday 18/05/2015 (2:00-4:00 pm) at the Max Planck Institute for Research on Collective Goods (Kurt-Schumacher-Str. 10, 53113 Bonn).

Do you have any questions? Please answer the control questions.

Thank you for participating in the experiment!

Control questions

1. What are the parts of the total payment?

   _____

2. How many rounds and tasks are randomly selected for payment?

   _____

3. Assume you distribute 100 tokens in task 1 to the interval „102-104“ and 0 tokens to the others.

   a. How is the payment calculated in task 1, if the actual value after 4 weeks is 103 and the random number is 0,7?

      _____

   b. How is the payment calculated in task 1, if the actual value after 4 weeks is 107 and the random number is 0,7?

      _____

2 Gain-Loss Framing in Interdependent Choice

2.1 Introduction

Choices are influenced by framing. Casual observations as well as numerous studies are in line with that statement. Framing is also a powerful tool which is regularly and intentionally used in political speeches, advertisement and health care or donation campaigns. Changing the perceived context of a situation, simple relabeling of decisions or the description of outcomes is shown to have a huge impact on human decision makers.

The frame which is studied most prominently in economics is the gain-loss frame. People react differently to situations framed as a loss compared to situations framed as gains. This effect has been introduced to the economic literature in the seminal study by Tversky and Kahneman (1981) when comparing choices over lives lost compared to lives saved. Further examples are demonstrated by the fact that people are more risk-loving when facing losses compared to facing gains (Kahneman and Tversky, 1984; Tversky and Kahneman, 1991) and the endowment effect (Kahneman et al., 1990) with loss-aversion and reference-dependent preferences as the main driving factor (Kahneman and Tversky, 1979).

Importantly, being prone to framing effects does not only have consequences for independent decisions. Often decision maker's choices directly or indirectly impact the well-being of others. Evidence shows that even when decision makers take the outcome for others into account, the extent to which they do so is influenced by framing (e.g., Brekke et al., 2012; Dariel, 2013; Engel and Rand, 2014). This effect might be driven by different mental representations of the situation and with that the understanding of "what is the right thing to do". Alternatively, decision makers facing losses could be occupied with themselves while decision makers facing gains could have more cognitive resources at their disposal to take others' welfare into account.

Testing the framing effect in the context of interdependent choice, this paper investigates these processes by analyzing the information search and integration processes in binary modified dictator games.

For economic theory framing poses a fundamental challenge. When choices are not consistent but influenced by framing, the common revealed preference attempt is potentially misleading. This makes predictions challenging. Specifically, a decision maker's behavior as observed in one frame does not necessarily translate into similar behavior in a different frame. In behavioral economics, frames are mainly understood and modeled as a variation in the reference point (Tversky and Kahneman, 1981; Amos Tversky, 1986) and as a factor influencing beliefs (Dufwenberg et al., 2011; Ellingsen et al., 2012). A general framework is given by Salant and Rubinstein (2008) and Bernheim and Rangel (2007). They, among others, suggest that economic models should take "ancillary conditions" like frames into account to allow for welfare analysis encompassing non-standard decision makers.

Salant and Rubinstein (2008) describe a frame as "[...] observable information, other than the set of feasible alternatives, which is irrelevant in the rational assessment of the alternatives but nonetheless affects behavior". The effects of framing on choice and judgment behavior have been demonstrated in individual and interdependent decision situations various times, but exactly how framing affects behavior, i.e., how the mental representation of a situation changes, still remains unclear. So far, economists mainly focus on outcome-based models with choice as the main observational variable. It is recognized that in order to understand decision making and its influential factors completely, this might not be enough (e.g., Krajbich et al., 2014; Krajbich and Dean, 2015). When the aim is to develop a theory of economic decision making capable of predicting choices also in different, previously unobserved frames, a clear understanding of the underlying cognitive mechanism, i.e., the decision making process is important.

In order to study these questions, we conducted a lab experiment. Subjects play multiple modified-dictator games (Andreoni and Miller, 2002) where they decide between an own-outcome maximizing (selfish) option and an other-outcome maximizing (altruistic) option. In a between-subjects design, decisions are either framed as a gain (GAIN) or as a loss (LOSS). We use eye-tracking to record visual fixations of subjects.

We use eye-tracking as a source of complementary data to gain insights into the underlying mechanisms of choices. In particular, eye-fixations as an unobtrusive measure can provide important information about the weight (or importance) given to the different types of information (e.g., own outcome, recipient's outcome) during the decision making process (see, e.g., Armel et al., 2008; Krajbich et al., 2010; Krajbich and Rangel, 2011). Eye-tracking is unobtrusive in that we can gain insights into the motives of decision makers without actively changing the decision environment which in itself could influence decision making. Various studies utilize eye-tracking in the context of economic decision making. These papers shed light on fairness motivations (Arieli et al., 2009), decisions under uncertainty (Arieli et al., 2011), truth-telling (Wang et al., 2010), as well as behavior in social dilemmas (Fiedler et al., 2013), consumer choice (Reutskaja et al., 2011) and strategic interaction (Devetag et al., 2015; Polonio et al., 2015).

In recent years the interest in understanding the underlying mechanisms behind choices is rapidly increasing (e.g., Dohmen et al., 2011; Fehr and Rangel, 2011; Krajbich et al., 2010, 2014). With the advancements in neuroeconomics and cognitive psychology, new tools and a better understanding of how to interpret process data such as eye-movements and decision times are available. Studying framing effects is particularly helpful. Framing produces comparable situations which are identical from an outcome perspective. This way, every change in behavior must be a result of a different perception of the situation, i.e., a change on the process level because all other environmental features are kept constant (Levin et al., 2014).

The results of the study at hand provide evidence for a clear framing effect. Dictators facing gains choose the altruistic option more often (55%) than subjects facing losses (38%)

in situations where the dictator has a higher income than the recipient. This difference between frames is not found in situations in which the dictator has a lower income than the recipient. Specifically interesting in light of these choice patterns is the respective change in the observed attention distribution. We find a strong difference between frames concerning subject's information search behavior. Subjects in LOSS focus more on their own income compared to subjects in GAIN.

In order to structure our results we use a behavioral model, namely Reference Dependent Altruism (Breitmoser and Tan, 2014) and interpret it as a process model. We show that the model and altruism parameters elicited in an online pre-test fit the choice data and process data quite well. The altruism parameters strongly correlate with relative attentional weighting of selfish and other-regarding information.

The main aim of the paper is to improve the understanding of framing effects in interdependent situations. With this paper we provide a first step towards a better understanding of how exactly frames influence decision making. Our results suggests that, when facing losses, subjects put more weight on losses to their own outcome compared to losses of the other subjects. In other words, loss aversion seems to be stronger in the own-outcome domain compared to the other-outcome domain.

The remaining paper is structured as follows. In Section 2.2 we discuss further literature. We develop theoretical predictions for our study in Section 2.3. Section 2.4 describes the experimental setup. In Section 2.5 we present the results and discuss them in Section 2.6.

2.2 Further Literature

2.2.1 Gain-loss framing in interdependent situations

In line with our results multiple experiments have presented evidence showing that people's response when confronted with gains versus losses varies profoundly. Already the influential work by Kahneman and Tversky (1979) showed that losses have a bigger influence than gains of the same size (see for a more recent overview Baumeister et al., 2001). This effect has been observed in a wide range of situations and contexts alike, but mainly in the area of risky decision making (Kühberger, 1998). See Camerer and Loewenstein (2004) for an overview of loss aversion in the field, but see Novemsky and Kahneman (2005) for the boundaries of loss aversion.

With respect to interdependent social decisions the literature shows mixed results. In Antinyan (2014), subjects play a dictator game in which the dictator and the recipient experience a loss before making a decision. They do not find significant differences in average allocation behavior between loss and gain decisions but in the loss treatment more equal offers are observed. Buchan et al. (2005) use a ultimatum game in which decisions are made about sharing a loss and sharing a gain. They find that offers are higher when facing losses than when facings gains. Fitting to this result Zhou and Wu

(2011) find in a similar setting that non-fair offers were perceived less fair in the loss domain and got rejected more often compared to the gain domain (but see Leliveld et al., 2009). In contrast to these results, further studies show that individuals in a loss condition are more own-outcome oriented (De Dreu et al., 1994; De Dreu, 1996) more individualistic (Poppe and Valkenberg, 2003) and more prone to unethical behavior (Kern and Chugh, 2009) than individuals in the gain condition. Of these papers the experimental design in Poppe and Valkenberg (2003) is most similar to ours. They map decisions of subjects to social value orientations, while we focus on the overall share of altruistic decision and on explaining effects on choices with the help of eye-gaze data.

2.2.2 Process investigations on gains and losses

Process investigations of framing effects are rare in the literature and almost exclusively concern individual decision making without any consequences for others. Further, most of these studies focus on response times.

In early studies Liebrand and McClintock (1988) and Dehue et al. (1993) present evidence from decision time investigations of simple allocation tasks that cooperative decision makers need more time to decide about losses in comparison to gains. In general, this is understood as a consequence of loss-aversion and consequently a higher weighting of losses compared to gains. Yechiam and Hochman (2013a) suggest an alternative explanation: losses invoke an "attentional effect leading to increased sensitivity to task incentives" (Yechiam and Hochman, 2013a,b). Another paper dealing with the attentional effect is by Baumeister et al. (2001). They argue that bad events (e.g., losses) should capture more attention compared to good events (e.g., gains). Alternatively, this might be due to a negative mood raised by a negative frame inducing an increase in cognitive effort in the domain of losses (Kuo et al., 2009). More broadly, many studies showed that losses have a stronger effect on physiological arousal (e.g., heart rate and pupil dilations) compared to gains (Satterthwaite et al., 2007; Hochman et al., 2010; Hochman and Yechiam, 2011).

In contrast to these studies, we do not find a direct effect of the framing manipulation on decision times. Further, we mainly focus on the relative attention to specific information.

2.2.3 Assumptions about the relationship between gaze behavior and the cognitive process

Through technological progress in the area of gaze recordings we have the possibility to gain insights in previously unobservable cognitive processes involved in decision making. Thereby, understanding the connection between the observable single fixation and the respective unobservable processing of the attended information is of utterly importance. Evidence from the area of language processing and problem solving shows that the location and the duration of a fixation is strongly related in the sense that "the most active location

in working memory will eventually determine the most likely direction of the eye movement at a given point in time" (Huettig et al., 2011). Various experimental studies have shown that people tend to direct their attention at what they are currently talking and thinking about (e.g., Griffin and Bock, 2000; Renkewitz and Jahn, 2012). Additional support for this assumption is given by the result that the sensitivity to stimuli is greater when the stimuli are presented at a location to which attention has been allocated (e.g., Bashinski and Bacharach, 1980; Reynolds et al., 2000). The recent formulation of the Attentional Drift Diffusion Model (Krajbich et al., 2010) in the area of computational neuroscience researchers become even more concrete and claim that the proportion of attention to a particular option is strongly predictive for subsequent choice behavior (see also work by Shimojo et al., 2003).

Not only attention towards alternatives in general, but also towards specific attributes of an alternative has been shown to be predicted by the importance and weighting of a specific piece of information in the decision making process (e.g., Fiedler et al., 2013; Reisen et al., 2008).

Building on this assumption we will use eye-tracking to investigate the relative weighting and importance of attributes in the decision making process. Additionally we will provide insights in how this weighting changes through different frames.

2.3 Theoretical Framework

2.3.1 Setup

Our aim is to understand framing effects in social interactions. We focus on binary choice without uncertainty and without strategic interaction. Specifically, we look at a modified dictator game setting (Andreoni and Miller, 2002) in which subjects choose between two distributions of money between themselves and another anonymous participant. One option will be called the "selfish" option and the other the "altruistic" option.

Let the "selfish" option be denoted as (s_i, s_j), where s_i determines the own outcome and s_2 the outcome of the other player. Then, the "altruistic" option is given by $(a_i, a_j) = (s_i - c, s_j + b)$, where a_i is the own outcome and a_j is the other player's outcome. We set $c > 0$ and $b > c$, such that the altruistic option will always be socially efficient. Further, we vary two types of situations. Either, subjects are ahead of their partner in both options ($a_i > a_j$ and $s_i > s_j$) or they are behind regarding the outcomes ($a_i < a_j$ and $s_i < s_j$).

We introduce a framing manipulation by presenting the same allocation either as a gain (GAIN) or as a loss (LOSS). Let e_G be the endowment in GAIN and e_L the endowment in LOSS (with $e_L > e_G$). Then, the two options can be described in terms of gains (g) and losses (l). Specifically, the selfish option (s_i, s_j) can be expressed as $(s_i = e_G + g_i, s_j = e_G + g_j)$ in GAIN and as $(s_i = e_L - l_i, s_j = e_L - l_j)$ in LOSS. The altruistic option is defined accordingly. Importantly, both framing manipulations are identical from a payoff perspective.

2.3.2 Reference Dependent Altruism

In this section we discuss requirements on the theory. We are interested in models dealing with context effects and with gain-loss framing in particular. We are interested in a theory which gives us a unified account for different context effects. Specifically, we look for a theory which endogenously predicts whether subjects choose the altruistic, efficient option or whether they choose the selfish option. Further, we are interested in predictions regarding process data. In particular, we want to predict relative attention to certain information and decision times.

Note that we are not interested in comparing and testing different theories of fairness even though eye-tracking might be a powerful tool to do this. Rather, we are interested in whether framing influences attentional processes. For this we employ a parsimonious model which is easily applicable.

There is little evidence on what to expect in regard of a shift in attentional processes. To the best of our knowledge there is no single model that could predict choices, decision time, and relative proportion of fixations at the same time. Our approach is to use a behavioral model, interpret it as a process model and use it to make predictions about the choice and information search behavior.

We assume that attention is guided by the importance of certain attributes of the situation to the decision maker. Therefore, the model needs to predict the relative weight of the attributes that guide the choice. To simplify, we reduce them for now to two simple attributes: own payoff and recipient payoff. Accordingly, for our setting the model would need to feature weights for the own income in relation to the other player's income. We focus on one specific theory, namely Reference Dependent Altruism (RDA, Breitmoser and Tan, 2013, 2014) which fits our requirements.

The basic idea of RDA is that agents are more altruistic when their income is above a certain reference point. The authors focus on two types of reference points: The absolute reference point is determined by an endowment or by the ex-ante expected payoff (x_i^*). The relative reference point is determined by another agent's payoff (x_j).

RDA suggests a strong difference in behavior when their income is higher than that of the other subject, i.e. they are *ahead* of the other subject in terms of payoff compared to being *behind*. Subjects should be more altruistic when they are *ahead*. Also, when subjects are above their absolute reference point, e.g., by experiencing a gain, they are assumed to be more altruistic compared to when facing losses. For our purposes we induce gains and losses through the endowment and assume that the endowment determines the absolute reference point. The decision maker's income in GAIN (LOSS) is therefore always above (below) the absolute reference point[11]

In our setup subjects always face a relative reference point (the other player's payoff x_j) and an absolute reference point x^* at the same time. The combination of the frame

[11]Our predictions hold as long as we assume that the absolute reference point in LOSS is higher than in GAIN (compare Grolleau et al., 2014).

(GAIN, LOSS) and relative payoffs (*ahead*, *behind*) leads to four situations (GAIN-*ahead*, GAIN-*behind*, LOSS-*ahead*, LOSS-*behind*). We obtain the following utility function $U_i = x_i + \alpha_i(F, R)x_j$ where α_i now depends on the absolute reference point determined by frame F (with $F \in \{GAIN, LOSS\}$) and on the relative reference point R (with $R \in$ {ahead, behind}). Further, subjects are (potentially) heterogeneous in their parameters. Following RDA, we assume $\alpha(\cdot,$ ahead$) > \alpha(\cdot,$ behind$)$ and $\alpha(GAIN, \cdot) > \alpha(LOSS, \cdot)$, i.e. the altruism parameter is higher when subjects' income is above their relative reference point (independent of the frame) and higher when subjects' income is above their absolute reference point (independent of the relative comparison). Consequently, an individual acting according to this model could be characterized by four altruism parameters, one for every situation.[12] In order to compare the model predictions with individual behavior, we elicit these parameters for every subject in a pre-test (see Appendix 2.7.2).

2.3.3 Choice predictions

Given a choice between the selfish option $S = (s_i, s_j)$ and the altruistic option $A = (a_i, a_j) = (s_i - c, s_j + b)$ and a situation-dependent altruism parameter α, a subject chooses the altruistic option (here option A) whenever:

$$U_i(A) = s_1 - c + \alpha_i(s_2 + b) > U_i(S) = s_1 + \alpha_i s_2$$
$$\Leftrightarrow \alpha > \frac{c}{b}$$

Therefore, in the model, the choice is determined only by the cost-benefit factor (the fraction c/b) of the specific decision and the altruism parameter. In the experiment the cost-benefit factor varies between options. Given the assumptions over the altruism parameters the following two hypotheses follow directly.

HC1: *Overall, subjects are more likely to choose the altruistic option in* GAIN *compared to* LOSS*. On an individual level, the choice is determined by the parameters collected in the online pre-test.*

HC2: *Subjects are more likely to choose the altruistic option when being ahead compared to being behind. On an individual level, the choice is determined by the parameters collected in the online pre-test.*

2.3.4 Predictions about attentional process

In this section we derive predictions about the attentional process. In particular, we make prediction about the relative proportion of attention to own and other-regarding informa-

[12] Note that we make no assumptions about the interaction of absolute and relative reference points.

tion as well as the extent of information search, i.e. the decision time. We interpret the RDA model as a process model. For this, we adapt the basic assumption that subjects fixate more on information which is more important for their decision. We then interpret the altruism parameter as a measure of relative importance of other-regarding information in comparison to self-regarding information. This provides us with the following hypothesis.

HA1: *Information search behavior differs in terms of relative fixations to own and other income between treatments. Subjects in* LOSS *focus more on their own income compared to subjects in* GAIN. *On an individual level the relative proportion to the own outcome correlates negatively with the altruism parameter collected in the online pre-test.*

HA2: *Information search behavior differs in terms of relative fixations to own and other income between situations where subjects are ahead and where they are behind in their payoffs. On an individual level the relative proportion to the own outcome correlates negatively with the altruism parameter collected in the online pre-test.*

In order to get insights into whether framing makes a computational difference, we look at a measure for the depth of information, in particular the overall number of fixations and decision time. Following up on our process interpretation of the RDA model and the above assumptions we do not expect an influence of the frame and the relative income on the decision time. More precisely, our adapted RDA model only allows us to make predictions about the relative importance of information and not about a general difference between loss and gain decisions.

HA3: *The absolute number of fixations and decision time does not vary between frames and relative income situations.*

2.4 Experimental Design

2.4.1 Laboratory setup

Subjects in the experiment played multiple binary modified dictator games. In total, they faced 40 different decision tasks. For each of these decisions, subjects had to choose between a selfish option and an altruistic option. All options, however, gave both the decision maker and the receiver positive payoffs. The options were designed such that the altruistic option was additionally the socially efficient option, maximizing total payoffs.Subjects choosing the altruistic option had to forgo payoffs when choosing the altruistic option compared to the selfish option.

Framing was induced by describing each option pair either as a gain (GAIN treatment) or a loss (LOSS treatment). Subjects took part in only one treatment in a between-subjects

design. To accomplish identical final payoffs in both treatments subjects received an endowment of 0.25 € in GAIN and 9 € in LOSS. The endowment was made particularly salient by handing out the endowments before subjects started their task.[13] Additionally, in half of the decisions subjects earned more than their counterpart (irrespective of their choice) whereas in the other half of the decisions subjects earned less. We denote these decisions as ahead and behind, respectively.

Each subject faced the same items. The specific items were generated randomly within a given set of parameters. Specifically, the cost-benefit ratio of the generated mini dictator games was uniformly distributed between 0.1 and 0.9.[14] Also, the screen position (left vs. right) of the altruistic and selfish options were counterbalanced. The specific set of items used for this study can be found in Appendix 2.7.1. To control for order effects we varied the order in which the items appeared randomly for each subject. Subjects received detailed instructions and answered control questions about the nature of the game before they started (find the full set of instructions in appendix). Subjects were informed that one randomly selected item would be played out and become payoff relevant for themselves and their matched counterpart.[15]

Additionally, subjects took part in an incentivized online pre-test (at least 24 hours before the experiment) where we elicited their altruism parameters for the four situations (GAIN-ahead GAIN-behind, LOSS-ahead, LOSS-behind) using multiple choice lists. This way, we obtain four situation-dependent altruism parameters for each subject (the choice lists and a more detailed description of the procedure can be found in Appendix 2.7.2).

2.4.2 Decision screens and eye-tracking

In addition to choices we recorded subject's gaze behavior. Each decision started with a blank screen (3000ms), followed by a fixation cross (500ms) before subjects had to decide about two simultaneously presented outcome allocations (Figure 17). The two options differed on the dimension of own, other, differences, and sum of outcomes. All of this information was presented on the screen to avoid any need for calculation and making the information processing easily observable.

Figure 18 shows a schematic version of the decision screen. The location of the information (e.g. which information was presented on the top) varied between subjects but was constant over all trials for each individual subject.

Eye movements were recorded using three Eyegaze binocular remote systems with

[13] Money was put in a cup labeled with the amount that it was containing and placed right next to the subject for the time of the experiment.

[14] At the same time average payoffs, sums and differences over all games are identical (with a margin of 0.1€) between the left and right option.

[15] After finishing the 40 decision tasks, subjects also took part in the counterfactual treatment. Subjects were aware that there was a second part involving some decisions but had no further information. Only one choice of both these parts was paid. The specific decision was only revealed in the very end. In this study we focus on the first part of the study since this provides us with the cleanest data. The data of the counterfactual will be discussed in another paper but dis available on request.

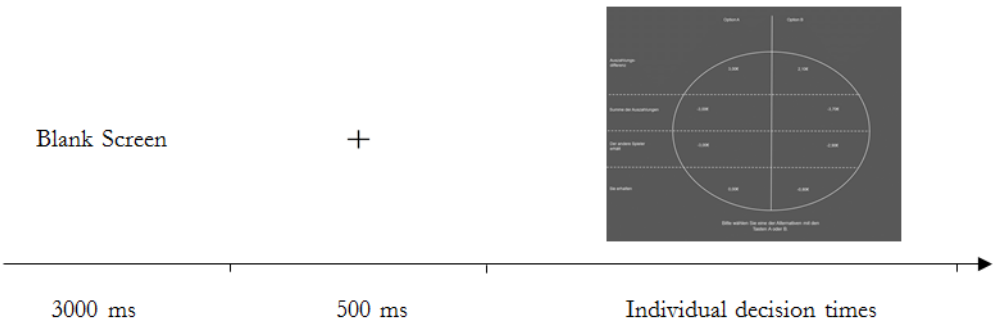


Figure 17: Sequence for each trial

sampling rate of 120 Hz and an accuracy of about 0.45 degree. Tasks were presented at screen with a display resolution of 1280 x 1024 pixels. To secure data quality a chin rest mounted 60 cm away from the screen was used to minimize head movements. Participants indicated their choices by key press ("C" for the option on the left and "M" for the option on the right). The Experiment was run in Presentation©.

For the analysis eight non-overlapping 100 x 100 pixels large areas of interest (AOIs) were defined. All 8 AOIs contained payoff information (2 own payoffs, 2 other players payoffs, 2 differences in payoffs, 2 sum in payoffs). Additional AOIs (100 x 190 pixels) containing content labels as well as the information about Options ("A" and "B") were defined to check if the trials pass the common quality thresholds, but were not used for the following analysis. The recorded choices as well as the eye-tracking data were pre-processed via Stata13.

Fixations were defined as periods of relative stable gazes within an area of 30pixel. Fixations shorter than 50 ms were excluded from the analysis. Decisions made faster than 200ms as well as tasks with duration longer than 3 standard deviations from the mean (within the particular decision block) were excluded from the analysis. In total 11.59% of recorded fixations were excluded this way. We analysed the number of fixations in each AOI and the decision times.

2.4.3 Procedure

In total 87 individuals, 44 in LOSS and 43 in GAIN (overall 60% were female), were recruited from the MPI Decision Lab Subject pool using Orsee (Greiner, 2015). All subjects had normal or corrected-to-normal vision. The experiment was conducted in September 2014 at the MPI Decision Lab in Bonn. The task in the lab took on average 30 minutes and subjects earned on average a total of 8.63 €.

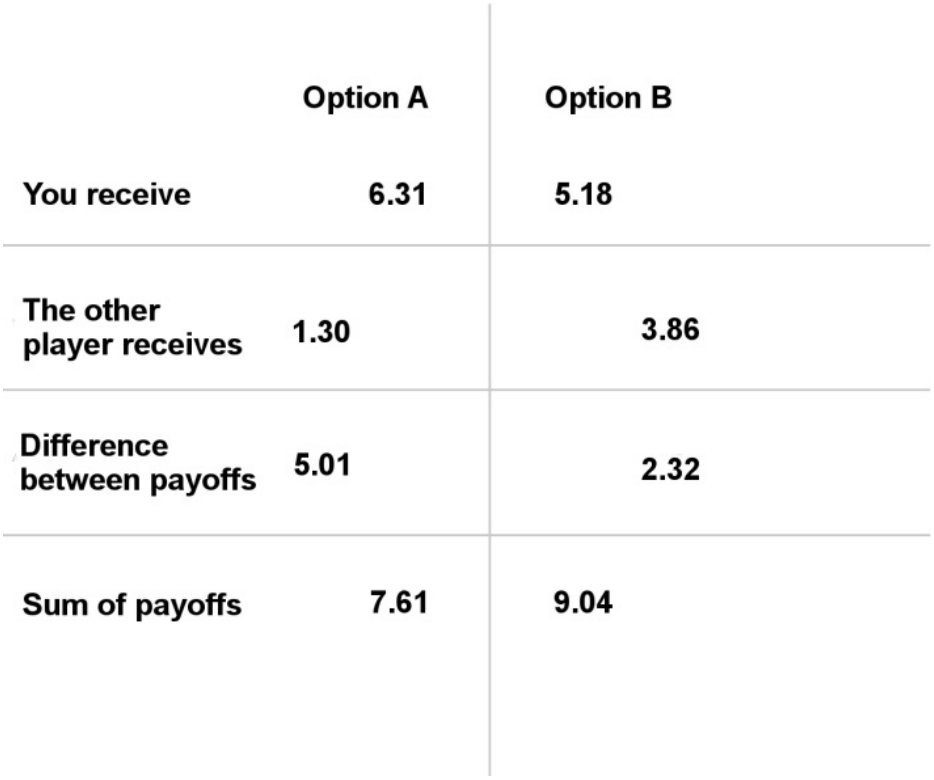


Figure 18: Decision screen (schematic)

2.5 Results

In this chapter, we test our hypothesis and provide additional results. First, we present choice data and afterwards show the results of the process data.

2.5.1 Choices

Figure 19 shows the share of altruistic choices in both treatments split for situations where decision makers are *ahead* or *behind*, i.e., when their income is above or below the income of the other subject. We find a clear framing effect when subjects are ahead of the other player with subjects in GAIN choosing the altruistic option more often compared to subjects in LOSS. (55% vs. 38%). Using a conservative measure treating individual mean cooperation rates as observations (N=87), we find that this difference is significant (rank-sum test, $p = 0.027$).

Result 1. *Subjects are more likely to choose the altruistic option in the gain-frame compared to the loss-frame when their income is above the income of the receiver.*

No such difference was found for situations in which the participant had lower payoffs than her matched player (*behind*). If anything the loss frame induced participants to be less altruistic in the gain frame compared to the loss frame (16% vs. 22%, rank-sum test, p=0.183). Additionally, these results show that being ahead leads to a higher share of altruistic choices independent of the frame (GAIN and LOSS, signed-rank test, $p < 0.001$).

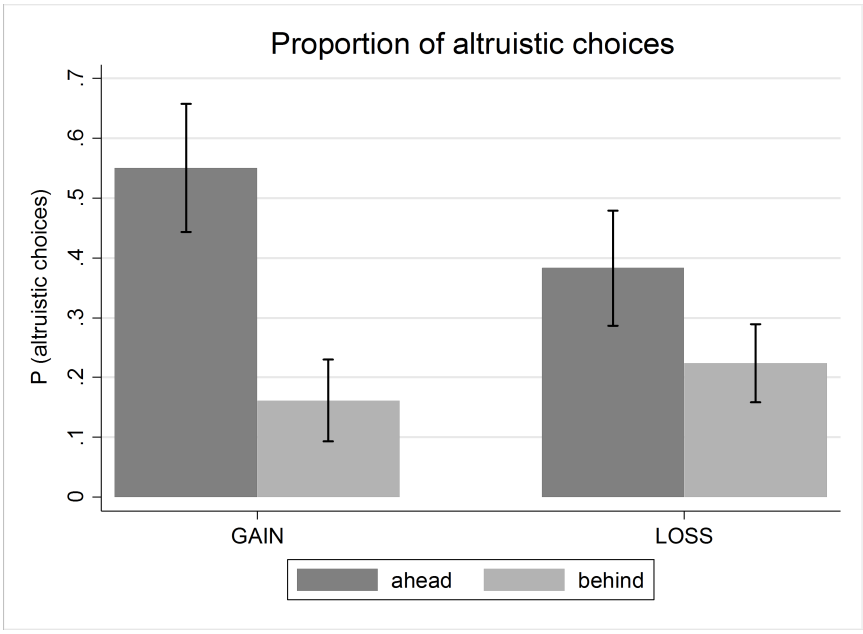


Figure 19: Altruistic choices by frame and relative income

Result 2. *Subjects are more likely to choose the altruistic option when their income is higher than the income of the receiver compared to situations with lower relative income.*

On an individual level, our hypothesis state that the individual parameters as elicited in the online pre-test should predict behaviour in the experiment. In total 77% of all choices are predicted correctly this way.

As a further factor for the altruistic choice, the cost-benefit is be important. As we described in the theory section, a higher cost-benefit ratio should lead to overall less altruistic choices. The following random-effects logit regression (table 9) shows that this is indeed the case. The main treatment effect for cases where subjects are ahead is robust against this control also when including the interaction between treatment and cost-benefit factor as well as the interaction term and order effects. Interestingly, for behind the coefficient for the cost-benefit factor is larger, i.e., subjects react more towards the efficiency of the altruistic choice.

2.5.2 Information search process

In order to explore whether and how framing influences the attentional process, we explore the information search behavior during the decision making process. In particular we examine the proportion of fixations to specific areas of interest (AOI, i.e., own gains / losses, other players gains / losses, difference between gains / losses and the sum of the own and the other players gains / losses), the overall number of fixations, and decision times per trial. The proportion of fixations to a specific AOI will give us insights on the relative weight that subjects put on this information. On the other hand, the absolute number of fixations and the decision time is an indicator for the depth of the information search and gives additional information on the complexity of the decisions.

Table 9: Altruistic choices

	(1) *ahead*	(2) *ahead*	(3) *ahead*	(4) *behind*	(5) *behind*	(6) *behind*
LOSS	-1.600*	-1.447+	-1.472+	0.813	1.149+	1.138
	(0.692)	(0.760)	(0.762)	(0.626)	(0.698)	(0.699)
Cost-benefit	-4.665***	-4.494***	-4.548***	-6.714***	-6.076***	-6.113***
	(0.361)	(0.502)	(0.506)	(0.522)	(0.772)	(0.774)
Interaction		-0.341	-0.272		-1.092	-1.052
		(0.706)	(0.709)		(1.026)	(1.027)
Order effects			YES			YES
Constant	2.573***	2.491***	2.716***	-0.655	-0.842	-1.039+
	(0.522)	(0.547)	(0.568)	(0.487)	(0.515)	(0.539)
Subjects	87	87	87	87	87	87
Observations	1740	1740	1740	1740	1740	1740

This table shows results from a random-effects logit regression. The dependent variable is 1 for the altruistic choice and 0 for the selfish choice. LOSS is a dummy taking 1 in the LOSS treatment and 0 in the GAIN treatment. "Cost-benefit" ranges between 0.1 and 0.9. "Interaction" is the interaction term between the treatment and the cost-benefit factor. "Order effects" controls for the trial order. Standard errors are in parentheses. + $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

2.5.3 Proportion of attention to AOIs

The proportion of attention is defined as the relative number of fixations to a specific AOI in relation to the total number of fixations on all AOIs in each trial. Figure 20 shows the average proportion of fixations to the specific AOI in both frames.

Overall, subjects attend their own payoffs more (57%) than all the other information combined with the other player's payoff being the second most fixated information (26%), the difference between payoffs being next (10%) and the sum of payoffs being the least fixated information (7%).

Our data shows a clear difference in the information search behaviour between the two frames. We treat the average proportion of attention for each subject as one observation and find that subjects in GAIN fixate less on their own payoff than subjects in LOSS (53.7% vs. 60.4%, rank-sum test, $p = 0.014$). The same holds true when restricting observations to *ahead* (54.0% vs. 60.3%, rank-sum test, $p = 0.0717$) and *behind* (53.4% vs. 60.5%, rank-sum test, $p = 0.0880$).

Result 3. *In the loss-frame subjects fixate relatively more on own outcomes compared to the gain-frame.*

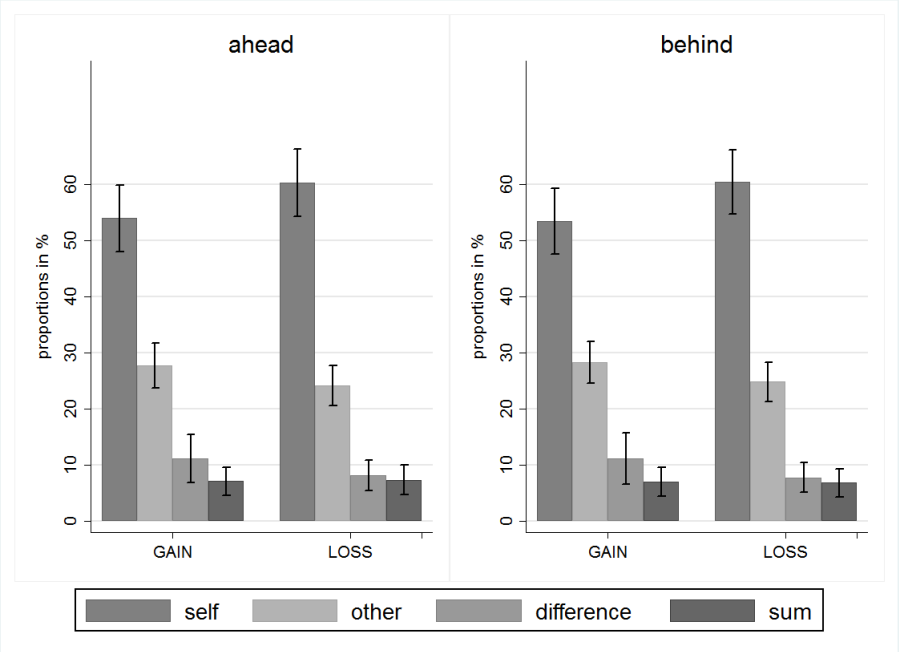


Figure 20: Proportion of Attention to AOIs

But, there is no overall significant difference in the proportion of attention to own payoffs in situations where subjects are ahead compared to when they are behind (57.1% vs 57.0%, sign-rank test, $p = 0.9571$). The proportion of attention is also not significantly different between *ahead* and *behind* when restricting observation to the GAIN treatment (54.0% vs. 53.4%, sign-rank test, $p = 0.8374$) or the LOSS treatment (60.3% vs. 60.5%, sign-rank test, $p = 0.8848$).

Result 4. *The relative income does not influence the proportion of attention to the own outcome.*

On an individual level, we hypothesized that subjects with stronger altruistic preferences weight own payoffs in the information search process less than people with more individualistic preferences. For the analysis we first look at each situation separately and correlate individual averages of the proportion of attention to the own outcome with the situation-dependent altruism parameter. We get a negative and significant correlation for GAIN-*ahead* (Spearman's, $\rho = -0.5455$, $p < 0.001$), GAIN-*behind* (Spearman's, $\rho = -0.6443$, $p < 0.001$) and LOSS-*behind* (Spearman's, $\rho = -0.4961$, $p < 0.001$). For LOSS-*ahead* the correlation is also negative but not significant (Spearman's, $\rho = -0.2488$, $p = 0.1076$). Additionally, pooling all four situations and using the average of the four elicited altruism parameters for each subject we also find a negative and significant correlation (Spearman's, $\rho = -0.6509$, $p < 0.001$).

Result 5. *More altruistic subjects fixate relatively less on their own outcome.*

2.5.4 Extent of information search

We use the absolute number of fixations as indicators for the depth of information search. Since fixations are very stable with respect to their duration this relates directly to the decision time. For the absolute number of fixations we count all fixations located within the predefined AOIs containing payoff information.[16]

The average total number of fixations does not differ between treatments (GAIN: 19.7 LOSS: 20.1, rank-sum test $p = 0.8833$). The same holds true when restricting for situations where subjects are *ahead* (20.1 vs. 19.4 fixations, rank-sum test, $p = 0.9312$) and *behind* (20.0 vs. 20.2 fixations, rank-sum test, $p = 0.5775$).

Similarly, the decision time does not vary significantly between treatments (GAIN: 5.34s LOSS: 5.56s, rank-sum test $p = 0.7265$). Again, restricting for cases where subjects are ahead or behind does not influence this difference (*ahead*: 5.41s vs. 5.28s, rank-sum test, $p = 0.9759$; *behind*: 5.50s vs. 6.61s, $p = 0.4550$).

Finally, subjects do not gather more information or have longer decision times when they are ahead compared to being behind (absolute number of fixations and decision time in both frames, sign-rank test, $p > 0.1$)

Result 6. *Decision times and the absolute number of fixations are not influenced by the frame. Further, the relative income does not influence the extent of information search.*

2.6 Discussion and Conclusion

In this paper, we studied the influence of gain-loss framing on behavior in interdependent social decisions. We observed subjects' information search behavior using eye-tracking. In our lab experiment we find that subjects facing a gain-frame are more likely to choose the altruistic option compared to subjects facing a loss frame if their payoffs are higher than the payoffs of the receiver. In cases where the payoff of the decision maker is lower than that of the receiver subjects are overall less altruistic but we do not find a difference between frames. Concerning the process data, we find that subjects in the loss frame fixate relatively more on their own income compared to subjects in the gain frame independently of whether their income is above or below that of the other subject.

Eye-tracking in combination with the choice data provides us with a rich data set. This allows us to analyse the underlying mechanism behind choices. The process data suggests that subjects that face losses weight their own payoffs higher in relation to the receiver's payoff compared to subjects that face gains. In effect this means that subjects experience loss aversion more in the own-outcome domain compared to the other-outcome domain, i.e., they put a higher weight on the losses to their own outcome compared to losses of the other players outcome. This interpretation of the results is in line with the

[16] Also remember, that we excluded fixations to text-AOIs from the analysis. The number of fixations is thus the number of fixations to value information only.

notion of impure altruism or warm-glow giving (Andreoni, 1990). Subjects mainly care about giving some amount but not necessarily about the utility of the receiver.

We employed a model of reference dependent altruism (Breitmoser and Tan, 2014) and interpret it as a process model. The model, in combination with parameters elicited before the experiment, proved to be capable of predicting 77% of subject's choices in our experiment correctly. Importantly, the eye-tracking data allows us to evaluate the model's assumptions. Subjects facing payoffs below their absolute reference point (loss-frame) focus their attention more on their own outcome compared to subjects with an income above their absolute reference point (gain-frame). This clear difference in information search behavior is in line with the assumption that the absolute reference point (here the endowment) influences altruistic preferences in a non-continuous way. Also, the proportion of attention to the other-regarding information directly correlates with the situation-dependent altruism parameters that we elicited in the online pre-test.

In contrast, we find a clear difference in choices between situations where subjects are ahead of others compared to situations where they are behind in payoffs but at the same time there is no difference in the information search behavior. This suggests that there is a more fundamental difference between an absolute reference point (e.g., the endowment) and a relative reference point (e.g., payoffs of the other subject). This deserves further exploration in the light of models of reference dependent preferences (Kőszegi and Rabin, 2006; Schwerter, 2013).

Finally, our results might also be interpreted as indication for an alternative attention-based channel through which framing influences choice. Previous results suggest that framing influences attentional processes (Kovach et al., 2014). At the same time, results from neuroscience show that manipulating attention might influence choice (Armel et al., 2008). Taken together, this provides the basis for a different, reversed mechanism: Framing manipulates which information decision makers attend to and this influences the decisions they make (see also Shimojo et al., 2003). When we interpret our results in this way, the proportion of attention would not be a reflection of the underlying weighting function but instead is driven by a preference for information (Falk and Zimmermann, 2014). For example, an altruistic subject is quite interested in another subject's payoffs while a purely selfish subject does not care at all about this information. This interest could then in principle be biased by the context or frame. In our context, losses to the own income would draw more attention than losses of other subjects. Then this would lead to an "attentional bias" towards the own outcome which would prompt subjects to make more selfish choices. The direction of the mechanism is still unclear. Does framing influence preferences which then drive the information search behavior? Or are preferences rather constructed and therefore prone to be influenced by an attentional bias? In order to test this one would have to manipulate attention directly (e.g., by highlighting some information on the decision screen) and see whether this influences choices. This provides a natural and important next step for our research.

The main goal of the paper is to improve the understanding of framing effects in social interactions. In this paper we demonstrate that eye-tracking data complements choice data in providing a rich data set and a powerful tool to improve and test assumptions of theoretical models. Therefore, our paper contributes to the goal to develop "a more unified approach toward decision-making" (Krajbich et al., 2014).

2.7 Appendix

2.7.1 Items

Table 10: Items in the experiment, numbers show final payoffs in €

	Option A		Option B			Option A		Option B	
#	own	other	own	other	#	own	other	own	other
1	5,5	1,32	4,94	4,13	21	2,99	3,5	1,79	6,61
2	4,64	4,06	5,15	1,41	22	3,25	4,36	2,64	6,13
3	4,3	3,95	4,82	1,28	23	1,96	7,44	2,87	5,09
4	5,08	4,32	5,62	1,52	24	3,23	5,15	3,76	4,06
5	2,85	6,62	3,4	3,69	25	5,27	3,24	6,08	1,78
6	2,68	3,47	2,1	7,11	26	7,08	1,44	5,54	3,65
7	1,3	7,3	1,87	3,35	27	5,84	3,29	6,87	1,45
8	1,37	7,67	2,1	3,92	28	6,37	1,91	5,72	3,03
9	4,83	3,82	5,55	1,3	29	2,05	6,74	3,44	4,75
10	5,49	1,38	4,85	4,51	30	1,29	5,29	1,9	4,1
11	4,48	4,18	5,08	1,42	31	2,95	3,61	2,01	5,39
12	4,69	4,32	5,24	1,79	32	1,46	7,52	3,34	4,6
13	2,72	4,32	1,98	6,86	33	6,28	2,61	6,79	1,98
14	2,75	4,35	2,22	6,96	34	5,03	1,67	3,58	3,32
15	1,61	5,55	2,26	2,82	35	6,01	2,74	4,93	4,17
16	2,89	3,27	1,83	7,43	36	6,26	2,95	6,81	2,29
17	6,31	1,3	5,18	3,86	37	3,9	4,6	1,51	7,62
18	5,7	2,45	5,04	3,78	38	3,45	5,55	1,52	7,96
19	5,97	1,89	4,95	4,55	39	4,37	4,88	3,46	5,92
20	4,33	1,87	3,76	3,3	40	2,29	4,52	1,7	5,28

2.7.2 Online pre-test

Before the main experiment subjects took part in an online pre-test. Participants were faced with four multiple choice lists (MCL) as seen below. For each row they had to indicate whether they want to choose option A or option B. At the end of the experiment, one row from one randomly selected MCL was randomly selected and became payoff relevant for the decision maker and one other subject. The MCL were designed such that participants are expected to choose Option A for some rows and then switch to Option B for the remaining rows or, alternatively, choose Option B in all rounds. We choose this switching point as the point of indifference between Option A and Option B. This provides us with an altruism parameter for each MCL. Each MCL relates to one situation from the lab experiment, i.e., 2 MCLs feature decisions over gains and 2 MCLs feature decisions over losses. For gains and losses one table only has options where the subject earns more than the other subject and one where he earns less. All participants in the study were consistent in the sense that they indicated only one switching point for each MCL.

Table 11: GAIN-ahead

Option A	Option B	α for indifference
(1.90 €; 0.20 €)	(1.86 €; 1.00 €)	0.05
(1.90 €; 0.20 €)	(1.82 €; 1.00 €)	0.1
(1.90 €; 0.20 €)	(1.74 €; 1.00 €)	0.2
(1.90 €; 0.20 €)	(1.66 €; 1.00 €)	0.3
(1.90 €; 0.20 €)	(1.58 €; 1.00 €)	0.4
(1.90 €; 0.20 €)	(1.50 €; 1.00 €)	0.5
(1.90 €; 0.20 €)	(1.42 €; 1.00 €)	0.6
(1.90 €; 0.20 €)	(1.34 €; 1.00 €)	0.7
(1.90 €; 0.20 €)	(1.26 €; 1.00 €)	0.8
(1.90 €; 0.20 €)	(1.10 €; 1.00 €)	1

Table 12: GAIN-behind

Option A	Option B	α for indifference
(1.00 €; 1.10 €)	(0.96 €; 1.90 €)	0.05
(1.00 €; 1.10 €)	(0.92 €; 1.90 €)	0.1
(1.00 €; 1.10 €)	(0.84 €; 1.90 €)	0.2
(1.00 €; 1.10 €)	(0.76 €; 1.90 €)	0.3
(1.00 €; 1.10 €)	(0.68 €; 1.90 €)	0.4
(1.00 €; 1.10 €)	(0.60 €; 1.90 €)	0.5
(1.00 €; 1.10 €)	(0.52 €; 1.90 €)	0.6
(1.00 €; 1.10 €)	(0.44 €; 1.90 €)	0.7
(1.00 €; 1.10 €)	(0.36 €; 1.90 €)	0.8
(1.00 €; 1.10 €)	(0.20 €; 1.90 €)	1

Table 13: LOSS-ahead

Option A	Option B	α for indifference
(-0.20 €; -1.90 €)	(-0.24 €; -1.10 €)	0.05
(-0.20 €; -1.90 €)	(-0.28 €; -1.10 €)	0.1
(-0.20 €; -1.90 €)	(-0.36 €; -1.10 €)	0.2
(-0.20 €; -1.90 €)	(-0.44 €; -1.10 €)	0.3
(-0.20 €; -1.90 €)	(-0.52 €; -1.10 €)	0.4
(-0.20 €; -1.90 €)	(-0.60 €; -1.10 €)	0.5
(-0.20 €; -1.90 €)	(-0.68 €; -1.10 €)	0.6
(-0.20 €; -1.90 €)	(-0.76 €; -1.10 €)	0.7
(-0.20 €; -1.90 €)	(-0.84 €; -1.10 €)	0.8
(-0.20 €; -1.90 €)	(-1.00 €; -1.10 €)	1

Table 14: LOSS-behind

Option A	Option B	α for indifference
(-1.10 €; -1.00 €)	(-1.18 €; -0.20 €)	0.05
(-1.10 €; -1.00 €)	(-1.26 €; -0.20 €)	0.1
(-1.10 €; -1.00 €)	(-1.34 €; -0.20 €)	0.2
(-1.10 €; -1.00 €)	(-1.42 €; -0.20 €)	0.3
(-1.10 €; -1.00 €)	(-1.50 €; -0.20 €)	0.4
(-1.10 €; -1.00 €)	(-1.58 €; -0.20 €)	0.5
(-1.10 €; -1.00 €)	(-1.66 €; -0.20 €)	0.6
(-1.10 €; -1.00 €)	(-1.74 €; -0.20 €)	0.7
(-1.10 €; -1.00 €)	(-1.82 €; -0.20 €)	0.8
(-1.10 €; -1.00 €)	(-1.90 €; -0.20 €)	1

2.7.3 Instructions

The original instructions in German are available from the authors upon request. Below is the English translation of the instructions used in treatment GAIN. Differences in the instructions in treatment LOSS are marked by square brackets "[...]".

Information about the Experiment

Welcome to the Experiment!

Please read the following information carefully. In the instructions you will learn what you need in order to participate in the study. If you have any questions please indicate it. We will answer the question at your seat.

The study today consist of two parts. In each of the two parts you will make a series of decisions. At the end of today's session one of the decisions of one of the two parts will be selected. This decision will then be payoff relevant for you and another participant. You will receive your part of the payment at the end of today's sessions. The other participant will not be a participant of the current session but a participant of one of the following sessions. This participant will have the identical task and instructions as you.

Accordingly, for every other subject that took part in a session before your session, one of his decisions was selected for payment. You will receive, additionally to the payment based on your decision, a payment that is based on a decision that another participant in another session made. This participant will have the identical task and instructions as you.

Additionally, you will receive the payment of your online questionnaire.

You will receive complete information about the decisions before the start of each part.

Part 1

In this part of the experiment you start with an endowment of 0.25 € [9 €] which you find in the box in front of you.

In the following you will face a series of 40 decision task. In each of the tasks you need to decide how to split a gain [loss] between you and another randomly determined person. In each task you can choose between two options (left and right side) and thereby decide how to split gains [losses] between yourself and another person. Your decision is made by pressing the keys A and B marked in red. There are no right or wrong answers in this task.

After completion of the first part we will hand out information for the second part and store your endwoment until the payment.

Example:

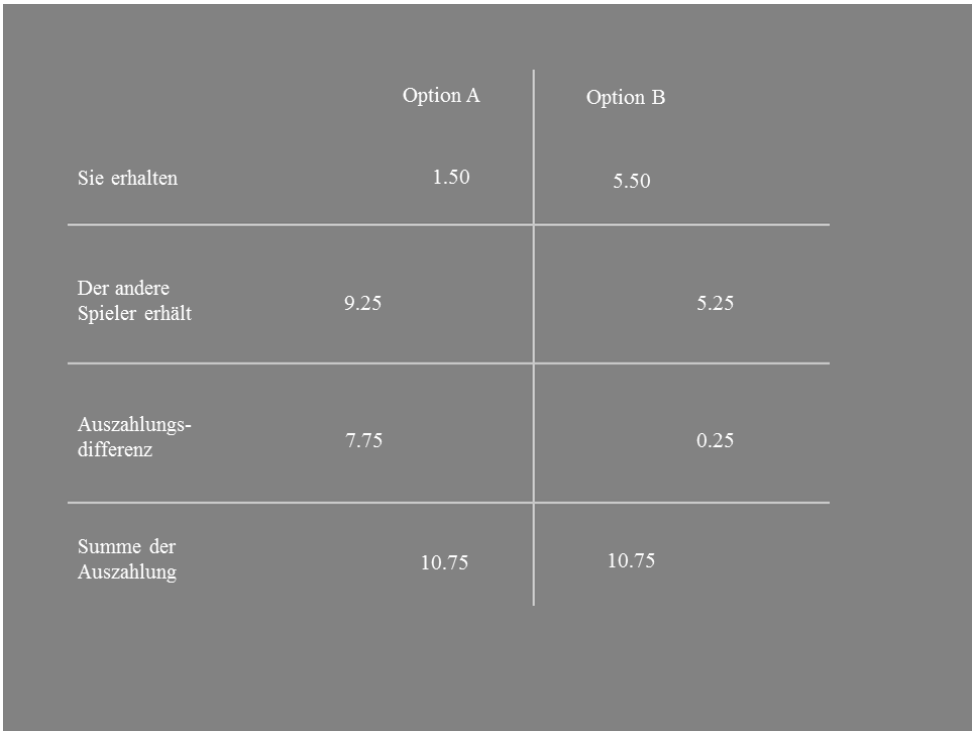


Figure 21: This is how the decision task will look like on the screen

3 Leadership Effectiveness and Institutional Frames

3.1 Introduction

Leader-follower relationships are observed in many institutions in the areas of economic, political, and societal life. A potential reason is that the effectiveness of institutions is likely to be affected by leadership. In fact, within the prominent paradigm of social dilemmas that we study in this paper, leadership is sometimes even seen as one of the key factors that shape cooperation (e.g., Ostrom, 2009, identifies it as a key factor for sustaining social-ecological systems). For example, by granting the leader authority in the form of punishment or exclusion power, free-riding incentives of the group members can be mitigated (e.g., Güth et al., 2007). Yet, even in the absence of such strong institutional mechanisms of authority, leaders can have a positive effect due to "leading-by-example", though the empirical evidence is sometimes mixed (e.g., Gächter and Renner, 2004, Rivas and Sutter, 2011). It thus seems important to assess the virtues of leadership within the context of the other factors that shape the situation at hand. In this paper, we explore to what extent leadership behavior and leadership effectiveness are shaped by mere institutional framing; studying in particular the stability of cooperative behavior at the individual level between "positive" and "negative" frames.

In order to do so, we use laboratory experiments that are partly based on a setup introduced in Cox et al. (2013). The design allows for a paired comparison of positive and negative frames (see also Andreoni 1995, Sonnemans et al. 1998, Park 2000 or Dufwenberg et al. 2011 for corresponding simultaneous-move games). In the positive frame ("Give-some" treatments), subjects are endowed and can give (contribute) to the common pool. In the negative frame ("Take-some" treatments), the payoff functions and other basic elements of the situation are exactly identical — with the exception that subjects are not endowed but can take (withdraw) from the common pool. The game is played sequentially, with an entitled leader moving first and three followers, observing the leader's decision, moving second.[17]

In treatments Give-R and Take-R, the stage game is played repeatedly for ten periods. In treatments Give and Take, it is only played once, but we use a strategy-method approach on the second stage to precisely measure followers' reactions to leaders' decisions at the individual level. By eliciting followers' decisions conditional on each possible action of the leader, we can classify subjects into selfish types or conditional cooperators (with respect to the leader's decisions) and compare these types and their specific reactions between positive and negative institutional frames.

We find that leaders' behavior, followers' reactions and consequently the effectiveness of the leadership institution are strongly influenced by the institutional frame. Leaders under the positive frame on average contribute more than twice as much as leaders under

[17] Entitlement is induced by choosing the leader based on his or her performance in a general-knowledge quiz.

the negative frame leave in the common pool (12.67 tokens contributed in GIVE vs. 6.17 tokens left in TAKE). With respect to followers' behavior, we find that the institutional framing substantially shapes the distribution of revealed cooperation types. While in GIVE 67% of followers act as conditional cooperators and 14% as free riders, in TAKE only about one third of followers exhibit conditionally cooperative behavior, and an even larger fraction engages in free riding. These differences in leaders' and followers' behavior between frames have straightforward consequences in terms of social efficiency. While the average pool size is 40.67 tokens under the positive frame, on average only 23.83 tokens remain in the common pool under the negative frame. Similar results are observed in our repeated game setting. Over the course of 10 periods, both leaders and followers contribute less under the negative frame. On average, subjects in GIVE-R contribute 11.6 tokens while subjects in TAKE-R leave only 6.7 tokens.

The findings of our paper inform the growing literature on the effectiveness of leadership in social dilemmas (e.g., Gächter and Renner, 2004; Güth et al., 2007; Levati et al., 2007; Potters et al., 2007; Haigner and Walkobinger, 2010; Rivas and Sutter, 2011). So far, this strand of literature has established an unambiguously positive effect of leading by example only if leadership is endogenous. Our paper also adds to the literature on framing effects in social dilemmas which so far has produced mixed evidence (e.g., Goerg and Walkowitz, 2010). While some papers report higher total contributions under the negative frame (e.g., Brewer and Kramer, 1986; Sell and Son, 1997; Sell et al., 2002; Dufwenberg et al., 2011), other papers find a framing effect in the opposite direction (e.g., Andreoni, 1995; Willinger and Ziegelmeyer, 1999; Park, 2000). We enrich this discussion on framing effects by studying them under a sequential setting. Closest to our work is Cox et al. (2013). However, our sequential framework consists of a first-moving leader and second-moving followers, whereas Cox et al. (2013) implement the reverse move order. Moreover, to the best of our knowledge we are among the first to introduce a strategy-method approach in such a framework to exactly measure followers' reactions to leaders' decisions and to cleanly compare these reactions between positive and negative institutional frames.[18]

The data from our experiment suggest that, at least in our setup, individual cooperation types seem to be malleable. In this regard, our results are in line with Blanco et al. (2011). They find that social preferences, specifically inequality aversion, are not stable across different games. If the malleability of cooperation types translates into other setups as well, it might be of general interest for the literature measuring social preferences (e.g., Fischbacher et al., 2001; Fischbacher and Gächter, 2010, who also use a strategy method to identify cooperation types in social dilemmas, but only in a positive frame). Moreover, it might be of relevance for studies that measure cooperation preferences in one

[18]In a recent paper, Cartwright and Lovett (2013) interpret the conditional-cooperation measure in Fischbacher et al. (2001) as a situation where one follower reacts to the average contribution of three leaders, and compare it to a situation where three followers react to the contribution of a single leader. They find no differences in elicited cooperation types between the follower-average and the leader-followers conditions.

game and use them as a predictor in their main experiment—in particular when subjects' interpretation of the frame potentially changes between games.

From a policy perspective, our results are telling as well. Assuming that the lab evidence translates to the field (e.g., see Rustagi et al., 2010), our results underline that leaders can potentially affect followers' behavior and mitigate social dilemmas. At the same time, our findings show that the example provided by the leader must be desirable.[19] Finally, in particular when a leadership mechanism is in place, policy makers who care about social efficiency might want to set the institutional frame such that it addresses the positive aspects (do something good, give something, contribute) rather than it focuses on the negative aspects of behavior (do not do something bad, do not withhold something, do not withdraw).

The remainder of the paper is organized as follows. In chapter 2 we describe our experimental design. In chapter 3 we present the results of the experiment and in chapter 4 we discuss these results and conclude.

3.2 Experimental Design

Our experiment features a social dilemma. Each of $n = 4$ players has to choose how to allocate a given amount of tokens between a private and a public account (group account). Each token allocated to the public account yields a marginal per capita return of $\alpha = 0.4$, i.e., the sum of tokens allocated to the public account is multiplied by 1.6 before being distributed equally among all four players. Tokens in players' private accounts increase only the respective player's payoff. Given that $1/n < \alpha < 1$, players face a social dilemma because tokens allocated to the group account are socially efficient, while it would be individually rational for egocentric payoff-maximizers to allocate all tokens to the private account.

We study a sequential version of this social dilemma under two institutional frames, i) a give-some as well as ii) a take-some frame, both as a repeated and an one-shot game (2x2 design). The frame is manipulated between treatments. The treatments Take and Give (Take-R and Give-R, respectively, for the repeated game) only differ with respect to wording and to the initial token allocation. In treatments Give/Give-R, each player is endowed with $E = 20$ tokens in the private account while the group account is initially empty. By contrast, players in treatments Take/Take-R do not have an initial endowment in their private accounts ($E = 0$), but the group account initially consists of $nE = 4 \cdot 20 = 80$ tokens. Subjects in Give/Give-R have to decide how many tokens they want to *contribute to* the public account, whereas subjects in Take/Take-R have to

[19] In this respect, our work is also connected to papers that study the role of social information in social dilemmas (e.g. Engel et al., 2011; Shang and Croson, 2009; List and Lucking-Reiley, 2002; Berg et al., 1995). These studies show that positive examples can foster cooperation, increase donations, or promote trusting behavior. At the same time, some of these studies also demonstrate that negative examples can be detrimental to the problem at hand. Moreover, Baumeister et al. (2001) stress that, in general, bad information is processed more thoroughly than good information and suggest that "bad is stronger than good, as a general principle across a broad range of psychological phenomena" (p.323).

decide how many tokens they want to *withdraw from* the public account. Importantly, each subject's action space is identical in all treatments, i.e., up to 20 tokens can be contributed to the public account in GIVE/GIVE-R, and be withdrawn from the public account in TAKE/TAKE-R, respectively. Consequently, the payoff space is identical between frames. Each subject's payoff π_i is given by the number of tokens in his private account and 0.4 times the total number of tokens in the group account, irrespective of the frame being used. However, in order to reflect the difference in initial endowments between both treatments, subject i's payoff in the give and take frame can be rewritten as:

$$\begin{aligned} \pi_i^{\text{Give}} &= 20 - g_i + 0.4 \cdot (0 + g_i + \sum_{j \neq i} g_j) \\ \pi_i^{\text{Take}} &= 0 + t_i + 0.4 \cdot (80 - t_i - \sum_{j \neq i} t_j) \quad , \end{aligned} \tag{15}$$

with g_i and t_i being the number of tokens subject i contributes to the public account or withdraws from it, respectively.

Given that we are interested in leadership effectiveness, the game is implemented in a sequential move order. Instead of having all group members take their decision simultaneously, one group member, which we refer to as the *leader*, decides about his allocation before the others (*followers*) do.[20]

The sequential move order is implemented in all treatments. The conditions differ with respect to the frequency with which subjects face the social dilemma described above and with respect to the method in which subjects make their decisions. In treatments GIVE-R and TAKE-R, subjects play 10 iterations of the game within the same group of subjects (partner design). The same subject is the leader over all 10 periods. Followers can observe the actual contribution decision of their leader and afterwards take their own contribution decision. Leaders then learn about followers' reactions and can adjust their own behavior in subsequent periods. Since subjects were also informed about the total contribution to the public account and their earnings, this might induce reputation building and learning effects. By contrast, subjects in treatments GIVE and TAKE play a pure one-shot implementation of the game, where follower's responses to the leader decisions are elicited using the strategy method (Selten, 1967).

Under the strategy method, followers have to indicate for each of the 21 possible contributions or requests by the leader how many tokens they want to contribute to the public account or withdraw from it, respectively. Only after all followers have submitted a complete strategy profile, the leader's actual decision is revealed and followers' decisions are implemented accordingly. This approach renders followers' decisions directly comparable between treatments, irrespective of potential differences in leaders' choices between the

[20]The group leader is determined based on subjects' performance in a general-knowledge quiz taking place before the actual experiment. The quiz consists of 20 multiple-choice questions. When answering these questions, subjects know that other parts of the experiment will follow, but they do not know about the game that will be played in these parts. The role of the leader is assigned to the best performing subject in each group.

give-some and take-some frame. It also allows to study changes in followers' behavior at the individual level by classifying each follower according to his individual contribution or withdrawal profile, respectively.

3.2.1 Predictions

The Nash-equilibrium predictions for self-centered agents who maximize their own monetary payoff are identical in all treatments: all subjects free-ride, i.e., they always allocate the maximum amount of 20 tokens to their private account, although it would be socially efficient to allocate all tokens to the public account. This implies that subjects' behavior is predicted to coincide in the give- and take-frames. The same is, ceteris paribus, also true under any outcome-based model of social preferences (e.g., Fehr and Schmidt, 1999). To hypothesize differences in behavior between the two institutional frames, one would need, for example, i) differences in beliefs about others' types in an outcome-oriented model, or ii) differences in beliefs about social norms or prescriptions in a norm-based or identity-based model (e.g., Akerlof and Kranton, 2000), or iii) differences in the reference point in models of reciprocity (e.g., Falk and Fischbacher, 2006; Dufwenberg and Kirchsteiger, 2004). In the Appendix, we discuss one specific model in detail, namely Revealed Altruism Theory by Cox et al. (2008). It predicts differences between the two frames in the context of the sequential games examined in this study.

3.2.2 Procedures

The studies were conducted in July 2013 and February 2014 at the Laboratory for Experimental Economics at the University of Bonn (BonnEconLab), using z-Tree (Fischbacher, 2007b) for the experiment and ORSEE (Greiner, 2015) for the recruitment. We randomly recruited from the entire subject pool at the BonnEconLab, which at that time consisted of about 6300 subjects, most of them undergraduate students of all majors from the University of Bonn. In total, we invited 240 subjects. Subjects were assigned randomly to one of the four treatments and each subject participated in only one treatment. 96 subjects participated in the Take and Give treatments, leaving us with a total of 12 leaders and 36 followers in each of those treatments (respectively $2 \cdot 36 \cdot 21 = 1512$ data points for followers when taking into account that they make their decision contingent on each of the leader's 21 possible allocations). Furthermore, 144 subjects participated in the Take-R and Give-R treatments, so that there were 18 leaders and 54 followers in each of those treatments (summing up to a total of $2 \cdot 18 \cdot 10 = 360$ data points for leaders and $2 \cdot 54 \cdot 10 = 1080$ data points for followers).

Upon arrival at the lab, subjects were randomly assigned to private cubicles and received written instructions, which were also read out aloud to the subjects to create common knowledge about the game being played.[21] To ensure that participants had

[21] Instructions and screenshots can be found in the Appendix.

understood the basic game structure, in particular the consequences of own and group members' contributions to the public account, they had to answer control questions. Only after having solved these questions correctly could subjects proceed to the experiment. Throughout the study, interaction was anonymous and subjects did not learn about the identity of other participants they were interacting with. The experiment ended with a short questionnaire. Afterwards, subjects received feedback about the outcomes of the experiment and were then paid in private. Tokens earned in the experiment were converted at a rate of 1 Token = 0.20€. Subjects in TAKE-R and GIVE-R were paid for one randomly selected period. Including the show-up fee of 4€, subjects earned on average 8.97€ in treatments TAKE and GIVE and 9.22€ in treatments TAKE-R and GIVE-R. Each session lasted about 50 minutes in TAKE and GIVE and about 60 minutes in TAKE-R and GIVE-R.

3.3 Results

We first report results on followers' decisions from the strategy method in treatments GIVE and TAKE. As will be seen, followers' behavior differs significantly between the institutional frames, both on average and at the individual level. This difference seems to be anticipated by the leaders, as the subsequent analysis of leaders' decisions shows. Afterwards, we derive implications for efficiency in terms of players' realized payoffs. We then demonstrate to what extent the findings from the pure one-shot game translate into the repeated game in treatments GIVE-R and TAKE-R. The results section concludes by presenting suggestive evidence, based on data from the ex-post questionnaire, on potential causes of the change in behavior, and by discussing our results in the light of a model of revealed altruism (Cox et al., 2008).

Please note that for treatment comparisons to be easy to understand, we report subjects' decisions in both frames in terms of contributions, i.e., the withdrawal of t_i tokens from the public account in the take frame corresponds to a contribution of $g_i = 20 - t_i$ tokens. Finally, recall that subjects were randomly assigned to treatments. Behavioral differences between treatments should therefore primarily be driven by the difference in frames.

3.3.1 Behavior in the one-shot situation (GIVE and TAKE)

For each possible contribution decision of the leader, the left-hand side of Figure 22 shows the corresponding contribution from the followers, averaged over all followers in the respective treatment.[22]

First, in both treatments we see that leaders' contributions affect followers' contingent decisions under the strategy method. There is a significant positive correlation between leaders' and followers' contributions in both treatments. If we take the average contribu-

[22]The contribution plans for each individual subject can be found in the Appendix.

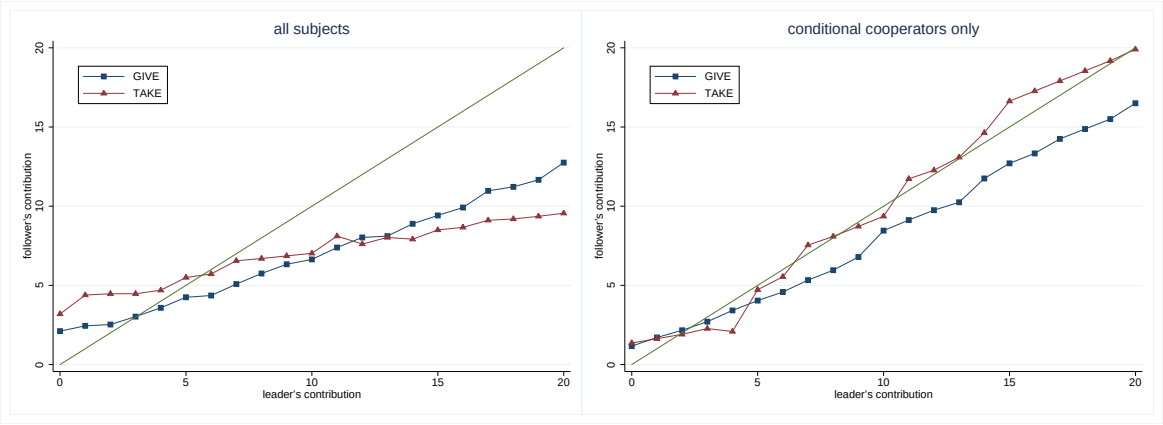


Figure 22: Average contribution plans

tion from followers for each given decision from the leader, we get Spearman's $\rho = 0.991$ in TAKE and $\rho = 1.0$ in GIVE, both with $p \leq 0.001$.[23] Second, the average contribution plans differ between treatments. For low contributions from the leaders, followers in TAKE contribute more than followers in GIVE; and vice versa for high contributions by the leaders.

This difference can also be seen in the following regression model:

$$c_i^f = \beta_0 + \beta_1 c_l + \beta_2 take + \beta_3 c_l take + \epsilon_i \ , \tag{16}$$

where c^f is the contribution made by followers, c_l the leader's contribution, TAKE is the treatment dummy which takes the value of 1 in TAKE and 0 in GIVE, and $c_l \times$ TAKE captures the interaction effects between leader's contribution and treatment. Table 15 lists the corresponding estimates. Estimates in Column (1) and Column (2) are based on the entire sample, with the difference being that additional covariates (gender, age, self-reported measures of risk and trust) are included in Column (2) to check for the robustness of the results. As we already observed in Figure 22, higher contributions from leaders induce higher contributions from followers in both treatments, but slope and intercept of the contribution profiles differ between treatments. The coefficient for c_l is significant and positive, 0.534 in GIVE and 0.304 ($= 0.534 - 0.230$) in TAKE. The difference in slopes of -0.230 is significant, but the coefficient for the treatment dummy TAKE just falls short of being significant ($p = 0.117$).

Result 1. *In the one-shot game, followers' contributions react to leaders' contribution in both frames, but the average contribution profiles differ between the give- and take-frame.*

[23] This conservative calculation is based on 21 observations per treatment. If we use each follower's individual contribution instead of the average contribution over all followers, we get Spearman's $\rho = 0.200$ in TAKE and $\rho = 0.458$ in GIVE, both with $p \leq 0.001$ but now based on 756 observations per treatment.

Table 15: Followers' contribution decisions (one-shot games)

	(1)	(2)	(3)
c_l	0.534***	0.534***	0.800***
	(0.0734)	(0.0734)	(0.0543)
TAKE	2.360	2.516	-0.706
	(1.462)	(1.606)	(1.306)
$c_l \times$ TAKE	-0.230*	-0.230*	0.240***
	(0.116)	(0.1159)	(0.0835)
Trust		0.871***	0.007
		(0.255)	(0.2006)
Gender		0.093	-0.507
		(1.5953)	(0.8848)
Age		-0.188	-0.004
		(0.1927)	(0.0641)
Risk		-0.078	-0.0585
		(0.2500)	(0.1853)
Constant	1.539*	1.963	0.7614
	(0.807)	(4.073)	(1.518)
Observations	1512	1512	735
Subjects	72	72	35
Sample	full	full	cond.coop.

Notes: This table shows coefficient estimates from a regression with errors clustered on the individual level. Standard errors are in parentheses. The dependent variable is the amount contributed by the follower for any possible contribution "c_l" of the leader. The variable "TAKE" is a dummy variable indicating treatment TAKE. Gender is 1 for male and 0 for female. Risk and Trust are self-reported measures elicited in the ex-post questionnaire, both ranging between 0 (low trust/risk averse) and 10 (high trust/risk seeking). Significance levels are denoted as follows: * p<0.1, ** p<0.05, *** p<0.01. Standard errors are in parentheses

The next question we address is why we observe the difference in the average contribution profile of followers. One possibility is that all subjects react less strongly to the leader's decision in TAKE, but the individual data tell a different story. Having access to the complete contribution plans of followers, we can use a type classification similar to the one introduced in Fischbacher et al. (2001) to discriminate between i) subjects who free-ride on the leader's contributions, ii) subjects who conditionally cooperate with respect to the leader's' contribution, and iii) other subjects that do not fall into the previous categories. More precisely, we use the following classification strategy:

i) free riders: subjects who contributes exactly zero for all 21 possible contributions of the leader

ii) conditional cooperators: subjects with a positive Spearman correlation coefficient $\rho_{c_i,c_l} > 0$ between own contributions and leader's contributions that reaches a level of significance of $p \leq 0.01$

iii) others: subjects who are neither free-riders nor conditional cooperators

Table 16: Distribution of types

Type	GIVE	TAKE
free-riders	5 (14%)	13 (36%)
conditional cooperators	24 (67%)	11 (31%)
others	7 (19%)	12 (33%)

Table 16 shows the distribution of types between treatments. We observe strong treatment differences (Pearson χ^2-test, $p = 0.008$). In treatment GIVE, the number of subjects being categorized as conditional cooperators is more than twice as high as in TAKE (24 vs. 11 subjects). At the same time, only about half as many subjects are categorized as free-riders in GIVE than in TAKE (5 vs. 13), the same being true for the number of subjects classified as 'others' (7 vs. 12).[24] Considering that the treatments are randomly assigned to subjects, one should expect to see roughly the same distribution of types in both treatments. Instead, it seems that cooperation types are not stable but are prone to changes in the institutional frame.

Alternatively it might be that the cooperation types as measured here do not necessarily account for the complexity of 'real' cooperation type of subjects. In particular it is possible that cooperative behavior is not fixed but the result of an underlying mechanism which is influenced by framing. We discuss a model describing such a mechanism further below. It is also important to note that we elicit contributions contingent only on

[24]In total, 26.4% of followers are categorized as 'others'. Within this classification type, there is a large heterogeneity in contribution patterns, e.g., some subjects contribute a positive but constant amount for all decisions of leaders while some subjects show more 'random' patterns.

the leader's decisions. While followers cannot contingent their decisions on the actions of the other followers, this allows for a clear focus on the leader-follower relationship. It is possible, however, that part of the change in followers' contribution plans is because the frames change their beliefs about the contribution plans of the other followers. In particular subjects might contribute only little or even free ride when they expect other followers to do so. Recognizing these points we refer to the elicited types as *revealed cooperation types.*

Result 2. *The distributions of revealed cooperation types differ significantly between the take- and the give-frame.*

When we compare the behavior of subjects within a given cooperation category, by definition we do not observe differences for free-riders (they always contribute nothing). We also do not observe significant differences for 'others'. However, as the right-hand side of Figure 22 shows, we do find significant effects for conditional cooperators. Conditional cooperators in treatment TAKE frequently match leaders' contributions or even surpass them, while they stay below leaders' contributions in GIVE. This can also be seen in Column (3) of Table 15, where we re-run the regression of followers' contributions on leader's contribution, but restricted to the sample of conditional cooperators. The coefficient for $c_l \times$ TAKE is positive and significant, implying that the average contribution plan of conditional cooperators has a statistically higher slope in TAKE compared to GIVE (1.04 instead of 0.8 per token contributed by the leader).

Result 3. *For conditional cooperators, the positive impact of leaders' contributions on followers' contributions is significantly more pronounced in the take- than in the give-frame.*

To wrap up, with respect to contributions the take-some frame has a positive effect on those followers who condition their behavior on the leader's decision — but at the same time the probability for being such a conditional cooperator is reduced under the take-some frame. At least in our sample, the latter effect dominates. Therefore, the marginal effect of an additional token contributed by the leader is on average smaller in TAKE than in GIVE.

Interestingly, leaders seem to anticipate the difference in followers' behavior, since they contribute more than double the amount in treatment GIVE than in TAKE. They contribute on average 12.67 tokens in GIVE and only 6.17 tokens in TAKE, the difference being significant (rank-sum test, $p = 0.0263$). The difference in means is due to a significant difference in the distributions between GIVE and TAKE (Kolmogorov-Smirnov exact test, $p = 0.092$). While in TAKE one third of the leaders contribute nothing at all, in GIVE all leaders contribute a positive amount and one third even contribute the maximum amount.

Result 4. *Leaders' contributions in the one-shot game are significantly lower in the take- than in the give-frame.*

If we apply leaders' decisions to followers' contribution plans to derive the actual realizations of contributions and payoffs, we observe that the sum of contributions to the public account is almost 50% lower in TAKE than in GIVE (23.8 vs. 40.7 tokens, rank-sum test, $p = 0.1257$), which implies that the leadership institution is less efficient in a take-frame than in a give-frame.

Result 5. *Combining leadership behavior and followers' reactions in the one-shot setting, the leadership institution is found to be less efficient in the take-frame than in the give-frame.*

3.3.2 Behavior in the repeated game (Give-R and Take-R)

In the following, we test if the above differences between TAKE and GIVE persist in repeated interactions, where reputation and learning effects come into play. We first compare average contributions between the two treatments of the repeated game. Subsequently, we check for differences in leadership behavior, differences in followers' reactions to their leader's contribution, both at the individual and aggregate level, and the resulting payoff consequences.[25]

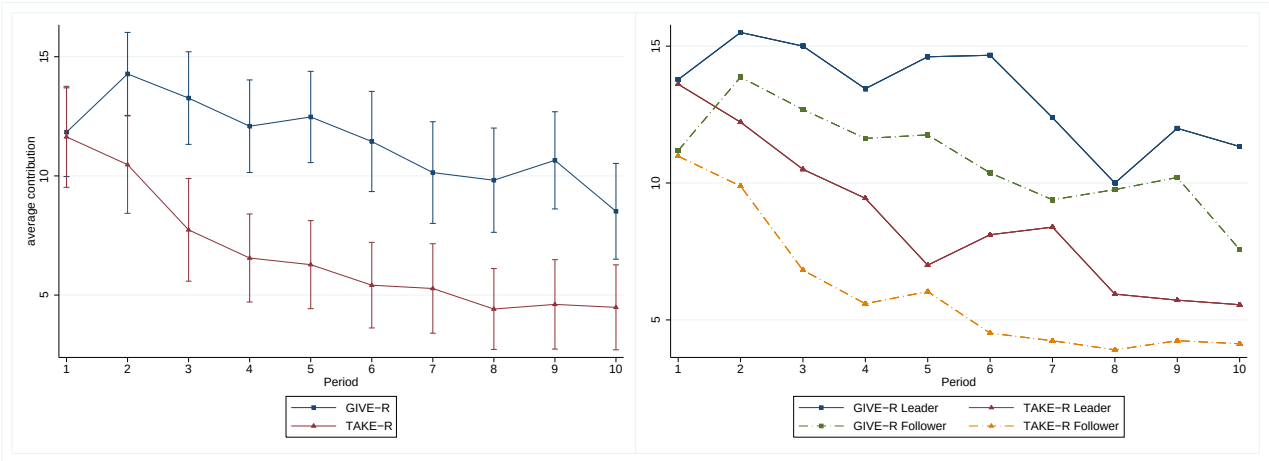


Figure 23: Average contributions over time

The left-hand side of Figure 23 shows average contributions to the public account for each of the ten periods in GIVE-R and TAKE-R, respectively.[26] The graph suggests a strong difference in contributions between treatments. Non-parametric analysis based on

[25] One should keep in mind, however, that the identification of cooperation types and differences in leadership now becomes more difficult and less reliable due to endogeneity problems (followers' behavior can only be observed with respect to a specific leadership contribution at the same time influencing leader's decisions in the following period, etc.).

[26] Observations for each individual group can be found in the Appendix.

matching group averages confirms this observation and reveals that individuals contribute significantly more in GIVE-R than in TAKE-R (Give-R: 11.45, Take-R: 6.7, rank-sum test $p < 0.001$) over all periods. The same holds true when looking at leaders and followers separately (leaders: 13.27 vs. 8.65; followers: 10.84 vs. 6.04; both rank-sum tests $p < 0.001$), as can be seen on the right-hand side of Figure 23. Overall, the sum of contributions at the group level is thus substantially lower in TAKE-R than in GIVE-R (26.8 vs. 45.8 tokens, rank-sum test $p = 0.0266$).

Result 6. *In the repeated setting, both leaders and followers contribute significantly more tokens to the public account in the give- than in the take-frame. Consequently, the leadership institution is found to be less efficient in the take- than in the give-frame.*

Interestingly, these differences occur although the initial contributions are very similar in both treatments. Average contributions, however, decrease much stronger in TAKE-R than in GIVE-R as the game proceeds. In part, this can be attributed to differences in leadership behavior. We see that leaders react very differently to followers' contributions in the first period. Moreover, from period two on, leaders' contributions differ significantly between treatments. Compared to TAKE-R, their average contribution in GIVE-R is more than 50% larger. Like in the one-shot situation, the difference in means is due to a significant difference in the distributions between GIVE-R and TAKE-R (Kolmogorov-Smirnov exact test, $p = 0.040$). While leaders in TAKE-R contribute nothing at all in 38.3% of all cases, in GIVE-R leaders contribute a positive amount in 88.3% of all cases and even contribute the maximum amount in more than half the number of cases (52.8%, compared to 27.2% in TAKE-R).

Result 7. *In the repeated setting, leaders' contributions are significantly lower in the the take- than in the give-frame.*

The second reason behind the stronger decline in contributions in TAKE-R can be found when looking at followers' behavior. On the one hand, there are more free-riders in TAKE-R than in GIVE-R. Using the same classification approach as above, in treatment TAKE-R (GIVE-R), we observe 11 (9) conditional cooperators, 12 (1) free-riders and 31 (44) others. The difference in distributions of revealed cooperation types is significant (Pearson χ^2-test, $p = 0.003$).[27] On the other hand, leading by example has a stronger impact on followers in GIVE-R than in TAKE-R. Follower contributions correlate with leader contributions in both treatments but the correlation is stronger in GIVE-R (Spearman's $\rho = 0.7372$, $p < 0.001$) than in TAKE-R (Spearman's $\rho = 0.5528$, $p < 0.001$). This holds true even when controlling for the differences in leaders' contributions and

[27] However, in contrast to the one-shot situation, where leader's contributions were strictly exogenous due to our use of the strategy method, the classification from the repeated-game data should be interpreted with caution. Leadership behavior differs between treatments, making it difficult to compare followers' responses between treatments. Additionally, over the course of the game followers are usually not confronted with every possible leader contribution but only with a restricted subset. Thus, many subjects cannot be classified at all in the repeated game and end up as 'others'.

Table 17: Followers' contribution decisions - repeated game

	(1)	(2)
Period	-0.246***	-0.245***
	(0.0811)	(0.0811)
TAKE	-0.0141	0.0255
	(1.594)	(1.5207)
Period × TAKE	-0.162	-0.164
	(0.1171)	(0.1167)
c_l	0.540***	0.542***
	(0.0459)	(0.0454)
c_l × TAKE	-0.162***	-0.165***
	(0.0582)	(0.0577)
Trust		0.323***
		(0.1167)
Gender		-0.681
		(0.6750)
Age		0.151
		(0.1388)
Risk		-0.282**
		(0.1235)
Constant	5.035***	1.738
	(1.1902)	(3.3931)
Observations	1080	1080
Subjects	108	108

Notes: This table shows coefficient estimates from a mixed-effects model allowing for heterogenous errors on the individual level nested in groups. Standard errors are in parentheses. The dependent variable is the amount contributed by the follower. Period is the period in which the contribution is made."c_l" is the contribution of the leader. The variable "TAKE" is a dummy variable indicating treatment TAKE. "*Period*× TAKE" and "c_l× TAKE" are interaction terms with the treatment dummy. Gender is 1 for male and 0 for female. Risk and Trust are self-reported measures elicited in the ex-post questionnaire, both ranging between 0 (low trust/risk averse) and 10 (high trust/risk seeking). Significance levels are denoted as follows: * p<0.1, ** p<0.05, *** p<0.01. Standard errors are in parentheses.

adding controls for followers' individual characteristics, as can be seen from the results of mixed-effects regressions in Table 17. Followers' contributions are increasing in leader contributions but significantly less so in TAKE-R as compared to GIVE-R. The effect is sizable. For each token contributed by the leader, followers contribute on average about 0.54 tokens in GIVE-R and only about 0.38 tokens in TAKE-R.[28]

Result 8. *In the repeated setting, followers' contributions are positively affected by an increase in leaders' contributions. The effect is significantly stronger in the give- than in the take-frame.*

To wrap up, we saw that the differences between the take- and give-frame observed in the one-shot setting persist in a multiple-period decision setting that allows for group dynamics to evolve. In both one-shot and repeated situations, followers react less strongly to leaders' contributions and leaders contribute less in the negative frame than in the positive frame. Consequently, leading by example is significantly less efficient in the take- than in the give-frame. Below, we present suggestive evidence for potential reasons behind the behavioral differences of leaders and followers.

3.3.3 Potential explanations for differences in behavior

The differences in leadership behavior between treatments might potentially be explained by leaders' perception of the situation. In the ex-post questionnaire, we asked leaders how responsible they felt for their group (on an 11-point Likert scale). For the one-shot setup we find that leaders in GIVE feel significantly more responsible for their group than leaders in TAKE (6.25 vs. 4.08, rank-sum test, $p = 0.0355$). We also asked leaders about different aspects that might have been of importance for their decision, and observe that leaders in TAKE state having cared significantly less about others' trustworthiness (8.25 vs. 5.66, rank-sum test $p = 0.0091$) and about fairness considerations (6.42 vs. 4.5, rank-sum test $p = 0.0961$) than in treatment GIVE. These observations suggest that leaders perceive the two frames differently, as the focus in the take-frame seems to shift away from social aspects like fairness, trust and responsibility. Interestingly, these significant differences in perception are not observed in the repeated setup, although we did observe differences in leaders' contribution behavior between both frames of the repeated game. This might imply that the difference in frames does not affect leaders' perceptions at all in a multi-period setup. It might also be that the motives found to be of importance in the one-shot situation are overridden by reputational motives which are not sufficiently captured by our questionnaire items; or that they do matter initially, but are subsequently "washed out" by the repeated exposure of leaders to disappointing experiences in both treatments of the repeated game (followers undercutting the leader's contribution).

[28] Consequently, every token invested by the leader leads on average to an increase of the tokens invested by the whole group of 1+3*0.54=2.62 in GIVE-R and only 1+3*0.38=2.14 in TAKE-R, meaning that investment just pays off in monetary terms in GIVE-R ($2.62 * 0.4 = 1.05 > 1$) but does not pay off in TAKE-R ($2.14 * 0.4 = 0.86$).

By contrast, for followers the treatment differences in questionnaire responses are more pronounced in the repeated rather than in the one-shot situation. Followers having experienced the repeated game report i) that they feel more responsible towards the leader (5.67 vs. 3.7, rank-sum test, $p = 0.0039$), ii) that they care more about the total group payoff (6.74 vs. 5.20, rank-sum test, $p = 0.016$), iii) that they are more willing to follow their leader's average contribution decision (6.28 vs. 4.96, rank-sum test, $p = 0.0306$) and iv) that they are more satisfied with their leader's average contribution decision (7.44 vs. 4.93, rank-sum test, $p = 0.0002$) in GIVE-R than in TAKE-R. Except for the last item, however, the reported differences turn out to be insignificant in the one-shot situation. Moreover, we cannot rule out that the differences are driven by different leadership experiences throughout the game, since they disappear as soon as we control in the corresponding regressions for leaders' actual contribution decisions (as they were seen by the respective followers in the preceding game).

There is one item, however, that is robust to including leaders' actual decision and that is found to be significantly different in both one-shot and repeated situations. We asked followers to state an amount that they thought would be appropriate to contribute as a leader. The amount is significantly higher in GIVE than in TAKE (13.83 vs. 8.75, rank-sum test, $p = 0.0017$), as well as in GIVE-R compared to TAKE-R (14.74 vs. 8.5, rank-sum test, $p < 0.0001$). This finding is particularly interesting, since it implies that the same contribution decision of a leader might be perceived quite differently by followers under the two different frames; namely if followers evaluate leaders' actual contributions in comparison to the contribution that they perceive as being appropriate in the respective frame. If we additionally assume that followers act in a reciprocal manner towards the leader's contribution, and that their reciprocal reaction depends on the perception of the leader's contribution, it becomes possible to derive models that can account for the differences in cooperation rates and revealed cooperation types between frames, as we do observe them in our data.

In particular, revealed altruism theory (Cox et al., 2008) could be used to predict that followers in the take-frame contribute less than followers in the give-frame. The corresponding analysis, which is analogous to the one in Cox et al. (2013), can be found in the appendix. Here, we only describe the basic mechanism, which is as follows: According to revealed altruism theory, subjects evaluate actual contributions against the status quo, i.e., the status quo serves as the comparison point. The status quo is the initial allocation of tokens to the public good. It differs between the give-frame (zero contribution) and the take-frame (full contribution). This implies that in the give-frame, leaders reach a certain contribution level by giving more to the public good than in the status quo. By contrast, in the take-frame the same contribution level is reached by taking away from the public good, i.e., contributing less than in the status quo. Therefore, the same contribution decision by a leader can at the same time be perceived as more generous in the give-frame and as less generous in the take-frame. Revealed altruism theory predicts

that subjects react more altruistic to generous actions than to ungenerous actions. When being more altruistic translates into higher contributions, the model can thus explain higher correlations between leader's and followers' contributions in give- compared to take-frames. Accordingly, it is also capable of explaining that more subjects are classified as conditional cooperators in GIVE than in TAKE.

3.4 Discussion

We studied the influence of positive and negative frames on leadership effectiveness in social dilemmas with one-shot and repeated interactions. In our lab experiments, we observed significant differences in cooperation rates between the institutional frames for both leaders and followers. Moreover, using data from a strategy method that elicits each follower's contribution plan contingent on the leader's decisions, we found that revealed cooperation types were not stable between institutional frames. The observed type distribution differed significantly between take- and give-frames. Based on self-reported measures from ex-post questionnaires, we provided indicative evidence that the change in cooperation behavior might have been due to differences in the perception of give- and take-frames.

Leading-by-example, or more general a sequential move structure, has been promoted in recent years as a potential solution to social dilemmas. Yet, the corresponding evidence almost exclusively stems from experiments that use games with a voluntary contribution mechanism. Our experiment supports the previous findings, since we also observe high levels of social efficiency in the presence of leaders — but only in the give-some frame. If the institutional frame is more like in the case of a common-pool resource (take-some frame), cooperation rates are reduced by about 42% in the repeated game and about 50% in the one-shot game.

Part of this loss in efficiency is due to a significant reduction in leaders' willingness to cooperate. Leaders set better examples in the give- than in the take-frames. One could think that the problem would be alleviated as soon as we find a way to increase leaders' contributions in the take-frames. However, we can observe this counterfactual because of the strategy-method data on followers' behavior, and prospects look bleak. We see that the marginal impact of leaders' decisions on followers' contribution is significantly smaller in the take-frame than in the give-frame. Even worse, we observe that a substantial fraction of followers seem to change their revealed cooperation type altogether under a take-frame, behaving like a free-rider rather than like a conditional cooperator.

The malleability of revealed cooperation types is striking. Assuming that revealed types are also not stable across frames in other games (which, of course, remains to be shown), one might want to be cautious in interpreting differences in aggregate data between games—in particular when subjects' perception of the frame changes between games.[29] As such, the potential malleability of types might constitute a challenge when

[29]For example, imagine that the cooperation type would be elicited in a positively-framed game (e.g.,

trying to assess the empirical relevance of certain behavioral theories (e.g., pure outcome-oriented models), since such tests usually need to rely on a selection of data from different kind of games. Given the importance of such assessments, we believe that one should try to learn more about why (or which) people react to differences in framing, so that these relevant factors could be controlled for (e.g., see Fosgaard et al., 2014).

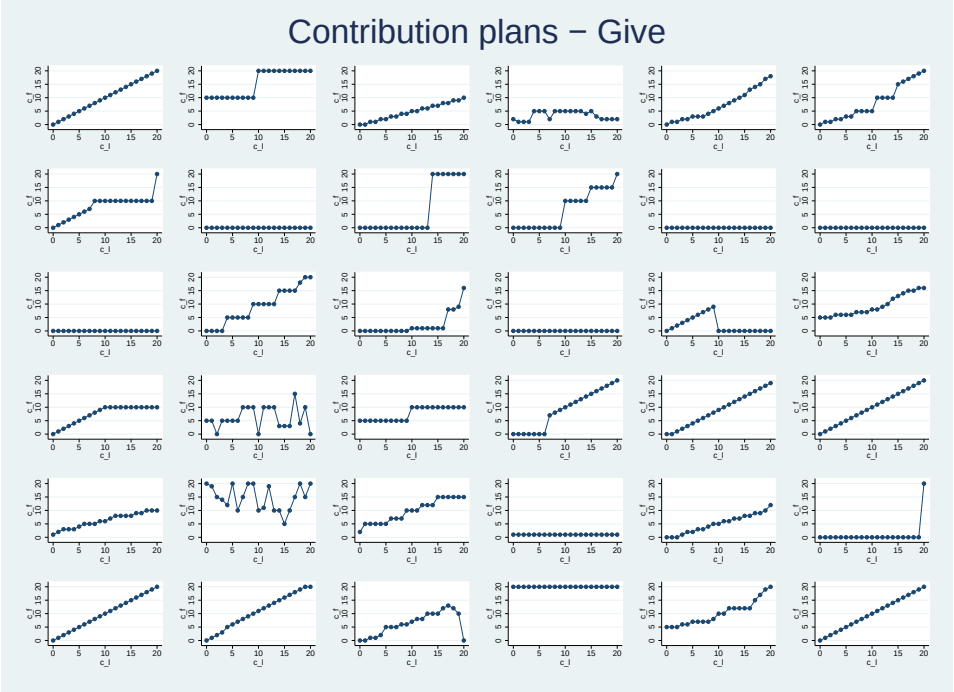
In this respect, our questionnaire data contain some indicative evidence why cooperation behavior might have changed between frames. In particular, leaders reported different aspects to be of importance for their own decision. Moreover, followers' perception of appropriate leadership behavior differed between frames. These findings lend support to certain classes of behavioral models that can account for the impact of changes in subjects' perception between frames (e.g., similar to the model of revealed altruism by Cox et al., 2008). However, first note that this statement partly relies on differences in self-reported measures that were elicited after the experiment. Subjects had already experienced the situation and made their decisions, so that a causal interpretation is not straightforward and should be subject to further investigation. Second, note that we elicited followers' contributions contingent only on the leader's decisions. While this allows for a clear focus on the leader-follower relationship, it implies that followers cannot make their decisions contingent on the actions of the other followers. Part of the change in followers' contribution plans between frames, however, might be due to a corresponding change in beliefs about other followers' behavior. The extent to which this matters remains an open question, so future studies might try to shed light on it by eliciting beliefs about other followers' contribution plans as well (e.g., Gächter et al., 2014).

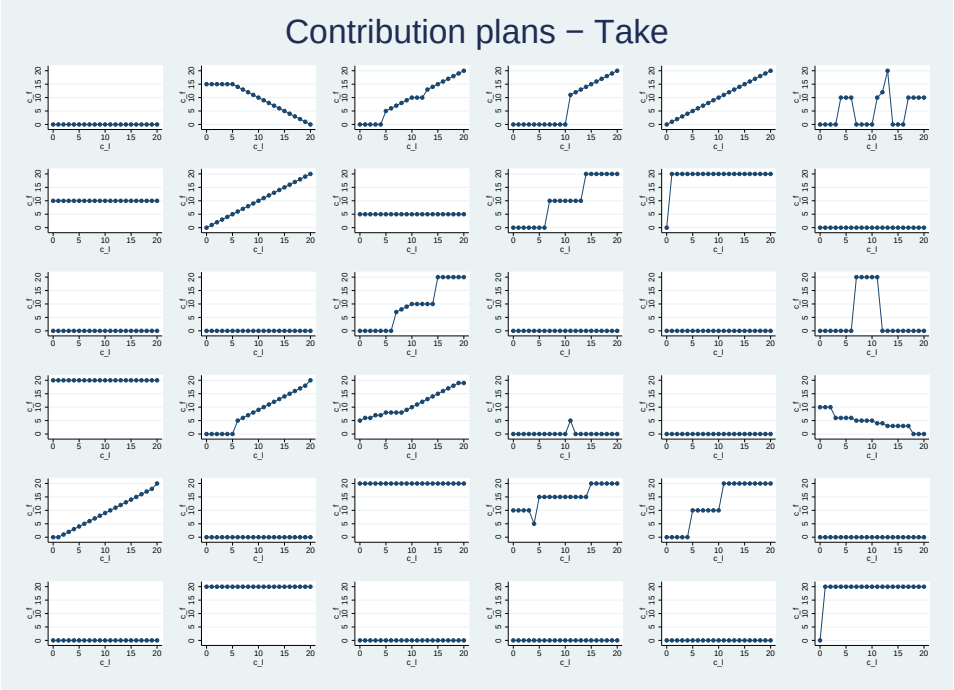
From a policy perspective, our results might be understood as an opportunity. (Not only) in environments where leading-by-example can be implemented or already is in place, shifting people's attention to the positive aspects of the situation might increase social efficiency. This could be done by addressing people with regard to increasing cooperation rather than reducing free-riding, respectively. For instance, one could try telling people to start behaving in a 'desired' way instead of communicating that we need to stop behaving in an 'undesired' way. A specific example might be environmental protection: instead of communicating that we are in a situation where there is too much pollution and everyone should reduce pollution, one should rather focus on the ways to reduce pollution and advise people to invest money/effort into these means (e.g., reducing power consumption vs. increasing energy efficiency; or stop using non-renewable resources vs. start using renewable resources; etc.). Whether this positive framing indeed outperforms the negative frame is, of course, ultimately an empirical question which requires additional field experiments—but our results from the lab at least point into this direction.

giving in a dictator game, contributing in a public-good game) and the main experiment under study is set in a negative frame (e.g., sabotage in tournaments, stealing game, market game with collusion). It might then be the case that the types elicited in the first game do not coincide with the behavior in the main experiment. One might jump to the conclusion that motives of cooperation are unimportant in the main experiment. Yet, maybe cooperation motives are relevant, but one just did not observe it because the different framings induced too many differences in revealed cooperation types.

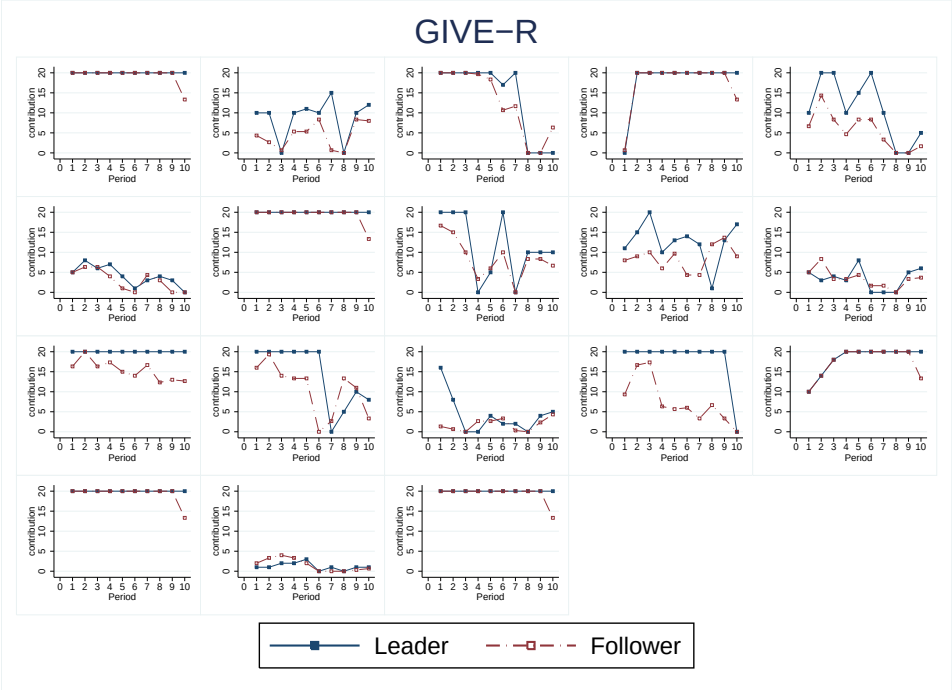
3.5 Appendix

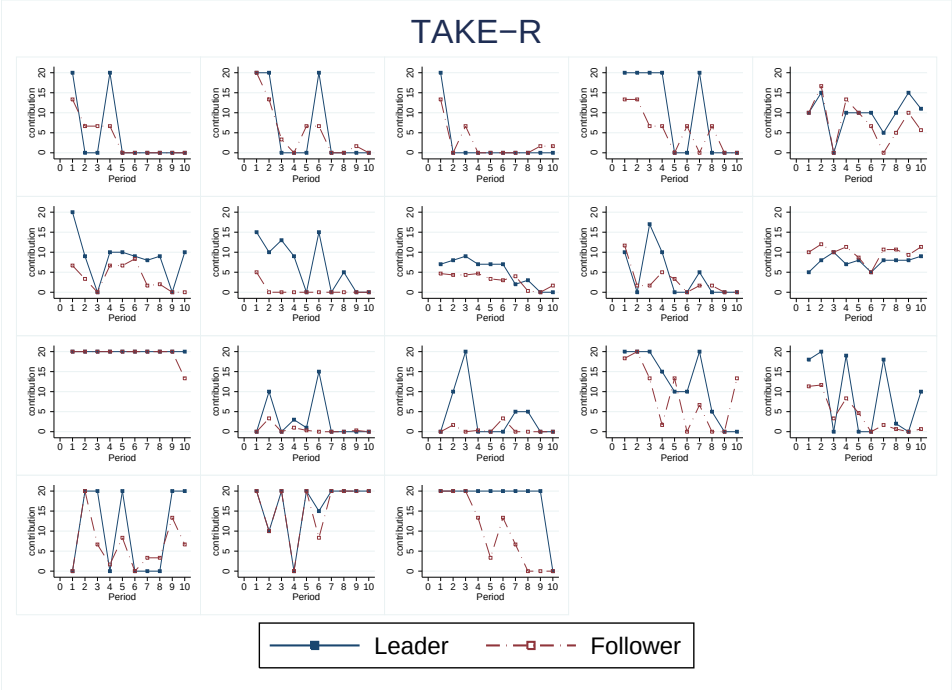
3.5.1 Individual contribution plans





3.5.2 Individual Groups (GIVE-R and TAKE-R)





3.5.3 Theoretical predictions - Revealed altruism

In this section, we want to demonstrate that theoretical models exist which predict that, given a certain contribution by a leader (g_L), followers in a give-frame contribute more (g_F^G) than followers in a take-frame (g_F^T). We assume reciprocal preferences as defined in revealed altruism theory (Cox et al., 2008). The proof is analogous to the proof of Proposition 5 in Cox et al. (2013). In the following we focus on the leader-follower relationship and abstract from any assumptions about follower's beliefs about other followers, i.e., we focus on the 'net effect' of leadership. Furthermore, we focus on a one-shot game setting as in the GIVE and TAKE treatments. Axiom R of the theory states that agents react more altruistic toward another agent when that agent chooses a more generous option. In our setting it is straightforward to establish that a contribution $g_{L,A}$ from the leader is more generous than (MGT) a contribution $g_{L,B}$ if $g_{L,A} > g_{L,B}$.

Option A is perceived by the follower as more generous than (MGT) option B if the following two properties hold:

$$\begin{aligned} (i) \quad & m_A^* - m_B^* \geq 0 \\ (ii) \quad & m_A^* - m_B^* \geq y_A^* - y_B^* \end{aligned}$$

with m_X^* being the follower's maximum possible payoff when the leader chooses option X, i.e., when he is contributing a certain amount g_L^X and y_X^* being the leader's maximum possible payoff when choosing option X. Let e be each player's endowment, g_L be the leader's contribution, g_i the contribution of a specific follower and G_{-i} the sum of the contribution of the other followers with n players in total giving an MPCR of a/n.

$$\begin{aligned} (i) \qquad m_A^* - m_B^* &= e + \frac{a}{N}(g_L^A + G_{-i}) - [e + \frac{a}{N}(g_L^B + G_{-i})] \\ &= \frac{a}{N}(g_L^A - g_L^B) \geq 0 \\ &\Leftrightarrow g_L^A \geq g_L^B \end{aligned}$$

$$\begin{aligned} (ii) \qquad & m_A^* - m_B^* \geq y_A^* - y_B^* \\ \Leftrightarrow & \frac{a}{N}(g_L^A - g_L^B) \geq (\frac{a}{N} - 1)(g_L^A - g_L^B) \\ & \Leftrightarrow g_L^A \geq g_L^B \end{aligned}$$

This means that the higher the contribution of the leader the more generous this is perceived and the more altruistic the follower should react (i.e., the follower should react with weakly higher contributions). The most generous option the leader can choose is to contribute everything in the GIVE frame and withdraw nothing in the TAKE frame. The important difference between the two frames is how the leader reaches a specific

contribution. In GIVE every contribution higher than zero is more generous than (MGT) the status-quo and should therefore make the followers more altruistic. In TAKE every amount lower than full contribution is less generous than the status-quo and should make followers less altruistic than they would be in a neutral case (e.g., when the leader is not choosing the contribution level himself). Being more (less) altruistic in this context simply means contributing weakly more (less) to the public good oneself.

We denote $g_F^T(g_L)$ as the preferred contribution by the follower in the TAKE treatment (i.e., the amount that is not withdrawn) conditional on the contribution by the leader. Likewise $g_F^G(g_L)$ denotes the preferred contribution in GIVE conditional on the leader's contribution. Let $g_F^N(g_L)$ be a followers preferred contribution if the leader's action would be decided by chance, i.e., when reciprocal preferences should not play a role. In this case Axiom R would not apply so $g_F^N(g_L)$ is the same in both frames. If the same contribution is now chosen by the leader, we get for each g_L:

$$g_F^T(g_L) \leq g_F^N(g_L)$$
$$g_F^G(g_L) \geq g_F^N(g_L)$$

From this we get $g_F^G(g_L) \geq g_F^T(g_L)$ for every g_L concluding the proof. QED

3.5.4 Instructions

The original instructions in German are available from the authors upon request. Below is the English translation of the instructions used in treatment GIVE. Differences in the instructions in treatment TAKE are marked by square brackets "[...]".

General information

You are participating in a study on economic decision-making. If you read the following explanations carefully, you can earn a substantial amount of money. It is therefore very important that you read these explanations carefully and understand them.

During the study no communication of any kind is allowed. If you have any questions, please indicate it and raise your hand. We will come to you and answer your question in private, so that the other participants will not be disturbed.

The study consists of exactly two parts. Information on the second part will be handed out to you after you have completed part one. The first part features a quiz. The quiz consists of 20 multiple-choice questions with four given answers each, of which one is the correct solution. Please indicate for each question the answer that you think is correct.

Please confirm each of your answers by clicking "OK" in order to proceed to the next question. As soon as all participants have completed the quiz in part one of the study, you receive the instructions for part two.

Do you have any questions?

Information on part two of the study

In part two, all monetary amounts are presented in Taler. At the end of the study, the Taler you have earned will be converted into Euro and paid out to you. The conversion rate is 1 Taler = 0.2 Euro. In addition to the earnings from part two, every participant receives a show-up fee of 4 Euro.

At the beginning of the study, all participants are randomly matched into groups of four. Accordingly, except for yourself, three other participants belong to your group. Every participant has to decide how to allocate a certain amount of Taler between two different accounts. The first account is a private account. The second account is a public account (group account) for all group members. A participant's payoff at the end of the study is composed of these two accounts, i.e.:

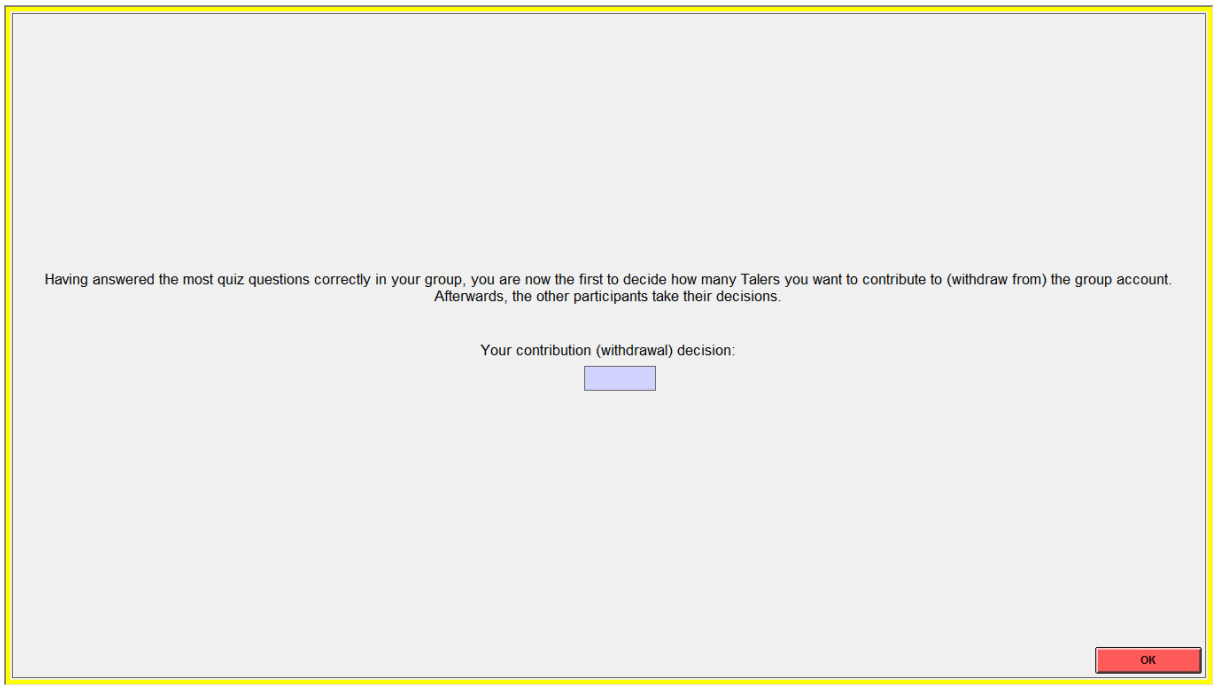
your payoff = 1 * no. of Taler in your private account
+ 0.4 * no. of Taler in the group's public account

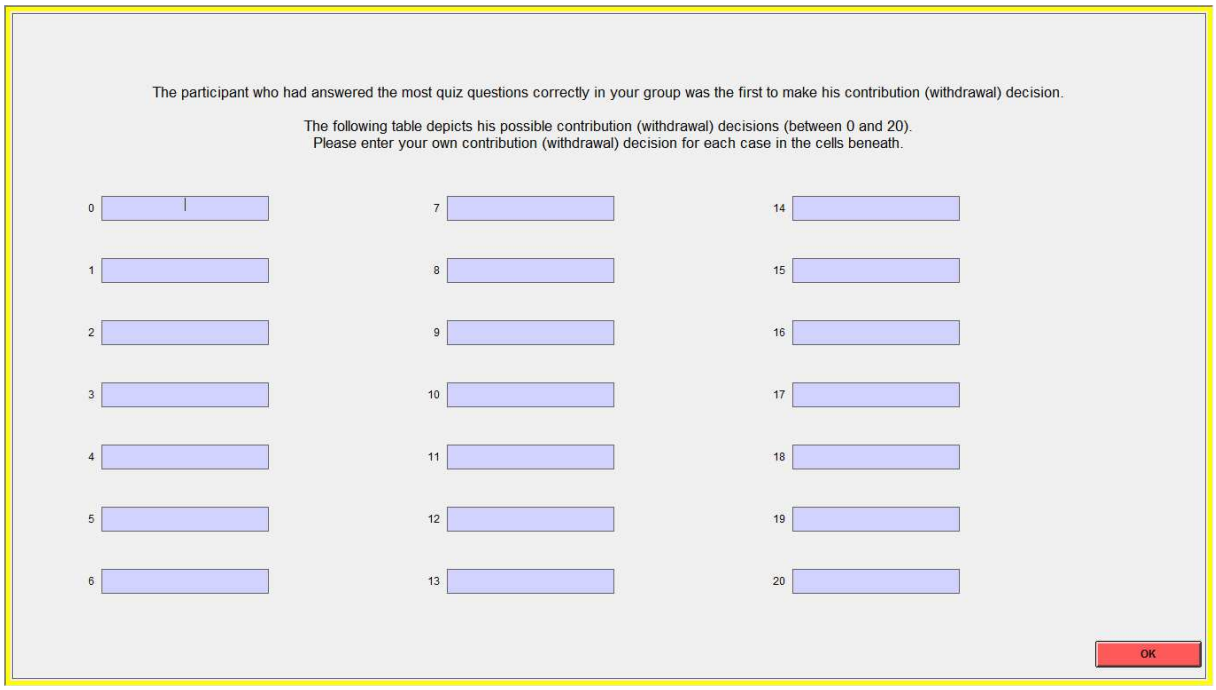
Initially, there are 0 Taler [80 Taler] in the public account of your group (group account) and 20 Taler [0 Taler] in your private account. Each participant has to decide how many Taler he wants to contribute to [withdraw for himself from] the group account. Every participant can contribute [withdraw] an integer amount between 0 and 20 Taler to [from] the group account.

Every Taler that you do not contribute to the group account remains on your private account. [Every Taler that you withdraw from the group account is put into your private account.] After all participants have made their decisions, the Taler in your group account are multiplied by the factor 1.6 and distributed equally among all four group members. Your payoff from the group account thus increases [decreases] by 0.4 Taler for each Taler that you contribute to [withdraw from] the group account. At the same time also the payoffs of the three other members of your group increase [decrease] by 0.4 Taler, because they receive payoffs from the group account as well.

Participants make their decisions sequentially. In each group, one participant is the first to decide. This is the participant who, out of all four group members, has answered the most quiz questions correctly. Before this participant's decision is revealed to the other three group members, these latter have to decide for each of the 21 possible contribution [withdrawal] decisions how many Taler they want to contribute to [withdraw from] the group account themselves. Of course, when you make the 21 decisions, you do not know which one will become relevant. Therefore, you should consider each decision carefully. Only after all participants have entered their decisions, the contribution [withdrawal] decision of the first participant is revealed. This decision and the decisions of the three other group members for this situation finally determine the participants' payoffs.

To further familiarize you with the procedure, the decision screens are presented below. Moreover, in a few seconds some additional control questions will appear on your screen. Afterwards, the second part of this study begins. After finishing the second part, we will ask you to fill out a short questionnaire. This questionnaire constitutes the final part of today's study. Afterwards you will be informed about your payoff, which will be paid to you in private.





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