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Estimating Preference Parameters from Strictly Concave Budget Restrictions*

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We propose an easy-to-use method for estimating preference parameters experimentally: choices from strictly concave budget restrictions (SCBRs). SCBRs generalize the popular method of analyzing choices from linear budget restrictions (LBRs). SCBRs promise (i) to improve the informational content of individual choices by reducing the number of corner allocations and (ii) to increase the range of identifiable behavioral types. Two online studies on risk and time preferences confirm the benefits of SCBRs vis-à-vis LBRs: (i) They reduce corner allocations drastically and make more participants estimable individually. (ii) They elicit a richer distribution of preference parameters, specifically, distinguishing linear from convex utility.

JEL Codes: C91, D01, D81, D90
Keywords: Preference elicitation, time preferences, risk preferences, budget constraints

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1 Introduction

We propose and test a novel, easy-to-use method for estimating preference parameters in behavioral experiments: choices from strictly concave budget restrictions (SCBRs). Our method generalizes the popular method of estimating preferences based on choices from linear budget restrictions (LBRs). In principle, SCBRs can be used whenever LBRs work.

Linear budget restrictions are ubiquitous in the economics literature. They have been used to investigate social preferences (e.g., Andreoni and Miller 2002; Fisman, Kariv, and Markovits 2007; Ellis and Freeman 2024), risk preferences (e.g., Gneezy and Potters 1997; Choi et al. 2007b; Andreoni and Sprenger 2012b; Choi et al. 2014; Halevy, Persitz, and Zrill 2018; Ellis and Freeman 2024), and time preferences ("Convex Time Budgets" [CTBs], e.g., Andreoni and Sprenger 2012a; Augenblick, Niederle, and Sprenger 2015; Andreoni et al. 2023). A problem observed in the literature, in particular when estimating time preferences, is the large number of corner allocations: the majority of studies that use CTBs report a share of corner allocations well above 40% (see Table 1). This is undesirable because corner allocations reveal less information than interior allocations and introduce issues in the statistical analysis. A second shortcoming of LBRs is that, by construction, they do not permit identifying preference parameters from the whole range of interest: their linearity makes it impossible to distinguish linear from convex utility (risk neutrality from risk proclivity), since both result in the same (corner) allocations.

Strictly concave budget restrictions address both issues: (i) They make the trade-offs at the endpoints highly pronounced and thereby tune the incentives such that a wider range of preferences leads to interior allocations. This should reduce the number of observed corner allocations, which is particularly beneficial when parameter estimation on the individual level is desired: fewer corner allocations increase the share of participants for which individual estimation becomes feasible. (ii) SCBRs increase the range of preference parameters that can be identified. Specifically, they make it possible to distinguish linear utility from convex utility.

We conducted two online experiments, one on risk preferences and one on time preferences. In the experiments, all participants made choices from both LBRs and SCBRs. The two studies confirm the benefits of our method: (i) Compared to LBRs, SCBRs reduce the prevalence of corner allocations by 63% and 87%, respectively, and they facilitate estimation on the individual level. (ii) SCBRs elicit a richer distribution of preference parameters than LBRs; for example, we estimate around 9% of our participants in the risk experiment to be risk-loving. Apart from that, we find that individual parameters estimated from the two types of budget restrictions are highly correlated. We also investigate rank correlations of the estimated parameters with other measures of risk and time preferences, and find them to be similar for LBRs and SCBRs. SCBRs thus offer an effective method for eliciting preferences experimentally.

In combination with restrictions and beliefs, preferences are a fundamental concept in the economic analysis of human behavior. Knowing individuals' preferences is essential not only for normative economics, that is, for making recommendations based on cost–benefit analyses. It is also crucial for positive economics, since understanding and forecasting human behavior depend on knowledge of individuals' preferences. In particular, studying the relation between

Table 1. Overview of selected studies using the Convex Time Budgets method

	Sample size (type) (1)	Number of budgets (2)	Options per budget (3)	Share corner allocations (4)	Share 0 interior allocations (5)	Stakes: \$min, \$max (6)
Andreoni et al. (2015)	58 (L)	24	6	88%	60%	19, 30 (lo)
Andreoni and Sprenger (2012a)	97 (L)	45	101	70%	37%	20, 30 (lo)
Augenblick et al. (2015)	80 (L)	20	—	86%	61%	24, 30 (lo)
Aycinena and Rentschler (2018)	419 (L)	24	6	—	—	12, 19 (hi)
Balakrishnan et al. (2020)	494 (L)	48	—	40%	12%	7, 28 (hi)
Boonmanunt et al. (2020)	180 (F)	15	4	61%	—	8, 12 (hi)
Brocas et al. (2018)	120 (L)	45	11	—	—	14, 22 (lo)
Carvalho, Meier, and Wang (2016)	1,060 (O)	12	501	23%	9%	500, 515 (hi)
Carvalho, Prina, and Sydnor (2016)	1,105 (F)	4	3	—	—	2.6, 2.9 (hi)
Chen et al. (2019)	201 (F)	24	6	61%	—	7, 16 (lo)
Clot et al. (2017)	282 (F)	15	3	—	—	1.7, 2.1 (hi)
Janssens et al. (2017)	286 (F)	8	11	—	—	6, 12 (hi)
Kuhn et al. (2017)	270 (L)	45	17	72%	36%	20, 27 (lo)
Lindner and Rose (2017)	144 (L)	48	6	—	—	4, 10 (lo)
Liu et al. (2014)	380 (L)	10	61	—	—	13.8, 14.1 (lo, Taiwan); 6.42, 6.54 (lo, China)
Lührmann et al. (2018)	914 (F)	21	4	46%	—	5.5, 8.8 (hi)
Sun and Potters (2022)	203 (L)	35	≥ 101	72%	38%	33, 187 (lo, hi)
Yang and Carlsson (2016)	164 (F)	10	21	61%	30%	6, 10 (hi)

Notes: The selected studies are based on Table B.1 of Imai, Rutter, and Camerer (2021, Online Appendix). We include only published studies that report parameter estimates on the individual level, were incentivized, and used a CRRA specification. We leave cells for which we could not retrieve the respective information empty. *Column 1:* We report details about the sample in parentheses, differentiating between field (F), lab (L), and online (O) experiments. *Column 2:* Carvalho et al. (2016): Only "ALP" participants made choices from CTBs with monetary rewards; 1,074 participants in total, out of which there are no missing choices for 1,060 participants. Lindner and Rose (2017): 24 different budget restrictions applied twice, once with and once without time pressure (within-subject design). *Column 3:* Sun and Potters (2022): Budget was in tokens and took on different values across trials: 100, 200, 300, 400, or 800 tokens. *Column 4:* Lührmann et al. (2018): 44% corner allocations in control group (N = 492) and 48% in treatment group (N = 422); the number in the table is the weighted average. Yang and Carlsson (2016): 164 couples participated; each spouse made 10 individual allocation decisions, and each couple made 10 joint allocation decisions; 59% of husbands', 63% of wives', and 62% of joint decisions were corner allocations; the numbers in the table are those for the individual decisions. *Column 5:* We report the share of participants who did not select a single interior allocation. Yang and Carlsson (2016): 52 husbands (32%), 46 wives (28%), and 55 couples (34%) made 0 interior allocations; the numbers in the table are those for the individual decisions. *Column 6:* We report the minimum and maximum total payoff (including any show-up fee) of the respective study, differentiating between low stakes (lo) and high stakes (hi). We classify experimental payments as high stakes if they exceed the daily income of a typical participant. We converted payments to USD using the exchange rate at the time of the experiments and rounded the amounts. Carvalho, Meier, and Wang (2016), Carvalho, Prina, and Sydnor (2016), Chen et al. (2019), Lindner and Rose (2017), Janssens et al. (2017), and Yang and Carlsson (2016) did not pay any show-up fee.

individual characteristics and economic decisions (e.g., Epper et al. 2020; Blow, Browning, and Crawford 2021) requires characterizing the heterogeneity of preferences across individuals.

For the purposes of forecasting and understanding behavior as well as for investigating the stability of preferences across contexts, measures of preferences need to be comparable across studies, populations, and contexts. A way to achieve comparability is to assume a behavioral model that takes preference parameters $\boldsymbol{\theta} \in \mathbb{R}^n$ as arguments and to estimate these parameters. That is, after specifying the behavioral model $M(\boldsymbol{\theta})$, one searches for the preference parameters $\hat{\boldsymbol{\theta}}$ that, by some predefined metric, best explain the observed choices.

Estimating preferences from naturally occurring data may often be desirable, but it is difficult. While some studies exist that estimate preferences based on field data (for overviews, see Barseghyan et al. 2018 on the estimation of risk aversion and probability weighting and DellaVigna 2018 on the estimation of, among others, present bias and temporal discounting), most estimations of preference parameters $\boldsymbol{\theta}$ rely on experimental settings because these permit close control of the decision environment.

Many empirical applications use point estimates of $\boldsymbol{\theta}$ to calibrate structural models, conduct cost–benefit analyses (see DellaVigna 2018 for an overview), or tailor incentives. For instance, Andreoni et al. (2023) use individual measures of time preferences to customize incentives for polio vaccinators. The Netherlands legally require pension funds to query their members' risk and time preferences on a regular basis. The Dutch financial markets authority (AFM) has developed criteria for this assessment, one of which is that the assessment be "measurable" (van der Meeren, de Cloe-Vos, and van Genn 2019, p. 223), that is, quantifiable. This guideline has led several pension funds to use methods from experimental economics that yield quantitative measures. For instance, APG Asset Management has conducted an online study that employs a bifurcation method, a choice list, and CTBs to calculate pension fund members' coefficient of relative risk aversion (Goossens et al. 2023). Regarding which elicitation method to use, Potters, Riedl, and Smeets (2016) strongly advocate obtaining incentivized and hypothetical (high-stakes) choices from budget sets à la Andreoni and Sprenger (2012a, 2012b).

In the analysis of time preferences, an important reason for performing estimation based on a structural model $M(\boldsymbol{\theta})$ is that human decisions are typically influenced by multiple concurrent motives. Structural estimation allows us to discern and quantify these simultaneous motives. To give an example, intertemporal choices are likely the outcome of both a desire for earlier over later consumption—pure time preference—and additional motives, such as a preference for consumption smoothing or an increasing consumption trajectory over time. It is necessary to account for the second component to measure the first component correctly: as Andreoni and Sprenger (2012a, p. 3334) elaborate, failing to do so leads to a biased estimate of an individual's time preference.[1]

Beyond unbiasedness, criteria for methods to estimate preference parameters include that they (i) cover the entire range of values admissible according to the underlying model, and (ii) provide estimates that are precise enough to detect variation over time, across contexts, or between individuals. Existing experimental methods are all limited in some way with respect

1. Economists usually model the motives that may underlie intertemporal choice via discounted utility or extensions thereof, such as β-δ discounting or habit formation. One thing all variants have in common is that decisions are modeled as the result of both a subjective valuation of the involved consequences (via a utility function u) and pure time preference (e.g., discounting with a factor δ). Consider an individual who values payoffs via the concave utility function $u(c) = \sqrt{c}$. Assume that you observe this person to be indifferent between receiving \$144 a year from now and receiving \$100 right now. Not taking the shape of $u(c)$ into account, one would estimate the individual's annual discount factor to be $\hat{\delta} = \$100 / \$144 = 10 / 14.4$. By contrast, taking $u(c)$ into account, one would estimate $\hat{\delta} = u(\$100) / u(\$144) = 10 / 12 > 10 / 14.4$. Hence, not taking the shape (here, concavity) of $u(c)$ into account leads to misestimation of the extent of discounting (here, the individual appears less patient than they actually are).

to at least one of the two criteria. For instance, in a repeated two-alternative choice task (e.g., Hey and Orme 1994), each choice reveals only whether a parameter is above or below a certain value. Decisions from choice lists (e.g., Holt and Laury 2002) or from budget restrictions (e.g., Gneezy and Potters 1997; Andreoni and Miller 2002; Choi et al. 2007b; Andreoni and Sprenger 2012a) reveal much more precise information per choice—as long as choices are interior.

Still, choice lists and (linear) budget restrictions, too, have their limitations. The first limitation is by construction: LBRs do not permit distinguishing between linear and convex utility because both map to the same (corner) choices. Hence, LBRs do not fulfill the criterion of covering the entire space of admissible—and relevant—parameter values.

The second limitation is empirical: Letting experimental participants make choices from LBRs leads to a large number of corner allocations. This is particularly true for intertemporal choices over money, where many participants do not make even a single interior choice (see Table 1). The low number of interior allocations strips the budget-based approach of its major advantage: the amount of information revealed per choice. Researchers have countered this issue by collecting a large number of observations per participant (e.g., 45 in Andreoni and Sprenger 2012a). This, however, puts a burden on participants, and it may be infeasible when time is scarce.[2] The problem becomes worse when parameter estimates on the individual level are required. As Andreoni and Sprenger (2012a, p. 3349) and Augenblick, Niederle, and Sprenger (2015, p. 1093) mention, using estimation techniques that account for the censored nature of corner allocations becomes impossible in the absence of any interior allocations. Consequently, any study aiming at estimating preference parameters on the individual level depends on the presence of interior allocations. If a low number of decisions per participant is desired, the presence of interior allocations and thus individual estimability may be out of reach.

A third limitation is that covering the relevant parameter space for the discount factors (β, δ) in studies like Andreoni and Sprenger (2012a) and Augenblick, Niederle, and Sprenger (2015) and for the selfishness parameter (a) in studies like Andreoni and Miller (2002) requires that the slopes of the budget restrictions cover a wide range. With LBRs, the fewer the number of decisions, the larger the steps at which the restrictions' slopes must vary across trials. With a high proportion of corner allocations, this entails that the parameter estimates become imprecise and mechanically depend on the budget restrictions administered by the experimenter.[3]

Letting participants make choices from *strictly concave* budget restrictions rather than from linear budget restrictions promises to address all three limitations simultaneously:

(i) The concavity improves estimability on the individual level by making the trade-offs at the endpoints highly pronounced and tuning the incentives such that a wider range of

2. One might consider adaptive designs (e.g., Toubia et al. 2013) as a potential remedy. However, such designs do not resolve the issue that linear and convex utility give rise to corner allocations.

3. Consider the following (realistic) example on estimating time preferences: Participants make choices on budget restrictions with slopes 1.00, 1.10, and 1.20 (i.e., interest rates of 0%, 10%, and 20%). Assume that a participant allocates the entire budget to the earlier date t when the interest rate is 0%, and to the later date $t + k$ when the interest rate is 10% or above. Hence, the discounting parameter δ^k can be interval-identified to lie between $1/1.10$ and $1/1.00$. A structural estimation will yield a point estimate somewhere within that interval. By contrast, if the experimenter chooses the set of slopes to be 1.00, 1.15, and 1.30, the estimation will yield a point estimate from the interval $(1/1.15, 1/1.00)$ that will very likely be different despite the same underlying preferences.

preferences leads to interior allocations. In particular, linear utility gives rise to interior allocations with SCBRs, while it gives rise to corner allocations with LBRs.

(ii) The concavity of SCBRs enlarges the range of estimable values for the curvature of the utility function such that convex utility (up to a certain degree) can be identified.

(iii) By varying the slope continuously *within-restriction*, SCBRs improve the estimation of preference parameters like the selfishness parameter in social and discount factors in intertemporal decision-making. Ideally, the slope of the budget restriction covers the entire range by approaching 0 and ∞ at the corners.

To test whether SCBRs live up to their theoretical promises, we conducted two incentivized experiments, one on risk and one on time preferences. All participants made decisions subject to both SCBRs and LBRs. We find that SCBRs fulfill all promises while having otherwise little impact on participants' choices and understanding of the task.

By varying the slope continuously, our method reduces the dependency of the results on discrete choices of constant slopes by the experimenter which are unavoidable when using LBRs. It thereby reduces researchers' degrees of freedom and follows the call for more parsimony in the methodological apparatus of economic analysis (Stango, Yoong, and Zinman 2017). Our method is particularly promising for researchers studying preferences in large cross-sectional samples (e.g., Falk et al. 2018; L'Haridon and Vieider 2019), in relation to other individual characteristics (e.g., Dohmen et al. 2010; Dohmen et al. 2011; Dohmen et al. 2012; Castillo et al. 2024), or over time (e.g., Meier and Sprenger 2015; Drichoutis and Nayga 2022). It can benefit empirical researchers across numerous fields such as development economics (e.g., Carvalho, Prina, and Sydnor 2016; Clot, Stanton, and Willinger 2017), finance (e.g., Breuer, Renerken, and Salzmann 2022), experimental macroeconomics (see Duffy 2010), and political science (e.g., Bechtel et al. 2024). This is because SCBRs can, in principle, be used wherever LBRs are used, making it easy to integrate them into online studies, laboratory experiments, and (large-scale) surveys alike. We will be glad to assist researchers in including SCBRs in their studies by sharing our (oTree and JavaScript) source code.

Our paper is structured as follows: We derive theoretical predictions for choices from LBRs and SCBRs in Section 2. Section 3 explains the parameter estimation. Section 4 describes the design of our two experimental studies. Section 5 presents the results. We conclude with a discussion of our findings in Section 6.

2 Theoretical Setting

2.1 General Approach

We first outline in general how preference parameters relate to choices from linear and strictly concave budget restrictions. We then apply this model to the case of risk preferences in Section 2.2 and to the case of time preference in Section 2.3.[4]

4. The method is also applicable to social preferences, as outlined in Appendix B in the Online Appendix.

Almost all experimental studies to date have limited participants to choosing from budget constraints with only two goods, and have imposed utility functions involving just these two goods (with the exception of Part II of Sun and Potters 2022). The theoretical model behind the estimation of preference parameters from linear budget restrictions is then given by

$$\max_{c_i, c_j} \; U(c_i, c_j; \boldsymbol{\theta}) \quad \text{s.t.} \quad p_i\, c_i + p_j\, c_j \;=\; m. \tag{1}$$

Our notation is as follows: m denotes the (monetary) budget that the decision-maker is endowed with; c_i and c_j denote the decision-maker's two utility-relevant choice variables; p_i and p_j are the (monetary) prices per unit of c_i and c_j, respectively; m, p_i, and p_j are set by the experimenter. It is invariably assumed in the literature that the utility function U is strictly increasing in both c_i and c_j so that the budget is always exhausted.

In line with the literature, we assume narrow bracketing.[5] This means, for instance, that we do not take background consumption or background risk into account, in line with Choi et al. (2007b, 2007a). It also means that we assume hand-to-mouth consumers, in line with Andreoni and Sprenger (2012a, 2012b): Utility is influenced by the experimental payoffs only in the very periods in which the payoffs occur, that is, it is immediately translated into consumption.[6] Moreover, in the application to time preferences, neglecting stochastic background consumption permits us to use deterministic utility instead of expected utility.

We denote all preference parameters by lowercase Greek letters and collect these parameters in $\boldsymbol{\theta}$. The collection $\boldsymbol{\theta}$ can include, for example, the curvature of the utility function (ρ) and discount parameters (β, δ). It is this collection of parameters that we aim to estimate.

In principle, choices from continuous budgets allow for the point identification of the preference parameters $\boldsymbol{\theta}$.[7] Point identification, however, is possible only as long as individuals choose interior allocations, that is, as long as $c_i < m\,/\,p_i$ and $c_j < m\,/\,p_j$. Then, optimal choices equate the marginal rate of substitution (MRS, the slope of the highest attainable indifference curve) with the technical rate of substitution (TRS, the slope of the budget restriction):

$$\frac{\partial U(c_i, c_j; \boldsymbol{\theta})\,/\,\partial c_i}{\partial U(c_i, c_j; \boldsymbol{\theta})\,/\,\partial c_j} \;=\; \frac{p_i}{p_j}. \tag{2}$$

At the boundaries of the budget restriction, the optimality condition turns into an inequality that is satisfied by a whole range of parameters $\boldsymbol{\theta}$. This is the case as soon as indifference curves are linear, that is, U is linear in c_i and c_j. This situation is encountered very frequently in experimental studies—in particular, in studies on time preferences. This strips the budget-based approach of one of its treasured features: the large amount of information contained in a single decision which enables point identification of preference parameters.

5. Direct evidence for narrow bracketing is provided by Rabin and Weizsäcker (2009) and by Ellis and Freeman (2024). Moreover, any experiment that reveals violations of the independence axiom of expected utility theory through choices in the classical "three-color" or "two-color" Ellsberg problems (e.g., Halevy 2007) does provide evidence on narrow bracketing. Individuals who violate the independence axiom fail to realize that they make a decision that should be logically related to another decision they made just a few seconds earlier.

6. See also the discussion "About Arbitrage" by Andreoni and Sprenger (2012a, Online Appendix B).

7. In practice, the precision of the identification depends on the granularity with which c_i and c_j can be chosen.

The central idea of our approach is to mitigate this issue by introducing strictly concave budget restrictions. While a linear budget restriction is characterized by a single, constant slope (a single TRS), the ideal SCBR would be a budget restriction that covers slopes ranging from 0 to ∞. A function that fulfills this criterion—as long as both c_i and c_j are allowed to become 0—is the well-known constant-elasticity-of-substitution (CES) function

$$p_i^{1+z}\, c_i^{1+z} + p_j^{1+z}\, c_j^{1+z} \;=\; m^{1+z}. \tag{3}$$

This general form nests the linear case for $z = 0$, while $z > 0$ yields a strictly concave budget restriction. When using a budget restriction of this form, the first-order condition becomes

$$\frac{\partial U(c_i, c_j; \boldsymbol{\theta}) \,/\, \partial c_i}{\partial U(c_i, c_j; \boldsymbol{\theta}) \,/\, \partial c_j} \;=\; \left(\frac{p_i}{p_j}\right)^{1+z} \left(\frac{c_i}{c_j}\right)^{z}. \tag{4}$$

We say that preference parameters are identified if they can be backed out of observed choices, that is, there is a unique $\boldsymbol{\theta}$ consistent with the observed choices, given p_i and p_j. Here, preference parameters $\boldsymbol{\theta}$ can be point-identified as long as equation (4) holds.

The following proposition states that using larger values of z increases the set of parameters governing the curvature of the utility function that can be identified (proof in Appendix A in the Online Appendix).

Proposition (Increased range of identifiable degrees of curvature of the utility function)**.** *Let $U(c_i, c_j; \boldsymbol{\theta})$ be a utility function that is additively separable in its arguments. Let each component of U belong to the power utility (constant relative risk aversion, CRRA) family with curvature parameter ρ, where $\rho \in I_z := (-z, \infty) \subseteq \mathbb{R}$. The set I_z is defined as the interval of curvature parameters for which equation (4) holds with equality at a given $z \geq 0$. For any $0 \leq z' < z''$, we have $I_{z'} \subset I_{z''}$. That is, the set of point-identifiable curvature parameters increases in z.*

In particular, $z > 0$ allows distinguishing linear utility from convex utility. With LBRs ($z = 0$), both linear and convex utility lead to corner choices and are thus indistinguishable. With SCBRs ($z > 0$), it becomes possible to identify values $\rho \leq 0$, as long as $\rho > -z$.

2.2 Application: Risk Preferences

Consider the two-outcome lottery $L = (c_1, c_2; q, 1 - q)$, which yields outcome $c_1 \geq 0$ with probability q and outcome $c_2 \geq 0$ with probability $1 - q$. We impose a budget restriction that limits the joint availability of c_1 and c_2 and thereby introduces a trade-off between the two. The decision-maker chooses c_1 and c_2 subject to the imposed budget restriction.

The choice is determined by the decision-maker's risk preferences. Assuming expected utility, the utility function is given by $q\, u(c_1; \rho) + (1 - q)\, u(c_2; \rho)$, where the parameter ρ denotes the degree of the curvature of the von Neumann–Morgenstern utility function u.[8]

8. Different assumptions on utility, for example, disappointment aversion as investigated by Choi et al. (2007b), are possible to accommodate but would lead to different optimality conditions.

When the decision-maker faces a budget restriction of the type introduced in equation (3), the optimization problem is given by

$$\max_{c_1,c_2} \; q\,u(c_1;\rho) + (1-q)\,u(c_2;\rho) \quad \text{s.t.} \quad p_1^{1+z}\,c_1^{1+z} + p_2^{1+z}\,c_2^{1+z} \;=\; m^{1+z}. \tag{5}$$

This approach has been used with linear budget restrictions ($z = 0$) multiple times in the literature (e.g., Gneezy and Potters 1997; Choi et al. 2007b, 2007a; Choi et al. 2014; Friedman et al. 2022).[9] Following this literature, we assume a power (CRRA) utility function with

$$u(c;\rho) \;\coloneqq\; \begin{cases} (c^{1-\rho}-1)\,/\,(1-\rho) & \text{if } \rho \neq 0, \\ \ln(c) & \text{if } \rho = 0. \end{cases} \tag{6}$$

We illustrate the resulting LBRs and SCBRs along exemplary choices of decision-makers under expected utility in Figure 1.

The optimality condition (4) then amounts to

$$\begin{aligned} \frac{q}{1-q}\left(\frac{c_1}{c_2}\right)^{-\rho} &= \left(\frac{p_1}{p_2}\right)^{1+z}\left(\frac{c_1}{c_2}\right)^{z} \\ \Longleftrightarrow \qquad \frac{c_1}{c_2} &= \left[\frac{q}{1-q}\left(\frac{p_2}{p_1}\right)^{1+z}\right]^{\frac{1}{\rho+z}} \;\eqqcolon\; C^{\star}(q,p_1,p_2,z;\rho). \end{aligned} \tag{7}$$

This condition for an interior allocation is applicable as long as the curvature of the indifference curves is less pronounced than the curvature of the budget restriction, that is, $\rho > -z$. Notably, as long as this condition holds, there is a one-to-one relation between the coefficient of relative risk aversion, ρ, and the chosen payment ratio, c_1/c_2. In particular, when $\rho \to \infty$, the payment ratio approaches the safe portfolio, $c_1/c_2 \to 1$, and when $\rho \to -z$, the choice approaches one of the corners of the budget restriction.

In the special case that $(p_1/p_2)^{1+z} = q/(1-q)$ and $\rho = -z$, the utility-maximizing indifference curve coincides with the budget restriction so that the decision-maker is indifferent between all allocations on the budget restriction. In the case that $(p_1/p_2)^{1+z} \neq q/(1-q)$ and $\rho = -z$ or in the case that $\rho < -z$, the decision-maker chooses a corner allocation. To determine which of the two corner allocations yields the higher expected utility, we need to compare the price ratio with the ratio of probabilities[10], which yields

9. Gneezy and Potters (1997) describe their task as endowing participants with a budget and letting them "bet" arbitrary shares of that budget on a gamble that has an expected value above 1. This is effectively the same as choosing an allocation from a linear budget restriction of the type that used in the "asymmetric treatment" by Choi et al. (2007b): Their budget restrictions all include a safe portfolio ($c_1 = c_2$). The "betting" task by Gneezy and Potters simply makes the safe portfolio one of the endpoints of the budget line.

10. The corner allocation $(m/p_1, 0)$ is chosen if

$$q\,u(m/p_1;\rho) + (1-q)\,u(0;\rho) \;>\; q\,u(0;\rho) + (1-q)\,u(m/p_2;\rho)$$

With power utility, this amounts to

$$\begin{aligned} q\,(m/p_1)^{1-\rho} + (1-q)\,0^{1-\rho} \;&>\; q\,0^{1-\rho} + (1-q)\,(m/p_2)^{1-\rho} \\ \Longleftrightarrow \qquad q/(1-q) \;&>\; (p_1/p_2)^{1-\rho}. \end{aligned}$$

Figure 1. Risk experiment: Illustration of choices from a linear budget restriction (panel A) and a strictly concave budget restriction (panel B)

Notes: Assume expected utility, $q\,u(c_1;\rho) + (1-q)\,u(c_2;\rho)$ with $u(c;\rho) = (c^{1-\rho} - 1)/(1-\rho)$. The shorter segment of the budget restriction is first-order stochastically dominated if $q \geq ½$ and $p_1 < p_2$, or if $q \leq ½$ and $p_1 > p_2$, that is, if the probability ratio favors the same state as the price ratio. The purple markers • indicate infinite risk aversion ($\rho \to \infty$): The decision-maker chooses the safe portfolio, $c_1 = c_2$. The green markers •, accompanied by the green linear indifference curves, indicate choices by a risk-neutral decision-maker ($\rho = 0$). Under LBRs, risk-neutrality leads to corner allocations, while it yields interior allocations under SCBRs. Under SCBRs, corner allocations occur only in the case of risk proclivity that is quite pronounced ($\rho \leq -z$, indicated by the magenta marker •).

$$C^{\star}(q, p_1, p_2, z; \rho) \;=\; \begin{cases} \infty & \text{if } (p_1/p_2)^{1-\rho} < q/(1-q), \\ 0 & \text{otherwise.} \end{cases} \tag{8}$$

If $q = ½$—which is the value that we used in our risk experiment (see Section 4.2)—the corner associated with the lower price is chosen. It payoff-dominates the other corner allocation. The case $q = ½$ also implies that for each point on the budget restriction between the safe portfolio and the dominated corner, there is a payoff-dominating point on the budget restriction between the safe portfolio and the chosen corner. A decision-maker who obeys payoff monotonicity will never choose a point from the payoff-dominated segment of the budget restriction (indicated in red in Figure 1).

Otherwise, the corner $(0, m/p_2)$ is chosen. To interpret the inequality further: A risk-neutral decision-maker chooses the corner allocation that yields the higher expected value. So does a decision-maker who is slightly risk-loving. A decision-maker who is strongly risk-loving, in turn, prefers the corner allocation that yields the higher payoff, even if its probability is comparatively low. The threshold for ρ that determines which corner is chosen amounts to:

$$\rho \;=\; 1 - \ln[q/(1-q)]/\ln[(p_1/p_2)].$$

2.3 Application: Time Preferences

Consider two points in time, t and $t+k$, with $t \geq 0$ and $k > 0$. The decision-maker can decide about two dated (monetary) payoffs, $c_t \geq 0$ and $c_{t+k} \geq 0$, subject to an intertemporal budget restriction. The decision is made at $t = 0$. Following the literature (e.g., Andreoni and Sprenger 2012a, 2012b), we assume intertemporal utility to be time-separable and stationary over the payments that individuals receive, and we allow for potential present bias via β-δ preferences (Laibson 1997). Given a budget restriction of the type introduced in equation (3), the optimization problem of the decision-maker is then given by

$$\max_{c_t, c_{t+k}} \; u(c_t;\rho) + \beta^{1[t=0]}\,\delta^k\,u(c_{t+k};\rho) \quad \text{s.t.} \quad c_t^{1+z} + (1/R)^{1+z}\,c_{t+k}^{1+z} \;=\; m^{1+z}, \tag{9}$$

where $1[t=0]$ is an indicator that equals 1 if $t = 0$ and 0 if $t > 0$. We denote by m the budget at time t, which amounts to the normalization $p_t = 1$. We denote the interest rate factor by R, with $1/R = p_{t+k}/p_t$ and $R > 0$. The nominal interest rate is $r \coloneqq R - 1$, and is not restricted to positive values. We follow the majority of existing studies and assume power utility (CRRA) for the instantaneous utility function:[11]

$$u(c;\rho) \;\coloneqq\; \begin{cases} (c^{1-\rho} - 1)/(1-\rho) & \text{if } \rho \neq 0, \\ \ln(c) & \text{if } \rho = 0. \end{cases} \tag{10}$$

The optimality condition for choosing an interior point on the budget restriction, see equation (4), amounts to

$$\frac{1}{\beta^{1[t=0]}\,\delta^k}\left(\frac{c_t}{c_{t+k}}\right)^{-\rho} \;=\; \left(\frac{1}{1/R}\right)^{1+z}\left(\frac{c_t}{c_{t+k}}\right)^{z} \tag{11}$$

$$\Longleftrightarrow \qquad \frac{c_t}{c_{t+k}} \;=\; \left(\frac{1}{\beta^{1[t=0]}\,\delta^k\,R^{1+z}}\right)^{\frac{1}{\rho+z}} \;\eqqcolon\; C^\star(t,k,R,z;\beta,\delta,\rho). \tag{12}$$

The condition for an *interior allocation* is applicable if the curvature of the indifference curves is less pronounced than the curvature of the budget restriction, that is, $\rho > -z$. A higher value of ρ implies a stronger desire to smooth income over time, that is, $c_t/c_{t+k} \to 1$. The higher the values for β and δ, the more patient the decision-maker becomes, indicating a preference for a higher payment at time $t+k$ relative to c_t: c_t/c_{t+1} decreases in β and δ.

A budget restriction that covers all possible slopes from 0 to ∞ is the most desirable one in terms of theoretical results. This is ensured when both c_t and c_{t+k} are allowed to be zero. In order to equalize transaction costs across all possible choices, including corner allocations, the best practice is, however, to keep the number of transactions constant across all choices by including some positive baseline payments (see the detailed discussion by Balakrishnan, Haushofer, and Jakiela 2020, pp. 300–1). We denote these baseline payments by b_t and b_{t+k}.

To simplify the exposition, let the vector $\boldsymbol{x} = (t, k, b_t, b_{t+k}, m, R, z)$ collect all experimental parameters that describe the decision environment, and let $\boldsymbol{\theta} = (\beta, \delta, \rho)$ collect the preference parameters to be estimated. Solving the budget restriction for c_t and c_{t+k}, respectively, yields

11. Around 80.6% of studies using the CTB method (Andreoni and Sprenger 2012a) specify utility $u(\cdot)$ as being of the power (CRRA) type, while only about 6.6% use the exponential utility (CARA) specification (see Imai, Rutter, and Camerer 2021, p. 1796).

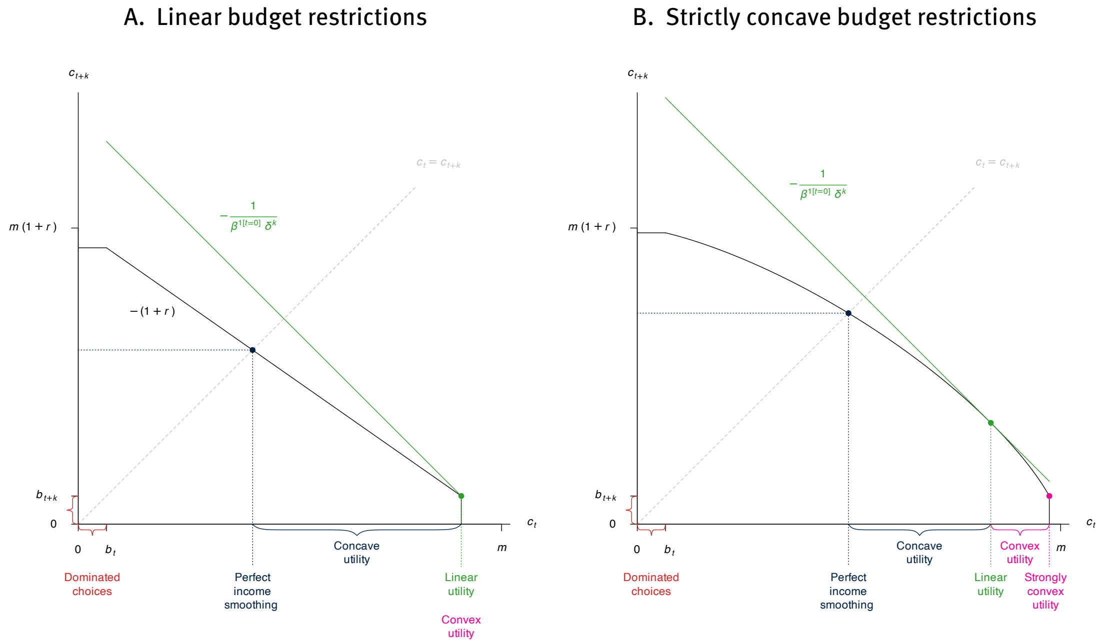


Figure 2. Time experiment: Illustration of choices from a linear budget restriction (panel A) and a strictly concave budget restriction (panel B)

Notes: Assume quasi-hyperbolic discounting, $u(c_t;\rho) + \beta^{1[t=0]}\,\delta^k\,u(c_{t+k};\rho)$ with $u(c;\rho) = (c^{1-\rho} - 1)\,/\,(1-\rho)$. The horizontal segment and vertical segment are due to the presence of the baseline payments b_t and b_{t+k}. They are payoff-dominated because foregoing a baseline payment does not lead to a higher payment on the respective other date. The blue markers • indicate a decision under strongly concave utility ($\rho \to \infty$): The decision-maker desires to equalize the earlier and later payment, $c_t\,/\,c_{t+k} \to 1$. The green markers •, accompanied by the green linear indifference curves, indicate choices by a decision-maker with linear utility ($\rho = 0$). Under LBRs, linear utility leads to corner allocations, while it leads to interior allocations under SCBRs. Under SCBRs, corner allocations occur only in the case of convex utility that is sufficiently pronounced (indicated by the pink marker •).

$$c_t(c_{t+k}) \;=\; \left[m^{1+z} - (c_{t+k}\,/\,R)^{1+z}\right]^{\frac{1}{1+z}}, \tag{13}$$

$$c_{t+k}(c_t) \;=\; R\left[m^{1+z} - c_t^{1+z}\right]^{\frac{1}{1+z}}. \tag{14}$$

Using these equations, we define

$$c_t^{\max}(\boldsymbol{x}) \;\coloneqq\; c_t(b_{t+k}) \quad \text{and} \quad c_{t+k}^{\max}(\boldsymbol{x}) \;\coloneqq\; c_{t+k}(b_t). \tag{15}$$

With baseline payments, the budget restriction thus ends at $(b_t, c_{t+k}^{\max}(\boldsymbol{x}))$ instead of $(0, R\,m)$, and at $(c_t^{\max}(\boldsymbol{x}), b_{t+k})$ instead of $(m, 0)$. This means that the budget restrictions still cover a wide range of slopes, but the very extreme slopes of 0 and ∞ cannot be reached anymore.[12]

We additionally include a horizontal segment $((0, c_{t+k}^{\max}), (b_t, c_{t+k}^{\max}))$ and a vertical segment $((c_t^{\max}, b_{t+k}), (c_t^{\max}, 0))$, which allows us to check whether participants make dominated choices. This yields the following piecewise budget restriction:

12. A different implementation would be to include the baseline payments in such a way that the budget restriction would still be horizontal and vertical at the corners. This, however, would destroy the simplicity of the solution to the first-order condition.

$$c_{t+k} = c_{t+k}^{\max}(\boldsymbol{x}) \qquad \text{if} \quad c_t \in [0, b_t), \tag{16}$$
$$m^{1+z} = c_t^{1+z} + (1/R)^{1+z}\, c_{t+k}^{1+z} \qquad \text{if} \quad c_t \in [b_t, c_t^{\max}(\boldsymbol{x})], \tag{17}$$
$$c_t = c_t^{\max}(\boldsymbol{x}) \qquad \text{if} \ c_{t+k} \in [0, b_{t+k}). \tag{18}$$

We illustrate the resulting LBRs and SCBRs in Figure 2.

The optimal choice is affected by the presence of baseline payments as follows: If $C^{\star}(\boldsymbol{x}, \boldsymbol{\theta})$, derived in equation (12), falls below $C^{\min}(\boldsymbol{x}) \coloneqq b_t / c_{t+k}^{\max}(\boldsymbol{x})$, then the corner allocation $C^{\min}(\boldsymbol{x})$ is chosen: as little money as possible is allocated to the earlier payment date. Conversely, if $C^{\star}(\boldsymbol{x}, \boldsymbol{\theta})$ rises above $C^{\max}(\boldsymbol{x}) \coloneqq c_t^{\max}(\boldsymbol{x}) / b_{t+k}$, then the corner allocation $C^{\max}(\boldsymbol{x})$ is chosen: as much money as possible is allocated to the earlier payment date. In summary, the optimal payment ratio in the presence of baseline payments is given by

$$C^{\star\star}(\boldsymbol{x}, \boldsymbol{\theta}) \coloneqq \min\left\{C^{\max}(\boldsymbol{x}), \max\left\{C^{\min}(\boldsymbol{x}), C^{\star}(\boldsymbol{x}, \boldsymbol{\theta})\right\}\right\}. \tag{19}$$

In the special case that $R^{1+z} = 1/(\beta^{1[t=0]}\,\delta^k)$ and $\rho = -z$, the utility-maximizing indifference curve coincides with the budget restriction so that the decision-maker is indifferent between all allocations on the budget restriction. If $\rho = -z$ and $R^{1+z} \neq 1/(\beta^{1[t=0]}\,\delta^k)$, or if the convexity of the instantaneous utility function is so strong that $\rho < -z$, the tangency condition from equation (12) is never satisfied, and the corner allocation that yields the higher discounted utility is chosen. That is, the decision-maker allocates the entire budget to the earlier payment date t if

$$u(c_t^{\max}(\boldsymbol{x}); \rho) + \beta^{1[t=0]}\,\delta^k u(b_{t+k}; \rho) > u(b_t; \rho) + \beta^{1[t=0]}\,\delta^k u(c_{+k}^{\max}(\boldsymbol{x}); \rho), \tag{20}$$

and to the later date $t + k$ otherwise.

3 Estimation Strategy

3.1 Derivation of the Estimation Equations

3.1.1 General Approach. The estimation equation is based on the FONC $c_i / c_j = C^{\star}(\boldsymbol{x}; \boldsymbol{\theta})$, that is, equation (7) with $c_i / c_j = c_1 / c_2$ or equation (12) with $c_i / c_j = c_t / c_{t+k}$. Estimating the preference parameter(s) $\boldsymbol{\theta}$ amounts to replacing the left-hand side by the observed choices and finding values for $\boldsymbol{\theta}$ such that the observed choices are fitted well by the right-hand side.

When assuming a lognormal mean-one multiplicative error term, the preference parameter(s) $\boldsymbol{\theta}$ can be estimated directly via nonlinear maximum likelihood estimation (NLMLE). With the chosen utility specification, linear regression is also possible, since the estimation equation can be loglinearized. This is the approach followed by Andreoni and Sprenger (2012a) and various other studies. The loglinearization turns the multiplicative lognormal error term into a Gaussian mean-zero additive error term. With linear regression, the components of $\boldsymbol{\theta}$ are estimated indirectly: they are backed out of the estimated linear coefficients via nonlinear combinations. We describe both approaches and their strengths and drawbacks below.

3.1.2 Estimation Equation for Risk Preferences.

As derived above, the payment ratio according to the optimality condition for an interior solution is given by equation (7), that is,

$$\frac{c_1}{c_2} = \left[\frac{q}{1-q} \left(\frac{p_2}{p_1} \right)^{1+z} \right]^{\frac{1}{\rho+z}}. \tag{21}$$

Taking the logarithm of equation (21) yields the log payment ratio[13]

$$\ln\left(\frac{c_1}{c_2}\right) = \frac{1}{\rho+z} \left[\ln\left(\frac{q}{1-q}\right) + (1+z) \ln\left(\frac{p_2}{p_1}\right) \right]. \tag{22}$$

In our case of $q = ½$, the expression on the right-hand side simplifies to

$$\ln\left(\frac{c_1}{c_2}\right) = \underbrace{\frac{1}{\rho+z}}_{\gamma_\rho} (1+z) \ln\left(\frac{p_2}{p_1}\right). \tag{23}$$

The coefficient of relative risk aversion ρ can be estimated directly via nonlinear regression, for instance, via NLMLE. Alternatively, one can estimate the coefficient γ via linear regression and recover the estimate of the structural parameter ρ from the linear coefficient γ_ρ as follows:

$$\hat{\gamma}_\rho = \frac{1}{\hat{\rho}+z} \quad \Longleftrightarrow \quad \hat{\rho} = \frac{1}{\hat{\gamma}_\rho} - z. \tag{24}$$

The standard error of $\hat{\rho}$ can then be calculated via the delta method.

3.1.3 Estimation Equation for Time Preferences.

Just as in the case of estimating risk preferences, the log payment ratio constitutes the central expression. The observed payment ratio, c_t / c_{t+k}, is explained by the optimality condition derived in equation (12):

$$\frac{c_t}{c_{t+k}} = \left(\frac{1}{\beta^{1[t=0]}\, \delta^k\, R^{1+z}} \right)^{\frac{1}{\rho+z}}. \tag{25}$$

Taking logs yields the following linear equation[14]:

$$\ln\left(\frac{c_t}{c_{t+k}}\right) = -\underbrace{\frac{\ln\beta}{\rho+z}}_{\gamma_\beta} 1[t=0] - \underbrace{\frac{\ln\delta}{\rho+z}}_{\gamma_\delta} k - \underbrace{\frac{1}{\rho+z}}_{\gamma_\rho} (1+z) \ln R. \tag{26}$$

Equation (26) can be used to estimate the preference parameters β, δ, and ρ directly via nonlinear regression, for instance, via NLMLE. Variation in the experimental parameters t, k, and R allows us to identify the preference parameters β, δ, and ρ. Alternatively, one can estimate the coefficients γ_β, γ_δ, and γ_ρ via linear regression and recover the estimates of the structural parameters from the linear coefficients via nonlinear combinations:

13. We follow the literature (Choi et al. 2007b, p. 1929; Andreoni, Kuhn, and Sprenger 2015; Bechtel et al. 2024, footnote 6) and replace $c_1 = 0$ and $c_2 = 0$ by small positive values so that the log payment ratio remains finite. Note that this adjustment is unnecessary for interior allocations, which SCBRs are designed to promote.

14. Note that for $z = 0$ (and background consumption $\omega = 0$), this expression is exactly the same as equation (6) of Andreoni and Sprenger (2012a, p. 3342).

$$\hat{\gamma}_\beta = \ln(\hat{\beta})\,\hat{\gamma}_\rho \iff \hat{\beta} = \exp\left(\frac{\hat{\gamma}_\beta}{\hat{\gamma}_\rho}\right); \tag{27}$$

$$\hat{\gamma}_\delta = \ln(\hat{\delta})\,\hat{\gamma}_\rho \iff \hat{\delta} = \exp\left(\frac{\hat{\gamma}_\delta}{\hat{\gamma}_\rho}\right); \tag{28}$$

$$\hat{\gamma}_\rho = \frac{1}{\hat{\rho}+z} \iff \hat{\rho} = \frac{1}{\hat{\gamma}_\rho} - z. \tag{29}$$

The associated standard errors can then be calculated via the delta method.

3.2 Further Characteristics of the Estimation

3.2.1 Discussion of the Assumed Error Structure. Assuming an additive error on the log payment ratio in equations (23) and (26) approximates a multiplicative error on the payment ratio c_i / c_j. For instance, an error of 0.05 on the log payment ratio means that the observed payment ratio is about 5% higher than the predicted payment ratio, while an error of −0.05 on the log payment ratio means that the chosen payment ratio is about 5% lower than the predicted payment ratio. A symmetric distribution of this additive error—which is usually assumed and a characteristic of the Gaussian distribution—implies that participants diverge from the optimal payment ratio with equal relative strength in both directions.

This assumption seems the more reasonable, the further the choices are away from the corners. This is more likely to be the case for SCBRs than for LBRs, given that SCBRs are designed to convert corner choices observed under LBRs into interior choices.

3.2.2 Taking Censoring into Account. If corner allocations are present in the dataset, this constitutes censoring of the dependent variable and needs to be taken into account. Hence, when using linear regression, one can resort to two-limit Tobit estimation instead of OLS.

The NLMLE can be augmented to address censoring in the same way that Tobit estimation augments the linear model: Denote the lower bound on the dependent variable by $C^{\min}(\boldsymbol{x})$ and the upper bound by $C^{\max}(\boldsymbol{x})$. Let (c_i, c_j) be a single choice that an individual makes when facing the decision environment $\boldsymbol{x}$. In the absence of baseline payments—as in our investigation of risk preferences—these bounds are $C^{\min}(\boldsymbol{x}) = 0$ and $C^{\max}(\boldsymbol{x}) = \infty$ (see Section 2.2). In the presence of baseline payments—as in our investigation of time preferences—the values are $C^{\min}(\boldsymbol{x}) = b_t / c^{\max}_{t+k}(\boldsymbol{x})$ and $C^{\max}(\boldsymbol{x}) = c^{\max}_t(\boldsymbol{x}) / b_{t+k}$ (see Section 2.3). Taking two-sided censoring into account yields the following log-likelihood contribution of the observation (c_i, c_j):

$$\begin{aligned} l[\boldsymbol{\theta} \mid \boldsymbol{x}, (c_i, c_j)] =& \\ & 1\left[\ln\left(\frac{c_i}{c_j}\right) \le \ln(C^{\min}(\boldsymbol{x}))\right] \times \ln\left[\Phi\left(\frac{\ln(C^{\min}(\boldsymbol{x})) - \ln(C^\star(\boldsymbol{x}, \boldsymbol{\theta}))}{\sigma}\right)\right] \\ & + 1\left[\ln\left(\frac{c_i}{c_j}\right) \ge \ln(C^{\max}(\boldsymbol{x}))\right] \times \ln\left[1 - \Phi\left(\frac{\ln(C^{\max}(\boldsymbol{x})) - \ln(C^\star(\boldsymbol{x}, \boldsymbol{\theta}))}{\sigma}\right)\right] \\ & + 1\left[\ln(C^{\min}(\boldsymbol{x})) < \ln\left(\frac{c_i}{c_j}\right) < \ln(C^{\max}(\boldsymbol{x}))\right] \times \ln\left[\frac{1}{\sigma}\,\phi\left(\frac{\ln(c_i / c_j) - \ln(C^\star(\boldsymbol{x}, \boldsymbol{\theta}))}{\sigma}\right)\right]. \end{aligned} \tag{30}$$

The first part of the sum is the cumulative probability of the standard normal distribution (denoted by Φ) evaluated for censored observations at the lower bound. The second part is the cumulative probability evaluated for censored observations at the upper bound. The third part is the probability density of the standard normal distribution (denoted by ϕ) evaluated for uncensored observations. A detailed derivation is provided in Appendix C in the Online Appendix.[15]

3.2.3 Ruling out Inadmissible Parameter Estimates. Note that the approach so far exclusively relies on the FONC for an interior allocation. As outlined in the theoretical section, a decision-maker with sufficiently convex utility ($\rho < -z$) does not pick an interior allocation but a corner allocation. For such a decision-maker, the FONC is not satisfied as an equality. Since the estimation relies on the FONC as an equality, it is misspecified in this case.

Specifically, the estimation can converge to parameter values that rather identify a constrained utility minimum instead of a maximum. This has been noted before: Kuhn, Kuhn, and Villeval (2017) "discarded the estimates" when they "violated the maximization assumptions" (p. 84). With our approach, this issue can be easily addressed: To rule out inadmissible parameter estimates $\hat{\rho} < -z$, we adjust the likelihood function by assigning a sufficiently large penalty whenever $\rho < -z$. This allows us to analyze all observations, without having to discard any.

3.2.4 Comparison of NLMLE with Tobit. The most popular estimation method in studies that use CTBs is Tobit regression (see Imai, Rutter, and Camerer 2021, Table 4). On this background, we would like to highlight three features of our estimation strategy:

(i) As long as the same numerical optimization method and convergence criterion are used, the NLML estimator should yield the same results as the two-limit Tobit estimator. Our estimation results in Section 5 show that it is indeed the case—except in those cases where the Tobit estimation converges to inadmissible parameter values.[16]

    The results in Section 5 also illustrate the conditions under which the Tobit approach is likely to converge to inadmissible parameter values: The Tobit regression erroneously estimates high degrees of risk *proclivity* for several individuals that in fact display high degrees of risk *aversion* by picking allocations very close to the safe portfolio. Technically, for these individuals, the tangency condition can be fulfilled by large negative values of ρ.

(ii) Our adjustment for ruling out inadmissible parameter estimates $\hat{\rho} < -z$ could also be implemented for linear estimation. However, this approach would be much less straightforward,

15. By using NLMLE, we deviate slightly from our preanalysis plan (PAP, https://doi.org/10.1257/rct.9837). In the PAP, we planned to use nonlinear least squares (NLLS) estimation, building on the method by Andreoni and Sprenger (2012a). However, we realized that it is necessary to estimate σ separately when using NLLS, whereas Andreoni and Sprenger simply set $\sigma = 1$ in their Stata code (see their replication package http://doi.org/10.3886/E112569V1 and footnote 8 in Harrison, Lau, and Rutström 2013). By construction, NLMLE (including Tobit) estimates σ and thus avoids this drawback, which is why we preferred it over NLLS.

16. Consequently, to speed up the estimation, we first estimate all individuals via two-limit Tobit regression and use the results as the initial values for the NLMLE routine. If the parameter values estimated via Tobit violate the economic model, that is $\hat{\rho} < -z$, or if the Tobit estimation does not converge, we set the initial values for the numerical NLMLE procedure manually. To double-check our analyses, we run the Tobit estimation in both R and Stata. We implement the NLMLE in R.

Table 2. Timeline of the two online experiments

	Time experiment	Risk experiment
	November 22, 2022	November 30, 2022
	Recruitment: $N_T = 100$	Recruitment: $N_R = N_T / 2 + 50 = 100$
(i)	Instructions and three practice tasks	Instructions and three practice tasks
(ii)	Decision tasks: 23 LBR decisions: 18 low-, 5 high-stakes 23 SCBR decisions: 18 low-, 5 high-stakes	Decision tasks: 41 LBR decisions: 36 low-, 5 high-stakes 41 SCBR decisions: 36 low-, 5 high-stakes
(iii)	Survey: GPS: staircase method time and risk preferences SOEP: self-reports time and risk preferences Demographics, question on decision strategies 10 Raven progressive matrices	Survey: GPS: staircase method time and risk preferences SOEP: self-reports time and risk preferences Demographics, question on decision strategies 10 Raven progressive matrices
(iv)	Payment info (incl. dates)	Payment info (incl. dates)

since the restriction could not be directly placed on the structural parameter ρ, but would have to be imposed on the coefficient(s) γ_ρ (and γ_β, γ_δ) from the linearized equation.

(iii) The direct nonlinear estimation has the advantage that it can be readily performed when the parameter z varies across observations. Performing linear estimation and recovering the structural parameters when z varies across observations is not straightforward, because z enters the estimated linear coefficient(s) γ_ρ (and γ_β, γ_δ) nonlinearly. In particular, if one wishes to analyze decisions from linear budget restrictions and strictly concave budget restrictions jointly, the NLMLE approach can be applied without any adjustments.

4 Study Design

4.1 General Structure

4.1.1 Two Online Experiments: Risk Experiment and Time Experiment. We conducted two online experiments. The number of participants was 100 in both studies. The first experiment investigated time preferences and was conducted on November 22, 2022. The second experiment investigated risk preferences and followed on November 30, 2022.

Participants were invited from the subject pool of the BonnEconLab using hroot (Bock, Baetge, and Nicklisch 2014). To investigate the relationship between risk and time preferences, half of the participants from the time experiment also participated in the risk experiment. The invitation to the risk experiment did not mention any connection between the two experiments.

The structure of both experiments is very similar, comprising four parts: (i) instructions and practice tasks; (ii) a series of decision tasks; (iii) a survey, including sociodemographic questions; and (iv) information on the earnings and payment date(s); see Table 2.

4.1.2 Instructions and Practice Tasks. The complete set of instructions is available in Appendix K in the Online Appendix. After reading the instructions, participants are asked to complete three practice tasks. In the practice tasks, they have to select pre-specified allocations in strictly concave budget sets. This is done to familiarize participants with the experimental interface. We paid close attention that the practice tasks did not suggest any particular strategy such as maximization of the average payoff. As we wanted to ensure that participants fully understood the mechanics, we designed the practice tasks in a way such that it was very hard to submit the correct answer by trial and error. The solutions to the practice task are such that one is rather close to the corner allocation $C^{\min}(\boldsymbol{x})$, one is quite central, and one is closer to the corner allocation $C^{\max}(\boldsymbol{x})$. Upon successful completion, a separate screen announces the start of the payoff-relevant decision situations.

4.1.3 Survey and Raven Progressive Matrices. After completing the decision situations, participants are presented with a survey which is identical in both experiments. The survey includes an open-ended question that asks participants to describe briefly how they had made decisions during the experiment. Following that question, the survey contains questions related to time and risk preferences from the Global Preference Survey (GPS, Falk et al. 2018) and the German Socio-Economic Panel (SOEP, https://www.diw.de/en/soep) as well as demographic questions. See Appendix I in the Online Appendix for a detailed description of the survey questions and Table I.1 in the Online Appendix for a summary of the collected variables.

At the end of the survey, we ask participants to solve Raven progressive matrices (Raven 1941) to proxy for fluid intelligence. Participants are given 5 minutes to solve 10 Raven matrices. They earn €0.20 for each correct response.

4.1.4 Remuneration. In the instructions of the experiment, we inform participants that one of their allocation decisions will become payoff-relevant. Participants learn that each decision has the same probability of being selected and that their choice in a given decision situation will not influence the other decision situations in any way. The payoff-relevant decision is drawn in real-time by the computer after all decisions have been submitted. An information page at the end of the experiment summarizes the payments that participants will receive and the dates at which the money transfers will be carried out.

All payments are made via bank transfer to participants' accounts. We chose the payment dates such that no German bank holidays interfered with any of them, and we made sure that the payment dates of the time and risk experiment did not coincide.

The average completion time for the risk experiment was around 47 minutes, with an average payment of €51.96 (minimum €1.00, median €26.05, maximum €264.34; average of €1.00 in the IQ task [5 Raven matrices correct]). The average completion time for the time experiment was around 66 minutes, and the average payment amounted to €28.73 (minimum €14.67, median €20.63, maximum €168.15; average of €1.02 in the IQ task [5.08 Raven matrices correct]).

4.2 Risk Experiment

4.2.1 Decision Situations. The risk experiment comprises 46 allocation decisions. For simplicity, and in line with Choi et al. (2014, p. 1522), we use a probability of $q = 1/2$ in all decision situations. Half of the decision situations feature linear budget restrictions ($z = 0$), and

Table 3. Risk experiment: Variation of experimental parameters across decision situations

Characteristic	Description
Budget (m, in €)	18 low-stakes decision situations (€30 ≤ m ≤ €80) for $z = 0$ 18 low-stakes decision situations (€30 ≤ m ≤ €80) for $z = 0.4$ 5 high-stakes decision situations (€180 ≤ m ≤ €270) for $z = 0$ 5 high-stakes decision situations (€180 ≤ m ≤ €270) for $z = 0.4$
Price ratio (p_2 / p_1)	Varies across decision situations, takes on values for both $z = 0$ and $z = 0.4$ from set {2, 1.75, 1.5, 1.25, 1, 0.8, 0.66667, 0.57143, 0.5} Each decision situation accompanied by "mirrored" decision situation: inverse price ratio and corresponding m

the other half feature strictly concave budget restrictions ($z = 0.4$).[17] Within those two environments, the decision situations differ in the characteristics outlined in Table 3. Table D.1 in the Online Appendix lists all experimental parameters used in the 46 decision situations in the risk experiment. Figure D.1 in the Online Appendix visualizes the resulting budget restrictions.

4.2.2 Decision Screens. Since each allocation on an SCBR is associated with a different effective price ratio, an intuitive and at the same time detailed representation of the decision situations is important. For this reason, all budget restrictions are represented visually. We implement an interactive graphical interface similar to that of Choi et al. (2007b, 2007a) and Choi et al. (2014).[18] Figure 3 shows an example decision screen from the risk experiment.[19]

Participants can select their desired allocation on the budget restriction by using the mouse pointer.[20] To avoid anchoring, there is no preselected allocation, and an allocation is only highlighted when participants actively move the mouse pointer into the plot. Payments that are associated with a given mouse pointer position are indicated on the graph's axes and updated in real time. The axes also indicate the maximum achievable payments at either of the corner allocations.

The currently selected payments are also illustrated in the form of a bar diagram to the right of the plot. Located below the bar diagram are arrow buttons which participants can use to fine-tune their allocations in steps of a few cents (similar to the way in which Choi et al. 2007a permitted use of the arrow keys to adjust the desired allocation).

Once participants are satisfied with the selected allocation, they have to confirm it by clicking on the budget line or by clicking on the "Lock position" ["Fixieren"] button (see Figure 3).

17. We calibrated the curvature levels z based on data from a pilot study. In general, if budget restrictions are close to linear (low values of z), it is hard to visually discern strictly concave from linear budget restrictions. Overly curved budget restrictions (high values of z), in turn, would shrink the range in which risk-averse decisions can be made, thereby amplifying the influence of noise in the choice of allocations, which potentially propagates to the parameter estimates.

18. We use oTree (Chen, Schonger, and Wickens 2016) and JavaScript.

19. Note that in the experimental interface, the axes are flipped vis-à-vis Figure 1, so that "payment 1" and "payment 2" are displayed in the reading direction familiar to our participants, that is, from left to right.

20. Choi et al. (2014, p .1523) argue that it is sufficient to restrict allocations to be *on* the budget line. This is also done in all studies using CTBs.

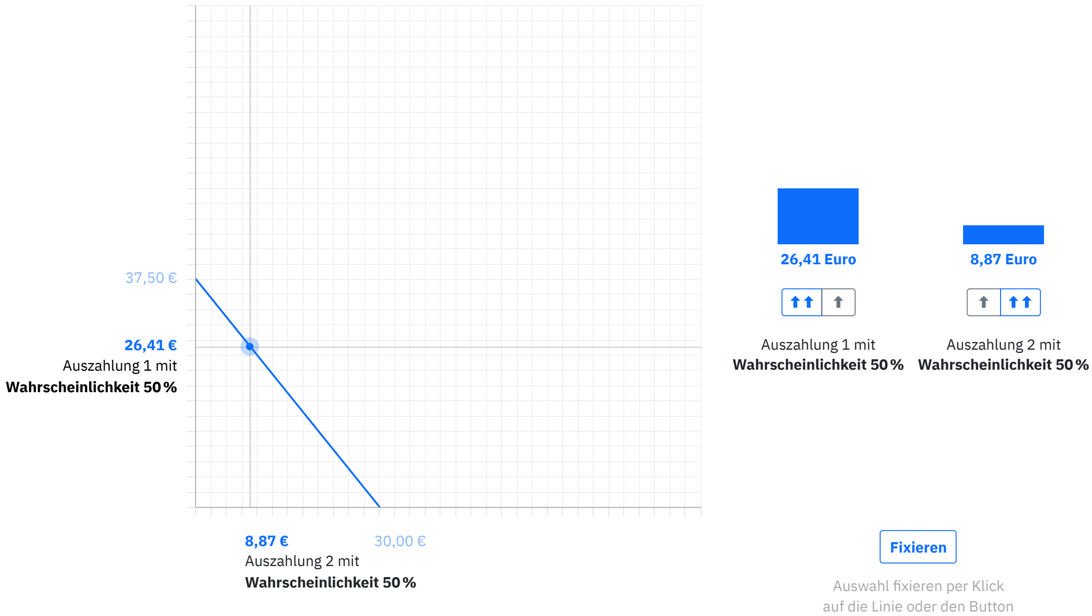


Figure 3. Risk experiment: Decision screen showing a linear budget restriction

Note: Here, €26.41 is allocated to state 1, and €8.87 is allocated to state 2. The allocation has not been "logged in" yet. Participants could get a maximum payment of €37.50 if they allocate the entire budget to state 1, or a maximum payment of €30.00 if they allocate the entire budget to state 2.

After clicking the "Lock position" button, a "Confirm" ["Bestätigen"] button appears that needs to be clicked to record the decision.

Unlike in previous studies, the price ratios that we implement are symmetric about 1: each budget restriction is accompanied by a budget restriction mirrored around the 45° line. This symmetry allows us to investigate whether the graphical representation biases participants' choices. In the absence of bias, participants' allocations must fulfill $c_1 = c_2$ on average, irrespective of the degree of risk aversion and of noise due to the symmetry.

4.2.3 Order of Presentation of the Budget Sets. In both experiments, we present the budget sets in four blocks. The first two blocks consist of low-stakes budget sets, and the last two blocks consist of high-stakes budget sets. We present the high stakes last because we consider them a control condition for assessing the stability of preferences across stakes. Within each block, the type of budget restrictions, that is, whether $z = 0$ or $z = 0.4$, remains constant. To examine potential spillover effects, for instance, whether SCBRs reduce the frequency of corner allocations in subsequent LBRs, we randomized between participants whether they face linear or strictly concave budget restrictions first. Within each block, we fully randomized the order of the decision situations.

4.3 Time Experiment

4.3.1 Decision Situations. The time experiment comprises 82 allocation decisions. Half of the decision situations feature LBRs ($z = 0$), and the other half feature SCBRs ($z = 0.4$). Within

Table 4. Time experiment: Variation of experimental parameters across decision situations

Characteristic	Description
Budget (m, in €)	36 low-stakes decision situations (€14 ≤ m ≤ €25) for z = 0 36 low-stakes decision situations (€14 ≤ m ≤ €25) for z = 0.4 5 high-stakes decision situations (€120 ≤ m ≤ €150) for z = 0 5 high-stakes decision situations (€120 ≤ m ≤ €150) for z = 0.4
Price ratio (1 / R)	Varies across decision situations, takes on values for both z = 0 and z = 0.4 from set {1.42857, 1.25, 1.11111, 1, 05, 1, 0.95238, 0.9, 0.8, 0.7} Each decision situation accompanied by "mirrored" decision situation: inverse price ratio and corresponding m
Front-end delay (t weeks)	8 (k, m, R, z) combinations presented twice, once with t = 0, once with t = 1
Delay payment dates (k weeks)	k = 5 or k = 10 for both z = 0 and z = 0.4

those two environments, decision situations differ with respect to the characteristics outlined in Table 4. Table E.1 in the Online Appendix lists all experimental parameters used in the 82 decision situations, and Figure E.1 visualizes the budget restrictions.

The interest rates that we offer are symmetric about 1. This allows us to measure temporal discounting and present bias in a model-free way (see Section 5.3.2): without discounting, a participants' allocations fulfill $c_t = c_{t+k}$ on average due to the symmetric interest rates.

4.3.2 Decision Screens. Just like in the risk experiment, we implement an interactive graphical interface that plots the current budget restriction and allows participants to choose the preferred allocation on the restriction via mouse click.[21]

Figure 4 shows an example decision screen from the time experiment. We flip the axes in the interface vis-à-vis Figure 2 to align the payments' temporal order with the participants' familiar reading direction, that is, from left to right. The two baseline payments of €1.50 are indicated by vertical and horizontal segments on the budget restriction. The axes of the plot also indicate the maximum achievable payments at either of the corner allocations.

Before participants can select any allocations, the timeline above the plot highlights the involved payment dates, t and $t + k$, in large font for two seconds. This is done to ensure that participants are well aware of the relevant dates. Immediate payments ($t = 0$), as in the example, are indicated by the word "today" ["heute"] in a colored box.[22]

Participants can select their desired allocations on the budget restriction via the mouse pointer. To avoid anchoring, there is no preselected allocation; an allocation is only highlighted when participants move the mouse pointer into the plotting area. Payments associated with a given pointer position are updated in real-time on the axes of the plot and also illustrated via a bar chart. Participants can also make fine-grained adjustments (€0.01 steps on the horizon-

21. We will be glad to share our oTree (Chen, Schonger, and Wickens 2016) and JavaScript source code.
22. Since present bias is not the focus of this paper, we are not concerned with the potential behavioral effect that this design choice might have.

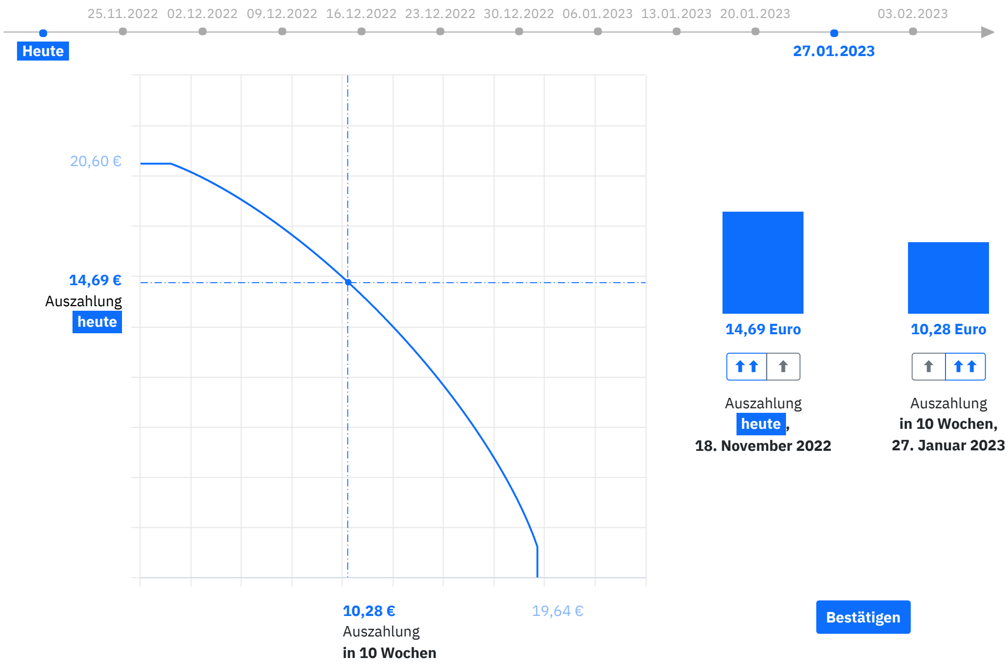


Figure 4. Time experiment: Decision screen showing a strictly concave budget restriction

Notes: In this example, an allocation of €14.69 paid "today" and €10.28 paid ten weeks later (i.e., €24.97 in total) has been chosen. The allocation is already fixed/selected by the participant. Participants would get a payment of €20.60 "today" and €1.50 ten weeks later (i.e., €22.10 in total) if they allocated the entire budget to the earlier payment date, or a maximum payment of €1.50 "today" and €19.64 ten weeks later (i.e., €21.14 in total) if they allocated the entire budget to the later payment date.

tal axis for the low-stakes budget restrictions, €0.10 steps for the high-stakes restrictions) via arrow buttons displayed below the bar chart.

When satisfied with an allocation, participants can fix it by clicking on the budget line or by clicking on the "Lock position" ["Fixieren"] button. This makes a "Confirm" ["Bestätigen"] button appear that needs to be clicked to submit the decision and proceed to the next round.

4.3.3 Order of Presentation of the Budget Sets. We present the budget sets in four blocks. The first two blocks consist of low-stakes budget sets, and the last two blocks consist of high-stakes budget sets. We introduce the high-stakes treatment as a control condition to investigate whether an increase in the stake size alone might reduce the number of corner allocations.[23] To be able to control for potential spillover effects between the two types of budget restrictions, we randomize between participants whether odd-numbered blocks consist of LBRs or SCBRs. Within each block, we fully randomize the order of decision situations for a given curvature parameter z.

23. The high-stakes study by Carvalho, Meier, and Wang (2016) finds a share of corner allocations (23%) and a share of individuals without any interior allocation (9%), which are low compared to low-stakes studies. In contrast to this, another high-stakes study by Boonmanunt et al. (2020), finds a high share of corner allocations. See Table 1. We do not observe any decrease in the incidence of corner allocations in the high-stakes budget restrictions, except for two participants (IDs 22, 23) in the risk experiment, see Figure 6.

5 Results

5.1 Summary of Our Findings and Indicators of Data Quality

5.1.1 Summary of Our Findings. We find that SCBRs drastically reduce the amount of corner allocations vis-à-vis LBRs. This applies to both the risk experiment and the time experiment: the reduction amounts to 63% and 87%, respectively. The details are reported in Section 5.2.

We also find that SCBRs live up to their promise of both identifying convex utility over money for some participants—which is impossible when using LBRs—and of improving estimability on the individual level. The details regarding the results of our individual-level analyses are reported in Section 5.3. We first cover the results of our model-free analyses of participants' choices in Sections 5.3.1 and 5.3.2.[24] We then present the results of our structural estimations of preference parameters in Sections 5.3.3 and 5.3.4.

Finally, we find that SCBRs perform similarly to LBRs regarding other aspects such as rank correlations with other common survey- and choice-based measures of time and risk preferences. The details are reported in Section 5.4.

As a first step, however, we take a look at indicators of the quality of our data.

5.1.2 No Evidence for Visual Bias. The (graphical) representation of a decision problem should not bias participants' decisions. We therefore investigate a bias that could be brought about by the so-called vertical–horizontal illusion (Gibson 1950). The vertical–horizontal illusion is a phenomenon in visual perception where a vertical line appears longer than a horizontal line of the same length. Given that our experimental interface features a horizontal and a vertical axis, choices might be influenced by this bias. With our selection of budget restrictions, we can test for the presence of a visual bias, because the two states in the risk experiment are perfectly symmetrical. That is, the amount allocated to the two states should, on average, be identical, $c_1 = c_2$, across all decisions. Testing this, we find no evidence for a visual bias, so it is unlikely that the graphical representation influences our results (see also Figure 5; for details, see Section G.1 in the Online Appendix).

5.1.3 Substantial Heterogeneity between Individuals. Analyzing individual-level data is only meaningful when there is heterogeneity in behavior to explain. In our sample, this heterogeneity is evident in both the risk and time experiments, for both LBRs and SCBRs.

- For the risk experiment, Figures 6 and 7 demonstrate, for both budget restriction types, that several participants avoid risk entirely by choosing $c_1 = c_2$ (allocations on the 45° line, e.g., IDs 2, 3, 4, 47, 72, 73), while others make (almost) perfectly risk-neutral choices (e.g., IDs 8, 68), and yet others display limited risk aversion or risk proclivity.

24. Model-free measures offer several benefits: they are straightforward to compute for each individual and they yield results that are unaffected by design choices required for structural estimation, such as distributional assumptions, convergence criteria, or the choice of optimization algorithms. We report the model-free measures to confirm the robustness of our results in the structural estimations (in line with the recommendations by Andrews, Gentzkow, and Shapiro 2020).

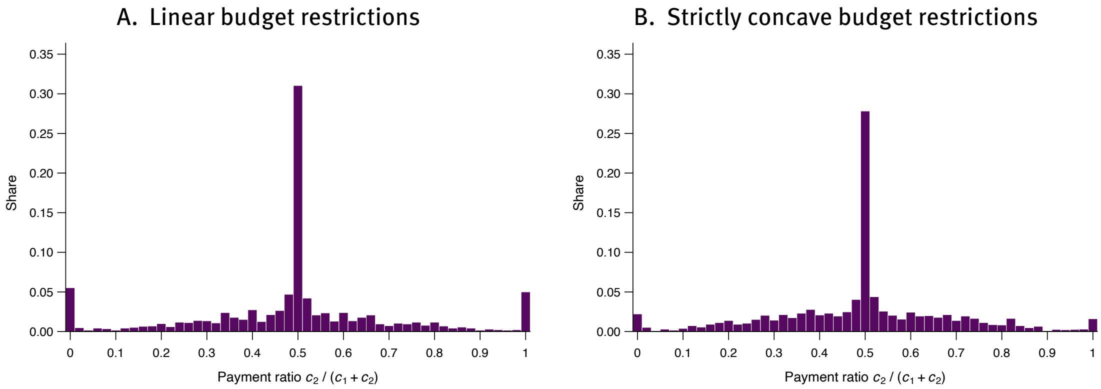


Figure 5. Risk experiment: Chosen payment ratios across all participants, by LBRs and SCBRs

Notes: The payment ratio is calculated as $c_2 / (c_1 + c_2)$. In the absence of perceptual biases, the observations should be symmetrical around 0.5, since the two states are symmetrical and each budget restriction had a mirror image. Please be aware that the bins around 0 and 1 also include near-corner allocations.

- Similar heterogeneity can be observed in Figures 9 and 10 for the time experiment: Some participants strongly smooth income over time (e.g., IDs 3, 4, 70), while others do so much less; out of whom some do not seem to discount time at all (e.g., IDs 49, 60), some make present-oriented choices (e.g., ID 59), and some make future-oriented choices (e.g., ID 50).

5.1.4 Few Dominated Choices. It is essential that participants understand the interface and also the incentives that they face. A crucial measure in this regard is whether participants make choices that respect payoff monotonicity. A violation of monotonicity would be problematic because making payoff-dominated choices would indicate that the incentives are ineffective or participants have problems understanding the task. This clearly does not apply to our studies, neither to the LBRs nor to the SCBRs:

- For the risk experiment, Figures 6 and 7 reveal that there are very few choices of severely payoff-dominated allocations (indicated by red markers). With the exception of a couple of choices by participants 34, 44, 67, 75, 76, and 82, all payoff-dominated choices are very close to the 45° line. This indicates that participants aimed for the safe portfolio $c_1 = c_2$ but missed it by a few cents (i.e., a few pixels on their computer screens).
- For the time experiment, Figures 9 and 10 show that participants made very few payoff-dominated choices. Here, dominated choices amount to foregoing the baseline payment in period t or $t + k$ (see a few of the choices by participants 10, 20, 44, 57, 85, and 96). Such choices occurred in particular in the high-stakes trials, where a baseline payment represented about 1% of the total payoff (and occupied only a few pixels on participants' computer screens).

5.1.5 Self-Reported Decision Strategies. Participants' understanding of the incentives and the interface is also evident from their self-reported decision strategies. For instance, they speak of "playing it safe" or "avoiding risk" or of "maximizing expected value" or "maximizing the total payout" (see Sections G.3 and H.2 in the Online Appendix), even though we never mentioned the concept of "risk" or any decision criteria like expected value in the instructions.

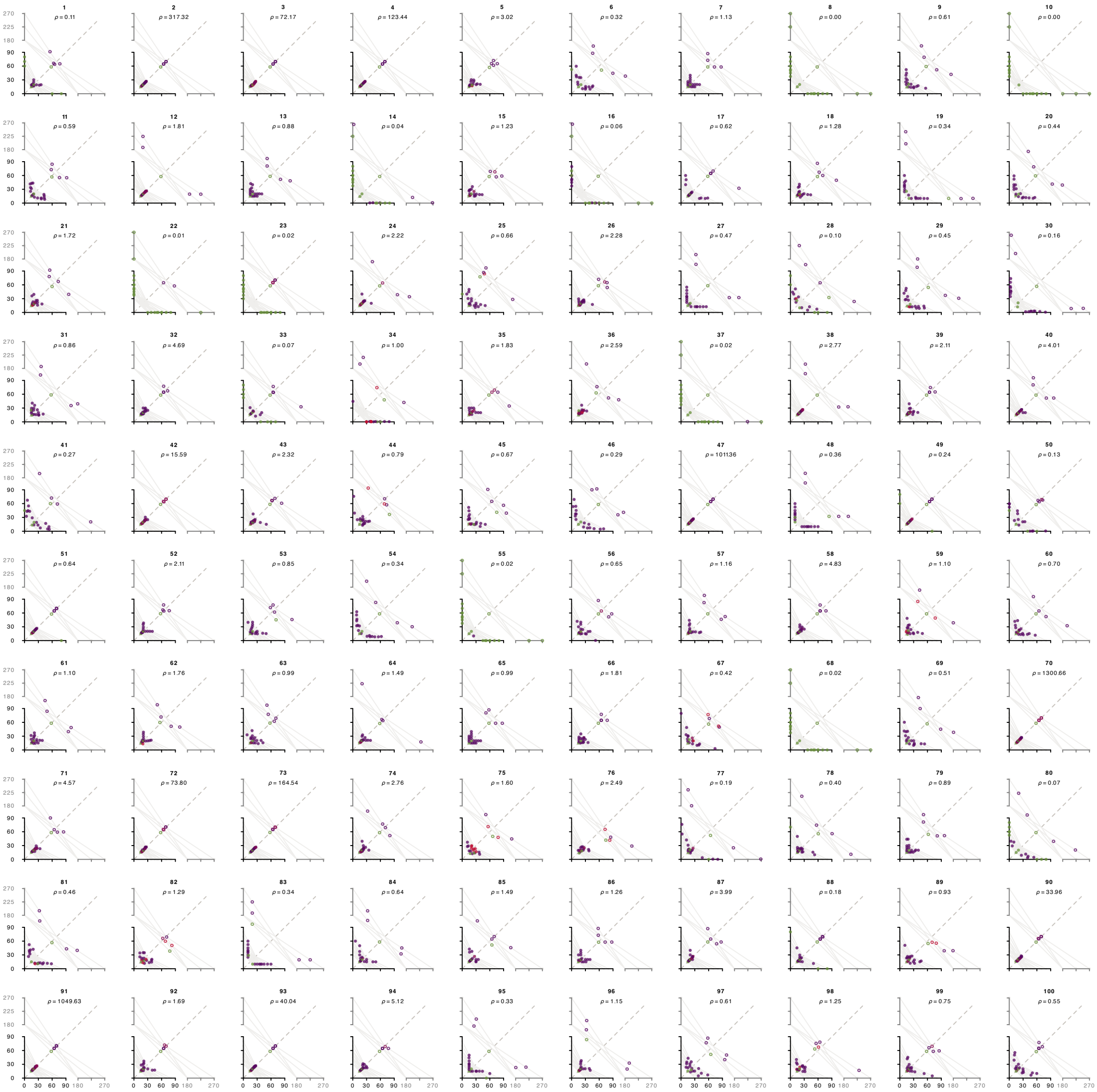


Figure 6. Risk experiment: Allocations chosen from the linear budget restrictions

Notes: • Purple markers indicate risk-averse allocations. • Green markers indicate risk-neutral (expected-value-maximizing) allocations. Mixed colors are used when the payment ratio of the chosen allocation deviates less than 10% from the neighboring category. • Solid markers indicate decisions from the low-stakes budget restrictions. ∘ Open markers indicate decisions from the high-stakes budget restrictions (scaled down for display purposes).

5.2 Lower Share of Corner Allocations with SCBRs

5.2.1 Risk Experiment. Figure 5 shows the distributions of observed allocations in LBRs (panel A) and SCBRs (panel B). We define a corner allocation as a choice $c_1 = 0$ or $c_2 = 0$. The share of corner allocations amounts to 8.9% in LBRs, which reduces by 63% to 3.3% in SCBRs.

To investigate the pattern of allocations on the individual level, Figures 6 and 7 visualize the allocation decisions of all 100 participants. The comparison of both figures shows a pattern of how allocations change: (i) Interior allocations in LBRs remain interior allocations in SCBRs (e.g., IDs 5, 9). (ii) Most participants who chose corner allocations in LBRs reduce their preva-

Figure 7. Risk experiment: Allocations chosen from the strictly concave budget restrictions

Notes: See Figure 6. • Moreover, magenta markers indicate risk-loving allocations.

lence in SCBRs (e.g., IDs 8, 14). (iii) Conversely, participants who chose corner allocations in SCBRs also choose corner allocations in LBRs (e.g., ID 16).

This general pattern is exactly what one would expect if both methods elicit similar risk attitudes. Risk-averse choices are interior allocations in both types of budget restrictions, risk-neutral choices shift from corner allocations in LBRs to interior allocations in SCBRs, and (strongly) risk-loving choices lead to corner allocations in both LBRs and SCBRs. A pattern that should not be observed—and indeed is not observed for a single participant—is the shift from interior allocations in LBRs to corner allocations in SCBRs.

5.2.2 Time Experiment. The main drawback of LBRs, a high incidence of corner allocations, is particularly widespread in the experimental investigations of time preferences. In previous studies, the share of corner allocations ranges from 23% to 88% (see Table 1). Figure 8 illus-

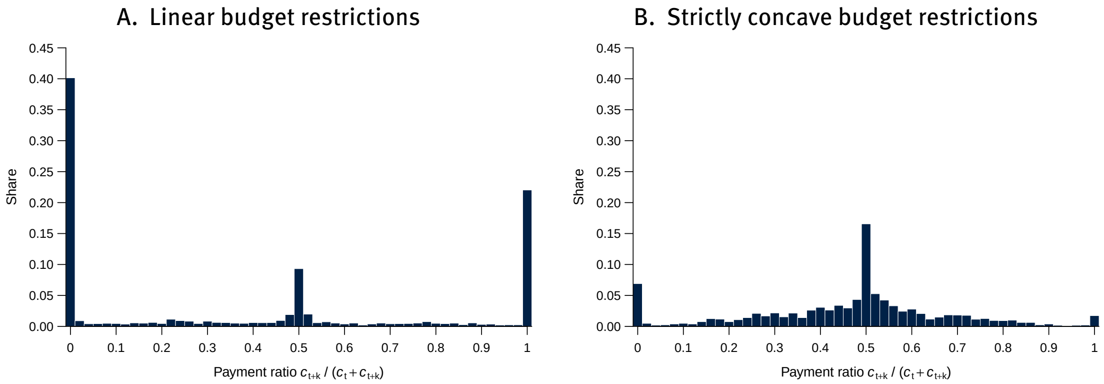


Figure 8. Time experiment: Chosen payment ratios across all participants, by LBRs and SCBRs

Notes: The payment ratio is calculated as $(c_{t+k} - b_{t+k}) / (c_t - b_t + c_{t+k} - b_{t+k})$. The larger share of observations below 0.5 indicates discounting, since in the absence of discounting, the distribution would be symmetrical around 0.5, given that each budget restriction had a mirror image. In the case of dominated choices, e.g., $c_t < b_t$ or $c_{t+k} < b_{t+k}$, we set the payment ratio to 0 and 1, respectively. Please be aware that the bins around 0 and 1 also include near-corner allocations.

trates the distribution of payment ratios, defined as $(c_{t+k} - b_{t+k}) / (c_t - b_t + c_{t+k} - b_{t+k})$, across all individuals in our experiment. Panel A shows the distribution for our LBRs, and panel B for our SCBRs. Given that we implemented symmetric budget restrictions, we can already observe that individuals are, on average, "impatient": the distribution of the payment ratios is skewed towards 0, the all-earlier allocation. We will use this property to construct individual model-free measures of discounting in Section 5.3.2.

We define a corner allocation in the time domain as $c_t \leq b_t$ or $c_{t+k} \leq b_{t+k}$, that is, an individual opts for the baseline payment (or even less) on one of the payment dates. A payment ratio of 0 indicates an all-earlier corner allocation, and a payment ratio of 1 indicates an all-later corner allocation. In line with earlier studies, we find that corner allocations constitute more than half of all choices: Around 56% of choices in LBRs are corner allocations (36% all-earlier and 20% all-later allocations). This number drops to 7.2% in SCBRs (5.7% all-earlier and 1.5% all-later allocations). This means that SCBRs fulfill one of their central objectives: relative to LBRs, corner allocations are reduced by 87%.

To investigate the extent of the reduction on the individual level, Figures 9 and 10 plot the allocation decisions made by all 100 individuals. The comparison of both figures shows that the general pattern of how allocations change is very similar to the risk domain, but more pronounced: (i) As expected, interior allocations in LBRs remain interior allocations in SCBRs (e.g., IDs 3, 4). (ii) Most participants who choose corner allocations in LBRs reduce their prevalence in SCBRs (e.g., IDs 5, 7, 60). (iii) Conversely, participants who choose corner allocations in SCBRs also choose corner allocations in LBRs (e.g., IDs 24, 40).

Regarding the estimability on the individual level, a particularly relevant metric is the proportion of individuals with zero interior allocations. As Andreoni and Sprenger (2012a, footnote 33) and Augenblick, Niederle, and Sprenger (2015, footnote 36) mention, a positive number of interior allocations is required for the estimation of preference parameters on the individual level using methods that account for censoring, such as two-limit Tobit. SCBRs improve

Figure 9. Time experiment: Allocations chosen from the linear budget restrictions

Notes: ▪ Blue markers indicate allocations that suggest concave utility over money. ▪ Green markers indicate allocations that maximize the undiscounted sum of payments. ▪ Red markers indicate dominated allocations, i.e., participants decided to forego the baseline payments. Mixed colors are used when the payment ratio of the chosen allocation deviates less than 10% from the neighboring category. • Circles indicate allocations in decisions with a front-end delay ($t > 0$). ▲ Triangles indicate allocations in decision situations without a front-end delay ($t = 0$). ▪ Solid markers indicate decisions from the low-stakes budget restrictions. ▫ Open markers indicate decisions from the high-stakes budget restrictions (scaled down for display purposes).

significantly on this dimension: while as many as 23% of individuals did not pick any interior allocation in LBRs, this number drops to 1% in SCBRs (a reduction of 96%). Our sample shows a comparatively low share; for instance, 37% of individuals in the original study by Andreoni and Sprenger (2012a) and 61% in the study by Augenblick, Niederle, and Sprenger (2015) did not select any interior allocation. In many other studies, the share of individuals with zero interior allocations exceeds 60% (see Table 1). Section 5.3 confirms that the increase of individuals who pick at least one interior allocation improves estimability on the individual level.

Figure 10. Time experiment: Allocations chosen from the strictly concave budget restrictions

Notes: See Figure 9. ▪ Moreover, pink markers indicate allocations that suggest convex utility over money.

5.3 Wider Range of Identified Behavioral Types and Improved Estimability on the Individual Level with SCBRs

5.3.1 Risk Experiment: Model-Free Measures of Risk Attitudes. We devise a model-free measure of risk attitudes that is very close to the “nonparametric” measure by Choi et al. (2014, pp. 1529–30) and the “model-free, nonparametric summary measure” (“relative risk premium”) by Friedman et al. (2022, p. 66). Both measures employ a normalized measure of how much a chosen allocation deviates from the expected-value-maximizing allocation.

We call our measure *normalized risk premium* (NRP). For each budget restriction, we calculate the difference between the expected value (EV) of the EV-maximizing (risk-neutral) allocation and the EV of the chosen allocation; we normalize this difference via division by the

EV of the EV-maximizing allocation. The normalization ensures that the measure is comparable across different stake sizes. We average the measure across all $D_{\text{risk}} = 23$ decisions, $(c_1, c_2)_d$, that a participant made per type of budget restriction B^z_{risk}, where B^0_{risk} is the set of LBRs, and $B^{0.4}_{\text{risk}}$ is the set of SCBRs. Formally, for each individual, we calculate

$$NRP^z \ := \ \frac{1}{D_{\text{risk}}} \sum_{d \in B^z_{\text{risk}}} \frac{\max \mathrm{E}[c \mid \boldsymbol{x}_d] - 0.5\,(c_{1,d} + c_{2,d})}{\max \mathrm{E}[c \mid \boldsymbol{x}_d]} \times (1[RA_d] - 1[RL_d]). \tag{31}$$

This fraction assigns a value of 0 to a risk-neutral decision d and is nonnegative. Thus, it cannot differentiate between risk-averse ($1[RA_d] = 1$) and risk-loving ($1[RL_d] = 1$) allocations. To capture risk proclivity, we multiply the fraction by -1 whenever a participant foregoes a higher average payoff in favor of an increase in the spread of the payoffs in decision d.

The Spearman rank correlation of the NRP values between LBRs and SCBRs is very high ($0.87, p < 0.001$). This suggests that both types of budget restrictions capture the same relative ordering of risk preferences across individuals. We observe $NRP^0 > 0$ for 97% of participants when using LBRs and $NRP^{0.4} > 0$ for 89% of participants when using SCBRs. Based on two-sided t-tests, 93% of the calculated values for LBRs and 81% for SCBRs are significantly greater than 0 (at the 5% level). Additionally, with SCBRs, $NRP^{0.4} < 0$ is observed for 11% of participants, with the value being significantly different from 0 for 3% of participants. That is, for these participants, the allocations are on average consistent with risk-loving behavior. One would expect these individuals to exhibit NRP values close to 0 in the LBRs—which is the case for the majority of the respective participants.

5.3.2 Time Experiment: Model-Free Measures of Temporal Discounting and Present Bias. Constructing a model-free measure for time preferences is slightly more involved than for risk preferences. More specifically, constructing a model-free measure of discounting relies on the budget restrictions having slopes that are symmetric around 1. This symmetry implies that an individual who neither discounts the future nor is future-oriented allocates on average as much money to the later time point $t + k$ as to the earlier time point t.

Since our budget restrictions have slopes that are symmetric around 1, we can calculate the following payment ratio as a *normalized measure of discounting* (NMD) per individual as

$$NMD^z \ := \ \frac{1}{D_{\text{time}}} \sum_{d \in B^z_{\text{time}}} \frac{c_{t+k,d} - b_{t+k}}{c_{t,d} - b_t + c_{t+k,d} - b_{t+k}}. \tag{32}$$

Here, D_{time} denotes the 41 decisions, $(c_t, c_{t+k})_d$, that a participant made per type of budget restriction B^z_{time}, where B^0_{time} is the set of LBRs, and $B^{0.4}_{\text{time}}$ is the set of SCBRs. The NMD ranges from 0 to 1 and equals 0.5 if an individual allocates, on average, the same monetary amount to the earlier and later date. Values below 0.5 mean that individuals allocate, on average, a higher monetary amount to the earlier date, which reflects temporal discounting.

The Spearman rank correlation of the NMD values between the two types of budget restrictions is high ($0.64, p < 0.001$). This demonstrates that LBRs and SCBRs capture a similar relative ordering of individuals' discounting. In line with the literature (Ericson and Laibson 2019;

Cohen et al. 2020), we find that the majority of individuals discount the future: 80% of individuals allocate, on average, more money ($NMD^z < 0.5$) to the earlier date in LBRs, and 67% do so in SCBRs (for 30% and 18%, respectively, the NMD measure is significantly different from 0.5 at the 5% level in two-sided t-tests). We observe $NMD^0 > 0.5$ for 20% of individuals and $NMD^{0.4} > 0.5$ for 33% of individuals in SCBRs (2% and 7%, respectively, significantly different from 0.5 at the 5% level in two-sided t-tests). Averaging over all individuals, we find an average NMD of 0.39 in LBRs and an average NMD of 0.46 in SCBRs. Figure 8 shows histograms of this measure (pooled over all participants).

This finding is supported by participants' self-reported decision strategies (see Section H.2 in the Online Appendix). Participants were generally well aware of the intertemporal nature of the decisions. None of them stated a preference for the later payment date (say, to counteract self-control issues), while many participants stated that they considered the timing of the payments unimportant or that they allocated a larger share to the earlier payment date.

To obtain a model-free measure of present bias, we compare NMD^z for those decision situations in which $t = 0$ with NMD^z for the decision situations in which $t > 0$, keeping the other parameters (delay k, budget m, and slope R) constant. This means we can use 8 decisions for $t = 0$ and 8 decisions for $t > 0$ per type of budget restriction B^z_{time} for this analysis (see Table 4). We do not find evidence for present bias in LBRs ($p > 0.71$) nor in SCBRs ($p > 0.13$), and the rank correlation of the measure across the two type of budget restrictions is virtually zero. Both may be a consequence of the rather low number of observations on which this analysis is based.

Lastly, based on the variability of decisions, one can think of devising a model-free measure of the desire to smooth income over time: smoothing would drive decisions away from the endpoints of the budget restrictions, toward the 45° line. As a simple binary measure, one could simply check whether a participant picks any interior allocation at all. For a more gradual measure, however, there is no natural benchmark—unlike for the model-free measure of discounting with a natural benchmark of 0.5—so we do not investigate it further.

The measure of discounting and, particularly, any gradual measure of smoothing based on the variability of choices nicely illustrate the limitations of model-free measures: They are unable to separate preferences from noise. This is because noise mechanically biases the model-free measures towards the center of the choice set. In the case of choice lists, this is towards the middle option of the list (see Andersson et al. 2016). In the case of budget restrictions, noise generates (i) decisions with large variance and (ii) decisions on either side of the 45° line. Hence, (i) no desire to smooth income and (ii) an absence of discounting would be diagnosed. Structural estimation overcomes this limitation by explicitly accounting for the (in)consistency in participants' decisions—at the cost of doing so from the perspective of a particular theoretical model. In our case, noise is captured by the parameter σ, see equation (30).

5.3.3 Risk Experiment: Structural Estimates of the Coefficient of Relative Risk Aversion. The number of corner allocations is much lower in the risk experiment than in the time experiment. It is still substantially reduced by moving from LBRs to SCBRs, as reported in Section 5.2.1. This reduction and the associated increase in the number of individuals who choose at least one interior allocation translates into improved estimability on the individual level: while Tobit

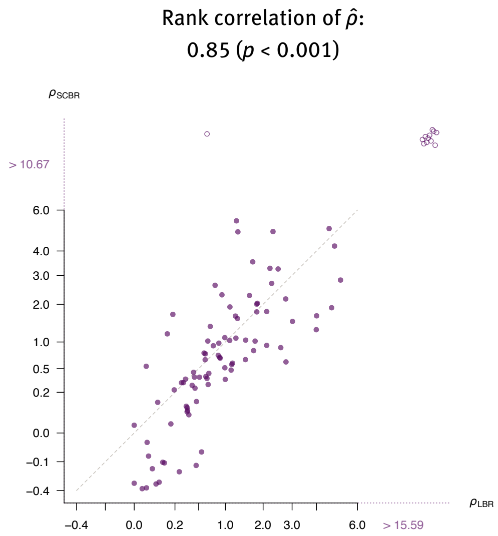


Figure 11. Risk experiment: Scatterplot of estimated ρ values

Notes: The vertical axis shows parameter estimates from SCBR data, and the horizontal axis shows parameter estimates from LBR data. The axes are scaled according to $\text{sgn}(x)\sqrt{|x|}$ to allow for better differentiation of the values around 0. For display purposes, estimates above the indicated thresholds (∘ open markers) are placed depending on their rank instead of their absolute values.

estimation does not converge for two participants (IDs 8, 10) when using LBRs (see Table G.1 in the Online Appendix), it converges for all participants when using SCBRs (see Table G.2 in the Online Appendix).[25]

Figure 11 presents individual ρ estimates from the risk experiment, based on choices from LBRs and SCBRs and estimated via NLME (see Section 3.2.2). The complete set of parameter estimates is reported in Tables G.1 and G.2 in the Online Appendix. The Spearman rank correlation of $\hat{\rho}$ estimates from LBRs and SCBRs is very high (0.85, $p < 0.001$), suggesting that parameter estimates obtained from SCBRs reflect the same ordering of individuals' risk attitudes as the estimates obtained from LBRs.[26]

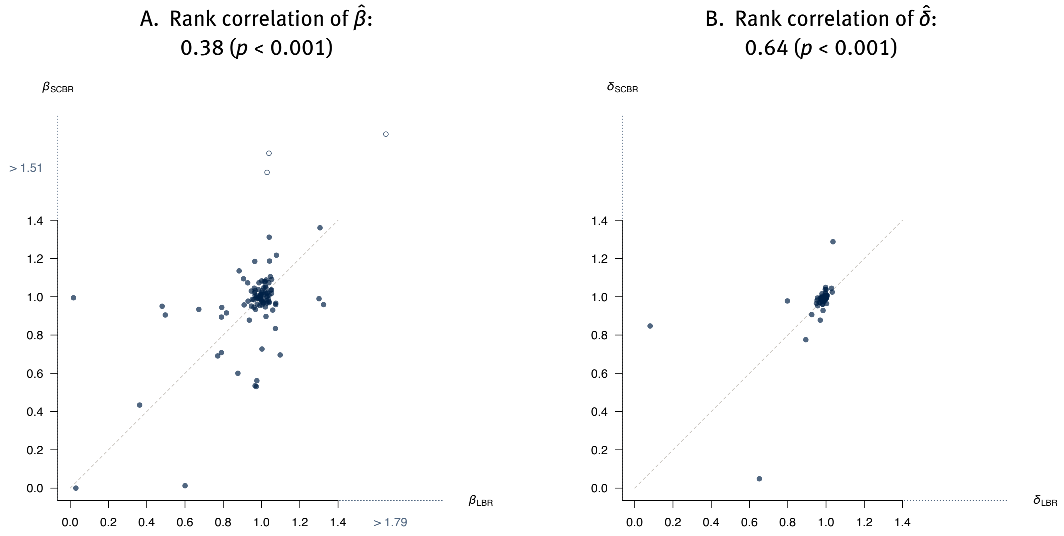
Based on two-sided t-tests, 92% of participants obtain significantly positive values of ρ for LBRs, and 74% do so for SCBRs. In addition, SCBRs are able to discern risk-loving from risk-neutral individuals: 13% of individuals obtain negative ρ estimates for SCBRs, which are significantly different from 0 for 9% of participants, indicating risk-loving choices. Finally, the ρ estimates are not significantly different from 0 for 8% and 17% of participants for LBRs and SCBRs, respectively, indicating (approximately) risk-neutral choices (all tests at the 5% level).

5.3.4 Time Experiment: Structural Estimates of Exponential Discounting, Present Bias, and Curvature of the Utility Function.

Section 5.2.2 shows that SCBRs, compared to LBRs, lead to a drastic reduction of corner allocations (−87%) and an increase in the number of individuals who make at least one interior allocation. As mentioned in our motivation, this translates to better estimability on the individual level. While the Tobit estimation did not converge for six

25. The non-convergence of the Tobit estimation for participants 8 and 10 is because these two participants chose the risk-neutral corner allocation in every decision. The Tobit regression also obtains inadmissible $\hat{\rho}$ values for three individuals in LBRs ($\hat{\rho} < 0$ for IDs 3, 70, and 91) and for four individuals in SCBRs ($\hat{\rho} < -0.4$ for IDs 2, 47, 70, and 72). Our NLME procedure corrects this.

26. In Table I.5 in the Online Appendix, we report rank correlations of preferences elicited twice via the same method with an 8-day distance, based on data from the 50 participants who took part in both the time and the risk experiment. These correlations provide a benchmark for the maximum correlation that one might expect and range from 0.52 to 0.87 for measures of risk preferences.



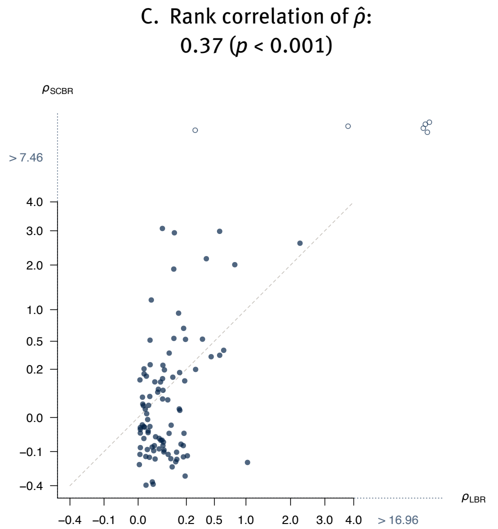


Figure 12. Time experiment: Scatterplots of estimated preference parameters

Notes: The vertical axis shows parameter estimates from SCBR data, and the horizontal axis shows parameter estimates from LBR data. Panel B illustrates the weekly discount factor δ. The axes in panel C are scaled according to $\text{sgn}(x)\sqrt{|x|}$ to allow for better differentiation of the values around 0. For display purposes, estimates above the indicated thresholds (∘ open markers) are placed depending on their rank instead of their absolute values.

individuals (IDs 8, 13, 33, 49, 52, 62) based on their choices from LBRs (see Table H.1 in the Online Appendix), the estimation converged for all individual when using choices from SCBRs (see Table H.2 in the Online Appendix).[27]

Figure 12 plots the individual β, δ, and ρ estimates based on our participants' choices from LBRs (horizontal axis) and SCBRs (vertical axis).[28] The complete set of parameter estimates on the individual level is reported in Tables H.1 and H.2 in the Online Appendix. Spearman rank correlations between estimates based on choices from LBRs and SCBRs are high, amount-

27. The Tobit estimation for individual 70 did not converge because choices show no variation and are all on the 45° line (see Figure 9 and Figure 10), which implies extreme concavity of the utility function. The Tobit regression also obtains inadmissible $\hat{\rho}$ values in both LBRs ($\hat{\rho} < 0$ for IDs 4, 22, 63, 70) and SCBRs ($\hat{\rho} < -0.4$ for IDs 4, 9, 50, 70). Our NLME procedure corrects this.

28. Note that in most studies, ρ is primarily a nuisance parameter that is not of interest in itself, but needs to be accounted for to estimate δ without bias.

ing to 0.38 ($p < 0.001$) for β, to 0.64 ($p < 0.001$) for δ, and to 0.37 ($p < 0.001$) for ρ.[29] This suggests that parameter estimates obtained from SCBRs reflect a similar ordering of individuals' intertemporal preferences as those obtained from LBRs. This is particularly true for the discounting parameter δ, which is arguably the parameter that experimenters are most interested in when using CTBs with monetary payments.

The fact that the rank correlations are lower than in the risk experiment is unsurprising, since the elicitation of time preferences involves accounting for different motives, and these are not completely separable in the presence of noise. We find that the SCBR-based estimates predict participants' choices from LBRs well (slightly worse than the LBR-based estimates, as one would expect) and that the LBR-based estimates predict participants' choices from the SCBRs well (slightly worse than the SCBR-based estimates, as one would expect).

As in the risk experiment, we observe a wider range of estimated ρ values: A sizable share of individuals (48%) feature point estimates $\hat{\rho} < 0$. That is, utility over (small amounts of) money is estimated to be convex for these individuals. For 23% of participants, the negative $\hat{\rho}$ for SCBRs is significantly different from 0 (two-sided t-tests, 5% level). 77% of participants obtain significantly positive estimates $\hat{\rho} > 0$ for LBRs and 24% for SCBRs (two-sided t-tests, 5% level). Hence, for 23% and 53% of participants, the estimate $\hat{\rho}$ is not significantly different from 0 for LBRs and SCBRs, respectively, consistent with (approximately) linear utility.

In line with the pattern that we describe in Section 5.2.2, we do not observe many individuals for whom an LBR-based estimate of ρ close to 0 turns into a (significantly) positive SCBR-based $\hat{\rho}$. This could have been the case if participants picked corner allocations in LBRs because they are focal points, easily selected, and trump a smoothing motive. The fact that most participants who are estimated to have linear utility in LBRs are also estimated to have linear utility in SCBRs suggests that they indeed do not have a desire to smooth income.

5.4 Correlation of Structural Estimates with Individual Characteristics

Another way to investigate whether LBRs and SCBRs yield otherwise comparable results is to examine how the estimated preference parameters relate to individual characteristics, and in particular to other commonly used preference measures such as self-reports in surveys and hypothetical decisions. Figure 13 reveals that the parameter estimates from LBRs and SCBRs yield similar rank correlations with self-reported preference measures. In the risk domain (panel A), rank correlations are virtually identical. In the time domain (panel B), a similar picture emerges. The only exceptions are the rank correlations with the time staircase (GPS) and the patience (SOEP) measure, which are higher by 0.13 and 0.10, respectively, when using LBRs.

Our results are generally in line with values reported in the literature. For example, Attanasi et al. (2018, p. 354) find a correlation of 0.47 between a risk measure based on Holt and Laury (2002) and risk-taking assessed via the SOEP general risk question. For time preferences, Vischer et al. (2013) find that the correlations between self-reported and experimentally elicited measures are approximately 0.15—to which our correlations compare very favorably.

29. Our benchmark rank correlations for eliciting a particular preference using the same method twice range from 0.47 to 0.92 regarding measures of time preferences (see Table I.5 in the Online Appendix).

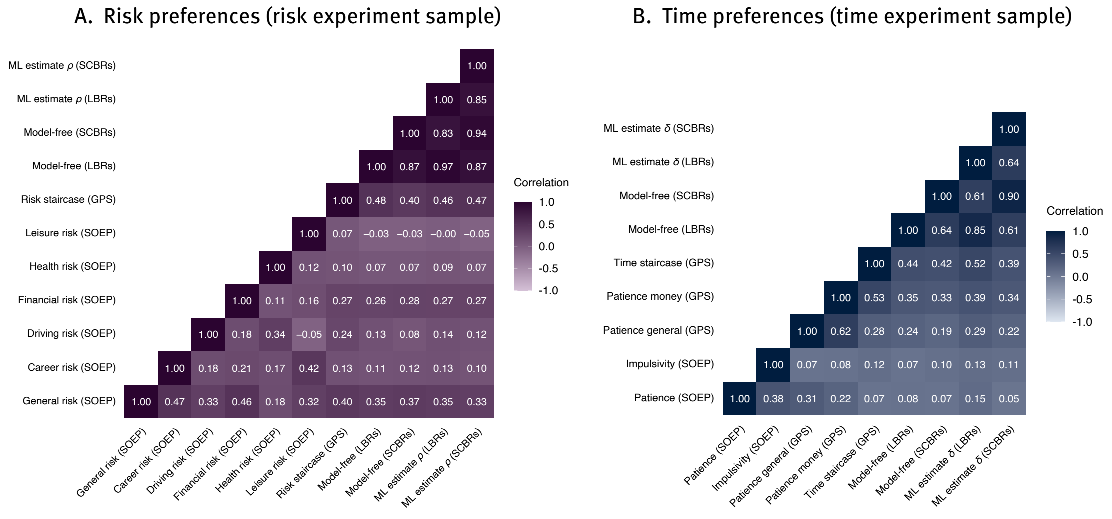


Figure 13. Heatmaps depicting the rank correlation between different measures of risk preferences (panel A) and between different measures of time preferences (panel B)

Notes: In the risk domain, we invert the SOEP and staircase measures to align them with the direction of our structural ρ estimates; that is, higher values indicate higher risk aversion instead of higher willingness to take risks. In the time domain, we similarly invert the time staircase, SOEP patience, and model-free measures to match our structural δ estimates; that is, higher values indicate more pronounced patience instead of more pronounced impatience.

The literature points towards an association of risk attitudes with IQ (Dohmen et al. 2010). We find a correlation of our IQ measures (Raven score and math grade) with estimated risk attitudes in the expected direction—that is, higher IQ goes along with less risk aversion. The correlations are insignificant, though. This may be because our sample is too small or too homogeneous to detect such a relation, or because our IQ measures are not precise enough.

In line with the literature (e.g., Charness and Gneezy 2012; Filippin and Crosetto 2016), we find that female participants are more risk-averse than male participants. Specifically, the median $\hat{\rho}$ is 1.23 for female and 0.51 for male participants in LBRs. The difference between women and men is significant (Wilcoxon rank-sum test, $W = 1431.5, p < 0.01$). We find the same pattern for SCBRs, in which the median $\hat{\rho}$ is 1.18 for female participants and 0.36 for male participants. Also here, the difference between women and men is significant ($W = 1414, p < 0.01$).

5.5 No Correlation of Curvature Estimates across Domains

Andreoni and Sprenger (2012a, p.3335) find that the curvature of the utility function, when estimated from CTBs, is substantially lower than estimates obtained via risk multiple price lists and that estimates across the domains are uncorrelated. With this in mind, we let 50 participants of the time experiment also participate in the risk experiment (see Section 4.1). This approach allows us to examine how ρ estimates from the time and the risk experiment relate to each other.

We find virtually no correlation between the individual ρ estimates across the two domains, neither for the LBR-based ($0.02, p = 0.88$) nor for the SCBR-based ($-0.13, p = 0.38$) estimates.

The absence of a relation is also apparent from individuals' choices: Figures 6 and 9 show that some (highly) risk-averse individuals also smooth income over time (IDs 3, 4)—behavior that is captured by strongly concave utility over money in both domains. Other (highly) risk-averse individuals, however, do not exhibit any income smoothing (e.g., IDs 2, 5, 42, 49) so that their behavior is explained by strongly concave utility in the risk domain, but (close to) linear utility in the time domain. On average, we find that the curvature of the utility function is more pronounced in the risk domain than in the time domain for both LBRs and SCBRs, in line with the findings of Andreoni and Sprenger (2012a), Abdellaoui et al. (2013), and Cheung (2020).

The missing correlation and the level shift indicate a disconnect between preferences in the risk and time domain and thereby cast doubt on the approach of Andersen et al. (2008) to use choices from the risk domain to inform parameter estimation in the time domain.

6 Discussion

We have introduced and tested a novel method for estimating preference parameters from experimental choices: strictly concave budget restrictions. SCBRs generalize a method that is highly popular in the literature: estimating preference parameters from linear budget restrictions. We have shown that our approach improves upon LBRs in two critical aspects:

(i) SCBRs drastically reduce the incidence of corner allocations, with a reduction of 63% in the risk experiment and of 87% in the time experiment. Also, the number of individuals who do not pick any interior allocation across trials is reduced. These reductions directly translate to an improved estimability of preference parameters on the individual level.
(ii) SCBRs expand the range of identifiable preference parameters vis-à-vis LBRs by making it possible to distinguish risk-loving from risk-neutral behavior. We find that 9% of the individuals who participated in our risk experiment are classified as risk-loving.

SCBRs achieve these improvements with virtually no drawbacks relative to LBRs: There is no indication that overall decision quality is worse in choices from SCBRs than from LBRs. Also, LBRs and SCBRs yield similar rank correlations with other commonly used measures of risk and time preferences as well as individual characteristics.

One finding, however, merits further discussion: In the time experiment, 48% of our participants are estimated to exhibit convex utility over money, $\hat{\rho} < 0$, when using SCBRs, and for 23% of the participants this is statistically significant. Certainly, some individuals for whom ρ is estimated to be negative indeed have preferences that are best described by convex utility over money—which can only be captured by SCBRs and goes undetected by LBRs. It is conceivable, however, that several negative ρ estimates are driven by noise in participants' decisions: We allowed very fine-grained choices of the desired payment allocations (on the €0.01 level for the low-stakes budget restrictions). This approach has the advantage of implementing the conditions used in the theoretical derivation—in which the payments c_t and c_{t+k} are continuous variables—as closely as possible. The fine-grainedness, however, comes at the cost of noise influencing virtually any interior allocation. As a result, the SCBRs in combination with our fine-grained implementation may be overly sensitive to noise and may lead to an overly large number of negative estimates of the curvature parameter ρ.

This suspicion is supported by participants' comments regarding their decision strategies that we inquired about in the postexperimental survey: Several participants who were assigned negative ρ estimates—and also some participants who were assigned positive ρ estimates—indicate that they intended to maximize the sum of the two (undiscounted) payments but did so only by approximation via eyeballing (see Section H.2 in the Online Appendix). Importantly, however, these participants virtually all receive δ estimates very close to 1. Hence, the variation in the estimated ρ values does not necessarily translate into variation in the estimated δ values.

We suggest to investigate this question in future research. A possible adaptation of our design is to reduce the granularity of the permitted choices. The current design implies that participants choose one allocation out of up to 2,455 possible allocations. This is much more fine-grained than the 101 possible allocations ($0.20 steps for the later payment) in Andreoni and Sprenger (2012a) and the up to 801 possible allocations in Sun and Potters (2022). A reduction of the granularity could make participants consider each allocation more closely, thereby reducing noise.

A different adaptation would be to supplement the display of the SCBRs by information that is de facto available in the LBRs: (i) When facing an LBR, a participant can calculate the slope, or at least gauge it, by the ratio of the endpoints of the budget line. This does not apply to SCBRs, whose very nature is that the slope varies. (ii) With LBRs—even if they are not depicted as graphs, as in most studies so far—it is pretty apparent which allocation maximizes the sum of the two (undiscounted) payments. When facing an SCBR, finding the allocation that maximizes the sum requires more effort. Following this rationale, supplementing SCBRs by the information that is readily available in LBRs (for a mock-up, see Figure J.1 in the Online Appendix) might help reduce noise in participants' decisions.

Whichever outcome one expects, SCBRs have crucial desirable properties: If a researcher finds it credible that a sizable number of individuals have convex utility over money, then SCBRs have the desirable property that they are able to identify this type of preference. If a researcher finds it more likely that individuals have linear utility over money, then SCBRs have the desirable property that observed choices are interior allocations, while LBRs lead to less informative corner allocations.

An important next step would be to include SCBRs in large-scale surveys and field experiments, so that we can learn about their performance in settings where participants' time is scarce and only a few responses per participant can be collected. Future research could also assess the consistency of choices in SCBRs based on efficiency indexes or violations of the Generalized Axiom of Revealed Preferences.

Already now, SCBRs are well suited for use by empirical researchers. They are readily understandable by participants, and it is straightforward to integrate our JavaScript- and HTML-based implementation into online studies, laboratory experiments, and (large-scale) surveys. SCBRs are generally applicable in all scenarios where LBRs are currently used: the analysis of social decisions, decisions under risk, and intertemporal decisions. SCBRs promise to be more cost-effective than LBRs and to simplify the estimation of preferences.

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Online Appendix

Appendix A Proof of the Proposition

Setting. We consider an additively separable utility function $U(c_i, c_j; \boldsymbol{\theta})$, where each component can be represented by a CRRA (power utility) form with curvature parameter ρ:

$$U(c_i, c_j; \boldsymbol{\theta}) \;:=\; u(c_i, \rho) + \alpha\, u(c_j, \rho), \tag{A.1}$$

where

$$u(c; \rho) \;:=\; \begin{cases} (c^{1-\rho} - 1)\,/\,(1-\rho) & \text{if } \rho \neq 0, \\ \ln(c) & \text{if } \rho = 0, \end{cases} \tag{A.2}$$

and $\alpha > 0$ is an arbitrary weighting factor. Hence, $\boldsymbol{\theta} := (\alpha, \rho)$ in this case. The first-order necessary condition for an interior allocation from equation (4) in the main text then becomes

$$\frac{1}{\alpha}\left(\frac{c_i}{c_j}\right)^{-\rho} \;=\; \left(\frac{p_i}{p_j}\right)^{1+z}\left(\frac{c_i}{c_j}\right)^{z} \quad\Longleftrightarrow\quad \frac{c_i}{c_j} \;=\; \left[\frac{1}{\alpha}\left(\frac{p_j}{p_i}\right)^{1+z}\right]^{\frac{1}{\rho+z}}. \tag{A.3}$$

We first show that the set of ρ values that lead to interior allocations is $(-z, \infty)$. That is, for a larger z, a larger interval of ρ values leads to interior allocations. We then show that for a given z, the relation between ρ and the ratio $c_i\,/\,c_j$ is a one-to-one mapping for all admissible ρ with $c_i\,/\,c_j$ spanning the entire range of interior allocations. Consequently, a unique ρ value can be recovered from an observed $c_i\,/\,c_j$. Hence, for larger z values, a larger range of ρ values can be identified from observing $c_i\,/\,c_j$.

Put differently: Let D_z be the set of ρ values that lead to interior allocations for a given z. This set amounts to $D_z = (-z, \infty)$. Let I_z denote the set of identifiable curvature parameters ρ for a given z. We show that the two sets coincide: $I_z = D_z$. Hence, $I_z = (-z, \infty)$ so that $I_{z'} \subset I_{z''}$ for $z' < z''$.

Step 1: Boundedness of ρ. Our budget restrictions allow for nonnegative payments $c_i \geq 0$ and $c_j \geq 0$. An interior allocation amounts to strictly positive payments $c_i > 0$ and $c_j > 0$, while a corner allocation includes either $c_i = 0$ or $c_j = 0$.

The first-order necessary condition for an interior allocation is given by equation (A.3). Mathematically, the condition can be fulfilled by $\rho \neq -z$. However, the resulting allocation would minimize utility instead of maximizing it in the case of $\rho \leq -z$. Thus, the decision-maker picks a corner allocation whenever $\rho < -z$, as well as in the case of $\rho = z$ when the term in square brackets in equation (A.3) is not equal to 1. In the special case of $\rho = -z$ and the aforementioned term being equal to 1, the decision-maker is indifferent between all allocations on the budget restriction.

We therefore have $\rho \in D_z = (-z, \infty)$ as the interval of ρ values that lead to interior allocations.

Step 2: One-to-One Mapping That Spans the Entire Range of Both the Curvature Parameter and the Interior Allocations. Taking the logarithm of equation (A.3), we obtain

$$\ln\left(\frac{c_i}{c_j}\right) = \frac{1}{\rho+z}\left[-\ln(\alpha) + (1+z)\ln\left(\frac{p_j}{p_i}\right)\right]. \qquad (A.4)$$

This shows that c_i/c_j is a strictly monotone and continuous function of ρ. It also shows that $\lim_{\rho\to\infty}(c_i/c_j) = 1$: Large values of ρ drive the allocation towards $c_i = c_j$. It also shows that $\lim_{\rho\to -z}(c_i/c_j) = 0$ or $\lim_{\rho\to -z}(c_i/c_j) = \infty$, depending on whether the term in square brackets is positive or negative—equivalently, whether the term in square brackets in equation (A.3) is greater than or less than 1. To be precise, if the term is exactly 1, then $c_i/c_j = 1$.

Taken together, these properties imply:

(i) The limit considerations and the continuity imply that the admissible ρ values from $D_z = (-z, \infty)$ lead to payment ratios that cover the entire range of interior allocations: $(c_i/c_j) \in (0, \infty)$.
(ii) The limit considerations and the continuity imply that a ρ value that leads to an interior allocation for a given z' also leads to an interior allocation for $z'' > z'$. In other words, an increase in z does not turn an interior allocation into a corner allocation.
(iii) The strict monotonicity/one-to-one relation implies that a ρ value can be unambiguously recovered from an observed payment ratio (c_i/c_j) for a given z.[30]
(iv) Thus, the set I_z is identical to the interval D_z: $I_z = D_z = (-z, \infty)$.
(v) Consequently, the set of ρ values that are identifiable from observed payment ratios increases in z: $I_{z'} \subset I_{z''}$ for $z' < z''$.

Note that the following applies to the important benchmark case of linear budget restrictions ($z = 0$):

(i) Any interior allocation under (m, p_i, p_j) and $z = 0$ remains an interior allocation under (m, p_i, p_j) and $z > 0$.
(ii) An allocation at the boundary under $z = 0$ that is brought about by convex utility (e.g., when $\rho = -0.1$) can become an interior allocation under $z > 0$ (e.g., for $z = 0.2$). An allocation at the boundary under $z = 0$ that is brought about by linear utility ($\rho = 0$) for certain turns into an interior allocation under $z > 0$.
(iii) If $\rho = z$, which is in no way unrealistic with $z = 0$ because linear utility $\rho = 0$ is plausible for low amounts of money, the preference parameter α cannot be point-identified. It is only interval-identified by the price ratios between which a switch from one corner allocation to the other occurs. By contrast, with $z > 0$, $\rho = 0$ gives rise to an interior allocation which permits point identification of α.

□

30. The formula for calculating ρ from an observed payment ratio c_i/c_j is

$$\rho = \frac{-\ln\alpha + (1+z)\ln(p_j/p_i)}{\ln(c_i/c_j)} - z. \qquad (A.5)$$

Appendix B Theoretical Setting Altruism

Note that the method can be readily applied to the social domain (which we do not cover in our experiments). Assume, in line with one of the specifications that Andreoni and Miller (2002) investigate, that the decision-maker's utility is additively separable and given by

$$U(c_s, c_o; \alpha, \rho) \;=\; u(c_s; \rho) + \alpha\, u(c_o; \rho), \tag{B.1}$$

where c_s denotes the payoff for the decision-maker herself, c_o denotes the payoff for the other individual, and utility is of the power type,

$$u(c; \rho) \;:=\; \begin{cases} (c^{1-\rho} - 1) / (1-\rho) & \text{if } \rho \neq 0, \\ \ln(c) & \text{if } \rho = 0. \end{cases} \tag{B.2}$$

The altruism parameter α determines the decision-maker's valuation of the other person's utility relative to their own utility. We denote the budget restriction by

$$p_s^{1+z}\, c_s^{1+z} + p_o^{1+z}\, c_o^{1+z} \;=\; m^{1+z}. \tag{B.3}$$

Optimality at an interior point then requires that

$$\begin{aligned} \frac{1}{\alpha}\left(\frac{c_s}{c_o}\right)^{-\rho} &= \left(\frac{p_s}{p_o}\right)^{1+z}\left(\frac{c_s}{c_o}\right)^{z} \\ \Longleftrightarrow \qquad \frac{c_s}{c_o} &= \left[\frac{1}{\alpha}\left(\frac{p_o}{p_s}\right)^{1+z}\right]^{\frac{1}{\rho+z}} \;=:\; C^{\star}(p_s, p_o, z; \alpha, \rho). \end{aligned} \tag{B.4}$$

This has the same structure as equation (7) and equation (12) in the main text and allows estimating the preference parameters α and ρ in the same way as described in Section 3 in the main text.

Appendix C Estimation: Maximum Likelihood Criterion Function

Fundamental Objects and Notation. Below we provide a detailed outline of our strategy to estimate preference parameters. As explained in Section 2 in the main text, the budget restrictions may include baseline payments. We denote these by b_i and b_j. In the elicitation of risk preferences, $i = 1$ and $j = 2$. We set the baseline payments to 0 in the risk experiment, but they could be positive. In the elicitation of time preferences, $i = t$ and $j = t + k$. In the elicitation of time preferences, baseline payments are positive. Consequently, the maximum payments in the two states of the world or at the two payment dates, respectively, are given by $c_i^{\max}(\boldsymbol{x})$ and $c_j^{\max}(\boldsymbol{x})$, see equation (15) in the main text. The payment ratio can thus only be chosen between

$$C^{\min}(\boldsymbol{x}) \;\coloneqq\; \frac{b_i}{c_j^{\max}(\boldsymbol{x})} \quad \text{and} \quad C^{\max}(\boldsymbol{x}) \;\coloneqq\; \frac{c_i^{\max}(\boldsymbol{x})}{b_j}, \tag{C.1}$$

where $C^{\max}(\boldsymbol{x}) \to \infty$ for $b_j \to 0$.

The estimation rests on the assumption that an individual would like to implement a *desired* payment ratio $C^\star(\boldsymbol{x}, \boldsymbol{\theta})$. This desired payment ratio may lie within or outside the permitted bounds. We denote by (c_i, c_j) an observed decision of an individual.

Accounting for Censoring. The desired payment ratio in our case is the quantity $C^\star(\boldsymbol{x}, \boldsymbol{\theta})$ given by the first-order necessary conditions for an interior allocation, equation (7) or equation (12) in the main text, respectively.

The estimation assumes that the theoretically predicted payment ratio is implemented by individuals with some sort of decision noise. If we are willing to make distributional assumptions regarding the error term, we can derive analytical expressions for the probability that the predicted payment ratios are beyond the bounds. Just like in the Tobit model, we assume that the error term ε is additive on the log payment ratio:

$$g \;=\; \ln(C^\star(\boldsymbol{x}, \boldsymbol{\theta})) + \varepsilon. \tag{C.2}$$

We further assume that ε is normally distributed with mean 0 and variance σ^2.

Using this assumption, the choice probabilities for corner allocations are given by

$$\Pr[\ln(C^\star(\boldsymbol{x}, \boldsymbol{\theta})) + \varepsilon \leq \ln(C^{\min}(\boldsymbol{x}))] \;=\; \Phi\!\left(\frac{\ln(C^{\min}(\boldsymbol{x})) - \ln(C^\star(\boldsymbol{x}, \boldsymbol{\theta}))}{\sigma}\right) \tag{C.3}$$

and

$$\Pr[\ln(C^\star(\boldsymbol{x}, \boldsymbol{\theta})) + \varepsilon \geq \ln(C^{\max}(\boldsymbol{x}))] \;=\; 1 - \Phi\!\left(\frac{\ln(C^{\max}(\boldsymbol{x})) - \ln(C^\star(\boldsymbol{x}, \boldsymbol{\theta}))}{\sigma}\right), \tag{C.4}$$

respectively. Note that these equations indicate that a particular boundary allocation is the more likely to be picked, the farther a desired allocation exceeds the respective boundary. It is in this way that the model can capture both accidental and deliberate choices of the boundary allocations.

The probability density of observing a particular interior allocation is given by

$$\frac{1}{\sigma}\,\phi\!\left(\frac{\ln(c_i / c_j) - \ln(C^\star(\boldsymbol{x}, \boldsymbol{\theta}))}{\sigma}\right). \tag{C.5}$$

Log Likelihood Function. Collecting the three terms above, the log likelihood contribution of a single observation (c_i, c_j) for estimating the parameter vector $\boldsymbol{\theta}$ is given by

$$
\begin{aligned}
l[\boldsymbol{\theta} \mid \boldsymbol{x}, (c_i, c_j)] \ = \ & \\
& 1\left[\ln\left(\frac{c_i}{c_j}\right) \leq \ln(C^{\min}(\boldsymbol{x}))\right] \times \ln\left[\Phi\left(\frac{\ln(C^{\min}(\boldsymbol{x})) - \ln(C^{\star}(\boldsymbol{x}, \boldsymbol{\theta}))}{\sigma}\right)\right] \\
& + 1\left[\ln\left(\frac{c_i}{c_j}\right) \geq \ln(C^{\max}(\boldsymbol{x}))\right] \times \ln\left[1 - \Phi\left(\frac{\ln(C^{\max}(\boldsymbol{x})) - \ln(C^{\star}(\boldsymbol{x}, \boldsymbol{\theta}))}{\sigma}\right)\right] \\
& + 1\left[\ln(C^{\min}(\boldsymbol{x})) < \ln\left(\frac{c_i}{c_j}\right) < \ln(C^{\max}(\boldsymbol{x}))\right] \times \ln\left[\frac{1}{\sigma}\,\phi\left(\frac{\ln(c_i / c_j) - \ln(C^{\star}(\boldsymbol{x}, \boldsymbol{\theta}))}{\sigma}\right)\right], \qquad \text{(C.6)}
\end{aligned}
$$

where $1[\cdot]$ is the indicator function.

We use $\boldsymbol{X}$ to denote the matrix that stacks all the vectors $\boldsymbol{x}_d$ of experimental parameters that a given individual faces across decisions d. The matrix $\boldsymbol{C}$ stacks all the allocations $(c_i, c_j)_d$ which that individual chose across decisions d.

The log likelihood function for the individual is obtained by summing the log likelihood contributions over all decisions $d = 1, \ldots, D$:

$$L(\boldsymbol{\theta} \mid \boldsymbol{X}, \boldsymbol{C}) \ = \ \sum_{d=1}^{D} l[\boldsymbol{\theta} \mid \boldsymbol{x}_d, (c_i, c_j)_d]. \qquad \text{(C.7)}$$

The maximum likelihood estimate of $\boldsymbol{\theta}$ for the individual is then

$$\hat{\boldsymbol{\theta}}^{\text{MLE}} \ := \ \arg\max_{\boldsymbol{\theta}} L(\boldsymbol{\theta} \mid \boldsymbol{X}, \boldsymbol{C}). \qquad \text{(C.8)}$$

Appendix D Detailed Description of the Risk Experiment

Table D.1. Parameter values used in the risk experiment

Decision situation #	Base payment in state 1 b_1 (€)	Base payment in state 2 b_2 (€)	Probability of state 1 q	Curvature z	Budget m (€)	Price ratio p_2/p_1
1	0.00	0.00	0.5	0.0	60.00	2.00000
2	0.00	0.00	0.5	0.0	52.50	1.75000
3	0.00	0.00	0.5	0.0	45.00	1.50000
4	0.00	0.00	0.5	0.0	37.50	1.25000
5	0.00	0.00	0.5	0.0	30.00	1.00000
6	0.00	0.00	0.5	0.0	30.00	0.80000
7	0.00	0.00	0.5	0.0	30.00	0.66667
8	0.00	0.00	0.5	0.0	30.00	0.57143
9	0.00	0.00	0.5	0.0	30.00	0.50000
10	0.00	0.00	0.5	0.0	80.00	2.00000
11	0.00	0.00	0.5	0.0	70.00	1.75000
12	0.00	0.00	0.5	0.0	60.00	1.50000
13	0.00	0.00	0.5	0.0	50.00	1.25000
14	0.00	0.00	0.5	0.0	40.00	1.00000
15	0.00	0.00	0.5	0.0	40.00	0.80000
16	0.00	0.00	0.5	0.0	40.00	0.66667
17	0.00	0.00	0.5	0.0	40.00	0.57143
18	0.00	0.00	0.5	0.0	40.00	0.50000
19	0.00	0.00	0.5	0.4	60.00	2.00000
20	0.00	0.00	0.5	0.4	52.50	1.75000
21	0.00	0.00	0.5	0.4	45.00	1.50000
22	0.00	0.00	0.5	0.4	37.50	1.25000
23	0.00	0.00	0.5	0.4	30.00	1.00000
24	0.00	0.00	0.5	0.4	30.00	0.80000
25	0.00	0.00	0.5	0.4	30.00	0.66667
26	0.00	0.00	0.5	0.4	30.00	0.57143
27	0.00	0.00	0.5	0.4	30.00	0.50000
28	0.00	0.00	0.5	0.4	80.00	2.00000
29	0.00	0.00	0.5	0.4	70.00	1.75000
30	0.00	0.00	0.5	0.4	60.00	1.50000
31	0.00	0.00	0.5	0.4	50.00	1.25000
32	0.00	0.00	0.5	0.4	40.00	1.00000
33	0.00	0.00	0.5	0.4	40.00	0.80000
34	0.00	0.00	0.5	0.4	40.00	0.66667
35	0.00	0.00	0.5	0.4	40.00	0.57143
36	0.00	0.00	0.5	0.4	40.00	0.50000
37	0.00	0.00	0.5	0.0	270.00	1.50000
38	0.00	0.00	0.5	0.0	225.00	1.25000
39	0.00	0.00	0.5	0.0	180.00	1.00000
40	0.00	0.00	0.5	0.0	180.00	0.80000
41	0.00	0.00	0.5	0.0	180.00	0.66667
42	0.00	0.00	0.5	0.4	270.00	1.50000
43	0.00	0.00	0.5	0.4	225.00	1.25000
44	0.00	0.00	0.5	0.4	180.00	1.00000
45	0.00	0.00	0.5	0.4	180.00	0.80000
46	0.00	0.00	0.5	0.4	180.00	0.66667

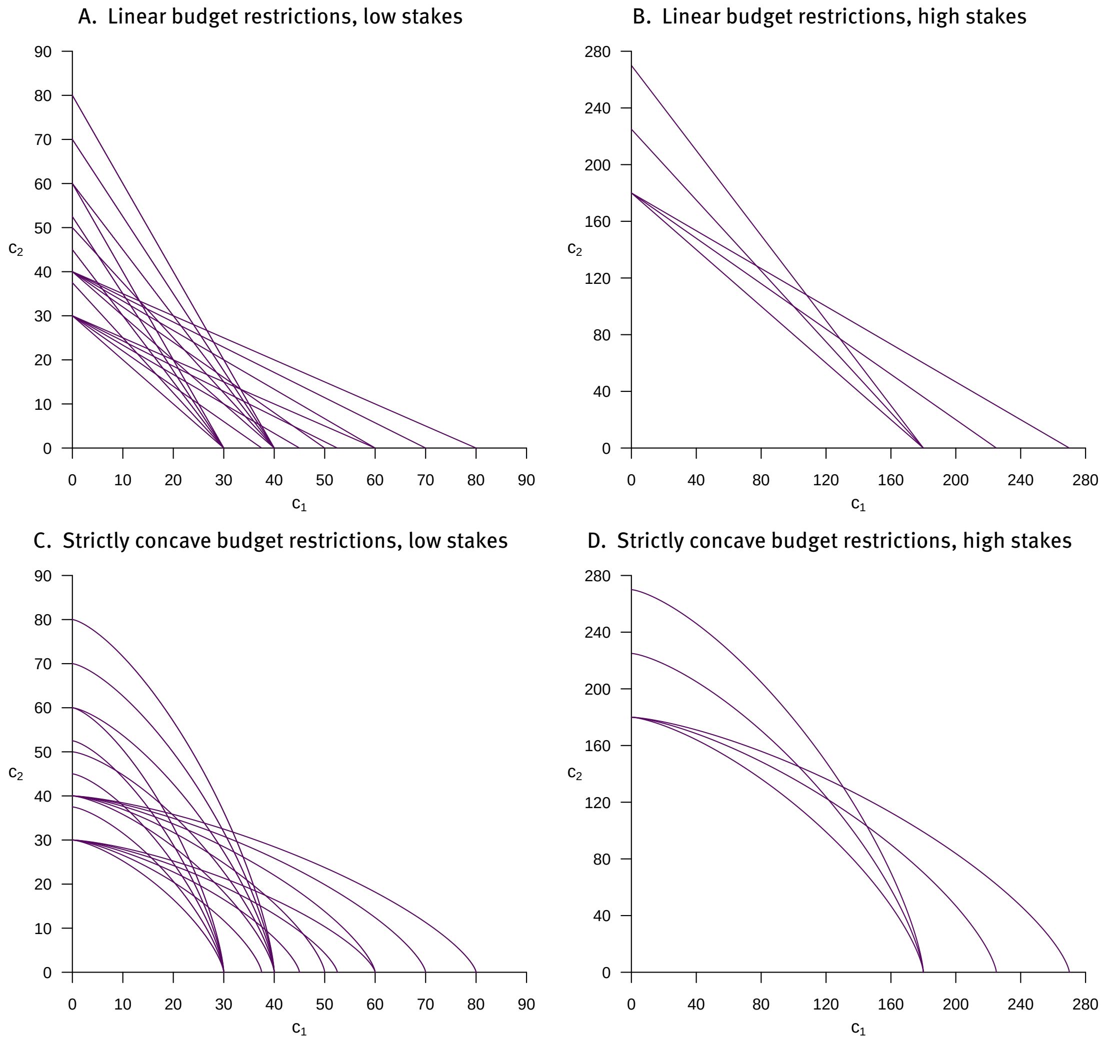


Figure D.1. Graphical illustration of the budget restrictions used in the risk experiment

Appendix E Detailed Description of the Time Experiment

Table E.1. Parameter values used in the time experiment

Decision situation #	Base payment at earlier date b_t (€)	Base payment at later date b_{t+k} (€)	Curvature z	Front-end delay t (weeks)	Delay k (weeks)	Budget m (€)	Price ratio $p_{t+k}/p_t = 1/R$
1	1.50	1.50	0.0	1	5	20.00	1.42857
2	1.50	1.50	0.0	1	5	17.50	1.25000
3	1.50	1.50	0.0	1	5	15.56	1.11111
4	1.50	1.50	0.0	1	5	14.70	1.05000
5	1.50	1.50	0.0	1	5	14.00	1.00000
6	1.50	1.50	0.0	1	5	14.00	0.95238
7	1.50	1.50	0.0	1	5	14.00	0.90000
8	1.50	1.50	0.0	1	5	14.00	0.80000
9	1.50	1.50	0.0	1	5	14.00	0.70000
10	1.50	1.50	0.0	1	5	25.00	1.25000
11	1.50	1.50	0.0	1	5	21.00	1.05000
12	1.50	1.50	0.0	1	5	20.00	1.00000
13	1.50	1.50	0.0	1	5	20.00	0.95238
14	1.50	1.50	0.0	1	5	20.00	0.80000
15	1.50	1.50	0.0	1	10	20.00	1.42857
16	1.50	1.50	0.0	1	10	17.50	1.25000
17	1.50	1.50	0.0	1	10	15.56	1.11111
18	1.50	1.50	0.0	1	10	14.70	1.05000
19	1.50	1.50	0.0	1	10	14.00	1.00000
20	1.50	1.50	0.0	1	10	14.00	0.95238
21	1.50	1.50	0.0	1	10	14.00	0.90000
22	1.50	1.50	0.0	1	10	14.00	0.80000
23	1.50	1.50	0.0	1	10	14.00	0.70000
24	1.50	1.50	0.0	1	10	25.00	1.25000
25	1.50	1.50	0.0	1	10	21.00	1.05000
26	1.50	1.50	0.0	1	10	20.00	1.00000
27	1.50	1.50	0.0	1	10	20.00	0.95238
28	1.50	1.50	0.0	1	10	20.00	0.80000
29	1.50	1.50	0.0	0	5	14.70	1.05000
30	1.50	1.50	0.0	0	5	14.00	0.95238
31	1.50	1.50	0.0	0	5	21.00	1.05000
32	1.50	1.50	0.0	0	5	20.00	0.95238
33	1.50	1.50	0.0	0	10	14.70	1.05000
34	1.50	1.50	0.0	0	10	14.00	0.95238
35	1.50	1.50	0.0	0	10	21.00	1.05000
36	1.50	1.50	0.0	0	10	20.00	0.95238

Continued on next page.

Table E.1 (continued)

Decision situation #	Base payment at earlier date b_t (€)	Base payment at later date b_{t+k} (€)	Curvature z	Front-end delay t (weeks)	Delay k (weeks)	Budget m (€)	Price ratio $p_{t+k}/p_t = 1/R$
37	1.50	1.50	0.4	1	5	20.00	1.42857
38	1.50	1.50	0.4	1	5	17.50	1.25000
39	1.50	1.50	0.4	1	5	15.56	1.11111
40	1.50	1.50	0.4	1	5	14.70	1.05000
41	1.50	1.50	0.4	1	5	14.00	1.00000
42	1.50	1.50	0.4	1	5	14.00	0.95238
43	1.50	1.50	0.4	1	5	14.00	0.90000
44	1.50	1.50	0.4	1	5	14.00	0.80000
45	1.50	1.50	0.4	1	5	14.00	0.70000
46	1.50	1.50	0.4	1	5	25.00	1.25000
47	1.50	1.50	0.4	1	5	21.00	1.05000
48	1.50	1.50	0.4	1	5	20.00	1.00000
49	1.50	1.50	0.4	1	5	20.00	0.95238
50	1.50	1.50	0.4	1	5	20.00	0.80000
51	1.50	1.50	0.4	1	10	20.00	1.42857
52	1.50	1.50	0.4	1	10	17.50	1.25000
53	1.50	1.50	0.4	1	10	15.56	1.11111
54	1.50	1.50	0.4	1	10	14.70	1.05000
55	1.50	1.50	0.4	1	10	14.00	1.00000
56	1.50	1.50	0.4	1	10	14.00	0.95238
57	1.50	1.50	0.4	1	10	14.00	0.90000
58	1.50	1.50	0.4	1	10	14.00	0.80000
59	1.50	1.50	0.4	1	10	14.00	0.70000
60	1.50	1.50	0.4	1	10	25.00	1.25000
61	1.50	1.50	0.4	1	10	21.00	1.05000
62	1.50	1.50	0.4	1	10	20.00	1.00000
63	1.50	1.50	0.4	1	10	20.00	0.95238
64	1.50	1.50	0.4	1	10	20.00	0.80000
65	1.50	1.50	0.4	0	5	14.70	1.05000
66	1.50	1.50	0.4	0	5	14.00	0.95238
67	1.50	1.50	0.4	0	5	21.00	1.05000
68	1.50	1.50	0.4	0	5	20.00	0.95238
69	1.50	1.50	0.4	0	10	14.70	1.05000
70	1.50	1.50	0.4	0	10	14.00	0.95238
71	1.50	1.50	0.4	0	10	21.00	1.05000
72	1.50	1.50	0.4	0	10	20.00	0.95238
73	1.50	1.50	0.0	1	10	150.00	1.25000
74	1.50	1.50	0.0	1	10	126.00	1.05000
75	1.50	1.50	0.0	1	10	120.00	1.00000
76	1.50	1.50	0.0	1	10	120.00	0.95238
77	1.50	1.50	0.0	1	10	120.00	0.80000
78	1.50	1.50	0.4	1	10	150.00	1.25000
79	1.50	1.50	0.4	1	10	126.00	1.05000
80	1.50	1.50	0.4	1	10	120.00	1.00000
81	1.50	1.50	0.4	1	10	120.00	0.95238
82	1.50	1.50	0.4	1	10	120.00	0.80000

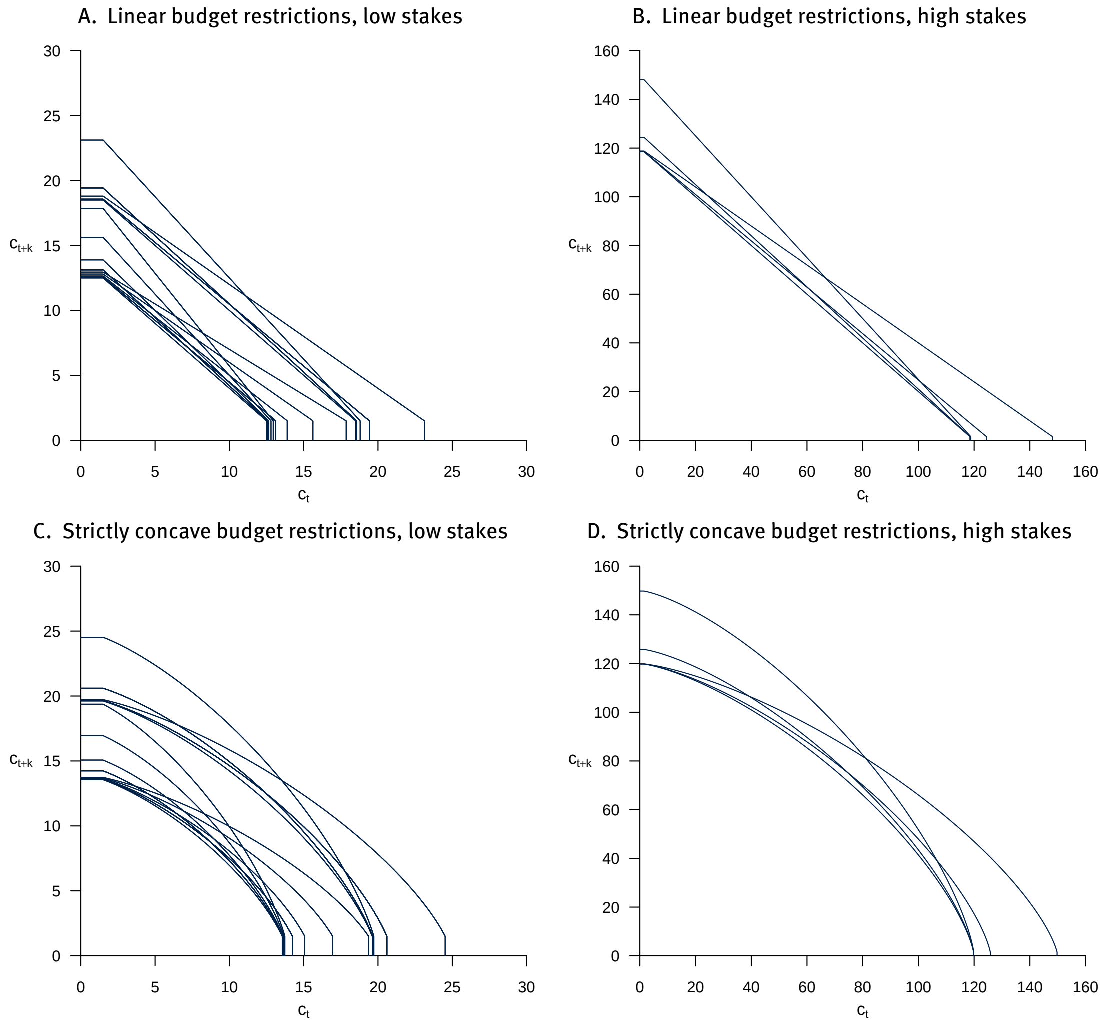


Figure E.1. Graphical illustration of the budget restrictions used in the time experiment

Note: For each LBR, the endpoint of the associated SCBR would have been identical in the absence of positive baseline payments.

Appendix F Share of Corner Allocations in Risk and Time Experiment

Table F.1. Frequency of corner allocations for different subsets of our budget restrictions

	Time			Risk		
	All earlier	All later	Total	All state 1	All state 2	Total
LBR	0.362	0.195	0.558	0.045	0.044	0.089
LBR (low stakes)	0.366	0.194	0.560	0.050	0.048	0.098
LBR (high stakes)	0.330	0.208	0.538	0.026	0.028	0.054
LBR ($R \geq 1$)	0.101	0.435	0.536	0.002	0.097	0.099
SCBR	0.057	0.015	0.072	0.018	0.015	0.033
SCBR (low stakes)	0.060	0.015	0.075	0.021	0.018	0.039
SCBR (high stakes)	0.036	0.010	0.046	0.008	0.002	0.010
SCBR ($R \geq 1$)	0.031	0.032	0.062	0.002	0.033	0.035

Table F.1 shows the proportion of corner allocations in the time and risk experiment under various data restrictions e.g., decision situations with only positive interest factors. In the time domain, 55.8% of choices from LBRs are corner allocations, while this numbers drops to 7.2% for SCBRs. In the risk domain, 8.9% of choices from LBRs are corner allocations, while this number drops to 3.3% for SCBRs.

The results are robust across various subsets of the budget restrictions that we used. High-stakes decision situations in the risk domain reduce the proportion of corner allocations further.

Appendix G Results Risk Experiment

G.1 Bias through Graphical Representation?

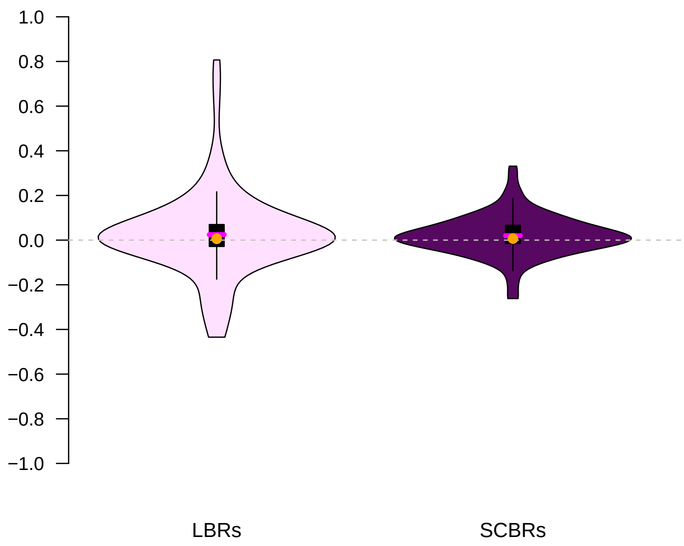


Figure G.1. Distribution of individual average log payment ratios, $\log(c_1 / c_2)$

Note: The pink horizontal bar indicates the mean; the orange dot indicates the median.

Figure G.1 shows violin plots of the distributions of the individual average log payment ratios, $\log(c_1 / c_2)$, in the risk experiment based on choices from the linear and strictly concave budget restrictions. Recall that c_1 was plotted on the vertical axis in the experiment. Hence, an average log payment ratio above 0 would indicate a bias towards the payoff displayed on the vertical axis, in line with the vertical–horizontal illusion.

Individual two-sided t-tests reveal that the average log payment ratio is significantly different from 0 (on the 5% level) for 3 out of 100 participants in LBRs; it is larger than 0 for two participants, and negative for one participant. In SCBRs, there is a statistically significant bias for 2 out of 100 participants, both in the direction favoring the vertical axis.

This suggests that our design did not introduce any strong visual bias that may influence the estimated preference parameters.

G.2 Individual Parameter Estimates

Table G.1. Individually estimated preference parameter, risk experiment, linear budget restrictions: degree of relative risk aversion, $\hat{\rho}$

Participant	Tobit			MLE		
ID	$\hat{\rho}$	SE of $\hat{\rho}$	$\hat{\sigma}$	$\hat{\rho}$	SE of $\hat{\rho}$	$\hat{\sigma}$
1	0.110	0.024	3.816	0.110	0.024	3.816
2	317.316	182.887	0.004	317.316	2.796	0.003
3	−82.546	143.110	0.044	72.167	11.872	0.046
4	99.459	1.285	0.000	123.443	0.061	0.000
5	3.016	0.809	0.188	3.016	0.809	0.188
6	0.317	0.087	1.818	0.317	0.087	1.818
7	1.131	0.084	0.138	1.131	0.084	0.138
8	n/a	n/a	0.000	0.000	0.000	0.000
9	0.606	0.043	0.244	0.606	0.043	0.244
10	n/a	n/a	21.417	0.000	0.000	0.000
11	0.588	0.064	0.390	0.588	0.064	0.390
12	1.808	1.181	0.763	1.808	1.172	0.763
13	0.881	0.049	0.133	0.881	0.049	0.133
14	0.040	0.007	5.503	0.040	0.007	5.503
15	1.234	0.145	0.200	1.234	0.145	0.200
16	0.057	0.012	7.123	0.057	0.012	7.123
17	0.619	0.100	0.551	0.619	0.100	0.551
18	1.285	0.203	0.259	1.285	0.203	0.259
19	0.337	0.051	0.942	0.337	0.051	0.942
20	0.437	0.021	0.237	0.437	0.021	0.237
21	1.717	0.397	0.285	1.717	0.397	0.285
22	0.008	0.005	29.730	0.008	0.005	29.734
23	0.018	0.007	14.399	0.018	0.006	14.399
24	2.218	0.904	0.388	2.218	0.905	0.388
25	0.658	0.441	2.151	0.658	0.442	2.151
26	2.275	0.523	0.213	2.275	0.523	0.213
27	0.467	0.041	0.399	0.467	0.041	0.399
28	0.098	0.016	3.180	0.098	0.016	3.180
29	0.445	0.032	0.345	0.445	0.032	0.345
30	0.162	0.012	0.931	0.162	0.012	0.931
31	0.862	0.141	0.399	0.862	0.141	0.399
32	4.691	0.892	0.086	4.691	0.896	0.086
33	0.075	0.017	5.502	0.075	0.017	5.502
34	0.998	3.171	6.575	0.998	3.446	6.575
35	1.826	0.441	0.279	1.826	0.441	0.279
36	2.586	1.117	0.353	2.586	1.117	0.353
37	0.020	0.003	2.412	0.020	0.003	2.412
38	2.772	1.829	0.503	2.772	1.799	0.503
39	2.113	0.344	0.163	2.113	0.344	0.163
40	4.005	1.834	0.241	4.005	1.827	0.241
41	0.269	0.054	1.576	0.269	0.054	1.576
42	15.592	6.432	0.056	15.592	6.849	0.056
43	2.319	0.664	0.261	2.319	0.664	0.261
44	0.788	0.244	0.830	0.788	0.244	0.830
45	0.670	0.069	0.324	0.670	0.069	0.324
46	0.291	0.014	0.355	0.291	0.014	0.355
47	1011.820	6114.237	0.013	1011.357	5.932	0.013
48	0.360	0.030	0.494	0.360	0.030	0.494
49	0.245	0.103	3.558	0.245	0.103	3.558
50	0.132	0.029	3.469	0.132	0.029	3.469
51	0.638	0.385	1.992	0.638	0.111	1.992
52	2.113	0.418	0.198	2.113	0.418	0.198
53	0.850	0.088	0.258	0.850	0.088	0.258
54	0.343	0.017	0.310	0.343	0.017	0.310
55	0.017	0.005	5.052	0.017	0.005	5.052
56	0.653	0.194	0.963	0.653	0.194	0.963
57	1.163	0.178	0.277	1.163	0.178	0.277
58	4.830	1.408	0.127	4.830	1.405	0.127
59	1.097	0.258	0.453	1.097	0.258	0.453
60	0.697	0.086	0.375	0.697	0.086	0.375
61	1.103	0.154	0.267	1.103	0.154	0.267
62	1.759	0.379	0.259	1.759	0.379	0.259
63	0.989	0.133	0.287	0.989	0.133	0.287
64	1.495	0.602	0.569	1.495	0.603	0.569
65	0.989	0.021	0.046	0.989	0.021	0.046
66	1.808	0.299	0.193	1.808	0.299	0.193
67	0.425	0.094	1.099	0.425	0.094	1.099
68	0.025	0.006	8.666	0.025	0.006	8.666
69	0.513	0.032	0.256	0.513	0.032	0.256
70	-1.4×10^4	1.3×10^6	0.014	1300.661	2.796	0.014
71	4.572	1.345	0.136	4.572	1.341	0.136
72	73.805	112.588	0.044	73.805	2.966	0.010
73	164.564	224.414	0.017	164.543	4.843	0.017
74	2.763	1.044	0.289	2.763	1.047	0.289
75	1.599	0.666	0.550	1.599	0.667	0.550
76	2.492	1.215	0.413	2.492	1.217	0.413
77	0.193	0.043	2.427	0.193	0.043	2.427
78	0.404	0.154	1.989	0.404	0.154	1.989
79	0.888	0.057	0.152	0.888	0.057	0.152
80	0.067	0.009	3.401	0.067	0.009	3.401
81	0.462	0.054	0.540	0.462	0.054	0.540
82	1.294	0.322	0.406	1.294	0.322	0.406
83	0.337	0.037	0.680	0.337	0.037	0.680
84	0.637	0.101	0.524	0.637	0.101	0.524
85	1.489	0.405	0.385	1.489	0.405	0.385
86	1.258	0.164	0.218	1.258	0.164	0.218
87	3.989	1.472	0.195	3.989	1.477	0.195
88	0.180	0.049	3.140	0.180	0.049	3.140
89	0.927	0.174	0.427	0.927	0.174	0.427
90	34.004	21.622	0.039	33.961	11.863	0.039
91	−51.455	34.053	0.027	1049.627	5.305	0.029
92	1.690	0.317	0.234	1.690	0.317	0.234
93	40.037	17.274	0.023	40.037	8.389	0.022
94	5.124	1.254	0.101	5.124	1.254	0.101
95	0.326	0.095	1.881	0.326	0.092	1.881
96	1.146	0.367	0.591	1.146	0.368	0.591
97	0.609	0.089	0.505	0.609	0.089	0.505
98	1.245	0.385	0.524	1.245	0.385	0.524
99	0.754	0.136	0.504	0.754	0.136	0.504
100	0.546	0.056	0.395	0.546	0.056	0.395

Note: “n/a”: not available, since the estimation procedure did not converge.

Table G.2. Individually estimated preference parameter, risk experiment, strictly concave budget restrictions: degree of relative risk aversion, $\hat{\rho}$

Participant	Tobit			MLE		
ID	$\hat{\rho}$	SE of $\hat{\rho}$	$\hat{\sigma}$	$\hat{\rho}$	SE of $\hat{\rho}$	$\hat{\sigma}$
1	−0.108	0.075	2.589	−0.108	0.075	2.589
2	−168.063	75.867	0.008	1004.354	5.932	0.010
3	29.339	9.587	0.032	29.309	9.497	0.032
4	162.952	116.098	0.013	162.952	8.389	0.010
5	1.503	0.177	0.145	1.503	0.177	0.145
6	0.350	0.065	0.344	0.350	0.065	0.344
7	0.478	0.044	0.170	0.478	0.044	0.170
8	0.007	0.010	0.173	0.007	0.010	0.173
9	0.648	0.051	0.138	0.648	0.051	0.138
10	−0.305	0.016	4.125	−0.305	0.016	4.125
11	0.771	0.093	0.201	0.771	0.093	0.201
12	2.006	1.589	0.812	2.006	1.578	0.812
13	0.688	0.077	0.192	0.688	0.077	0.192
14	−0.154	0.048	2.340	−0.154	0.048	2.340
15	1.651	0.294	0.207	1.651	0.294	0.207
16	−0.314	0.017	5.826	−0.314	0.017	5.826
17	0.385	0.120	0.579	0.385	0.120	0.579
18	1.582	0.450	0.338	1.582	0.450	0.338
19	0.077	0.042	0.550	0.077	0.042	0.550
20	0.376	0.063	0.308	0.376	0.063	0.308
21	0.819	0.087	0.172	0.819	0.087	0.172
22	−0.375	0.009	14.363	−0.375	0.009	14.363
23	−0.363	0.010	8.353	−0.363	0.010	8.353
24	3.275	1.754	0.384	3.275	1.759	0.384
25	0.284	0.064	0.404	0.284	0.064	0.404
26	2.702	0.751	0.231	2.702	0.751	0.231
27	0.119	0.036	0.394	0.119	0.036	0.394
28	−0.103	0.046	1.554	−0.103	0.046	1.554
29	0.243	0.049	0.354	0.243	0.049	0.354
30	0.010	0.028	0.491	0.010	0.028	0.491
31	0.974	0.154	0.241	0.974	0.154	0.241
32	1.894	0.253	0.142	1.894	0.253	0.142
33	−0.292	0.018	3.942	−0.292	0.018	3.942
34	0.347	1.534	7.972	0.347	1.510	7.972
35	2.031	0.449	0.225	2.031	0.449	0.225
36	0.880	0.187	0.338	0.880	0.187	0.338
37	−0.011	0.024	0.461	−0.011	0.024	0.461
38	0.610	0.188	0.544	0.610	0.188	0.544
39	1.781	0.257	0.160	1.781	0.257	0.160
40	1.658	0.541	0.378	1.658	0.540	0.378
41	0.305	0.056	0.331	0.305	0.056	0.331
42	67.705	35.573	0.023	67.707	6.849	0.023
43	4.900	2.329	0.245	4.900	2.314	0.245
44	2.634	0.868	0.279	2.634	0.869	0.279
45	0.429	0.082	0.355	0.429	0.082	0.355
46	0.306	0.031	0.181	0.306	0.031	0.181
47	−799.168	4216.106	0.020	970.512	11.863	0.020
48	0.040	0.038	0.580	0.040	0.038	0.580
49	−0.182	0.065	3.881	−0.182	0.065	3.881
50	1.187	0.249	0.293	1.187	0.249	0.293
51	195.784	117.789	0.009	195.784	5.932	0.009
52	0.926	0.132	0.222	0.926	0.132	0.222
53	0.728	0.150	0.349	0.728	0.150	0.349
54	0.062	0.026	0.362	0.062	0.026	0.362
55	0.537	0.108	0.364	0.537	0.108	0.364
56	1.021	0.649	0.951	1.021	0.650	0.951
57	0.589	0.101	0.307	0.589	0.101	0.307
58	4.220	1.175	0.163	4.220	1.178	0.163
59	1.034	0.400	0.575	1.034	0.399	0.575
60	1.371	0.240	0.227	1.371	0.240	0.227
61	1.918	0.499	0.275	1.918	0.500	0.275
62	1.019	0.210	0.309	1.019	0.210	0.309
63	1.097	0.201	0.265	1.097	0.201	0.265
64	1.041	0.390	0.555	1.041	0.390	0.555
65	0.514	0.058	0.207	0.514	0.058	0.207
66	1.772	0.208	0.130	1.772	0.208	0.130
67	0.445	0.175	0.727	0.445	0.175	0.727
68	−0.065	0.037	0.973	−0.065	0.037	0.973
69	0.376	0.044	0.217	0.376	0.044	0.217
70	−885.489	8101.223	0.031	969.266	1.049	0.004
71	5.045	0.916	0.091	5.045	0.913	0.091
72	−218.628	893.915	0.055	90.249	11.865	0.056
73	49.806	18.822	0.022	49.804	17.462	0.022
74	2.170	0.409	0.183	2.170	0.410	0.183
75	2.283	1.245	0.512	2.283	1.244	0.512
76	3.248	1.373	0.305	3.248	1.369	0.305
77	0.224	0.054	0.411	0.224	0.054	0.411
78	0.274	0.137	0.895	0.274	0.137	0.895
79	0.677	0.117	0.297	0.677	0.117	0.297
80	0.114	0.025	0.285	0.114	0.025	0.285
81	−0.127	0.059	2.321	−0.127	0.059	2.321
82	4.885	3.384	0.358	4.885	3.390	0.358
83	0.054	0.037	0.524	0.054	0.037	0.524
84	0.360	0.110	0.566	0.360	0.110	0.566
85	0.650	0.151	0.406	0.650	0.151	0.406
86	5.435	1.927	0.167	5.435	1.918	0.167
87	1.289	0.285	0.295	1.289	0.285	0.295
88	1.699	0.497	0.334	1.699	0.497	0.334
89	2.306	0.531	0.214	2.306	0.531	0.214
90	23.946	10.434	0.052	23.946	8.389	0.052
91	10.677	6.693	0.161	10.677	5.443	0.161
92	3.537	0.774	0.148	3.537	0.775	0.148
93	104.585	134.555	0.036	104.582	11.863	0.036
94	2.824	0.677	0.192	2.824	0.677	0.192
95	0.086	0.029	0.359	0.086	0.029	0.359
96	0.567	0.174	0.550	0.567	0.174	0.550
97	0.757	0.123	0.273	0.757	0.123	0.273
98	1.086	0.318	0.426	1.086	0.318	0.426
99	0.919	0.184	0.313	0.919	0.184	0.313
100	−0.043	0.114	2.620	−0.043	0.114	2.620

G.3 Self-Reported Decision Strategies

Table G.3. Original responses by participants in German

ID	Response
1	Bei gleichwertigen Beträgen auf beiden Achsen die Mitte, um auf jeden Fall eine Auszahlung zu haben. Bei sehr großen Unterschieden "alles oder nichts"
2	Fast 50/50 gleich, wobei es nicht auf die ein paar Cents ankommt...
3	Aufteilung halbe - halbe
4	Bei gleich hoher Wahrscheinlichkeit ähnlich hohe Auszahlung
5	Ich wollte auf jeden fall mindestens etwa 20 euro bekommen
6	Im Zweifel ging es eher um eine sichere Auszahlung als das totale Risiko, jedoch kam der Reiz zu letzterem immer wieder auf und ihm wurde auch ein paar wenige Male nachgegeben.
7	Ich habe die Hälfte des kleineren Betrags als Mindestbetrag genommen, den ich erhalten möchte. Diesen habe ich dann auf dem Graphen angewählt; unabhängig davon ob dieser eine Gerade oder eine Kurve war. Bei den nicht-linearen Graphen, bei denen es zweimal denselben Betrag zu gewinnen gab, habe ich den Wert ausgewählt bei dem die beiden potentiellen Auszahlungssummen (annähernd) gleich waren. In einigen der ersten Graphen binich dieser Taktik noch nicht unbedingt gefolgt.
8	Ich habe versucht, die Punkte mit höchster euklidscher Standardnorm im R^2 auszuwählen, um den Erwartungswert der Gewinnausschüttung zu maximieren
9	- wenn Betrag gleich war, meistens mittige Fixierung - wenn Differenz groß war, meistens mehr im Bereich des größeren Betrages
10	höchstmöglichen Gewinn erzielen
11	Beide Auszahlungen nicht zu unterschiedlich wählen, weniger Risiko eingehen, eher zu mehr Sicherheit tendieren, überhaupt etwas zu bekommen, anstatt hcoh zu pokern, viel zu bekommen
12	Bei kleinen Beträgen eher: Hauptsache man gewinnt etwas Bei größeren Beträgen wird man etwas risikofreudiger, dennoch: ein mindest Gewinn von 30 € sollte je nach Wahrscheinlichkeit drin sein (somit ein guter Stundenlohn)
13	In den meisten Entscheidungssituationen habe ich mich an dem Mindestgewinn orientiert
14	möglichst viel Geld, auch mit einem gewissen Risiko
15	Ich habe versucht, mit gleicher Wahrscheinlichkeit immer relativ viel Geld daraus zu beziehen.
16	Keine bestimmte Strategie verfolgt
17	Wenn zwischen Auszahlung 1 und 2 kaum Preisunterschiede lagen habe ich die Mitte gewählt. Bei großen Unterschieden bin ich auf Risiko gegangen und habe eine höhere Summe angegeben aber hab bei der zweiten Auszahlung mindestens 10€ gewählt.
18	Ich habe versucht, die beiden Auszahlungen relativ gleich hoch zu gestalten, da mir eine Wahrscheinlichkeit von 50% nicht sicher genug ist, um das Risiko einzugehen, sehr wenig zu bekommen. Bei den letzten 10 Fällen mit den höheren Zahlen war ich jedoch aufgeschlossener, einen Betrag viel höher zu setzen als den anderen, da auch der geringe Betrag immer noch sehr hoch war.
19	Ich habe mich stets an der höherskalierten Skala orientiert. Außerdem bin ich risikoreich vorgegangen und habe meine "Kreuze"nicht in der Mitte gesetzt um immer einen durchschnittlichen Wert zu erhalten, sondern habe den niedrigeren Wert nur knapp über 10€ gehalten, da ich dadurch im Schnitt mehr Geld gewinnen kann (wenngleich ich zu 50% auch verlieren kann). Da es aber eine Online-Studie war, reicht mir ein Stundenlohn von 10€ aus und ich werde mich nicht allzu ärgern, wenn ich den geringeren Wert erhalte. (:
20	Größter durchschnittlicher Gewinn, mit ein paar Cut-off Minimal Werten, z.B. geringere Auszahlung nicht unter 10€
21	Weitestgehend gleichmäßige Verteilung
22	Bei den niedrigen Beträgen das höchste mögliche Ergebnis. Alles 50/50 also eine gute Chance auf den hohen Betrag. Da uch kein eigenes Geld verwette
23	den höchst möglichen Betrag erreichen, da eine Wahrscheinlichkeit von 50 % ziemlich hoch ist.
24	Das Beste (höchste) Ergebnis zu erzielen (Ohne große Rechnerei) ohne allzu viel Risiko einzugehen.
25	Ich habe versucht nie ganz auf einen der beiden Auzahlungswerte zu setzen.
26	Ungefähr immer die Hälfte
27	Ich habe mich immer an der höheren Achse orientiert
28	Maximierung des erwarteten Wertes, aber wenn ein Betrag höher war mehr Gewichtung auf diesen um das Risiko einzugehen den höheren zu erhalten. Gleichzeitig sollte der niedrigere nicht zu niedrig sein, sodass ich trotzdem eine gewisse Vergütung erhalte.
29	-
30	stärkster Ausschlag
31	Gleich gute Ergebnisse. Kein Spielen. Kein Risiko.
32	Es gab eine Schmerzgrenze (ca. 15-20 Euro, je nach Grundbetrag), die nicht unterschritten werden durfte. ich habe versucht immer möglichst ausgeglichen die Beträge aufzuteilen, obwohl ich dadurch Geld verliere.
33	Teilweise sicherer Gewinn, außer der Unterschied war zu verlockend - dann alles oder nichts
34	hauptsache heute viel Geld machen, wer weiß ob ich später noch lebe
35	in allen Fällen eine zufriedenstellende Summe
36	Ich wollte es möglichst ausgeglichen haben, um in beiden Fällen z.B. ca. 20€ zu erhalten. Also ginge ich lieber auf Nummer sicher, sodass ich mit dem Ergebnis beider Entscheidungen zufrieden wäre, anstelle zu riskieren das viel schlechtere zu erhalten.
37	Maximale Erwarteungswerte
38	Ich gebe mich mit einer bestimmten Mindestauszahlung zufrieden und der andere Betrag ist dementsprechend höher.
39	Meist einen Mindestwert wie 20€ oder 100€ festgelegt, dass war der niedrigste für eine Auszahlung, die andere dann entsprechend der Rest des Budgets. Dieser Mindestwert lag aber immer sehr nah am Mittelwert, so dass Verhältnisse wie bspw. 28€ zu 20€ entstehen.
40	Anfangs eher weniger, meist 50/50. Später mindestwert 50 bzw. 80 Euro erreichen.
41	- teilweise Erwartungswert maximiert - teilweise nach Gefühl, bzw. wollte bei entweder oder Entscheidungen nicht komplett auf ein Extremum setzen, obwohl die erwartete Auszahlung dann höher ist
42	Ich habe immer die Entscheidung gewählt, in der ich bei beiden Situationen ungefähr gleich viel Geld ausgezahlt bekomme.
43	Das ic sowohl mit Auszahlung 1 als auch 2 zufrieden bin - deshalb wenig risiko-Strategie gefahren und eher Sicherheit
44	Ich habe mittlere Entscheidungen getroffen
45	Aus dem Bauchgefühl bzw. sodass egal ob Auszahlung 1 oder 2 ausgezahlt wird, ich einen hoffentlich Mindestbetrag vom 10 - 15€ bekomme.
46	Bei geringeren Beträgen hoffe ich, dass ich die höhere Summe bekomme. ABer ich wollte nicht ganz leer ausgehen.
47	Da bei allen Möglichkeiten die Wahrscheinlichkeit bei 50/50 lag, habe ich die Werte je versucht auf beide Auszahlungen gleich zu setzen.
48	Ich habe darauf geachtet, dass die kleinere Auszahlung niemals einen bestimmten Wert unterschreitet um nicht am Ende mit leeren Händen dazustehen, aber auf der anderen Seite auch eine Chance auf einen höheren Gewinn zu haben.
49	Ich habe meistens versucht, den Betrag beider Auszahlungen in ungefähr gleicher Höhe zu halten.
50	Wenig Risiko

Continued on next page.

Table G.3 (continued)

ID	Response
51	Ich habe immer den erwartende Wert für das Geld ausgerechnet und durch eine bestimmte Formel abgelesen.
52	-Mindestbetrag der auf jeden fall erreicht werden soll; eher in die richtung der Höheren beträge
53	Ich habe versucht im durchschnitt die höchsten Preise zu erzielen
54	Falls beide Auszahlungen die gleiche Summe hatten, habe ich mich für den Mittelwert entschieden. Je größer die Differenz der beiden Beträge war desto näher bin ich an den größeren Betrag gegangen. Dabei habe ich darauf geachtet, dass ich einen Mindestbetrag von 7-8€ bekomme.
55	in den ersten Beispielen habe ich so gewählt, dass ich sicher 20 € bekomme. Danach habe ich den Erwartungswert maximiert.
56	Bei einer 50 protzentigen Chance habe ich die Auszahlungen meistens so gewählt, dass immer der ungefähr gleiche Betrag am Ende raus kommt. Manchmal habe ich einfach die Hälfte des Auszahlungsbetrages genommen.
57	Ich habe mir immer ca. eine Mindestsumme gesetzt, die ich gerne rausbekommen würde und habe dann anhand der Skalierung geschaut, welche Kombination mehr Sinn macht, sodass die zweite Summe größer ist. Bei gleicher Skalierung habe ich immer versucht ca. denn Mittelwert zu nehmen.
58	Ich habe die Entscheidung so getroffen um bei jeder Experimentrunde einen gewissen Mindestlohn zu erhalten keine bestimmte Strategie
59	Ich habe mir überlegt welchen Betrag ich stets auch angenehm finden würde und welche andere Auszahlung im Vergleich auch erfreulich wäre. Da das Risiko an sich stets 50% Betrug, ging ich nach der mit der Wahl von Auszahlung 1 oder 2 stets nach meinem Bauchgefühl.
60	Ich habe immer geschaut, dass der niedrige Geldbetrag nicht unter einen bestimmten Wert fällt. Zudem habe ich die Werte immer so gewählt, dass ich mich über den höheren sehr freuen würde, würde ich ihn erlangen, aber auch mit dem kleineren sehr zufrieden wäre, sollte es dieser werden. Habe aber auch immer beachtet, wie die zwei Werte sich zueinander verhalten und wie viel es auf der einen Seite weniger wird, aber auf der anderen Seite dann vielleicht der Geldbetrag um einiges mehr steigt.
61	Ich habe immer darauf geachtet, dass in jedem Fall mindestens 14€ ausgezahlt werden. Bei nicht linearen Verteilungen, habe ich versucht ein Punkt möglichst starker Steigung zu finden. Bei linearen Verteilungen mit gleichen Achsen, habe ich grob die Mitte ausgewählt.
62	Grundsätzlich habe ich mich immer den höheren Beträgen angenähert. Bei gleichen Beträgen habe ich meist die Mitte gewählt, um kein Risiko einzugehen.
63	Versucht die Mitte zu treffen auf der Linie
64	Ich habe versucht so oft wie möglich, so sicher wie möglich zu wählen. D.h. ich habe in den allermeisten Fällen so gewählt, dass ich, in Auszahlung A und B ungefähr gleich viel ODER zumindest 20 Euro erhalte.
65	Ich habe überlegt, was ich im ßchlechtesten"Fall bekommen würde und ob ich damit zufrieden wäre
66	Mit möglichst großer Sicherheit einen möglichst großen Gewinn erzielen. Sicherheit war das wichtigere Kriterium als die Höhe des Gewinns.
67	Meistens versucht irgendwo einen Wert zu finden, bei dem man auf beiden Seiten zufrieden wäre, und manchmal einfach beschlossen das "Risiko"für den vollen Betrag einzugehen
68	Grundsätzlich habe ich die größte durchschnittliche Auszahlung angestrebt. Da ich nicht groß rumrechnen wollte habe ich bei den nicht-linearen Graphen einfach grob geschätzt, bei den linearen war es dann ja recht eindeutig
69	Da die Wahrscheinlichkeiten bei 50 % lagen habe ich versucht, einen maximalen Gewinn zu erzielen, aber falls die andere Wahrscheinlichkeit eintritt, keinen zu hohen Verlust zu erzielen. Zum beispiel wenn die Kurve Steiler für Wahrscheinlichkeit 1 ging, habe ich den Punkt weiter links gesetzt, da die Zunahme von 1 höher war als der Verlust bei 2.
70	Ich habe versucht, dass bei beiden Auszahlungen immer derselbe Betrag ausgezahlt wird.
71	Dass beide Ereignisse gleich wahrscheinlich sind.
72	Nein
73	immer möglichst die mitte nehmen
74	Auszahlung 1 und 2 möglichst gleich hoch halten
75	Sicherheit, um jedes mal einen Mittelwert zu erhalten
76	möglichst gleich hohe Beträge, um das Risiko geringer zu halten
77	so viel Geld wie möglich
78	Ein mindestwert von ca. 10 bis 15 € mitzunehmen / ungefähr gleich Geldwerte zu generieren (+/-) / vereinzelt Risiko voller Betrag / lieber bestimmte Beträge wie 15 20 50 100 € sichern als maximalen Betrag auf 50 50 Chance
79	Ja, ich wollte einen mindest Beitrag haben, den ich erreichen kann.
80	Bei gleichbleibendem Erwartungswert habe ich eine gleichmäßige Auszahlung präferiert. Bei stärkerer Auszahlung für eine Verteilung habe ich diese je nach Ausmaß der Verbesserung präferiert. Bei den größeren Auszahlungen war mir auch bei starker Verbesserung einer Auszahlung zumindest ein geringer Betrag bei ßchlechte-rem"Los wichtig. Auch habe ich versucht den Erwartungswert zu maximieren.
81	Ich habe mich eher in Richtung des höheren Betrages orientiert, aber meist so, dass bei der zweiten Auswahlmöglichkeit trotzdem 10, bzw. bei den höheren Zahlen Werten ca 50 Euro übrig waren
82	Habe versucht im Mittelwert zu bleiben. Damit man eine relativ konstante Auszahlung hat
83	Einen netten Stundenlohn sicher (den ich ohne Experiment nicht gehabt hätte :D), der Rest auf Glück auf die andere Seite. Bei den letzten 10 Auswahlen etwas angepasst.
84	Bei Entscheidungen, wo es um vergleichsweise nicht so hohe Beträge ging, habe ich versucht, möglichst den gleichen Betrag ßu sichern", wenn es um mehr ging, dann habe ich versucht, den einen Betrag möglichst hoch zu machen, den anderen aber noch verkraftbar gering zu halten, sodass ich nicht alles auf die 50%-Wahrscheinlichkeit setzen muss. Manchmal habe ich in der Hoffnung, den höchstmöglichen Betrag zu erhalten, meinen Punkt sehr nah am Maximum platziert.
85	Jeder mögliche Auszahlungsbetrag sollte mindestens so hoch sein, dass sich der Zeitaufwand gelohnt hat.
86	Habe versucht einen Betrag von 15 Euro nicht zu unterschreiten bzw. möglichst mittig zwischen beiden Möglichkeiten zu liegen.
87	Da die Wahrscheinlichkeit der Auszahlung 1 oder 2 gleich ist, wurde der Betrag ziemlich gleichmäßig verteilt, bzw. immer eine Mindestsumme für 1 oder 2 festgelegt.
88	Da die Wahrscheinlichkeit beider Auszahlungen gleich wahrscheinlich war, habe ich versucht in jedem Fall mit einem Gewinn rauszugehen, mit dem ich leben kann, auch wenn das bedeutet, dass ich nicht das Maximum raushole. Der Kurvenverlauf war nicht so relevant für mich.
89	Da die Chance jeweils bei 50% liegt, habe ich meist versucht ungefähr den gleichen Betrag bei beiden Möglichkeiten zu haben
90	Ich habe immer versucht einen Mittelwert zu finden, sodass beide Auszahlungen ungefähr gleich groß sind. Damit hat man die besten Chancen einen hohen Wert zu erhalten.
91	Versucht einen ausgeglichenen Betrag in beiden Optionen zu erzielen
92	Ich habe die meiste Zeit versucht, das Geld relativ gleichmäßig zu verteilen. Nur ab und zu habe ich auch ungleichmäßig verteilt.
93	Ich wollte immer lieber auf Nummer Sicher gehen, weshalb ich immer versucht habe so gut wie möglich den selben Betrag bei Auszahlung 1 und Auszahlung 2 zu fixieren.
94	Ich wollte eine relativ große Sicherheit haben und kein "Risiko ëingehen. Bei relativ nah beieinander liegenden Beträgen (z.B. 40-50) habe ich die Mitte gewählt und bei weiter auseinanderliegenden (z.B. 80-40) wollte ich die 20/25 nicht unterschreiten. Bei den höheren Beträgen im zweiten Teil genauso nur war die Grenze für mich da 120.
95	Habe abgewogen zwischen Erwartungswert der Auszahlungen und der minimalen Auszahlung. Bei den Geraden habe ich mich gefragt, welcher minimale Betrag für mich vertretbar wäre und habe dann die eine Auszahlung möglichst hoch gewählt, sodass aber trotzdem die andere für mich vertretbar wäre. Bei den Kurven bin ich näher an die rechnerisch öptimalen"Werte gegangen, weil bei diesen Varianten die minimale Auszahlung dann nicht 0 betragen würde
96	Ich habe mir überlegt eine möglichst hohe Wahrscheinlichkeit für eine garantierte Auszahlung von ca 20€ zu bekommen. Daran habe ich mich bei allen Entscheidungen orientiert, bin mir aber noch nicht sicher, ob die Strategie aufgegangen ist.
97	Ich habe oftmals versucht eine ungefähre Mitte zu finden. Habe jedoch bei größeren Beträgen die Wahrscheinlichkeit zum höheren Geldbetrag erhöht.
98	Ich wollte insgesamt nicht zu sehr mit dem Geld pokern und eher die sicherere Seite wählen, wodurch ich insgesamt weniger Geld insgesamt gewinnen kann, aber bei dem geringeren Beitrag, trotzdem eine nicht ganz niedrige Summer erhalte. Jedoch war mir das Variieren auch wichtig.
99	Das beides mehr oder weniger Ausgeglichen ist
100	mindestens 10 Euro wenn niedrigster Gewinn gezogen wird,damit es sich etwas lohnt wenn der Höchstbetrag verlockend aber risikoreich war hab ich auch mal "gepo-kertäber meist habe ich mich für die Mitte entschieden, da ich kein risikofreudiger Mensch bin

Table G.4. English translation of participants' responses

ID	Response
1	If the amounts were equal on both axes, I chose the middle to ensure a payout. If the differences were very large, it was "all or nothing".
2	Almost 50/50 equal, a few cents didn't matter...
3	Split evenly in half
4	With equally high probabilities, similar high payouts
5	I wanted to get at least around 20 euros for sure
6	In case of doubt, I preferred a secure payout over total risk, although the temptation to take the latter kept coming up and was given in to a few times.
7	I took half of the smaller amount as the minimum amount I wanted to receive. I then selected this on the graph, regardless of whether it was a straight line or a curve. For the non-linear graphs, where the amount to be won was the same twice, I chose the value where the two potential payout amounts were (approximately) equal. In some of the earlier graphs, I did not necessarily follow this tactic.
8	I tried to select the points with the highest Euclidean standard norm in R^2 to maximize the expected value of the payout.
9	- if the amount was equal, mostly chose the middle - if the difference was large, leaned more towards the higher amount
10	Aim to achieve the highest possible profit
11	Try not to choose payouts that are too different, take less risk, tend more towards safety, and ensure getting something rather than gambling for a big payout.
12	For small amounts: the main thing is to win something. For larger amounts: take a bit more risk, but ensure a minimum win of €30 depending on the probability (for a good hourly wage).
13	In most decision situations, I oriented myself towards a minimum win.
14	As much money as possible, even with some risk
15	I tried to consistently get a relatively high amount with equal probability.
16	Didn't follow a specific strategy
17	If there were hardly any price differences between payout 1 and 2, I chose the middle. For large differences, I took a risk and chose a higher amount but selected at least €10 for the second payout.
18	I tried to make both payouts relatively equal since a 50% probability wasn't secure enough for me to take the risk of getting very little. In the last 10 cases with higher numbers, I was more open to setting one amount much higher than the other since even the lower amount was still very high.
19	I always oriented myself towards the higher-scaled axis. I also took risks and didn't place my "marks"in the middle to get an average value but kept the lower amount just above €10, so I could win more money on average (even though I could lose 50% of the time). But since it's an online study, a €10 hourly wage is enough for me, and I won't be too upset if I get the lower amount.
20	Biggest average profit, with a few cut-off minimum values, e.g., lower payout not below €10
21	Mostly even distribution
22	For the lower amounts, the highest possible outcome. All 50/50, so a good chance for the high amount. Since I'm not betting my own money
23	Aim for the highest possible amount since a 50% probability is quite high.
24	Aim for the best (highest) outcome (without extensive calculations) without taking too much risk.
25	I tried to never bet entirely on one of the two payout values.
26	Almost always half
27	I always oriented myself towards the higher axis
28	Maximization of expected value, but if one amount was higher, I weighted it more to take the risk of getting the higher amount. At the same time, the lower amount shouldn't be too low so that I still get some compensation.
29	-
30	Strongest deviation
31	Equally good outcomes. No gambling. No risk.
32	There was a pain threshold (€15-20 depending on the base amount) that should not be undercut. I tried to split the amounts as evenly as possible, even if it meant losing money.
33	Partly secure profit unless the difference was too tempting - then "all or nothing".
34	As long as I make a lot of money today, who knows if I'll still be alive later.
35	A satisfactory amount in all cases
36	I wanted to keep it as balanced as possible, so I would receive around €20 in both cases. I'd rather play it safe so that I'm satisfied with the outcome of both decisions instead of risking getting the much worse option.
37	Maximum expected values
38	I'm satisfied with a certain minimum payout, and the other amount is correspondingly higher.
39	Mostly set a minimum value like €20 or €100, which was the lowest for a payout, and the other amount was the rest of the budget. This minimum value was always very close to the average value, so ratios like €28 to €20 would result.
40	Initially less, mostly 50/50. Later aimed for a minimum of €50 or €80.
41	- partly maximized expected value - partly based on intuition, didn't want to go to an extreme in either/or decisions, even if the expected payout would be higher.
42	I always chose the option where I would get approximately the same amount of money in both situations.
43	I wanted to be satisfied with both payouts 1 and 2 - so I took a low-risk strategy and leaned more towards safety.
44	I made moderate decisions
45	Based on gut feeling, so that no matter if payout 1 or 2 is paid out, I hopefully get a minimum amount of €10-15.
46	For smaller amounts, I hope to get the higher sum. But I didn't want to walk away empty-handed.
47	Since all options had a 50/50 probability, I tried to equalize the values for both payouts.
48	I made sure that the smaller payout never fell below a certain amount to avoid ending up with nothing but also having a chance for a higher gain.
49	I mostly tried to keep the amount of both payouts at roughly the same level.
50	Low risk

Continued on next page.

Table G.4 (continued)

ID	Response
51	I always calculated the expected value for the money and read it off using a specific formula.
52	-Minimum amount that should definitely be reached; leaning more towards higher amounts
53	I tried to achieve the highest prices on average
54	If both payouts were the same amount, I chose the average. The larger the difference between the two amounts, the closer I went to the larger amount. I made sure to get a minimum amount of €7-8.
55	In the first examples, I chose so that I would surely get around €20. After that, I maximized the expected value.
56	With a 50% chance, I mostly chose the payouts so that I would always end up with roughly the same amount. Sometimes I just took half of the payout amount.
57	I always set myself a minimum amount that I would like to get and then looked at the scaling to see which combination made more sense, so that the second amount was larger. If the scaling was the same, I always tried to take about the average.
58	I made the decision to get a certain minimum wage in each experimental round, no specific strategy.
59	I thought about what amount I would always find acceptable and which other payout would be pleasing in comparison. Since the risk was always 50%, I went with my gut feeling when choosing payout 1 or 2.
60	I always made sure that the lower amount of money didn't fall below a certain value. Additionally, I always chose the values so that I would be very happy with the higher amount if I got it, but also very satisfied with the smaller amount if that happened. I also always considered how the two values related to each other and how much less it would be on one side, but on the other side, the amount of money might increase significantly.
61	I always made sure that at least €14 would be paid out. For non-linear distributions, I tried to find a point with the steepest slope. For linear distributions with equal axes, I roughly chose the middle.
62	As a rule, I always approached the higher amounts. When the amounts were equal, I usually chose the middle to avoid risk.
63	Tried to hit the middle on the line
64	I tried to choose as safely as possible as often as possible. That means I mostly chose so that I would receive approximately the same amount or at least €20 in both payouts A and B.
65	I thought about what I would get in the "worst"case and whether I would be satisfied with that.
66	Aiming for the highest possible gain with the greatest possible security. Security was the more important criterion than the amount of the gain.
67	Mostly tried to find a value where I would be satisfied on both sides, and sometimes simply decided to take the "risk"for the full amount.
68	I generally aimed for the highest average payout. Since I didn't want to do a lot of calculations, I just roughly estimated the non-linear graphs; with the linear ones, it was quite straightforward.
69	Since the probabilities were 50%, I tried to achieve a maximum gain, but if the other probability occurred, not to incur too much loss. For example, if the curve was steeper for probability 1, I set the point further to the left, as the increase for 1 was higher than the loss for 2.
70	I tried to ensure that the same amount was always paid out for both payouts.
71	That both events are equally likely.
72	No
73	Always try to take the middle
74	Try to keep payout 1 and 2 as equal as possible
75	Security, to get an average amount each time
76	As equal amounts as possible, to keep the risk lower
77	As much money as possible
78	Try to take a minimum amount of around €10 to €15 / generate roughly equal amounts (+/-) / occasionally risk the full amount / prefer to secure certain amounts like €15, €20, €50, €100 rather than going for the maximum on a 50/50 chance
79	Yes, I wanted to have a minimum contribution that I could achieve.
80	With a constant expected value, I preferred an even payout. With a higher payout for one distribution, I preferred that one depending on the extent of the improvement. With larger payouts, even with a significant improvement in one payout, it was important for me to have at least a small amount in the "worse"draw. I also tried to maximize the expected value.
81	I leaned more towards the higher amount, but usually in such a way that there was still around €10 left in the second option, or around €50 for the higher numbers.
82	Tried to stay in the middle range, so you have a relatively constant payout
83	A secure hourly wage (which I wouldn't have had without the experiment :D), and the rest was left to luck on the other side. Adjusted slightly for the last 10 selections.
84	In decisions involving relatively low amounts, I tried to "secure"as equal an amount as possible. When it came to larger amounts, I tried to make one amount as high as possible while keeping the other one reasonably low so that I didn't have to bet everything on the 50% chance. Sometimes I placed my point very close to the maximum in the hope of getting the highest possible amount.
85	Every possible payout amount should be at least high enough to make the time spent worthwhile.
86	Tried not to fall below an amount of €15 or to be as close as possible to the middle between both options.
87	Since the probability of payout 1 or 2 was equal, the amount was distributed fairly evenly, or a minimum amount was set for 1 or 2.
88	Since the probability of both payouts was equally likely, I tried to ensure that I would win an amount that I could live with in either case, even if it meant I wouldn't get the maximum. The curve shape wasn't very relevant to me.
89	Since the chance was 50% each, I usually tried to have roughly the same amount on both options.
90	I always tried to find an average so that both payouts were about the same size. That way, you have the best chances of getting a high amount.
91	Tried to achieve a balanced amount in both options
92	I mostly tried to distribute the money fairly evenly. Only occasionally did I distribute it unevenly.
93	I always wanted to play it safe, so I always tried to fix the same amount for payout 1 and payout 2 as best as possible.
94	I wanted to have relatively high security and not take "risks". For amounts that were relatively close (e.g., €40-50), I chose the middle, and for those that were further apart (e.g., €80-40), I didn't want to fall below €20/25. For the higher amounts in the second part, it was the same, but the limit for me was €120.
95	Weighed between the expected value of the payouts and the minimum payout. For the straight lines, I asked myself what minimum amount would be acceptable to me and then chose one payout as high as possible while still keeping the other acceptable. For the curves, I went closer to the calculated "optimal"values because, with these variants, the minimum payout wouldn't be zero.
96	I tried to ensure a high probability of a guaranteed payout of around €20. I followed this strategy in all decisions, but I'm still unsure if it worked.
97	I often tried to find an approximate middle. However, for larger amounts, I increased the probability of getting the higher amount.
98	I didn't want to gamble too much with the money overall and preferred the safer side, so I could win less money overall, but still receive a decent amount even with the lower payout. However, varying it was also important to me.
99	That both are more or less balanced
100	At least €10 if the lowest payout is drawn, so it's somewhat worthwhile. If the highest amount was tempting but risky, I sometimes "gambled", but mostly I chose the middle since I'm not a risk-taker.

Appendix H Results Time Preferences

H.1 Individual Parameter Estimates

Table H.1. Individually estimated preference parameters, time experiment, linear budget restrictions: present bias parameter $\hat{\beta}$, weekly discount factor $\hat{\delta}$, curvature of the power utility function $\hat{\rho}$

Participant	Tobit							MLE						
ID	$\hat{\beta}$	SE of $\hat{\beta}$	$\hat{\delta}$	SE of $\hat{\delta}$	$\hat{\rho}$	SE of $\hat{\rho}$	$\hat{\sigma}$	$\hat{\beta}$	SE of $\hat{\beta}$	$\hat{\delta}$	SE of $\hat{\delta}$	$\hat{\rho}$	SE of $\hat{\rho}$	$\hat{\sigma}$
1	1.013	0.047	0.999	0.003	0.113	0.014	1.059	1.013	0.047	0.999	0.003	0.113	0.014	1.059
2	0.947	0.192	0.926	0.031	0.129	0.060	3.013	0.947	0.192	0.926	0.031	0.129	0.060	3.013
3	0.790	0.182	1.003	0.011	16.974	8.338	0.030	0.790	0.166	1.003	0.011	16.970	5.123	0.030
4	4.8×10^{9}	1.3×10^{12}	1.188	2.458	−159.176	1893.828	0.078	0.030	0.031	0.950	0.051	23.169	8.210	0.085
5	1.039	0.067	0.995	0.004	0.038	0.008	3.781	1.039	0.067	0.995	0.004	0.038	0.008	3.781
6	1.019	0.090	0.978	0.007	0.178	0.042	1.282	1.019	0.090	0.978	0.007	0.178	0.042	1.282
7	1.053	0.061	0.994	0.004	0.000	0.000	5250.488	0.987	0.003	0.996	0.000	0.003	0.000	0.473
8	n/a	n/a	n/a	n/a	n/a	n/a	0.044	0.995	∞	1.000	∞	0.000	∞	0.500
9	1.792	4.512	0.652	0.995	3.792	13.495	0.961	1.792	2.990	0.652	0.469	3.792	6.361	0.961
10	0.497	0.874	0.798	0.378	0.110	0.234	13.618	0.497	0.901	0.798	0.392	0.110	0.244	13.619
11	1.020	0.076	1.000	0.004	0.209	0.039	0.926	1.020	0.076	1.000	0.004	0.209	0.039	0.926
12	0.967	0.072	1.001	0.004	0.146	0.027	1.317	0.967	0.072	1.001	0.004	0.146	0.027	1.317
13	n/a	n/a	n/a	n/a	n/a	n/a	0.044	0.995	∞	1.000	∞	0.000	∞	0.500
14	1.039	0.054	0.992	0.003	0.008	0.004	11.942	1.039	0.054	0.992	0.003	0.008	0.004	11.942
15	1.020	0.068	0.995	0.004	0.023	0.007	6.156	1.020	0.068	0.995	0.004	0.023	0.007	6.156
16	1.048	0.059	0.980	0.004	0.121	0.020	1.178	1.048	0.059	0.980	0.004	0.121	0.020	1.178
17	1.074	0.072	0.989	0.004	0.176	0.029	0.974	1.074	0.072	0.989	0.004	0.176	0.029	0.974
18	0.960	0.023	0.999	0.002	0.005	0.003	8.102	0.960	0.023	0.999	0.002	0.005	0.003	8.102
19	1.078	0.151	1.006	0.008	0.459	0.156	0.775	1.078	0.151	1.006	0.008	0.459	0.156	0.775
20	0.947	0.142	0.976	0.011	0.150	0.056	2.417	0.947	0.142	0.976	0.011	0.150	0.056	2.417
21	0.936	0.049	0.994	0.003	0.572	0.073	0.233	0.936	0.049	0.994	0.003	0.572	0.073	0.233
22	104.026	9137.406	169.695	1.6×10^{4}	−8.791	165.214	1.258	0.017	0.013	0.080	0.035	1.030	0.112	0.529
23	0.997	0.135	1.029	0.012	0.400	0.134	0.872	0.997	0.135	1.029	0.012	0.400	0.134	0.872
24	0.966	0.071	0.980	0.004	0.019	0.007	6.257	0.966	0.071	0.980	0.004	0.019	0.007	6.257
25	1.029	0.048	1.002	0.003	0.158	0.018	0.756	1.029	0.048	1.002	0.003	0.158	0.018	0.756
26	1.097	0.105	0.990	0.006	0.280	0.066	0.862	1.097	0.105	0.990	0.006	0.280	0.066	0.862
27	1.028	0.021	0.999	0.001	0.003	0.002	9.699	1.028	0.021	0.999	0.001	0.003	0.002	9.699
28	0.963	3.006	1.000	0.050	0.003	0.917	1.804	0.963	2199.209	1.000	37.505	0.003	686.598	1.766
29	1.072	0.057	0.996	0.003	0.148	0.019	0.911	1.072	0.057	0.996	0.003	0.148	0.019	0.911
30	0.965	0.039	1.004	0.002	0.051	0.007	1.948	0.965	0.039	1.004	0.002	0.051	0.007	1.948
31	1.074	0.044	1.001	0.002	0.103	0.012	0.992	1.074	0.044	1.001	0.002	0.103	0.012	0.992
32	0.951	0.049	0.999	0.003	0.026	0.007	4.303	0.951	0.049	0.999	0.003	0.026	0.007	4.303
33	n/a	n/a	n/a	n/a	n/a	n/a	0.044	0.995	∞	1.000	∞	0.000	∞	0.500
34	1.325	0.285	0.955	0.021	0.284	0.127	1.592	1.325	0.285	0.955	0.021	0.284	0.127	1.592
35	1.029	0.026	0.996	0.002	0.002	0.002	13.984	1.029	0.026	0.996	0.002	0.002	0.001	13.984
36	0.909	0.051	0.989	0.003	0.100	0.014	1.338	0.909	0.052	0.989	0.003	0.100	0.014	1.338
37	1.019	0.030	0.997	0.002	0.002	0.002	28.446	1.019	0.030	0.997	0.002	0.002	0.002	28.450
38	1.003	0.024	1.000	0.001	0.002	0.002	13.630	1.003	0.024	1.000	0.001	0.002	0.002	13.630
39	1.031	0.052	0.992	0.003	0.053	0.009	2.230	1.031	0.052	0.992	0.003	0.053	0.009	2.230
40	0.999	0.011	0.997	0.001	0.005	0.002	2.376	0.999	0.011	0.997	0.001	0.005	0.002	2.376
41	1.008	0.056	1.000	0.003	0.076	0.011	1.874	1.008	0.056	1.000	0.003	0.076	0.011	1.874
42	1.024	0.059	0.983	0.004	0.092	0.015	1.561	1.024	0.059	0.983	0.004	0.092	0.015	1.561
43	0.987	0.073	0.999	0.004	0.017	0.007	9.002	0.987	0.073	0.999	0.004	0.017	0.007	9.002
44	1.040	0.243	0.953	0.029	0.190	0.109	2.985	1.040	0.243	0.953	0.029	0.190	0.109	2.985
45	1.014	0.063	0.998	0.003	0.049	0.009	2.902	1.014	0.063	0.998	0.003	0.049	0.009	2.902
46	1.002	0.072	0.996	0.004	0.109	0.020	1.624	1.002	0.072	0.996	0.004	0.109	0.020	1.624
47	0.991	0.032	1.002	0.002	0.024	0.005	2.811	0.991	0.032	1.002	0.002	0.024	0.005	2.811
48	0.480	116.820	0.970	0.005	0.057	0.015	2.143	0.480	16.777	0.970	0.005	0.057	0.015	2.143
49	n/a	n/a	n/a	n/a	n/a	n/a	0.044	0.995	∞	1.000	∞	0.000	∞	0.500
50	1.306	0.484	1.036	0.033	0.804	0.615	0.995	1.306	0.481	1.036	0.033	0.804	0.613	0.995
51	1.052	0.041	0.982	0.003	0.035	0.007	2.290	1.052	0.041	0.982	0.003	0.035	0.007	2.290
52	n/a	n/a	n/a	n/a	n/a	n/a	1.991	0.969	0.230	0.999	0.009	0.003	0.040	1.991
53	0.962	0.043	0.998	0.003	0.043	0.008	2.323	0.962	0.043	0.998	0.003	0.043	0.008	2.323
54	0.877	0.055	0.990	0.003	0.058	0.011	2.126	0.877	0.055	0.990	0.003	0.058	0.011	2.126
55	0.974	0.051	0.994	0.003	0.051	0.008	2.337	0.974	0.051	0.994	0.003	0.051	0.008	2.337
56	0.978	0.048	0.987	0.003	0.059	0.010	1.874	0.978	0.048	0.987	0.003	0.059	0.010	1.874
57	0.791	0.111	0.982	0.008	0.193	0.057	1.518	0.791	0.111	0.982	0.008	0.193	0.057	1.518
58	1.036	0.022	0.995	0.001	0.007	0.003	4.499	1.036	0.022	0.995	0.001	0.007	0.003	4.499
59	0.973	0.099	0.970	0.009	0.141	0.037	1.805	0.973	0.099	0.970	0.009	0.141	0.037	1.805
60	1.027	0.066	0.996	0.004	0.009	0.005	13.228	1.027	0.066	0.996	0.004	0.009	0.005	13.227
61	1.023	0.050	0.994	0.003	0.021	0.006	5.066	1.023	0.050	0.994	0.003	0.021	0.006	5.066
62	n/a	n/a	0.978	0.000	0.000	0.000	158.501	0.672	∞	0.978	∞	0.000	∞	10.000
63	0.979	0.591	1.002	0.033	−3.364	5.018	0.464	1.301	6.806	0.979	0.259	26.758	6.143	0.467
64	1.040	0.058	0.997	0.003	0.083	0.013	1.685	1.040	0.058	0.997	0.003	0.083	0.013	1.685
65	0.993	0.041	1.000	0.002	0.176	0.018	0.602	0.993	0.041	1.000	0.002	0.176	0.018	0.602
66	0.906	0.098	0.966	0.007	0.055	0.017	2.774	0.906	0.098	0.966	0.007	0.055	0.017	2.774
67	0.928	0.044	1.004	0.003	0.033	0.007	3.107	0.928	0.044	1.004	0.003	0.033	0.007	3.107
68	1.053	0.056	0.996	0.003	0.038	0.008	3.287	1.053	0.056	0.996	0.003	0.038	0.008	3.287
69	1.042	0.058	0.995	0.003	0.012	0.005	8.856	1.042	0.058	0.995	0.003	0.012	0.006	8.856
70	1.315	0.392	0.964	0.025	−1055.613	645.142	0.001	0.792	0.190	1.032	0.013	890.783	0.858	0.001
71	1.000	0.011	0.997	0.001	0.004	0.002	2.560	1.000	0.011	0.997	0.001	0.004	0.002	2.560
72	0.996	0.010	0.999	0.001	0.011	0.002	1.183	0.996	0.010	0.999	0.001	0.011	0.002	1.183
73	0.800	1.510	0.971	0.005	0.000	0.000	2985.864	0.817	∞	0.971	∞	0.000	∞	290.372
74	0.972	0.075	0.999	0.004	0.078	0.017	2.403	0.972	0.075	0.999	0.004	0.078	0.017	2.403
75	0.979	0.031	0.997	0.002	0.002	0.001	28.706	1.053	0.030	0.999	0.016	0.001	0.017	3.366
76	0.883	0.063	0.986	0.003	0.053	0.011	2.422	0.883	0.063	0.986	0.003	0.053	0.011	2.422
77	0.961	0.068	0.992	0.004	0.006	0.004	20.082	0.961	0.068	0.992	0.004	0.006	0.004	20.080
78	1.046	0.073	0.990	0.004	0.082	0.015	2.087	1.046	0.073	0.990	0.004	0.082	0.015	2.087
79	0.600	0.350	0.894	0.089	0.572	0.501	1.543	0.600	0.350	0.894	0.089	0.572	0.501	1.543
80	1.004	0.014	1.000	0.001	0.012	0.002	1.894	1.004	0.014	1.000	0.001	0.012	0.002	1.894
81	1.002	0.063	1.000	0.004	0.012	0.005	10.623	1.002	0.063	1.000	0.004	0.012	0.005	10.623
82	0.984	0.101	0.982	0.007	0.356	0.091	0.746	0.984	0.101	0.982	0.007	0.356	0.091	0.746
83	0.771	93.348	0.988	0.002	0.012	0.005	3.430	0.771	23.786	0.988	0.002	0.012	0.005	3.430
84	0.980	0.058	1.002	0.004	0.025	0.007	5.258	0.980	0.058	1.002	0.004	0.025	0.007	5.258
85	0.976	0.060	1.001	0.004	0.015	0.006	8.591	0.976	0.060	1.001	0.004	0.015	0.006	8.591
86	1.001	0.023	0.998	0.001	0.630	0.035	0.093	1.001	0.023	0.998	0.001	0.630	0.035	0.093
87	1.010	0.064	1.000	0.003	0.181	0.029	0.912	1.010	0.064	1.000	0.003	0.181	0.029	0.912
88	0.983	0.058	0.993	0.003	0.044	0.008	3.051	0.983	0.058	0.993	0.003	0.044	0.008	3.051
89	1.012	0.015	0.998	0.001	0.006	0.002	4.075	1.012	0.015	0.998	0.001	0.006	0.002	4.075
90	1.039	0.057	0.984	0.004	0.003	0.003	30.356	1.039	0.057	0.984	0.004	0.003	0.002	30.345
91	0.966	0.071	0.974	0.005	0.053	0.013	2.543	0.966	0.071	0.974	0.005	0.053	0.013	2.543
92	1.039	0.037	0.996	0.002	0.017	0.004	4.247	1.039	0.037	0.996	0.002	0.017	0.004	4.247
93	0.913	0.076	0.988	0.005	0.000	0.000	1519.892	1.023	0.031	0.990	0.003	0.000	0.000	127.018
94	1.059	0.068	0.993	0.004	0.094	0.016	1.708	1.059	0.068	0.993	0.004	0.094	0.016	1.708
95	1.001	0.041	0.998	0.003	0.009	0.004	8.975	1.001	0.041	0.998	0.003	0.009	0.004	8.975
96	0.930	0.049	0.994	0.003	0.127	0.017	1.040	0.930	0.049	0.994	0.003	0.127	0.017	1.040
97	1.026	0.039	1.000	0.002	0.187	0.018	0.526	1.026	0.039	1.000	0.002	0.187	0.018	0.526
98	1.029	0.059	0.998	0.003	0.051	0.009	2.746	1.029	0.059	0.998	0.003	0.051	0.009	2.746
99	0.363	0.517	0.956	0.062	2.255	2.943	0.606	0.363	0.513	0.956	0.062	2.255	2.911	0.606
100	1.012	0.020	0.998	0.001	0.008	0.003	3.806	1.012	0.020	0.998	0.001	0.008	0.003	3.806

Note: "n/a": not available, since the estimation procedure did not converge.

Table H.2. Individually estimated preference parameters, time experiment, strictly concave budget restrictions: present bias parameter $\hat{\beta}$, weekly discount factor $\hat{\delta}$, curvature of the power utility function $\hat{\rho}$

Participant	Tobit							MLE						
ID	$\hat{\beta}$	SE of $\hat{\beta}$	$\hat{\delta}$	SE of $\hat{\delta}$	$\hat{\rho}$	SE of $\hat{\rho}$	$\hat{\sigma}$	$\hat{\beta}$	SE of $\hat{\beta}$	$\hat{\delta}$	SE of $\hat{\delta}$	$\hat{\rho}$	SE of $\hat{\rho}$	$\hat{\sigma}$
1	1.011	0.077	1.004	0.004	2.935	0.446	0.059	1.011	0.077	1.004	0.004	2.935	0.444	0.059
2	0.951	0.157	0.907	0.026	−0.151	0.079	1.387	0.951	0.157	0.907	0.026	−0.151	0.079	1.387
3	0.709	0.484	0.964	0.047	20.462	21.498	0.072	0.708	0.422	0.964	0.033	20.459	8.097	0.072
4	5.1×10^{5}	2.9×10^{7}	1.037	0.213	−63.672	272.522	0.100	0.000	0.000	0.966	0.131	59.715	8.849	0.100
5	1.073	0.077	0.995	0.004	−0.037	0.046	0.509	1.073	0.077	0.995	0.004	−0.037	0.046	0.509
6	1.079	0.144	0.977	0.009	0.684	0.253	0.315	1.079	0.144	0.977	0.009	0.684	0.253	0.315
7	0.998	0.007	0.998	0.000	−0.007	0.005	0.045	0.998	0.007	0.998	0.000	−0.007	0.005	0.045
8	1.003	0.008	0.999	0.000	−0.012	0.005	0.051	1.003	0.008	0.999	0.000	−0.012	0.005	0.051
9	0.606	1.126	1.569	1.760	−3.936	8.798	1.013	14.786	19.890	0.049	0.118	23.475	19.299	1.014
10	0.905	0.129	0.978	0.009	0.538	0.233	0.387	0.905	0.127	0.978	0.008	0.538	0.096	0.387
11	1.054	0.121	1.003	0.006	−0.126	0.056	1.084	1.054	0.121	1.003	0.006	−0.126	0.056	1.084
12	1.032	0.056	1.005	0.003	0.006	0.039	0.346	1.032	0.056	1.005	0.003	0.006	0.039	0.346
13	1.012	0.054	1.000	0.003	−0.078	0.030	0.430	1.012	0.054	1.000	0.003	−0.078	0.030	0.430
14	1.007	0.009	1.000	0.001	−0.020	0.006	0.064	1.007	0.009	1.000	0.001	−0.020	0.006	0.064
15	0.947	0.043	1.002	0.002	−0.068	0.026	0.349	0.947	0.043	1.002	0.002	−0.068	0.026	0.349
16	1.034	0.081	0.980	0.005	−0.169	0.034	0.873	1.034	0.081	0.980	0.005	−0.169	0.034	0.873
17	0.966	0.087	1.002	0.005	−0.133	0.042	0.868	0.966	0.087	1.002	0.005	−0.133	0.042	0.868
18	0.984	0.068	0.990	0.004	−0.131	0.033	0.665	0.984	0.068	0.990	0.004	−0.131	0.033	0.665
19	1.217	0.132	1.007	0.006	0.318	0.130	0.369	1.217	0.132	1.007	0.006	0.318	0.130	0.369
20	1.030	0.083	0.993	0.004	0.004	0.057	0.513	1.030	0.083	0.993	0.004	0.004	0.057	0.513
21	0.878	0.072	1.000	0.004	0.333	0.103	0.280	0.878	0.072	1.000	0.004	0.333	0.103	0.280
22	0.995	0.239	0.847	0.061	−0.174	0.128	1.401	0.995	0.239	0.847	0.061	−0.174	0.128	1.401
23	1.014	0.141	1.045	0.014	2.169	0.630	0.140	1.014	0.141	1.045	0.014	2.169	0.632	0.140
24	0.468	118.451	0.983	0.005	−0.383	0.009	7.651	0.535	8.432	0.983	0.005	−0.383	0.008	7.652
25	0.967	0.063	0.999	0.003	−0.061	0.039	0.494	0.967	0.063	0.999	0.003	−0.061	0.039	0.494
26	0.696	0.268	0.974	0.022	7.858	4.737	0.102	0.696	0.288	0.974	0.025	7.858	5.853	0.102
27	1.003	0.075	1.008	0.004	0.204	0.080	0.323	1.003	0.075	1.008	0.004	0.204	0.080	0.323
28	1.022	0.008	1.000	0.000	−0.008	0.005	0.052	1.022	0.008	1.000	0.000	−0.008	0.005	0.052
29	0.834	0.102	0.989	0.007	0.174	0.118	0.524	0.834	0.102	0.989	0.007	0.174	0.118	0.524
30	1.185	0.124	1.007	0.006	0.130	0.094	0.491	1.185	0.124	1.007	0.006	0.130	0.094	0.491
31	0.959	0.063	0.995	0.004	0.140	0.063	0.317	0.959	0.063	0.995	0.004	0.140	0.063	0.317
32	0.985	0.047	1.000	0.003	−0.032	0.031	0.334	0.985	0.047	1.000	0.003	−0.032	0.031	0.334
33	0.998	0.018	0.998	0.001	−0.021	0.012	0.125	0.998	0.018	0.998	0.001	−0.021	0.012	0.125
34	0.959	0.129	0.993	0.007	0.199	0.142	0.581	0.959	0.129	0.993	0.007	0.199	0.142	0.581
35	1.001	0.028	0.998	0.002	0.012	0.020	0.177	1.001	0.028	0.998	0.002	0.012	0.020	0.177
36	0.957	0.071	0.998	0.004	−0.210	0.025	1.000	0.957	0.071	0.998	0.004	−0.210	0.025	1.000
37	1.023	0.034	0.994	0.002	0.035	0.025	0.196	1.023	0.034	0.994	0.002	0.035	0.025	0.196
38	1.031	0.067	1.002	0.003	0.015	0.047	0.402	1.031	0.067	1.002	0.003	0.015	0.047	0.402
39	1.021	0.090	0.998	0.005	0.235	0.099	0.360	1.021	0.090	0.998	0.005	0.235	0.065	0.360
40	1.007	0.039	0.999	0.002	−0.394	0.004	10.353	1.007	0.039	0.999	0.002	−0.394	0.003	10.353
41	0.970	0.049	1.001	0.003	0.027	0.038	0.304	0.970	0.049	1.001	0.003	0.027	0.038	0.304
42	1.088	0.146	0.960	0.011	−0.146	0.063	1.330	1.088	0.146	0.960	0.011	−0.146	0.063	1.330
43	1.073	0.073	0.997	0.004	−0.357	0.010	3.457	1.073	0.073	0.997	0.004	−0.357	0.010	3.457
44	1.311	0.209	0.982	0.009	−0.295	0.028	3.335	1.311	0.209	0.982	0.009	−0.295	0.028	3.335
45	1.080	0.093	0.996	0.005	−0.044	0.054	0.623	1.080	0.093	0.996	0.005	−0.044	0.054	0.623
46	0.727	0.243	1.038	0.026	1.895	1.178	0.328	0.727	0.243	1.038	0.026	1.895	1.189	0.328
47	0.954	0.040	0.993	0.002	0.109	0.037	0.211	0.954	0.040	0.993	0.002	0.109	0.037	0.211
48	0.950	0.053	0.995	0.003	−0.102	0.029	0.484	0.950	0.053	0.995	0.003	−0.102	0.029	0.484
49	0.991	0.008	1.000	0.000	−0.009	0.006	0.053	0.991	0.008	1.000	0.000	−0.009	0.006	0.053
50	0.424	1.331	0.658	0.843	−4.428	12.304	1.110	1.360	1.289	1.288	0.275	2.009	1.949	1.121
51	1.036	0.039	0.992	0.002	0.069	0.031	0.210	1.036	0.039	0.992	0.002	0.069	0.031	0.210
52	0.933	0.083	1.002	0.005	−0.038	0.058	0.631	0.933	0.083	1.002	0.005	−0.038	0.058	0.631
53	1.045	0.098	1.000	0.005	0.108	0.084	0.478	1.045	0.098	1.000	0.005	0.108	0.084	0.478
54	0.600	0.103	0.983	0.008	−0.091	0.069	1.053	0.600	0.103	0.983	0.008	−0.091	0.069	1.053
55	1.004	0.080	0.997	0.004	0.030	0.061	0.482	1.004	0.080	0.997	0.004	0.030	0.061	0.482
56	0.961	0.088	0.990	0.005	0.195	0.096	0.399	0.961	0.088	0.990	0.005	0.195	0.096	0.399
57	0.894	0.143	0.961	0.013	0.525	0.257	0.440	0.894	0.144	0.961	0.015	0.525	0.297	0.440
58	0.984	0.034	1.000	0.002	−0.088	0.019	0.288	0.984	0.034	1.000	0.002	−0.088	0.019	0.288
59	0.530	0.415	0.878	0.107	0.936	1.222	0.998	0.530	0.413	0.878	0.107	0.936	1.212	0.998
60	1.018	0.012	0.998	0.001	0.013	0.008	0.071	1.018	0.012	0.998	0.001	0.013	0.008	0.071
61	0.897	0.075	0.991	0.005	−0.095	0.045	0.692	0.897	0.075	0.991	0.005	−0.095	0.045	0.692
62	0.934	0.048	0.990	0.003	−0.191	0.020	0.623	0.934	0.048	0.990	0.003	−0.191	0.020	0.623
63	0.990	0.183	1.016	0.011	7.461	2.569	0.061	0.990	0.183	1.016	0.011	7.461	2.450	0.061
64	0.969	0.122	1.021	0.008	0.357	0.168	0.430	0.969	0.122	1.021	0.008	0.357	0.168	0.430
65	0.998	0.063	0.997	0.003	−0.068	0.037	0.492	0.998	0.063	0.997	0.003	−0.068	0.037	0.492
66	1.094	0.147	0.970	0.010	−0.052	0.084	0.977	1.094	0.147	0.970	0.010	−0.052	0.084	0.977
67	1.073	0.044	0.997	0.002	0.055	0.033	0.231	1.073	0.044	0.997	0.002	0.055	0.033	0.231
68	1.091	0.086	0.990	0.004	−0.085	0.045	0.640	1.091	0.086	0.990	0.004	−0.085	0.045	0.640
69	1.187	0.184	0.989	0.008	0.514	0.239	0.419	1.187	0.184	0.989	0.008	0.514	0.239	0.419
70	3.026	24.105	0.622	1.895	-1.2×10^{4}	7.8×10^{4}	0.001	0.944	0.197	1.024	0.011	621.634	0.939	0.001
71	0.978	0.044	1.001	0.002	0.006	0.032	0.285	0.978	0.044	1.001	0.002	0.006	0.032	0.285
72	0.984	0.058	0.999	0.003	−0.137	0.027	0.577	0.984	0.058	0.999	0.003	−0.137	0.027	0.577
73	0.915	0.148	0.971	0.011	−0.117	0.082	1.389	0.915	0.148	0.971	0.011	−0.117	0.082	1.389
74	0.995	0.067	0.992	0.004	−0.117	0.034	0.618	0.995	0.067	0.992	0.004	−0.117	0.034	0.618
75	1.018	0.012	0.999	0.001	−0.005	0.008	0.075	1.018	0.012	0.999	0.001	−0.005	0.008	0.075
76	1.135	0.076	0.994	0.004	−0.068	0.038	0.509	1.135	0.076	0.994	0.004	−0.068	0.038	0.509
77	0.945	0.053	0.996	0.003	0.001	0.039	0.357	0.945	0.053	0.996	0.003	0.001	0.039	0.357
78	1.105	0.104	0.980	0.006	−0.022	0.062	0.634	1.105	0.104	0.980	0.006	−0.022	0.062	0.634
79	0.013	0.151	0.776	0.540	2.982	9.199	1.174	0.013	0.083	0.776	0.295	2.982	4.946	1.174
80	0.958	0.067	0.999	0.004	0.240	0.078	0.281	0.958	0.067	0.999	0.004	0.240	0.078	0.281
81	1.022	0.094	1.000	0.005	0.038	0.073	0.544	1.022	0.094	1.000	0.005	0.038	0.073	0.544
82	1.038	0.145	1.003	0.008	0.528	0.228	0.388	1.038	0.145	1.003	0.008	0.528	0.228	0.388
83	0.691	0.128	0.978	0.010	−0.007	0.107	0.987	0.691	0.128	0.978	0.010	−0.007	0.107	0.987
84	0.990	0.065	0.996	0.004	−0.148	0.029	0.673	0.990	0.065	0.996	0.004	−0.148	0.029	0.673
85	0.561	0.321	1.038	0.036	1.188	1.123	0.652	0.561	0.322	1.038	0.036	1.188	1.131	0.652
86	1.083	0.052	0.994	0.003	0.388	0.066	0.156	1.083	0.052	0.994	0.003	0.388	0.066	0.156
87	0.968	0.087	1.006	0.005	−0.022	0.060	0.615	0.968	0.087	1.006	0.005	−0.022	0.060	0.615
88	0.992	0.029	0.998	0.002	−0.044	0.018	0.211	0.992	0.029	0.998	0.002	−0.044	0.018	0.211
89	0.984	0.076	1.015	0.005	0.147	0.074	0.363	0.984	0.076	1.015	0.005	0.147	0.074	0.363
90	1.537	0.731	0.928	0.050	0.164	0.383	1.724	1.537	0.728	0.928	0.050	0.164	0.382	1.724
91	1.007	0.036	0.994	0.002	0.064	0.029	0.198	1.007	0.036	0.994	0.002	0.064	0.029	0.198
92	0.975	0.085	1.001	0.005	−0.075	0.051	0.693	0.975	0.085	1.001	0.005	−0.075	0.051	0.693
93	1.048	0.126	0.994	0.007	0.121	0.112	0.594	1.048	0.126	0.994	0.007	0.121	0.112	0.594
94	0.930	0.090	0.993	0.005	−0.005	0.067	0.632	0.930	0.090	0.993	0.005	−0.005	0.067	0.632
95	0.980	0.021	0.994	0.001	−0.016	0.015	0.144	0.980	0.021	0.994	0.001	−0.016	0.015	0.144
96	0.977	0.051	1.000	0.003	−0.104	0.027	0.457	0.977	0.051	1.000	0.003	−0.104	0.027	0.457
97	0.977	0.059	1.003	0.003	0.115	0.055	0.302	0.977	0.059	1.003	0.003	0.115	0.055	0.302
98	1.515	0.386	1.049	0.022	3.074	1.261	0.153	1.515	0.387	1.049	0.022	3.074	1.268	0.153
99	0.434	0.413	0.953	0.051	2.613	2.842	0.458	0.434	0.406	0.953	0.050	2.613	2.771	0.458
100	1.047	0.041	0.998	0.002	−0.000	0.028	0.254	1.047	0.041	0.998	0.002	−0.000	0.028	0.254

H.2 Self-Reported Decision Strategies

Table H.3. Original responses by participants in German

ID	Response
1	- Meist überwiegte die Entscheidung zu einer ausgeglichenen Verteilung, um bei der Entscheidung nicht ohne Geld auszugehen. - Bei Situationen wo sich die Differenz zwischen den beiden Maximen deutlicher unterschieden haben, war es älles oder nichts".
2	JA: Weihnachten steht vor der Tür. Ich schmeiße an Weihnachten mein Geld aus dem Fenster. Ich bin ein sehr big spender. Weihnachten hat zu 90% meine Wahl beeinflusst. Normalerweise fällt es mir leicht auf Geld Monate zu warten, wenn es bedeutet, dass ich dann insgesamt mehr bekomme.
3	Ich habe den Betrag ungefähr gleich verteilt.
4	Konstante Auszahlung
5	Insgesamt möglichst viel Verdienst, egal wann
6	Primär ging es um den meisten Ertrag. Sekundär ging es um den Zeitpunkt der Auszahlung; man opfert lieber ein paar Cents oder Euros, wenn man den Betrag heute statt in zwei Monaten bekommt und mit diesem Geld etwas Schönes machen kann.
7	Bei den linearen Kurven ging es mir alleine darum einen möglichst großen Geldbetrag am Stück zu erhalten; für 50ct mehr 2 Monate länger auf mein Geld zu warten war es mir dann aber auch nicht wert, weshalb ich in solchen Fällen trotzdem den etwas niedrigeren Betrag ausgewählt habe der früher ausgezahlt wird. Bei den nicht linearen Kurven ist mir aufgefallen, dass wenn man an der rechts-untersten Stelle des Graphen beginnt und den Anfangsbetrag von 1,50€ immer mit dem Doppelpfeil erhöht, sich der Betrag des späteren Auszahldatums immer um genau 10 ct senkt. Dementsprechend habe ich den ersten Auszahlungsbetrag solange mit dem Doppelpfeil erhöht, bis dieser nicht mehr um mehr als 10ct gestiegen ist; dies habe ich getan um die größtmögliche Gesamtauszahlungssumme zu erhalten.
8	Im Allgemeinen, habe jch versucht, immer einen Punkt mit maximaler Norm (euklidsche Standardnorm im R^2) zu wählen. Bei den Geraden, bei denen derselbe maximale Wert beim ersten und beim zweiten Termin waren, habe ich aus Gründen der Systematik den Punkt gewählt, bei dem das meiste Geld beim ersten Termin ausgezahlt wird. Bei Geraden, auf denen verschiedene Werte aufgetragen waren, habe ich immer einen Punkt mit einer höchstmöglichen Koordinate genommen. Bei Kurven, bei denen die Differenz der maximalen Auszahlungen 0 war, habe ich immer versucht, die Zahlungen zum ersten und zweiten Termin gleichhoch zu machen. War die Differenz der maximalen Auszahlungen eher groß, dann habe ich eher näher an der Achse mit dem höheren Wert angefangen zu suchen.
9	teilweise ganz willkürlich, bei den höheren Beträgen stets relativ in der Mitte
10	höchstmöglichen Gewinn
11	Teilweise nach Höhe der ausgezahlten Beträge oder aber nach Auszahlungstermin. Wenn der Termin weit in der Zukunft liegt, dann mehr Geld am 1. Auszahlungstermin
12	Immer den maximalen Wert zu beziehen - der Zeitpunkt ist eher nebensächlich, solange ich das annähernd maximale rausbekomme Gibt es einen Linearen verlauf - spalte ich es gerne 50:50
13	Ich habe versucht die gesamt Auszahlung zu maximieren. Dies beruhte bei den ungleichmäßigen Wechselraten aber eher auf Schätzungen
14	möglichst viel Geld insgesamt
15	Zuerst habe ich geschaut, zu welchem Zeitpunkt ich den größten Gewinn machen kann, dabei war egal, wann die Auszahlungen bei mir ankommen. Wenn der Gewinn zu jedem Zeitpunkt gleich war, habe ich den früheren Termin gewählt bei kleineren Beträgen. Bei größeren Beträgen dann 2/3 zum früheren Zeitpunkt.
16	Wann ich das Geld brauche (bspw. ist der Dezember ein schwieriger Monat für mich im Vergleich zum Januar)
17	Nein, ich bin keiner Strategie gefolgt. Ich habe nur versucht mehr Geld heraus zu bekommen als an den jeweiligen Achsen recht und links stand.
18	Meine Strategie war, so einen hohen Endbetrag wie möglich zu erhalten, obwohl man dadurch das Geld vielleicht später bekommen würde.
19	Ich habe die beiden Summen addiert (überflogen), um die höchstmögliche Summe zu erzielen. Ich habe weniger auf die Zeitpunkte geachtet, da es für mich nicht so relevant ist, wann genau das Geld kommt (:
20	Maximaler Gewinn egal zu welchem Zeitpunkt
21	Relativ gleichmäßige Aufteilung, damit man je nach Auslosung in etwa den gleichen Geldwert erhalten würde
22	Immer danach geguckt am frühstmöglichen Zeitpunkt viel Geld zu kriegen weil knapp bei Kasse
23	Ich habe geschaut, möglichst den höchst möglichen Betrag zu erreichen. Die Tage der Überweisungen habe ich nicht beachtet
24	Frühestmöglicher hoher Betrag, oder ob es Wert ist lange auf einen höheren Betrag zu warten.
25	Ich habe versucht möglichst viel Geld zu generieren.
26	Mit der Mitte kann man nie wirklich falsch liegen
27	Bei linearen habe ich nur darauf geachtet, auf welcher Achse der höhere Betrag steht, bei den anderen habe ich drauf geachtet wo die Steigung am höchsten ist
28	Maximierung der gesamten Auszahlung, unabhängig vom Datum der Auszahlungen. Summe der Auszahlungen addiert nach Intuition wo das Maximum ungefähr ist. Danach schrittweise Annäherung
29	- am meisten Geld - ausprobieren
30	Ich habe versucht den höchsten Ausschlag des Graphen zu finde.n Bei den linearen Graphen habe ich auf der Achse des höchsten Wertes den größt möglichen Wert genommen + die 1.50€.
31	Höchster Wert. Bei gleichem Betrag mittig.
32	Möglichst den höchsten Betrag erhalten.
33	Bei gewölbten Kurven: Punkt wählen, wo Steigung = -1 -> Maximum Bei Geraden mit Steigung -1: früher Geld
34	je mehr Geld insgesamt entsteht
35	Welche Variante bringt am meisten Geld? Dabei ist mir der Zeitraum den ich warten muss egal.
36	Ich habe geschaut meinen Gewinn möglichst zu maximieren und eher bei der 1.Zahlung mehr zu erhalten als bei der 2.
37	Maximaler Gewinn, Bei geraden dort, wo das meiste Geld + 1,50 gezahlt wird, bei Kurven dort, wo die Steigung -1 beträgt, bzw. Man weniger gewinnt als man abgibt, wenn man kleine Schritte macht.
38	je mehr Geld, desto besser.
39	Immer den größten möglichen Gesamtbetrag zu bekommen
40	Maximierung des Betrags unabhängig vom Auszahlungsdatum
41	Ich habe mir einmal angeschaut wie sich die Kurven verhalten und dann ungefähr immer abgeschätzt wo der optimale Punkt lag. Wenn die Differenz zwischen den zwei Auszahlungen groß war habe ich bei Kurven einen Punkt auf der Hälfte der höheren Auszahlung gewählt, und bei Gerade den Punkt bei dem man am niedrigen Datum nur 1,50 und beim anderen den Maximalbetrag bekommt.
42	Ich habe versucht die Gesamtauszahlung zu maximieren. Wenn jedoch die Höhe der früheren Auszahlung höher war als die Höhe der späteren Auszahlung, habe ich direkt die höhere erste Auszahlung genommen, da ich das Geld theoretisch ja anlegen könnte. In diesen Fällen war mir die Gesamtauszahlung nicht so wichtig.
43	Erst mal ganz recht und links geschaut und dann den höherenBetrag genommen sodass man den höhsten Betrag hat und die 1,50 Grundauszahlung entweder im frühen oder späten Zeitpunkt. Irgendwann habe ich Strategie geändert und versucht den Gewinn zu maximieren.
44	Strategie war frühe Auszahlung.
45	Strategie war es den höchsten Betrag zu erziehlen, aber ich dachte mir wenn es keinen Unterschied gemacht hat, dann würde ich mich in Zukunft bestimmt drüber freuen. Auch wenn es von jetzt lange hin ist, aber Zeit ist nunmal ein Empfinden.
46	Bei den nicht linearen Verläufen habe ich meistens versucht die größte Fläche unter der Kurve zu generieren
47	Ich habe versucht, den Gesamtbetrag so hoch wie möglich zu wählen. Bei den gebogen Kurven habe ich dabei versucht den Flächeninhalt des Quadrats den die beweglichen Linien bilden am höchsten zu wählen. Wenn die Beträge an den zwei verschiedenen Zeitpunkten gleich waren. Waren diese verschieden, verschob sich der Punkt weiter in die Richtung des höheren Betrags. Bei den graden Kurven habe und gleichen Beträgen, war es egal wo der Punkt hinfällt, das der Gesamtbetrag sich nicht änderte. Dann habe ich meist die Hälfte an je einem Tag ausgewählt. War ein Betrag höher an einem Zeitpunkt, habe ich diesen Tag gewählt und am zweiten die 1,50 Euro, da dann der Gesamtbetrag am höchsten war.
48	Zunächst habe ich beachtet, welche Entscheidung den größten Gesamtgewinn nach sich zieht. Allerdings habe ich den früheren Termin etwas bevorzugt da ich tendenziell in der Vorweihnachtszeit das Geld besser gebrauchen kann, als danach.
49	Ich habe versucht, immer den höchst möglichen Betrag zu erzielen
50	Nein

Continued on next page.

Table H.3 (continued)

ID	Response
51	Möglichst die Gesamtauszahlung maximieren. Dabei eine leichte Präferenz für wenigstens ein bisschen Geld heute oder nächste Woche.
52	Versuch, insgesamt einen hohen Betrag zu erreichen.
53	- Wann es das meiste insgesamt Geld gab - die Achse mit dem Mauszeiger entlang geschaut, welches Verhältnis am meisten Geld gab - Manchmal auch nicht nach dem meisten Geld. Wenn es ca. gleich war auch geschaut das ich an beiden Terminen ca. gleich viel bekommen, da es sich in meiner Vorstellung befriedigender, anfühlt, zweimal etwa gleich viel zu bekommen als einmal ein paar Euro mehr.
54	Meistens habe ich darauf geachtet, möglichst schnell, möglichst viel Geld zu bekommen. Diese SStrategie"habe ich allerdings unterbrochen, wenn die Auszahlung am zweiten Termin erheblich höher war.
55	Ich habe immer versucht, den maximalen Geldbetrag zu erhalten. Das Auszahlungsdatum war dabei weniger wichtig, als die Menge des Geldes.
56	Ich persönlich habe nicht viel Wert darauf gelegt, wann ich das Geld bekomme, sondern eher darauf, wie der Wert sich verändert zu dem Zeitpunkt der Auszahlung.
57	möglichst hohe Beträge
58	Maximierung Gesamtauszahlung
59	Ich habe die unterschiedlichen Zeiträume betrachtet. Dann habe ich nach dem besten Zeitpunkt der Auszahlung geschaut, ob sich ggfs die Auszahlungshöhe bei einem späteren oder früheren Zeitpunkt erhöht (quasi nach einem Hochpunkt geschaut). Wenn eine hohe Auszahlung sofort oder in einer Woche stattgefunden hat, dann habe ich auch eine geringere Auszahlung zu einem späteren Zeitpunkt in Kauf genommen.
60	Ich habe immer die maximale Menge an Geld ausgewählt
61	Die Zeit war nicht der auschlaggebene Faktor, sondern der maximale Gewinn.
62	Ich habe meine Entscheidungen so getroffen, dass ich den höchstmöglichen Gegenwert in Materie erwerben kann. Dabei sind auch die aktuellen Inflationswerte eingeflossen.
63	Um keine Risiken einzugehen, habe ich mich bemüht die Entscheidung stets im mittleren Bereich zu halten.
64	Nun ich bin nicht unbedingt einer bestimmten Strategie gefolgt, aber ich sah es als besser an, länger auf Geld zu warten, wenn sich dafür der Geldbetrag etwas erhöht.
65	Orientierung an der größtmöglichen Gesamtsumme
66	Je nach dem wann man die erste und die letzte Zahlung erhalten würde und wie unterschiedlich die Betrage ausfallen würden. Ich finde zb, dass es keinen Sinn macht beim zweiten Termin einen höheren Betrag zu setzten, wenn die Differenz beider maximalen Beträge klein ist.
67	Möglichst das meiste Geld, der Zeitpunkt der Auszahlung war mir egal, oder wenn es keinen Unterschied gab, entschied ich mich für ca. die Hälfte des Geldes nach zu jedem Auszahlungspunkt.
68	ich habe immer versucht, durch meine Entscheidungen möglichst viel Gewinn zu erzielen, egal wann dieser Gewinn ausgezahlt werden sollte.
69	Ich habe geschaut nach welcher Verteilung man insgesamt den höchsten Beitrag erzielt. Wenn es ungefähr gleich war, habe ich danach entschieden den Beitrag früher ausgezahlt zu bekommen.
70	An beiden Auszahlungen wollte ich den gleichen Betrag bekommen können
71	Ich habe darauf geachtet den monetären Verlust der Auszahlung auf ein Minimum zu begrenzen.
72	Die höchstgesehene Summe
73	Meistens auf der Grundlage welche Entscheidung in etwa im maximalen Betrag resultiert, außer die Unterschiede der Beträge waren in meinen Augen nicht ausschlaggebend oder der zweite Termin mit mehr Auszahlung lag zu weit in der Zukunft.
74	Je höher der Unterschied zwischen den Auszahlungsbeträgen war, desto mehr habe ich mich hin zum maximalen Ertrag hin entschieden, unabhängig von der Wartezeit. Dies erübrigt sich natürlich, wenn der erste Auszahlungsbetrag der höhere ist. Bei geringeren Unterschieden zwischen den Auszahlungsbeträgen habe ich mich für eine höheren und früheren ersten Auszahlungsbetrag entschieden. Bei nicht linearen Zusammenhängen habe ich mich entlang der Kurve bewegt, um dem maximal zu erzielenden Betrag nahe zu kommen - ohne genau zu rechnen. Auch hier war die Wartebereitschaft größer, je höher der zu erzielende Betrag war.
75	Ich habe versucht, am meisten Geld zu bekommen.
76	Meistens habe ich versucht, den Höchstbetrag zu erlangen, es sei denn, der nähere Termin und der fernere hatten nahezu identische Summen
77	Das Datum hat bei mir in den meisten Fällen keine Auswirkung aus meine Entscheidung gehabt, sondern nur die Höhe des Gewinns.
78	maximaler Gewinn und bei längerem Zeitraum die Überlegung für welchen Zusatzgewinn ich bereit bin lange zu warten.
79	das Geld möglichst verteilt zu erhalten, bei viel Geld das Geld früh zu erhalten.
80	Bei den Grafiken mit einer konvexen Kurve habe ich versucht in der Mitte den maximalen Punkt zu finden. Bei Grafiken mit einer Geraden habe ich geschaut, an welchem Tag es eine höhere Auszahlung gibt und diesen Punkt ausgewählt, sodass an dem anderen Tag 1,50 ausgezahlt werden. Wenn an beiden Tagen die Auszahlung gleich ist, war es egal welcher Punkt gewählt wird. Generell war das Ziel insgesamt eine hohe Auszahlung zu erreichen.
81	Wo das meiste Geld (summiert) bei rum kommt.
82	Ich habe immer grob überschlagen bei welcher Kombination man insgesamt den höchsten Wert erhalten könnte und mich dann dementsprechend entschieden. Wenn es insgesamt auf einen ähnlichen Wert hinauslief habe ich die Kombination bevorzugt, bei der ich schneller mehr Geld bekomme.
83	Auf Grundlage des Zeitpunktes der Auszahlung, der Höhe der Auszahlung und der Differenz der Summe an den beiden Auszahlungsterminen. Ich bin der Strategie gefolgt, immer möglichst viel Geld am Ende zu bekommen, jedoch auch schon möglichst früh Geld zu erhalten.
84	- nicht zu lange nachdenken, sonst geringer Stundenlohn - bei linearer Zuordnung immer am Ende des höchsten Betrags - bei Kurve in der Nähe des höheren Betrags, aber auf Wölbung achten
85	Je nach Bauchgefühl - nicht zu viel Zeit mit den einzelnen Aufgaben verbringen
86	Grundsätzlich bin ich kein Fan von großem Risiko, daher hab ich nicht alles auf eine Karte gesetzt, auch bei höheren Risk-Reward Verhältnissen. Dennoch habe ich nicht immer 50/50 genommen. Meine Strategie war immer auf das Verhältnis der maximalen Auszahlungswerte zu schauen. Je größer der Unterschied, desto eher habe ich mich zu Gunsten der größeren Belohnung entschieden. Dabei habe ich versucht weiterhin in gemäßigten Bereichen zu bleiben, um eine möglichst sichere Auszahlung eines durchschnittlichen Betrags zu sichern. Während ich dadurch natürlich keine besonders hohe Auszahlung erzielen kann, kann ich auch nicht "leeräusgehen, ich versuche also, dass Zufall/Glück einen möglichst geringen Einfluss auf das Ergebnis haben. Der Zeitpunkt der Auszahlung hat nur wenig Bedeutung in meiner Entscheidung. Bei den linearen Graphen bin ich meistens ein größeres Risiko eingegangen als bei den exponentiellen Graphen, da bei den exponentiellen Graphen gegen Ende das Verhältnis des Risk-Reward Verhältnisses schlechter wird.
87	Meistens immer zu der größeren Auszahlung tendiert, da man dadurch insgesamt mehr profitieren kann.
88	Maximierung, Geldwert heute/morgen.
89	Ich habe versucht das meiste aus den Situationen zu holen. Dazu habe ich grob versucht die Mitte zu finden welche mir insgesammt am meisten geben würde
90	Bei konkaven Entscheidungen habe ich versucht, die summiert maximale Auszahlung zu erzielen. Bei den größeren Summen habe ich mehr Anreiz verspürt, eher ausgezahlt zu werden und dafür insgesamt in Summe weniger gezahlt zu bekommen, als bei den kleineren Beträgen.
91	Bei den linearen Graphen habe ich versucht, eine Balance zwischen der möglichst frühen Auszahlung und einem höheren Ertrag zu finden. War die höchste Auszahlung bei einem Termin jedoch merklich höher als bei dem anderen, habe ich dort den die gesamte Auszahlung gewählt. Bei den nicht linearen Graphen habe ich versucht den Punkt zu finden, an welchem ich am meisten Bezahlung bekommen könnte. Dabei habe ich versucht immer im mittleren Bereich zu bleiben und dann mehr in die Richtung des Termins zu gehen, an welchem mehr Geld zu erwarten war.
92	Die Entscheidung die am Ende das meiste Geld einbringt.
93	Ich habe versucht einen maximalen Gesamtbetrag zu erzielen. Hat sich dieser nur um einen geringen Wert von der direkten Auszahlung unterschieden, so wurde die direkte Auszahlung gewählt.
94	Bauchgefühl, um maximalen Gewinn zu haben.
95	Versucht einen Mix aus maximalem Gesamtbetrag und leichter Bevorzugung für gegenwärtige Auszahlungen zu finden
96	Ich habe mir überlegt, wie ich die Geldverteilung zum Eigennutzen am besten verwenden kann. Dabei habe ich keine genaue sondern grobe Angaben getroffen.
97	Ich habe vor allem versucht, den zeitlichen Aspekt der Bezahlung zu ignorieren und den höchstmöglichsten Gesamtwert zu erreichen. Meine Mathekenntnisse über Graphen lassen leider deutlich zu wünschen übrig, weswegen der Punkt mit dem höchsten Gesamtwert mithilfe von Ausprobieren geraten wurde.
98	Ich habe versucht die Logik der Kurven zu verstehen. Zwischenzeitlich habe ich pragmatisch entschieden
99	Mittig fand ich als die beste Wahl bei den langen Zeiträumen, da man dort gut planen kann mit jeweils der Hälfte des Geldes. Ausnahme bei mir waren alle Zeiträume kurz vor Weihnachten, da ich leider nicht viel Geld habe, aber Familie gerne Geschenke kaufen würde, würde mir das Geld in der Zeit folglich mehr helfen.
100	Linear: Die höherpreisige Ecke plus 1,50 ist immer am meisten (so zumindest meine Überlegung) Kurve: Entweder die Preise an der Kurve durchgehen oder Optisch schätzen, anhand des verhältnisses der zwei aan der Achse ausgezeichneten Beträgen Allgemein hab ich vorallem am anfang bei beiden Kurven-Typen erstmal viel gerechnet um das besser einschätzen zu können

Table H.4. English translation of participants' responses

ID	Response
1	- Most of the time, the decision was made to achieve a balanced distribution to avoid running out of money. - In situations where the difference between the two principles was more distinct, it was "all or nothing".
2	YES: Christmas is around the corner. I throw my money out the window at Christmas. I am a very big spender. Christmas influenced my choice by 90%. Normally, I find it easy to wait months for money if it means I'll get more in total.
3	I distributed the amount roughly equally.
4	Constant payout
5	As much total earnings as possible, regardless of when
6	The primary goal was the highest return. Secondarily, it was about the timing of the payout; one would rather sacrifice a few cents or euros if the amount is received today instead of in two months, and you can do something nice with that money.
7	For the linear curves, my goal was simply to receive the largest possible amount in one go; however, waiting two months longer for just 50 cents more wasn't worth it to me, so in such cases, I still chose the slightly lower amount that was paid out earlier. For the non-linear curves, I noticed that if you start at the bottom right of the graph and increase the initial amount of €1.50 with the double arrow, the amount of the later payout date always decreases by exactly 10 cents. Accordingly, I increased the first payout amount with the double arrow until it no longer increased by more than 10 cents; I did this to obtain the highest possible total payout.
8	In general, I tried to always choose a point with maximum norm (Euclidean standard norm in R^2). For lines where the same maximum value was at both the first and second dates, I systematically chose the point where the most money was paid out at the first date. For lines with different values, I always chose a point with the highest possible coordinate. For curves where the difference in maximum payouts was zero, I always tried to make the payments equal at the first and second dates. If the difference in maximum payouts was rather large, I started searching closer to the axis with the higher value.
9	Partially quite arbitrary, but always relatively in the middle for the higher amounts
10	Highest possible profit
11	Partially based on the amount paid or the payout date. If the date was far in the future, then more money at the 1st payout date.
12	Always aiming for the maximum value - the timing is rather secondary, as long as I get the nearly maximum amount. If there is a linear progression - I like to split it 50:50.
13	I tried to maximize the total payout. However, with uneven exchange rates, this was more based on estimation.
14	As much money as possible overall
15	First, I looked at when I could make the biggest profit, regardless of when the payouts would reach me. If the profit was the same at every time, I chose the earlier date for smaller amounts. For larger amounts, then 2/3 at the earlier time.
16	When I need the money (e.g., December is a more difficult month for me compared to January)
17	No, I didn't follow any strategy. I just tried to get more money than what was indicated on the respective axes on the right and left.
18	My strategy was to achieve the highest possible final amount, even though this meant receiving the money later.
19	I added the two sums together (at a glance) to achieve the highest possible total. I paid less attention to the dates, as it was not so relevant to me when exactly the money arrives.
20	Maximum profit regardless of the time
21	Relatively even distribution, so that one would receive about the same amount of money depending on the draw
22	Always aimed to get a lot of money at the earliest possible date because of being short on cash
23	I tried to achieve the highest possible amount. I didn't pay attention to the dates of the transfers.
24	The earliest possible high amount, or whether it's worth waiting a long time for a higher amount.
25	I tried to generate as much money as possible.
26	You can never really go wrong with the middle.
27	For linear ones, I only paid attention to which axis had the higher amount; for the others, I focused on where the slope was the highest.
28	Maximizing the total payout, regardless of the payout date. Added the total payouts intuitively, estimating where the maximum was approximately, then approached it step by step.
29	- the most money - try it out
30	I tried to find the highest peak of the graph. For the linear graphs, I took the highest possible value on the axis with the highest value + the €1.50.
31	Highest value. If the amount was the same, then in the middle.
32	Aiming to receive the highest amount possible.
33	For curved graphs: choose the point where the slope = -1 -> maximum. For straight lines with slope -1: earlier money.
34	As much total money as possible
35	Which option brings the most money? The time I have to wait doesn't matter to me.
36	I tried to maximize my profit and receive more in the 1st payment than in the 2nd.
37	Maximum profit. For straight lines, where the most money + €1.50 is paid, for curves, where the slope is -1, or where you gain less than you give up when making small steps.
38	The more money, the better.
39	Always aiming to get the largest possible total amount
40	Maximization of the amount, regardless of the payout date
41	I took a look at how the curves behave and then roughly estimated where the optimal point was. If the difference between the two payouts was large, I chose a point halfway to the higher payout for curves, and for straight lines, the point where you get only €1.50 at the earlier date and the maximum amount at the later one.
42	I tried to maximize the total payout. However, if the earlier payout was higher than the later payout, I took the higher first payout directly, as I could theoretically invest the money. In these cases, the total payout was not as important to me.
43	First, I looked all the way to the right and left and then took the higher amount so that I had the highest amount, and the €1.50 base payout either at the earlier or later date. At some point, I changed strategy and tried to maximize profit.
44	The strategy was early payout.
45	The strategy was to achieve the highest amount, but I thought if it made no difference, then I would certainly be happy about it in the future. Even if it's a long way off now, time is just a perception.
46	For non-linear progressions, I mostly tried to generate the largest area under the curve.
47	I tried to choose the highest total amount possible. For curved graphs, I tried to select the square area that the movable lines form at its highest. If the amounts at the two different times were equal, I chose the higher amount. For straight graphs and equal amounts, it didn't matter where the point fell, as the total amount didn't change. Then, I usually selected half on each date. If one amount was higher at one time, I chose that date and selected the €1.50 for the second date because then the total amount was highest.
48	First, I considered which decision would result in the highest total profit. However, I slightly preferred the earlier date since I could use the money better in the pre-Christmas period than afterward.
49	I tried to always achieve the highest possible amount.
50	No

Continued on next page.

Table H.4 (continued)

ID	Response
51	Try to maximize the total payout. With a slight preference for at least a little money today or next week.
52	Tried to achieve a high amount overall.
53	- When there was the most money overall - I looked along the axis with the mouse pointer to see which ratio gave the most money - Sometimes not aiming for the most money. If it was about the same, I also tried to get about the same amount at both dates because, in my mind, it feels more satisfying to get about the same amount twice than a few euros more once.
54	I mostly aimed to get as much money as quickly as possible. However, I interrupted this "strategy"when the payout at the second date was significantly higher.
55	I always tried to get the maximum amount of money. The payout date was less important than the amount of money.
56	Personally, I didn't put much value on when I got the money, but rather on how the value changed at the time of payout.
57	As high amounts as possible
58	Maximization of total payout
59	I looked at the different periods. Then I checked the best time for payout, whether the payout amount would increase at a later or earlier date (basically looked for a peak). If a high payout was immediate or within a week, I also accepted a lower payout at a later date.
60	I always selected the maximum amount of money.
61	Time was not the decisive factor, but the maximum profit.
62	I made my decisions based on the highest possible value I could acquire in material terms. Current inflation rates were also factored in.
63	To avoid risks, I tried to keep the decision always in the middle range.
64	Well, I didn't necessarily follow a specific strategy, but I considered it better to wait longer for money if the amount increased slightly.
65	Aiming for the largest possible total sum
66	Depending on when you would receive the first and last payment and how different the amounts would be. For example, I think it doesn't make sense to choose a higher amount for the second date if the difference between the maximum amounts is small.
67	Aiming for the most money possible, the payout time didn't matter to me, or if there was no difference, I decided to split the money about equally between the payout dates.
68	I always tried to make decisions that would yield the most profit, regardless of when that profit would be paid out.
69	I looked at which distribution would yield the highest total. If it was about the same, I chose to receive the amount earlier.
70	I wanted to receive the same amount at both payouts.
71	I aimed to minimize the monetary loss of the payout.
72	The highest observed sum
73	Mostly based on which decision resulted in approximately the maximum amount unless the differences in amounts were not significant to me or the second date with a higher payout was too far in the future.
74	The greater the difference between the payout amounts, the more I chose the option with the highest return, regardless of the waiting time. This, of course, doesn't apply if the first payout amount is the higher one. For smaller differences between the payout amounts, I chose a higher and earlier first payout. For non-linear relationships, I moved along the curve to get closer to the maximum amount - without precise calculation. Here too, the willingness to wait was greater, the higher the amount was to be received.
75	I tried to get the most money.
76	I mostly tried to get the highest amount unless the closer and further dates had nearly identical sums.
77	In most cases, the date did not affect my decision, only the amount of the profit.
78	Maximum profit, and for a longer period, considering what extra gain I am willing to wait for.
79	Try to receive the money in installments, get the money earlier if it's a lot.
80	For graphs with a convex curve, I tried to find the maximum point in the middle. For graphs with a straight line, I looked at which day had a higher payout and selected that point so that €1.50 would be paid on the other day. If the payout was the same on both days, it didn't matter which point was chosen. In general, the goal was to achieve a high total payout.
81	Where the most money (summed) is made.
82	I always roughly estimated which combination would yield the highest total value and decided accordingly. If the total value was similar, I preferred the combination where I got more money faster.
83	Based on the payout date, the amount of payout, and the difference in sums on the two payout dates. I followed the strategy of always getting as much money as possible in the end but also receiving money as early as possible.
84	- don't think too long, otherwise lower hourly wage - for linear assignment always at the end of the highest amount - for curves, near the higher amount, but pay attention to the curvature
85	Based on gut feeling - don't spend too much time on each task
86	In general, I'm not a fan of high risk, so I didn't put everything on one card, even with higher risk-reward ratios. Nevertheless, I didn't always choose 50/50. My strategy was always to look at the ratio of maximum payout values. The greater the difference, the more I chose the larger reward. I tried to stay within moderate ranges to ensure a safe payout of an average amount. While I can't achieve particularly high payouts this way, I also can't "lose,"so I try to minimize the influence of chance/luck on the outcome. The payout date had little significance in my decision. With linear graphs, I mostly took more risk than with exponential graphs, as the risk-reward ratio worsens towards the end of exponential graphs.
87	Usually tended towards the larger payout, as it can lead to more overall profit.
88	Maximization, monetary value today/tomorrow.
89	I tried to get the most out of the situations. I roughly tried to find the middle that would give me the most overall.
90	For concave decisions, I tried to achieve the maximum summed payout. For the larger sums, I felt more incentive to be paid earlier and receive less overall than with the smaller amounts.
91	With linear graphs, I tried to find a balance between the earliest possible payout and higher returns. However, if the highest payout at one date was noticeably higher than the other, I chose the total payout there. With non-linear graphs, I tried to find the point where I could get the most payment. I tried to stay in the middle range and then move towards the date where more money was expected.
92	The decision that brings in the most money in the end.
93	I tried to achieve a maximum total amount. If this only differed slightly from the immediate payout, I chose the immediate payout.
94	Gut feeling to maximize profit.
95	Tried to find a mix of maximum total amount and a slight preference for current payouts.
96	I considered how to best use the money distribution for my own benefit. I didn't make precise but rather rough estimates.
97	I mainly tried to ignore the timing aspect of the payment and achieve the highest possible total value. Unfortunately, my math skills regarding graphs are quite lacking, so the point with the highest total value was guessed through trial and error.
98	I tried to understand the logic of the curves. In between, I made pragmatic decisions.
99	I found the middle to be the best choice for long periods, as you can plan well with half the money each time. The exception for me was all periods just before Christmas because I don't have much money, but I would like to buy gifts for my family, so the money during that time would help me more.
100	Linear: The higher-priced corner plus €1.50 is always the most (at least that was my thinking) Curve: Either go through the prices on the curve or visually estimate based on the ratio of the two amounts marked on the axes In general, I first did a lot of calculations on both curve types to better assess them

Appendix I Postexperimental Survey

I.1 Survey Items

For collecting sociodemographic information and self-reported measures of risk and time preferences, we relied on questions from the German Socio-Economic Panel (SOEP) because of their high re-test stability and convergent validity (Dohmen et al. 2011; Vischer et al. 2013; Mata et al. 2018). We also use selected questions from the Global Preference Survey (GPS; Falk et al. 2018).[31] The original German wording of the survey items is documented in Section K.4.

1, 2—Comments on Decisions. We ask participants to describe their strategies behind the allocation decisions.

3, 4—Gender and Age. We collect participants' gender and age.

5, 6—Education. We collect data about the highest achieved educational degree, and the math grade on the most recent transcript.

7, 8, 9—Current Studies and Occupation. We collect information about participants' current studies. If participants indicate that they are currently studying another question prompts them to select their course of study. If participants indicate that they already graduated or did not study at all, they are prompted to indicate their current occupation.

10—Monthly Disposable Income. We ask participant to self-report their monthly disposable income (including parental support and state transfers like BAföG or unemployment benefits etc.) after deducting rent, heating and health insurance contributions. We use these data to correlate participants' disposable income with estimated preference parameters and conduct sub-group analyses.

11, 12—Loan and Saving Interest. We ask participants about their subjective beliefs on their debit and credit interest rates in percent.

13—Trust in Payments. Participants are asked to indicate their trust in receiving the payments from the experiment.

14—General Risk Attitudes (SOEP). We ask participants for a global assessment of their willingness to take risks: "How do you see yourself: Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks? Please tick a box on the scale, where the value 0 means 'not at all willing to take risks' and the value 10 means 'very willing to take risks.' You can use any number between the end points to refine your answer."

31. German versions of the SOEP survey items are available online. The relevant documents are https://www.diw.de/documents/dokumentenarchiv/17/diw_01.c.40965.de/personen_2004.pdf, https://www.diw.de/documents/publikationen/73/diw_01.c.622046.de/diw_ssp0608.pdf, and https://www.diw.de/documents/dokumentenarchiv/17/diw_01.c.611290.de/diw_ssp0563.pdf. The GPS survey items are available online at https://doi.org/10.1093/qje/qjy013#supplementary-data.

15, 16, 17, 18, 19, 20—Context-Specific Risk Attitudes (SOEP). We elicit five additional self-reported measures of risk in different contexts: car driving, financial matters, sports/leisure, career, health, and trust in foreign people. We use the same wording and scale as in the general risk question.

21—Patience (SOEP). We ask participants for a global assessment of their patience: "How do you see yourself: are you generally a person who is impatient or are you patient? A value of 0 means 'not at all patient' and the value 10 means 'very patient.' You can use any number between the end points to refine your answer."

22—Impulsivity (SOEP). We ask participants for an assessment of their impulsivity: "How do you see yourself: are you generally a person who thinks a lot before deciding or do you act impulsively. A value of 0 means 'not at all impulsive' and the value 10 means 'very impulsive.' You can use any number between the end points to refine your answer."

23—Hypothetical €100,000 Investment Decision (SOEP). We present participants with the hypothetical lottery task: "Suppose you win €100,000. Immediately after that, you receive the following offer from a renowned bank:

- There is a chance to double your win within the next 2 years.
- There is an equally likely risk that you will lose half of the money.

How much of the money would you invest in the risky but potentially profitable opportunity?

- The whole amount of €100,000.
- An amount of €80,000.
- An amount of €60,000.
- An amount of €40,000.
- An amount of €20,000.
- Nothing, I would reject the offer."

24—€10,000 Windfall Income (SOEP). We present participants with the following hypothetical situation: "Suppose you get, unexpectedly, a present of €10,000. How would you make use of the money? How much would you save, how much would you give away (donate), and how much would you spend? You can either split the money or allocate everything to one of the following purposes:

- Save
- Give away
- Spend"

(Participants could only proceed if the entered numbers summed up to €10,000.)

25—Patience (GPS, AF.1.1.2). We ask participants to self-assess their patience: "How willing are you to give up something that is beneficial for you today in order to benefit more from that in the future?" Participants are told that a value of 0 means "completely unwilling to do so," and a value of 10 means "very willing to do so." They can use any integer between the end points to refine their answer.

Table I.1. List of variables collected in the debriefing surveys

Num.	Variable name	Description	Domain	Values
1	*comment_decisions*	Self-report	Risk/Time	Qualitative
2	*comment_open*	Self-report	Risk/Time	Qualitative (not mandatory)
3	*gender*	Gender	—	Female (1), male (0), nonbinary (0.5)
4	*age*	Age	—	18, …, 100
5	*school_finished*	Sociodemographics	—	No degree, Hauptschulabschluss, Realschulabschluss, Fachhochschulreife, Abitur
6	*math_grade*	Sociodemographics	—	German grades: 1+ (best), 1, 1–, 2+, 2, 2–, …, 6 (worst)
7	*studying_currently*	Sociodemographics	—	Currently student, currently doctoral student, graduated from university, no university education
8	*study_field*	Sociodemographics	—	Humanities; art and music; mathematics, computer, or engineering science; natural sciences; medicine; psychology; law; social and cultural sciences; economic sciences; other
9	*current_occupation*	Sociodemographics	—	Occupied, jobless, retired, parental leave, student, apprentice, sabbatical, other
10	*disposable_income*	Self-report	—	Value in interval [€150; €100,000]
11	*interest_loan*	Self-report	—	Value in interval [–100%, 100%]
12	*interest_save*	Self-report	—	Value in interval [–100%, 100%]
13	*trust_in_payments*	Self-report	Risk/Time	0, 1, …, 10
14	*SOEP_risk_general*	Self-report	Risk	0, 1, …, 10
15	*SOEP_risk_driving*	Self-report	Risk	0, 1, …, 10
16	*SOEP_risk_financial*	Self-report	Risk	0, 1, …, 10
17	*SOEP_risk_leisure_sport*	Self-report	Risk	0, 1, …, 10
18	*SOEP_risk_career*	Self-report	Risk	0, 1, …, 10
19	*SOEP_risk_health*	Self-report	Risk	0, 1, …, 10
20	*SOEP_risk_trust*	Self-report	Risk	0, 1, …, 10
21	*SOEP_patience_general*	Self-report	Time	0, 1, …, 10
22	*SOEP_impulsivity_general*	Self-report	Time	0, 1, …, 10
23	*SOEP_risk_100000*	Hypothetical choice	Risk	€100,000; €80,000; €60,000; €40,000; €20,000; €0
24	*SOEP_spending_10000*	Hypothetical choice	Time	Save + donate + spend = €10,000; save ≥ 0, donate ≥ 0, spend ≥ 0
25	*GPS_patience*	Self-report	Time	0, 1, …, 10
26	*GPS_patience_money*	Self-report	Time	0, 1, …, 10
27	*GPS_time_staircase*	Hypothetical choice	Time	1, 2, …, 32
28	*GPS_risk_staircase*	Hypothetical choice	Risk	1, 2, …, 32
29	*raven_iq_score*	Fluid intelligence	—	0, 1, …, 10

26—Patience, Monetary Domain (inspired by GPS, AF.1.1.2). We ask participants to self-assess their patience in the monetary domain: "How willing are you to give up money today in order to get more money in the future?" Participants are told that a value of 0 means "completely unwilling to do so," and a value of 10 means "very willing to do so." They can use any integer between the end points to refine their answer.

27—Staircase Method: Patience (GPS, AF.1.1.1). We ask participants five interdependent quantitative questions to proxy for patience: "Suppose you were given the choice between receiving a payment today or a payment in 12 months. We will now present to you five situations. The payment today is the same in each of these situations. The payment in 12 months is different in every situation. For each of these situations we would like to know which you would choose. Please assume there is no inflation, that is, future prices are the same as today's prices. Please consider the following: Would you rather receive €100 today or €x in 12 months."

28—Staircase Method: Risk Taking (GPS, AF.2.2.2). We ask participants five interdependent quantitative questions to proxy for risk preferences: "Please imagine the following situation. You can choose between a sure payment of a particular amount of money, or a lottery [draw], where you would have an equal chance of getting amount €x or getting nothing. We will present to you five different situations. What would you prefer: a draw with a 50-percent chance of receiving amount €x and the same 50-percent chance of receiving nothing, or the amount of €y as a sure payment?"

29—Raven Progressive Matrices. We ask participants to solve Raven progressive matrices (Raven 1941) to proxy for fluid intelligence. Participants have 5 minutes to solve 10 Raven matrices, and they earn €0.20 for each correct response. Figure K.49 shows the first of the ten tasks.

I.2 Summary Statistics

We collected data from 100 individuals in the time experiment on November 22, 2022 and data from 100 individuals in the risk experiment on November 20, 2022. The latter group comprised 50 new participants and 50 individuals who had participated in the time experiment.

Table I.2. Summary of categorical variables from the postexperimental survey

Variable	Risk (N_R = 100)	Time (N_T = 100)	Participated in both (N_T / 2 = 50)
gender			
female	71	67	35
male	28	32	14
nonbinary	1	1	1
school_finished			
0—no degree	0	0	0
1—Hauptschulabschluss	0	0	0
2—Realschulabschluss	1	1	1
3—Fachhochschulreife	0	0	0
4—Abitur	99	99	49
studying_currently			
currently student	84	81	41
currently doctoral student	1	2	1
graduated from university	12	11	6
no university education	3	6	2
study_field			
art and music	0	0	0
computer or engineering science	0	0	0
economic sciences	14	10	5
humanities	12	16	5
law	9	7	6
mathematics	9	7	5
medicine	8	5	2
natural sciences	24	27	13
psychology	7	7	5
social and cultural sciences	5	6	4
other	12	15	5
current_occupation			
apprentice	0	0	0
jobless	1	1	0
occupied	8	10	5
parental leave	1	0	0
retired	1	2	1
sabbatical	0	0	0
student	87	86	44
other	2	0	0

Table I.3. Summary statistics of continuous variables from the postexperimental survey

Variable	Experiment	min	q_1	median	mean	q_3	max	sd
age	Risk	18.00	21.00	23.00	24.88	25.00	77.00	8.32
	Time	18.00	21.00	23.00	24.43	25.00	77.00	8.24
	Participated in both	18.00	21.00	23.00	25.02	25.00	77.00	9.36
math_grade	risk	0.70	1.30	2.00	2.03	2.70	5.00	0.96
	Time	0.70	1.30	2.00	2.19	3.00	5.00	1.07
	Participated in both	0.70	1.30	1.70	2.02	2.70	4.30	0.93
disposable_income	Risk	150.00	300.00	500.00	678.05	800.00	3,000.00	602.43
	Time	150.00	300.00	500.00	640.94	750.00	3,000.00	526.74
	Participated in both	150.00	250.00	500.00	674.48	787.50	3,000.00	616.34
interest_loan	Risk	−5.00	1.95	4.00	4.63	7.00	20.00	4.17
	Time	0.00	2.00	5.00	5.32	7.00	50.00	5.93
	Participated in both	0.00	2.00	5.00	5.76	9.94	20.00	4.90
interest_save	Risk	−0.50	1.95	4.00	4.63	7.00	30.00	4.06
	Time	−0.20	5.00	8.00	7.49	10.00	10.00	2.84
	Participated in both	−0.50	0.50	2.00	3.66	5.00	30.00	5.28
trust_in_payments	Risk	0.00	6.00	8.00	7.47	10.00	10.00	2.50
	Time	0.00	5.00	8.00	7.49	10.00	10.00	2.84
	Participated in both	2.00	7.00	9.00	8.12	10.00	10.00	2.19
SOEP_risk_general	Risk	1.00	3.00	5.00	4.61	6.00	10.00	2.07
	Time	0.00	2.00	4.00	4.25	6.00	10.00	2.13
	Participated in both	1.00	3.00	4.50	4.50	6.00	10.00	2.13
SOEP_risk_driving	Risk	0.00	1.00	3.00	3.32	6.00	9.00	2.71
	Time	0.00	0.75	2.00	2.79	5.00	10.00	2.65
	Participated in both	0.00	1.00	2.50	3.36	6.00	9.00	2.80
SOEP_risk_financial	Risk	0.00	2.00	3.00	3.30	5.00	10.00	2.10
	Time	0.00	2.00	2.00	3.15	4.25	10.00	2.35
	Participated in both	0.00	2.00	3.00	3.38	5.00	10.00	2.05
SOEP_leisure_sport	Risk	0.00	5.00	6.00	5.97	8.00	10.00	2.16
	time	2.00	4.00	6.00	5.85	7.00	10.00	2.11
	Participated in both	2.00	4.25	6.00	5.88	7.00	10.00	2.04
SOEP_risk_career	Risk	2.00	4.00	5.00	5.15	7.00	10.00	2.01
	Time	0.00	4.00	5.00	5.14	6.25	10.00	2.06
	Participated in both	2.00	4.00	5.00	4.94	6.00	10.00	1.89
SOEP_risk_health	Risk	0.00	2.00	3.00	3.58	5.00	10.00	2.28
	Time	0.00	2.00	3.00	3.47	5.00	10.00	2.50
	Participated in both	0.00	2.00	3.00	3.50	4.75	10.00	2.27
SOEP_risk_trust	Risk	0.00	3.00	4.00	4.38	6.00	10.00	2.25
	Time	0.00	2.00	4.00	4.03	6.00	10.00	2.51
	Participated in both	0.00	3.00	4.00	4.26	6.00	10.00	2.31
SOEP_patience_general	Risk	0.00	3.00	5.00	5.38	8.00	10.00	2.72
	Time	0.00	4.00	5.00	5.52	8.00	10.00	2.46
	Participated in both	1.00	3.00	5.00	5.34	8.00	10.00	2.65
SOEP_impulsivity_general	Risk	0.00	3.00	4.00	4.43	6.00	10.00	2.17
	Time	0.00	2.00	4.00	4.32	6.00	10.00	2.44
	Participated in both	0.00	3.00	4.00	4.44	6.00	10.00	2.05
GPS_patience	Risk	0.00	6.00	7.00	7.08	8.00	10.00	1.84
	Time	2.00	6.00	7.00	7.10	8.25	10.00	1.97
	Participated in both	2.00	7.00	7.00	7.34	8.75	10.00	1.75
GPS_patience_money	Risk	0.00	6.00	8.00	7.20	9.00	10.00	2.31
	Time	0.00	6.00	8.00	7.49	9.00	10.00	2.18
	Participated in both	2.00	6.00	8.00	7.46	9.75	10.00	2.23
raven_iq_score	Risk	1.00	4.00	5.00	5.00	6.00	8.00	1.76
	Time	1.00	4.00	5.00	5.08	6.00	9.00	1.51
	Participated in both	1.00	4.00	5.50	5.34	6.75	8.00	1.60

I.3 Staircase Scores

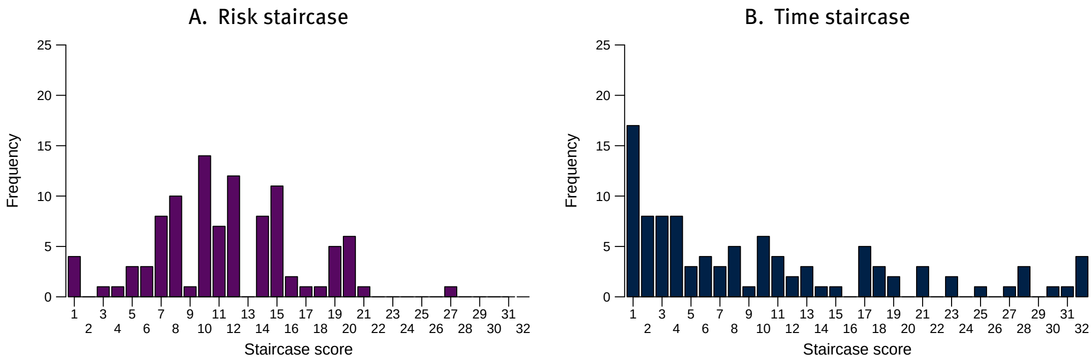


Figure I.1. Distribution of staircase scores in the time experiment on November 22, 2022

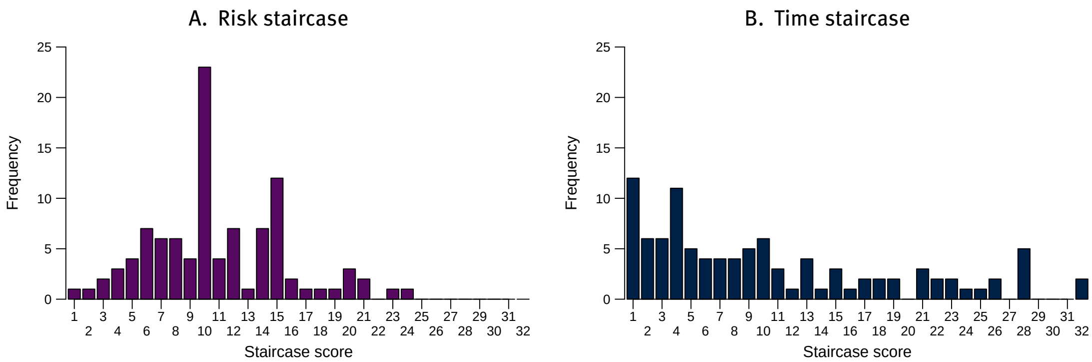


Figure I.2. Distribution of staircase scores in the risk experiment on November 30, 2022

Notes: A lower risk staircase score indicates stronger risk aversion; the staircase score of 16 corresponds to risk neutrality. A lower time staircase score indicates weaker discounting; the staircase score of 1 corresponds to no discounting.

I.4 Stability of Responses

Table I.4. Differences in self-reported demographic variables for the participants who reported these values twice (N_T / 2 = 50)

Variable	min	q_1	median	mean	q_3	max	sd	num differences
math_grade	−0.7	0.0	0.0	−0.042	0	0.07	0.231	16
disposable_income	−470	0	0	77.72	87.5	1,600	296.9	29
interest_loan	−5	−0.16	0	0.655	1	15	3.219	33
interest_save	−10	−0.225	0	0.521	1	15	3.681	34
trust_in_payments	−8	0	0	0.48	1	7	2.509	29
SOEP_risk_general	−2	−1	0	0.24	1	4	1.287	32
SOEP_risk_driving	−3	0	0	0.2	1	4	1.294	27
SOEP_risk_financial	−4	−1	0	0.02	1	4	1.464	31
SOEP_risk_leisure_sport	−4	0	0	0.22	1	4	1.433	33
SOEP_risk_career	−4	−1	0	−0.32	0.75	3	1.491	36
SOEP_risk_health	−4	−1	0	0.2	1	3	1.512	36
SOEP_risk_trust	−3	0	0	0.36	1	4	1.425	27
SOEP_patience_general	−7	−1	0	−0.1	1	10	2.533	36
SOEP_impulsivity_general	−4	−1	0	0.34	1	6	1.923	36
GPS_patience	−5	−1	0	−0.08	1	5	1.805	32
GPS_patience_money	−6	−1	0	−0.18	0	10	2.077	29
raven_iq_score	−3	−1	0	0.46	1	3	1.528	37
GPS_time_staircase	−13	0	0	0.38	1.75	9	3.458	32
GPS_risk_staircase	−18	−1	0	0.22	1.75	18	5.203	38

Note: 50 participants answered the survey twice: first in the time experiment on November 22, 2022, and again in the risk experiment on November 30, 2022.

Table I.5. Rank correlations of repeated responses to the survey items for the participants who responded to the items twice (N_T / 2 = 50)

Variable	Rank correlation
SOEP_risk_general	0.8191
SOEP_risk_driving	0.8681
SOEP_risk_financial	0.7429
SOEP_risk_leisure_sport	0.7564
SOEP_risk_career	0.6884
SOEP_risk_health	0.7420
SOEP_risk_trust	0.7750
SOEP_patience_general	0.5310
SOEP_impulsivity_general	0.6196
GPS_patience	0.4713
GPS_patience_money	0.6690
GPS_time_staircase	0.9181
GPS_risk_staircase	0.5241

Notes: 50 participants answered the survey twice: first in the time experiment on November 22, 2022, and again in the risk experiment on November 30, 2022. All rank correlations are significant on the 1% level.

Wherever individuals gave contradictory responses to survey items, such as reporting different math grades in the two experiments or reporting a higher age in the earlier of the two experiments, we use the first reported value in correlational analyses.

Appendix J Extended Graphical Interface

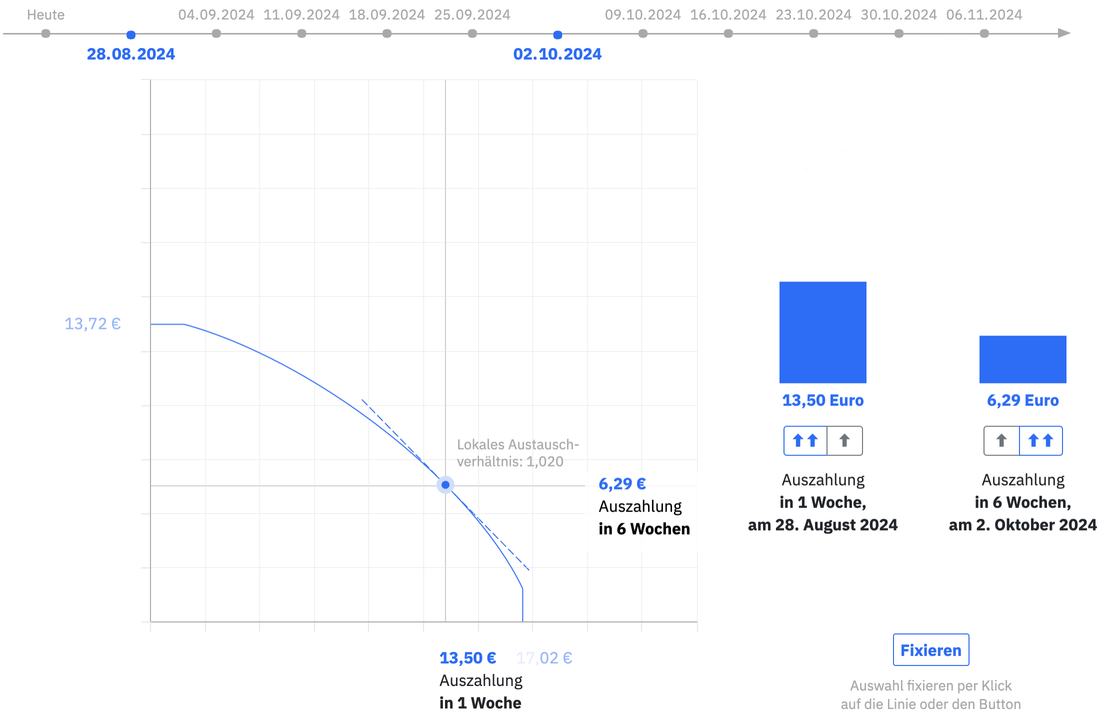
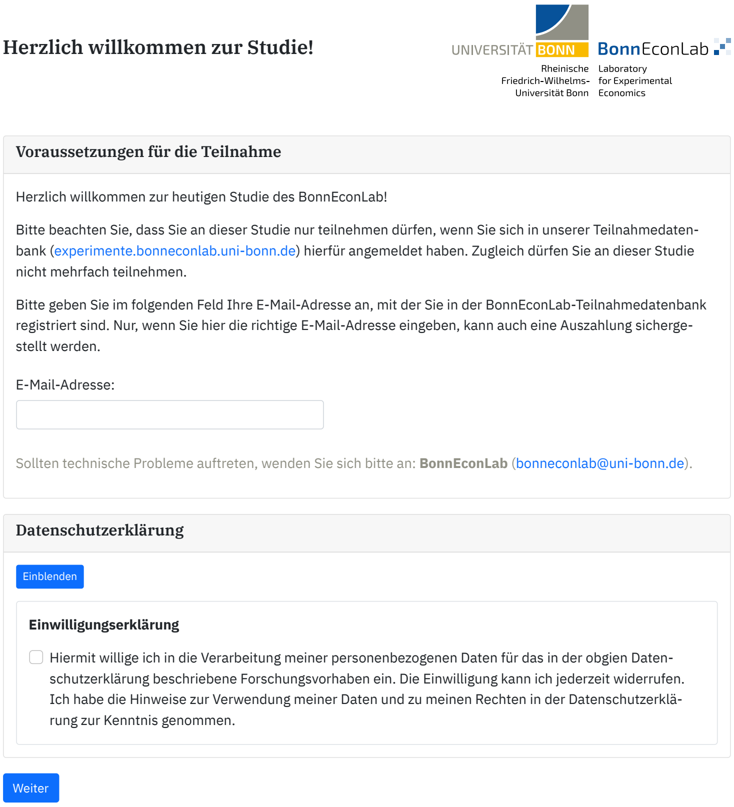


Figure J.1. Illustration of a SCBR with a slope indicator

Appendix K Instructions for the Study Participants

K.1 General Instructions



Herzlich willkommen zur Studie!

Voraussetzungen für die Teilnahme

Herzlich willkommen zur heutigen Studie des BonnEconLab!

Bitte beachten Sie, dass Sie an dieser Studie nur teilnehmen dürfen, wenn Sie sich in unserer Teilnahmedatenbank (experimente.bonneconlab.uni-bonn.de) hierfür angemeldet haben. Zugleich dürfen Sie an dieser Studie nicht mehrfach teilnehmen.

Bitte geben Sie im folgenden Feld Ihre E-Mail-Adresse an, mit der Sie in der BonnEconLab-Teilnahmedatenbank registriert sind. Nur, wenn Sie hier die richtige E-Mail-Adresse eingeben, kann auch eine Auszahlung sichergestellt werden.

E-Mail-Adresse:

Sollten technische Probleme auftreten, wenden Sie sich bitte an: **BonnEconLab** (bonneconlab@uni-bonn.de).

Datenschutzerklärung

Einblenden

Einwilligungserklärung

Hiermit willige ich in die Verarbeitung meiner personenbezogenen Daten für das in der obgien Datenschutzerklärung beschriebene Forschungsvorhaben ein. Die Einwilligung kann ich jederzeit widerrufen. Ich habe die Hinweise zur Verwendung meiner Daten und zu meinen Rechten in der Datenschutzerklärung zur Kenntnis genommen.

Weiter

Figure K.1. General instructions, page 1: welcome screen

Ihre Bankverbindung

Sämtliche Auszahlungen im Rahmen dieser Studie erfolgen per Banküberweisung.

Aus rechtlichen Gründen benötigt die Universitätsverwaltung bei Überweisung Ihrer Vergütung für dieses Experiment neben der **IBAN Ihres Kontos** (muss aus dem SEPA-Raum sein) und dem **BIC Ihrer Bank** auch **Ihren Namen** und **Ihre Adresse.**

Zu Ihrer Sicherheit werden Ihre Daten verschlüsselt an uns übermittelt. Die personenbezogenen Daten und die Bankverbindung werden nur für den Zweck der Auszahlung verwendet. Die Auswertung der experimentell erhobenen Daten erfolgt selbtverständlich anonymisiert.

Wenn Sie uns diese Angaben nicht mitteilen möchten, können Sie an diesem Experiment **leider nicht teilnehmen.**

IBAN: BIC:

Vorname: Nachname:

Straße und Hausnummer: Stadt: PLZ:

☐ Ich bestätige, dass ich im laufenden Kalenderjahr weniger als 1500 € von der Universität Bonn erhalten werde, die nicht aus einem Beschäftigungsverhältnis resultieren. Sollte die Grenze im Laufe des Kalenderjahres wider Erwarten überschritten werden, verpflichte ich mich, dies der zuständigen Stelle (Abt. 5.1) der Universität Bonn anzuzeigen. Mir ist bekannt, dass jegliches hier erzielte Einkommen im Zusammenhang mit Steuererklärung, Stipendien, BAföG u. Ä. meldepflichtig sein kann. Ich werde mich eigenständig um eine entsprechende Prüfung kümmern.

Hinweise akzeptieren und Daten speichern

Sollten Sie Fragen haben, schreiben Sie bitte eine E-Mail an **BonnEconLab** (bonneconlab@uni-bonn.de).

Figure K.2. General instructions, page 2: bank details

K.2 Risk Experiment

K.2.1 Risk Experiment: Instructions.

Anleitung zum heutigen Experiment

Vielen Dank, dass Sie an unserer heutigen Studie teilnehmen.

Ablauf des heutigen Experiments

Das heutige Experiment besteht aus vier Abschnitten:

Abschnitt 1 Als erstes bitten wir Sie, die Instruktionen aufmerksam zu lesen. Anschließend werden wir Ihr Verständnis mit drei Übungsaufgaben prüfen.

Abschnitt 2 Der zweite Abschnitt ist der **Hauptteil** der heutigen Studie: Ihnen werden nacheinander **46 verschiedene Situationen** präsentiert, in denen Sie jeweils eine **Entscheidung** treffen.

Abschnitt 3 Nach Abschluss von Abschnitt 2 werden wir Sie bitten, einige Fragen zu beantworten.

Abschnitt 4 Im letzten Abschnitt wird Ihre Auszahlung aus dem heutigen Experiment bestimmt und Ihnen mitgeteilt.

Allgemeine Informationen zum Experiment

Das Experiment wird ungefähr **60 Minuten** Ihrer Zeit in Anspruch nehmen.

Bitte kommunizieren Sie nicht mit den anderen Versuchspersonen, und teilen Sie Ihre Entscheidungen zu keinem Zeitpunkt anderen Versuchspersonen mit.

Weiter

Figure K.3. Instructions in the risk experiment, page 1

Anleitung zum heutigen Experiment

Seite 1 | Seite 2 | Seite 3 | Seite 4 | Seite 5 | Seite 6 | Seite 7

Allgemeine Informationen

In der heutigen Studie werden wir Ihnen **46 Entscheidungssituationen** vorlegen. In jeder Entscheidungssituation werden Sie **eine Entscheidung** treffen.

Mit jeder Entscheidung bestimmen Sie die Höhe von **zwei Auszahlungen**. Allerdings erhalten Sie **nur eine dieser beiden Auszahlungen.** Welche dies ist, wird **zufällig** bestimmt. Mit welcher Wahrscheinlichkeit Auszahlung 1 und mit welcher Wahrscheinlichkeit Auszahlung 2 gezogen wird, wird Ihnen in jeder Entscheidungssituation angezeigt.

Auszahlungsmodalitäten

Sämtliche Auszahlungen aus diesem Experiment erhalten Sie per **Überweisung** auf Ihr Bankkonto. Die Überweisungen für Ihre Auszahlungen werden **unverzüglich angelegt.**

Am Ende des Experiments wird **eine der 46 Entscheidungssituationen zufällig ausgelost.** Diese eine Entscheidungssituation wird für Sie **auszahlungsrelevant.** Nach der Auslosung wird Ihnen die auszahlungsrelevante Situation auf einer Infoseite angezeigt, und die von Ihnen in dieser Situation getroffene Entscheidung wird in die Tat umgesetzt.

Zusätzlich zur Infoseite erhalten Sie nach erfolgter Auszahlung eine **E-Mail** von uns, sodass Sie den Erhalt der Ihnen zustehenden Auszahlung ohne Aufwand werden überprüfen können.

Da jede der Entscheidungssituationen auszahlungsrelevant werden kann, sollten Sie sich jede Entscheidung gründlich überlegen. Jede Entscheidungssituation hat dieselbe Wahrscheinlichkeit, auszahlungsrelevant zu werden. Außerdem gilt, dass Ihre Entscheidungen keinerlei Einfluss auf die anderen Entscheidungssituationen haben. Daher sollten Sie **jede Entscheidung so treffen, als wäre sie Ihre einzige Entscheidung.**

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Figure K.4. Instructions in the risk experiment, page 2, tab 1

Anleitung zum heutigen Experiment

Seite 1 | **Seite 2** | Seite 3 | Seite 4 | Seite 5 | Seite 6 | Seite 7

Entscheidungssituationen

In jeder der 46 Entscheidungssituationen erhalten Sie ein **Geldbudget, das Sie auf zwei Auszahlungen aufteilen** können. Wie erwähnt, erhalten Sie nur eine der beiden Auszahlungen. Die andere Auszahlung verfällt. Welche der beiden Auszahlungen Sie erhalten, wird zufällig bestimmt. Sie bekommen:

- **Auszahlung 1** mit einer Wahrscheinlichkeit von **50 %** und
- **Auszahlung 2** mit einer Wahrscheinlichkeit von **50 %.**

Bei Ihrer Aufteilung werden Sie folgenden **Zusammenhang berücksichtigen** müssen:

- Je mehr Geld Sie Auszahlung 1 zuweisen, desto geringer ist der Geldbetrag für Auszahlung 2. Und Umgekehrt:
- Je mehr Geld Sie Auszahlung 2 zuweisen, desto geringer ist der Geldbetrag für Auszahlung 2.

<< >>

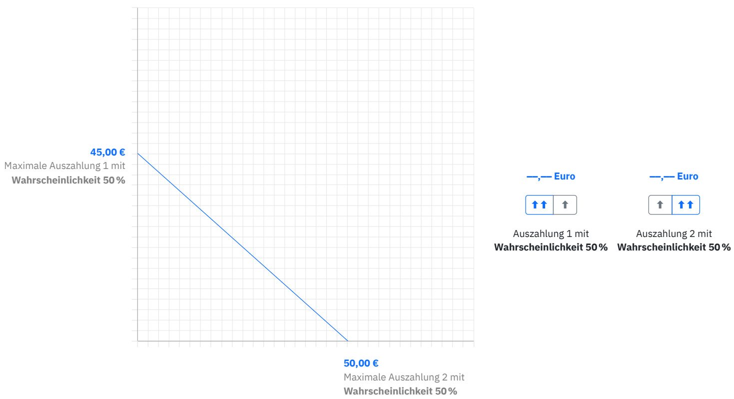
Figure K.5. Instructions in the risk experiment, page 2, tab 2

Anleitung zum heutigen Experiment

Seite 1 | Seite 2 | **Seite 3** | Seite 4 | Seite 5 | Seite 6 | Seite 7

Grafische Darstellung

Jede Entscheidungssituation wird Ihnen auf dem Bildschirm **grafisch dargestellt.** Hier sehen Sie ein Beispiel:



In der Grafik zeigt die **blaue Linie** alle von Ihnen wählbaren Kombinationen von Auszahlungsbeträgen an. Eine **Entscheidung** besteht darin, dass Sie genau einen Punkt auf dieser Linie auswählen. Dies können Sie mithilfe der Maus tun. Sobald Sie den Mauszeiger über die Linie bewegen, wird der aktuell ausgewählte Punkt hervorgehoben, und auf den beiden Achsen des Diagramms werden die zugehörigen Beträge genannt:

- Auf der **vertikalen Achse** wird der Betrag genannt, den Sie laut Ihrer aktuellen Wahl erhalten, falls **Auszahlung 1** zufällig gezogen wird.
- Auf der **horizontalen Achse** wird der Betrag genannt, den Sie laut Ihrer aktuellen Wahl erhalten, falls **Auszahlung 2** zufällig gezogen wird.

Dieselben Beträge werden zusätzlich im rechten Teil der Grafik als **Balkendiagramm** dargestellt. Unter dem Balkendiagramm finden Sie **Pfeil-Buttons,** mit deren Hilfe Sie Ihre Entscheidung ebenfalls eingeben können:

- Durch Klicken auf [↑↑] erhöhen Sie die jeweilige Auszahlung in größeren Schritten.
- Durch Klicken auf [↑] erhöhen Sie die jeweilige Auszahlung in kleinen Schritten.

Dieses Verfahren können Sie oben ausprobieren.

<< >>

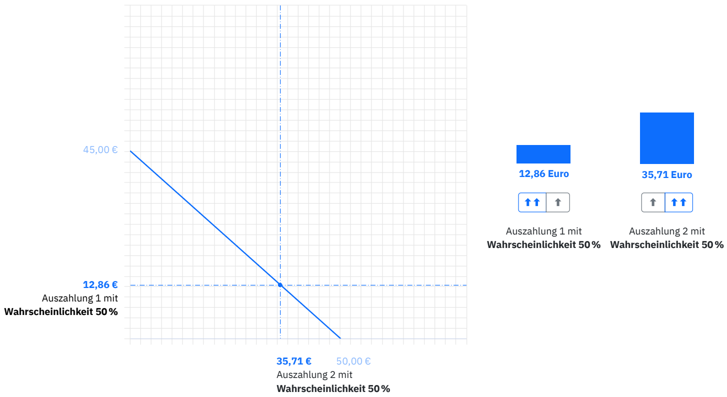
Figure K.6. Instructions in the risk experiment, page 2, tab 3

Anleitung zum heutigen Experiment

Seite 1 | Seite 2 | **Seite 3** | Seite 4 | Seite 5 | Seite 6 | Seite 7

Grafische Darstellung

Jede Entscheidungssituation wird Ihnen auf dem Bildschirm **grafisch dargestellt.** Hier sehen Sie ein Beispiel:



In der Grafik zeigt die **blaue Linie** alle von Ihnen wählbaren Kombinationen von Auszahlungsbeträgen an. Eine **Entscheidung** besteht darin, dass Sie genau einen Punkt auf dieser Linie auswählen. Dies können Sie mithilfe der Maus tun. Sobald Sie den Mauszeiger über die Linie bewegen, wird der aktuell ausgewählte Punkt hervorgehoben, und auf den beiden Achsen des Diagramms werden die zugehörigen Beträge genannt:

- Auf der **vertikalen Achse** wird der Betrag genannt, den Sie laut Ihrer aktuellen Wahl erhalten, falls **Auszahlung 1** zufällig gezogen wird.
- Auf der **horizontalen Achse** wird der Betrag genannt, den Sie laut Ihrer aktuellen Wahl erhalten, falls **Auszahlung 2** zufällig gezogen wird.

Dieselben Beträge werden zusätzlich im rechten Teil der Grafik als **Balkendiagramm** dargestellt. Unter dem Balkendiagramm finden Sie **Pfeil-Buttons,** mit deren Hilfe Sie Ihre Entscheidung ebenfalls eingeben können:

- Durch Klicken auf ↑↑ erhöhen Sie die jeweilige Auszahlung in größeren Schritten.
- Durch Klicken auf ↑ erhöhen Sie die jeweilige Auszahlung in kleinen Schritten.

Dieses Verfahren können Sie oben ausprobieren.

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Figure K.7. Instructions in the risk experiment, page 2, tab 3

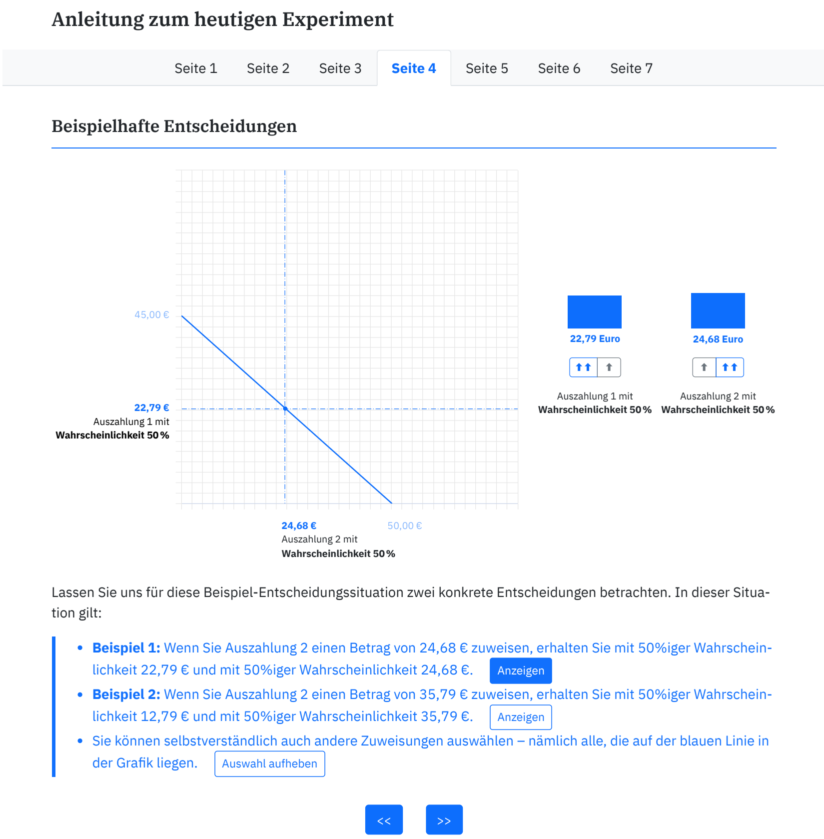


Figure K.8. Instructions in the risk experiment, page 2, tab 4

Anleitung zum heutigen Experiment

Seite 1 | Seite 2 | Seite 3 | Seite 4 | **Seite 5** | Seite 6 | Seite 7

Eigenschaften der Entscheidungssituationen

Die 46 Entscheidungssituationen unterscheiden sich voneinander in den folgenden Eigenschaften.

Eigenschaft 1: Budget
Das Ihnen zur Verfügung stehende Budget variiert von Situation zu Situation.

In manchen Entscheidungssituationen wird Ihnen ein höherer Betrag, den Sie auf die beiden Auszahlungen aufteilen können, als in anderen Situationen zur Verfügung stehen.

Eigenschaft 2: Austauschverhältnis
In den Situationen gelten unterschiedliche Austauschverhältnisse für die Aufteilung auf die Auszahlungen.

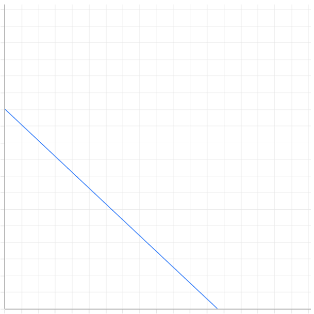
Das **Austauschverhältnis** beschreibt, wie sehr die Höhe einer Auszahlung zulasten der anderen Auszahlung geht. Dieses Verhältnis variiert von Situation zu Situation.

- In einigen Situationen ist das Austauschverhältnis konstant. Das heißt, es ist unabhängig davon, wie viel Geld Sie den beiden Auszahlungen zugewiesen haben. Für jeden Euro, um den Sie einen Auszahlungsbetrag verringern, steigt der andere Betrag um eine konstante Anzahl an Euro.
- In anderen Situation hingegen gilt, dass das Austauschverhältnis von Ihrer gewählten Aufteilung abhängt. Das bedeutet: Möchten Sie einen Auszahlungsbetrag – auf Kosten der anderen Auszahlung – erhöhen, steigt dieser Auszahlungsbetrag umso weniger, je mehr Geld Sie dieser Auszahlung bereits zugewiesen haben.

Die folgenden Abbildungen illustrieren die beiden unterschiedlichen Typen von Austauschverhältnissen und unterschiedlichen Budgets.

Linke Abbildung

- Die linke Abbildung zeigt eine Entscheidungssituation, in der das Austauschverhältnis konstant, d. h. **unabhängig** von Ihrer gewählten Aufteilung, ist. Die möglichen Aufteilungen stellen in diesem Fall eine **Gerade** dar.
- In der linken Abbildung ist das **Budget etwas geringer** als in der rechten Abbildung: Die blaue Linie endet etwas weiter links und weiter unten als die Kurve in der rechten Abbildung.



Rechte Abbildung

- Die rechte Abbildung zeigt eine Entscheidungssituation, in der das Austauschverhältnis von Ihrer gewählten Aufteilung **abhängig** ist. Die möglichen Aufteilungen stellen in diesem Fall eine **Kurve** dar.
- In der rechten Abbildung ist das **Budget etwas höher** als in der linken Abbildung: Die blaue Kurve endet etwas weiter rechts und weiter oben als die Linie in der linken Abbildung.

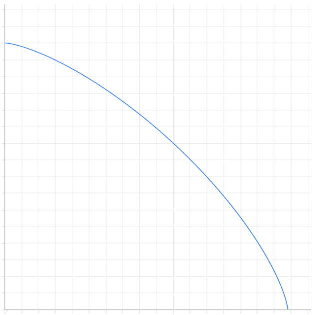


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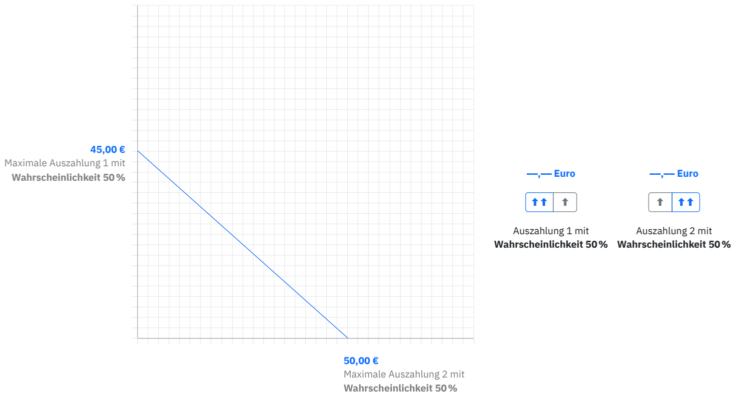
Figure K.9. Instructions in the risk experiment, page 2, tab 5

Anleitung zum heutigen Experiment

Seite 1 | Seite 2 | Seite 3 | Seite 4 | Seite 5 | **Seite 6** | Seite 7

Eingabe Ihrer Entscheidung

Im Folgenden erklären wir Ihnen, wie Sie Ihre **Entscheidungen eingeben** können.



Es gibt zwei Möglichkeiten, einen **Punkt auf der Linie in der Grafik auszuwählen:**

- Sie können, wie bereits erwähnt, die von Ihnen gewünschte Kombination von Auszahlungsbeträgen mithilfe der **Maus** eingeben.
- Sie können Ihre Entscheidung auch mithilfe der **Pfeil-Buttons** eingeben. Die Pfeil-Buttons helfen insbesondere dabei, feinere Aufteilungen präzise auszuwählen.

Beide Eingabemethoden können Sie in der obigen Grafik ausprobieren.

Es gibt zwei Methoden, eine **getroffene Wahl zu fixieren,** wenn Sie mit Ihrer Entscheidung zufrieden sind:

- Sie **klicken** auf den gewünschten Punkt auf der Linie.
- Sie **klicken** auf den Button Fixieren.

Eine **fixierte Entscheidung** können sie **korrigieren,** indem Sie erneut auf die Linie klicken oder erneut die Pfeil-Buttons benutzen.

Wenn Sie eine Entscheidung fixiert haben, erscheint ein Button Bestätigen (hier nicht angezeigt). **Durch Klicken auf Bestätigen geben Sie Ihre Entscheidung verbindlich ab.** Sie haben ab dann keine Möglichkeit mehr, Ihre Entscheidung zu revidieren, und Sie können nicht mehr zu einer früheren Entscheidungssituation zurückkehren.

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Figure K.10. Instructions in the risk experiment, page 2, tab 6

Anleitung zum heutigen Experiment

Seite 1 | Seite 2 | Seite 3 | Seite 4 | Seite 5 | Seite 6 | **Seite 7**

Übungsaufgaben

Damit Sie sich mit der Eingabemethode vertraut machen können, werden Sie nun **drei Entscheidungsbildschirme zur Übung** sehen. In diesen Übungsaufgaben werden Sie allerdings noch keine eigenen Entscheidungen treffen. Stattdessen wird Ihnen vorgegeben, welche Beträge Sie jeweils für Auszahlung 1 und Auszahlung 2 einstellen sollen.

Nach korrekter Bearbeitung der Übungsaufgaben werden Sie dann Ihre eigenen Entscheidungen treffen.

Weiter

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Figure K.11. Instructions in the risk experiment, page 2, tab 7

K.2.2 Risk Experiment: Practice Tasks.

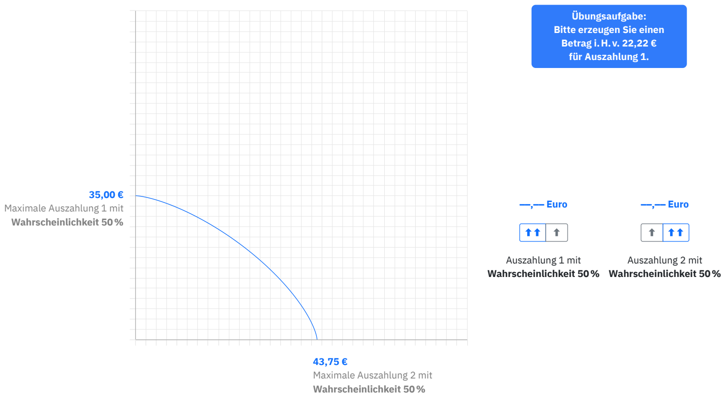

Figure K.12. Practice task no. 1 in the risk experiment

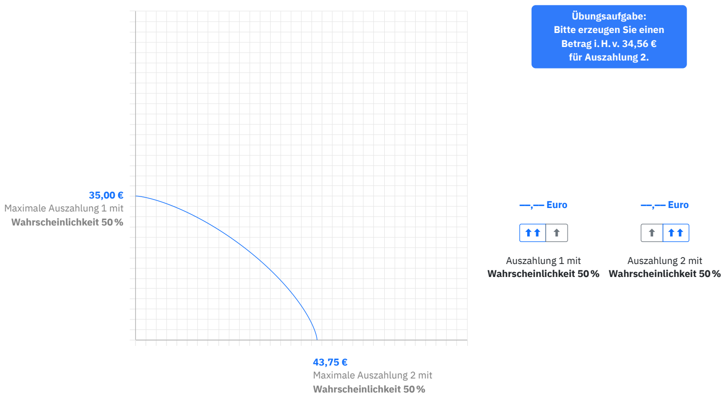

Figure K.13. Practice task no. 2 in the risk experiment

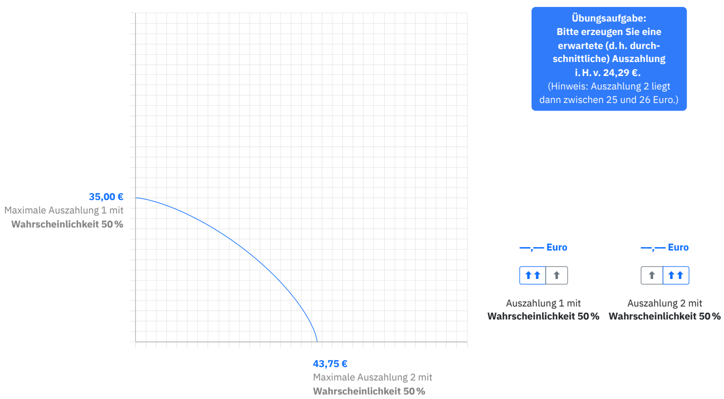

Figure K.14. Practice task no. 3 in the risk experiment

K.2.3 Risk Experiment: Example Decision Screens.

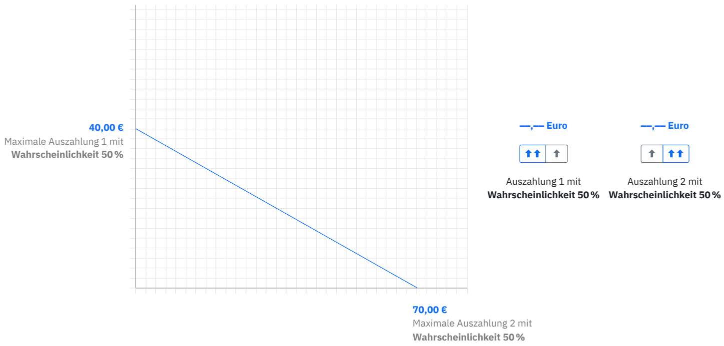

Figure K.15. Decision screen, linear, low stakes

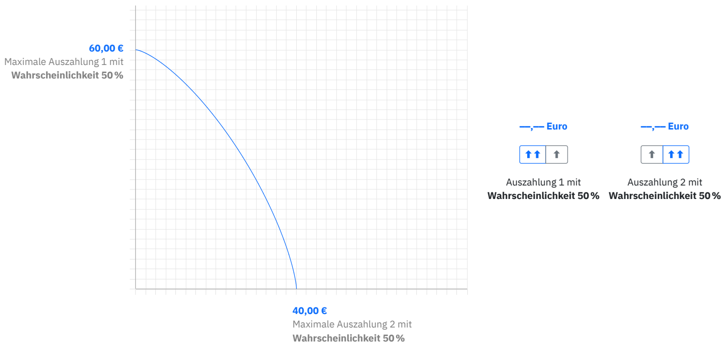

Figure K.16. Decision screen, strictly concave, low stakes

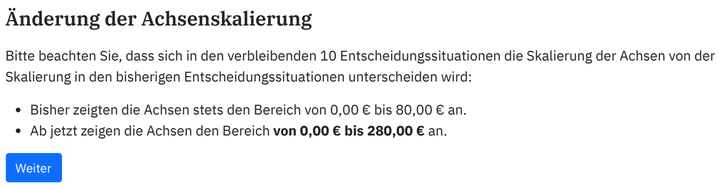

Figure K.17. Information screen to announce change of scaling in axes

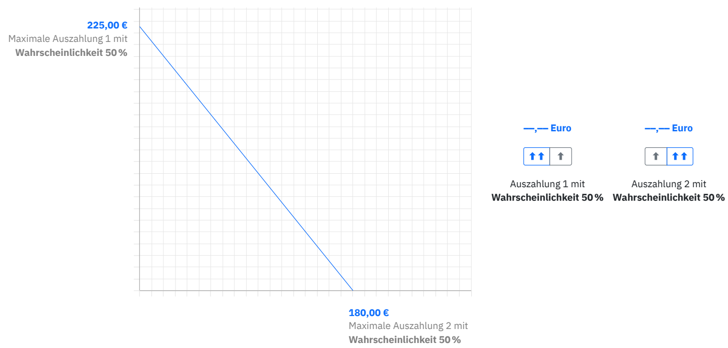

Figure K.18. Decision screen, linear, high stakes

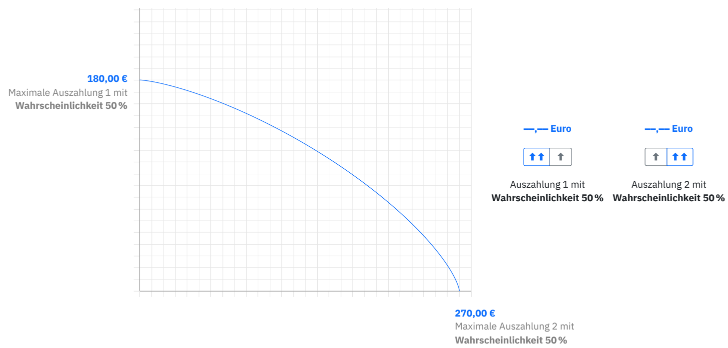

Figure K.19. Decision screen, strictly concave, high stakes

K.3 Time Experiment

K.3.1 Time Experiment: Instructions.

Anleitung zum heutigen Experiment

Vielen Dank, dass Sie an unserer heutigen Studie teilnehmen.

Ablauf des heutigen Experiments

Das heutige Experiment besteht aus vier Abschnitten:

Abschnitt 1 Als erstes bitten wir Sie, die Instruktionen aufmerksam zu lesen. Anschließend werden wir Ihr Verständnis mit drei Übungsaufgaben prüfen.

Abschnitt 2 Der zweite Abschnitt ist der **Hauptteil** der heutigen Studie: Ihnen werden nacheinander **82 verschiedene Situationen** präsentiert, in denen Sie jeweils eine **Entscheidung** treffen.

Abschnitt 3 Nach Abschluss von Abschnitt 2 werden wir Sie bitten, einige Fragen zu beantworten.

Abschnitt 4 Im letzten Abschnitt wird Ihre Auszahlung aus dem heutigen Experiment bestimmt und Ihnen mitgeteilt.

Allgemeine Informationen zum Experiment

Das Experiment wird ungefähr **75 Minuten** Ihrer Zeit in Anspruch nehmen.

Bitte kommunizieren Sie nicht mit den anderen Versuchspersonen, und teilen Sie Ihre Entscheidungen zu keinem Zeitpunkt anderen Versuchspersonen mit.

Weiter

Figure K.20. Instructions in the time experiment, page 1

Anleitung zum heutigen Experiment

Seite 1 | Seite 2 | Seite 3 | Seite 4 | Seite 5 | Seite 6 | Seite 7

Allgemeine Informationen

In der heutigen Studie werden wir Ihnen **82 Entscheidungssituationen** vorlegen. In jeder Entscheidungssituation werden Sie **eine Entscheidung** treffen.

Mit jeder Entscheidung bestimmen Sie die Höhe von **zwei Auszahlungen.** Die Auszahlungen erhalten Sie an **zwei verschiedenen Terminen,** und je Termin erhalten Sie genau eine Auszahlung.

Auszahlungsmodalitäten

Sämtliche Auszahlungen aus diesem Experiment erhalten Sie per **Terminüberweisung** auf Ihr Bankkonto. Die Überweisungen werden für exakt die beiden Termine beauftragt, die in der jeweiligen Entscheidungssituation genannt werden. Die Überweisungen für Ihre Auszahlungen werden **unverzüglich angelegt.**

Am Ende des Experiments wird **eine der 82 Entscheidungssituationen zufällig ausgelost.** Diese eine Entscheidungssituation wird für Sie **auszahlungsrelevant.** Nach der Auslosung wird Ihnen die auszahlungsrelevante Situation auf einer Infoseite angezeigt, und die von Ihnen in dieser Situation getroffene Entscheidung wird in die Tat umgesetzt.

Zusätzlich zur Infoseite erhalten Sie in Kürze eine **E-Mail** von uns, in der die Auszahlungsbeträge und -termine noch einmal aufgeführt werden. Außerdem erhalten Sie nach der letzten Auszahlung eine **weitere E-Mail** mit diesen Angaben, sodass Sie den Erhalt der versprochenen Auszahlungen ohne Aufwand werden überprüfen können.

Da jede der Entscheidungssituationen auszahlungsrelevant werden kann, sollten Sie sich jede Entscheidung gründlich überlegen. Jede Entscheidungssituation hat dieselbe Wahrscheinlichkeit, auszahlungsrelevant zu werden. Außerdem gilt, dass Ihre Entscheidungen keinerlei Einfluss auf die anderen Entscheidungssituationen haben. Daher sollten Sie **jede Entscheidung so treffen, als wäre sie Ihre einzige Entscheidung.**

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Figure K.21. Instructions in the time experiment, page 2, tab 1

Anleitung zum heutigen Experiment

Seite 1 | **Seite 2** | Seite 3 | Seite 4 | Seite 5 | Seite 6 | Seite 7

Entscheidungssituationen

In jeder der 82 Entscheidungssituationen erhalten Sie ein **Geldbudget, das Sie auf zwei Termine aufteilen** können.

Bei Ihrer Aufteilung werden Sie folgenden **Zusammenhang berücksichtigen** müssen:

- Je mehr Geld Sie dem früheren Termin zuweisen, desto geringer ist die Auszahlung am späteren Termin. Und umgekehrt:
- Je mehr Geld Sie dem späteren Termin zuweisen, desto geringer ist die Auszahlung am früheren Termin.

Eine Ausnahme hiervon besteht darin, dass Sie an jedem der beiden Termine eine **Grundauszahlung von 1,50 €** erhalten können, ohne dass Sie am jeweils anderen Termin auf Geld verzichten müssen.

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Figure K.22. Instructions in the time experiment, page 2, tab 2

Anleitung zum heutigen Experiment

Seite 1 | Seite 2 | **Seite 3** | Seite 4 | Seite 5 | Seite 6 | Seite 7

Grafische Darstellung

Jede Entscheidungssituation wird Ihnen auf dem Bildschirm **grafisch dargestellt.** Hier sehen Sie ein Beispiel:

Ein **Kalender** am oberen Rand der Grafik zeigt Ihnen die kommenden elf Wochen an. Die für die aktuelle Entscheidungssituation relevanten beiden **Zeitpunkte** werden **farbig hervorgehoben.** Anzeigen

In der Grafik zeigt die **blaue Linie** alle von Ihnen wählbaren Kombinationen der beiden Auszahlungen an. Eine **Entscheidung** besteht darin, dass Sie einen Punkt auf dieser Linie auswählen. Dies können Sie mithilfe der Maus tun. Sobald Sie den Mauszeiger über die Linie bewegen, wird der aktuell ausgewählte Punkt hervorgehoben, und auf den beiden Achsen des Diagramms werden die zugehörigen Beträge genannt:

- Auf der **vertikalen Achse** wird der Betrag genannt, den Sie laut Ihrer aktuellen Wahl am **früheren Termin** erhalten. (Hier ist dies der 22. November 2022.)
- Auf der **horizontalen Achse** wird der Betrag genannt, den Sie laut Ihrer aktuellen Wahl am **späteren Termin** erhalten. (Hier ist dies der 27. Dezember 2022.)

Dieselben Beträge werden zusätzlich im rechten Teil der Grafik als **Balkendiagramm** dargestellt. Unter dem Balkendiagramm finden Sie **Pfeil-Buttons,** mit deren Hilfe Sie Ihre Entscheidung ebenfalls eingeben können:

- Durch Klicken auf ⇈ erhöhen Sie die jeweilige Auszahlung in größeren Schritten.
- Durch Klicken auf ↑ erhöhen Sie die jeweilige Auszahlung in kleinen Schritten.

Dieses Verfahren können Sie oben ausprobieren.

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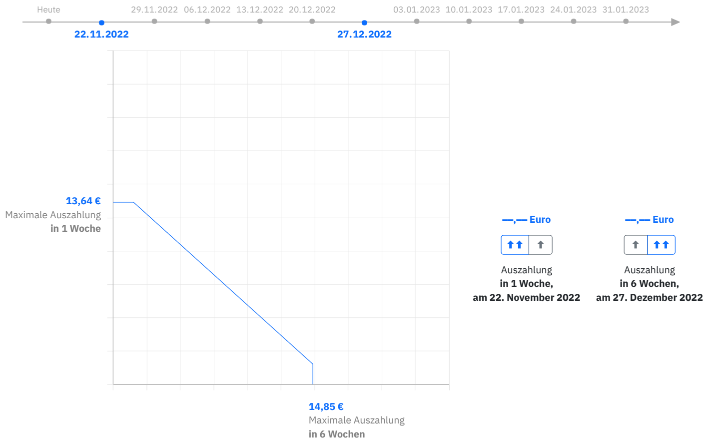
Figure K.23. Instructions in the time experiment, page 2, tab 3

Anleitung zum heutigen Experiment

Seite 1 | Seite 2 | **Seite 3** | Seite 4 | Seite 5 | Seite 6 | Seite 7

Grafische Darstellung

Jede Entscheidungssituation wird Ihnen auf dem Bildschirm **grafisch dargestellt.** Hier sehen Sie ein Beispiel:



Ein **Kalender** am oberen Rand der Grafik zeigt Ihnen die kommenden elf Wochen an. Die für die aktuelle Entscheidungssituation relevanten beiden **Zeitpunkte** werden **farbig hervorgehoben.** Anzeigen

In der Grafik zeigt die **blaue Linie** alle von Ihnen wählbaren Kombinationen der beiden Auszahlungen an. Eine **Entscheidung** besteht darin, dass Sie einen Punkt auf dieser Linie auswählen. Dies können Sie mithilfe der Maus tun. Sobald Sie den Mauszeiger über die Linie bewegen, wird der aktuell ausgewählte Punkt hervorgehoben, und auf den beiden Achsen des Diagramms werden die zugehörigen Beträge genannt:

- Auf der **vertikalen Achse** wird der Betrag genannt, den Sie laut Ihrer aktuellen Wahl am **früheren Termin** erhalten. (Hier ist dies der 22. November 2022.)
- Auf der **horizontalen Achse** wird der Betrag genannt, den Sie laut Ihrer aktuellen Wahl am **späteren Termin** erhalten. (Hier ist dies der 27. Dezember 2022.)

Dieselben Beträge werden zusätzlich im rechten Teil der Grafik als **Balkendiagramm** dargestellt. Unter dem Balkendiagramm finden Sie **Pfeil-Buttons,** mit deren Hilfe Sie Ihre Entscheidung ebenfalls eingeben können:

- Durch Klicken auf ⇈ erhöhen Sie die jeweilige Auszahlung in größeren Schritten.
- Durch Klicken auf ↑ erhöhen Sie die jeweilige Auszahlung in kleinen Schritten.

Dieses Verfahren können Sie oben ausprobieren.

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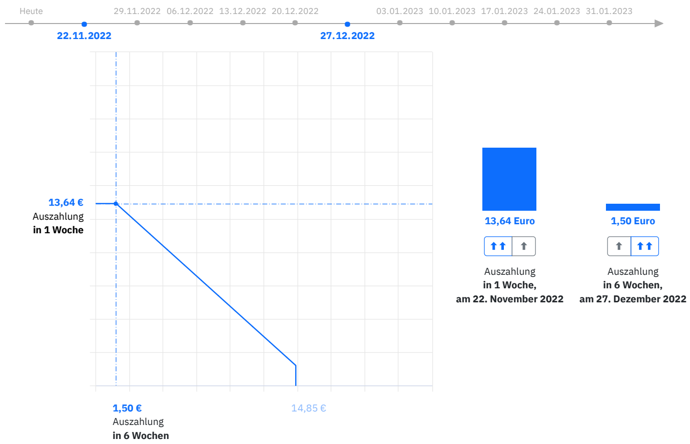
Figure K.24. Instructions in the time experiment, page 2, tab 3

Anleitung zum heutigen Experiment

Seite 1 | Seite 2 | Seite 3 | **Seite 4** | Seite 5 | Seite 6 | Seite 7

Beispielhafte Entscheidungen



Lassen Sie uns für diese Beispiel-Entscheidungssituation zwei konkrete Entscheidungen betrachten. In dieser Situation gilt:

> Der frühere Auszahlungstermin ist der 22. November 2022; der spätere Auszahlungstermin ist der 27. Dezember 2022.
>
> - **Beispiel 1:** Wenn sie dem früheren Termin 13,64 € zuweisen, erhalten Sie 13,64 € am 22. November 2022 und zusätzlich die Grundauszahlung i. H. v. 1,50 € am 27. Dezember 2022 (oder 0,00 €, wenn Sie auf die Grundauszahlung verzichten). Anzeigen
> - **Beispiel 2:** Wenn sie dem früheren Termin nur die Grundauszahlung i. H. v. 1,50 € zuweisen, erhalten Sie 1,50 € am 22. November 2022 und zusätzlich 14,85 € am 27. Dezember 2022. Anzeigen
> - Sie können selbstverständlich auch andere Zuweisungen auswählen – nämlich alle, die auf der blauen Linie in der Grafik liegen. Auswahl aufheben

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Figure K.25. Instructions in the time experiment, page 2, tab 4

Anleitung zum heutigen Experiment

Seite 1 Seite 2 Seite 3 Seite 4 **Seite 5** Seite 6 Seite 7

Eigenschaften der Entscheidungssituationen

Die 82 Entscheidungssituationen unterscheiden sich voneinander in den folgenden Eigenschaften.

Eigenschaft 1: Zeitpunkte
Die Zeitpunkte, an denen Sie Ihre Auszahlungen erhalten, sind unterschiedlich.

Jede Entscheidungssituation betrifft einen früheren und einen späteren Auszahlungstermin.

- Der frühere der beiden Auszahlungstermine kann entweder heute oder in einer Woche sein.
- Zwischen dem früheren und dem späteren Auszahlungstermin liegen entweder fünf oder zehn Wochen.

Eigenschaft 2: Budget
Das Ihnen zur Verfügung stehende Budget variiert von Situation zu Situation.

In manchen Entscheidungssituationen wird Ihnen ein höherer Betrag, den Sie auf die beiden Termine aufteilen können, als in anderen Situationen zur Verfügung stehen.

Eigenschaft 3: Austauschverhältnis
In den Situationen gelten unterschiedliche Austauschverhältnisse für die Aufteilung auf die beiden Termine.

Das **Austauschverhältnis** beschreibt, wie sehr die Auszahlung an einem Termin zulasten der Auszahlung am anderen Termin geht. Dieses Verhältnis variiert von Situation zu Situation.

- In einigen Situationen ist das Austauschverhältnis konstant. Das heißt, es ist unabhängig davon, wie viel Geld Sie den beiden Terminen zugewiesen haben. Für jeden Euro, auf den Sie an einem Termin verzichten, bekommen Sie also eine konstante Anzahl an Euro am anderen Termin.
- In anderen Situation hingegen gilt, dass das Austauschverhältnis von Ihrer gewählten Aufteilung abhängt. Das bedeutet: Möchten Sie die Auszahlung an einem Termin – auf Kosten des anderen Termins – erhöhen, steigt die Auszahlung an diesem Termin umso weniger, je mehr Geld Sie diesem Termin bereits zugewiesen haben.

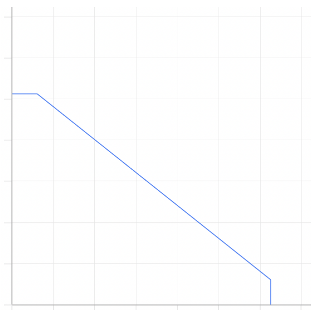
Die folgenden Abbildungen illustrieren die beiden unterschiedlichen Typen von Austauschverhältnissen und unterschiedliche Budgets.

Linke Abbildung

- Die linke Abbildung zeigt eine Entscheidungssituation, in der das Austauschverhältnis konstant, d. h. **unabhängig** von Ihrer gewählten Aufteilung, ist. Die möglichen Aufteilungen stellen in diesem Fall eine **Gerade** dar.
- In der linken Abbildung ist das **Budget etwas geringer** als in der rechten Abbildung: Die blaue Linie endet etwas weiter links und weiter unten als die Kurve in der rechten Abbildung.

Rechte Abbildung

- Die rechte Abbildung zeigt eine Entscheidungssituation, in der das Austauschverhältnis von Ihrer gewählten Aufteilung **abhängig** ist. Die möglichen Aufteilungen stellen in diesem Fall eine **Kurve** dar.
- In der rechten Abbildung ist das **Budget etwas höher** als in der linken Abbildung: Die blaue Kurve endet etwas weiter rechts und weiter oben als die Linie in der linken Abbildung.



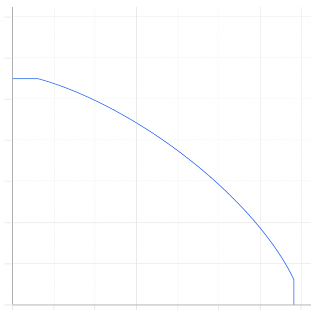


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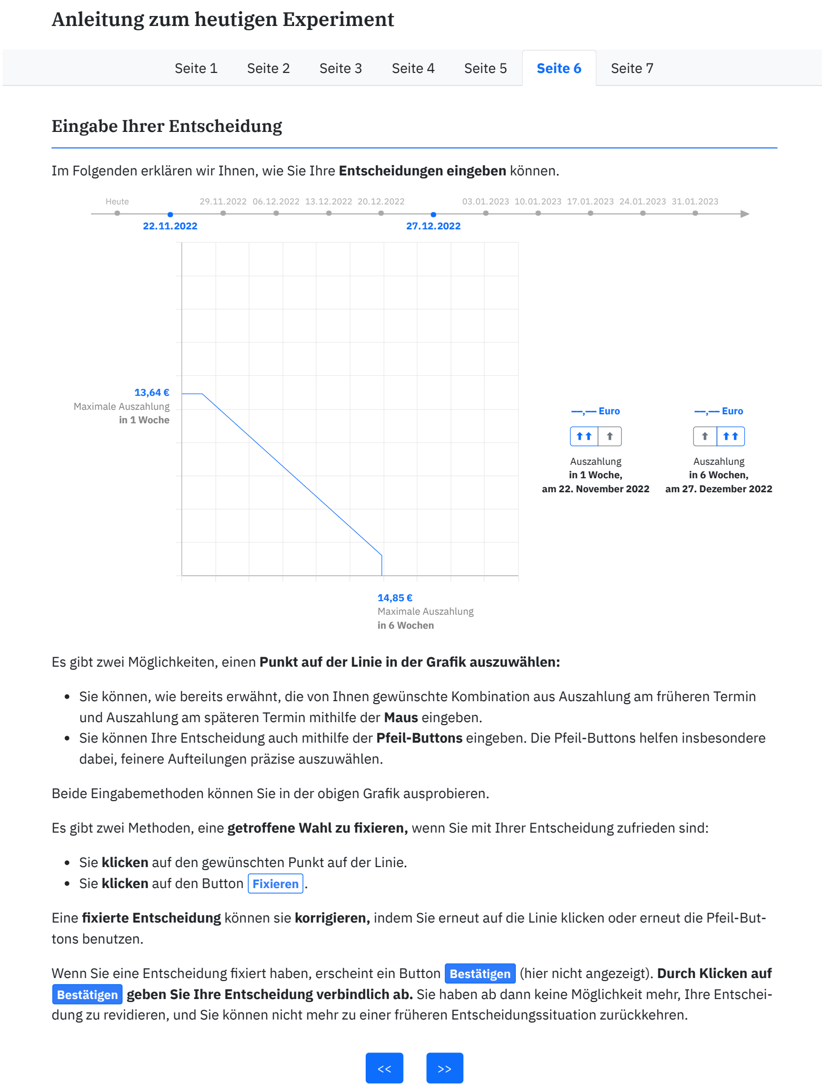
Figure K.26. Instructions in the time experiment, page 2, tab 5



Anleitung zum heutigen Experiment

Seite 1 | Seite 2 | Seite 3 | Seite 4 | Seite 5 | **Seite 6** | Seite 7

Eingabe Ihrer Entscheidung

Im Folgenden erklären wir Ihnen, wie Sie Ihre **Entscheidungen eingeben** können.

Es gibt zwei Möglichkeiten, einen **Punkt auf der Linie in der Grafik auszuwählen:**

- Sie können, wie bereits erwähnt, die von Ihnen gewünschte Kombination aus Auszahlung am früheren Termin und Auszahlung am späteren Termin mithilfe der **Maus** eingeben.
- Sie können Ihre Entscheidung auch mithilfe der **Pfeil-Buttons** eingeben. Die Pfeil-Buttons helfen insbesondere dabei, feinere Aufteilungen präzise auszuwählen.

Beide Eingabemethoden können Sie in der obigen Grafik ausprobieren.

Es gibt zwei Methoden, eine **getroffene Wahl zu fixieren,** wenn Sie mit Ihrer Entscheidung zufrieden sind:

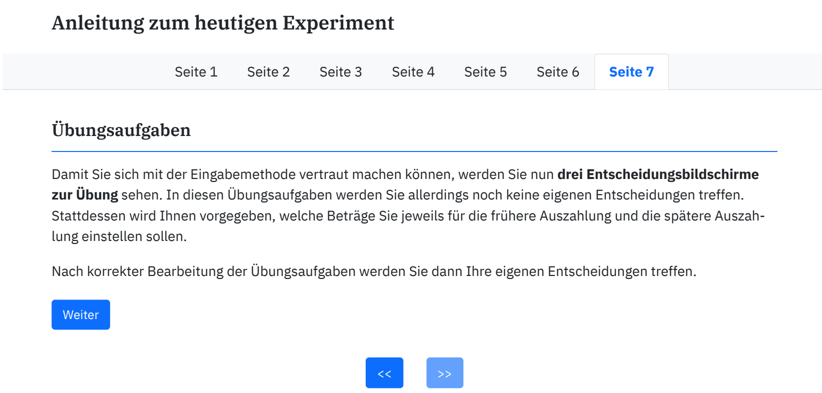
- Sie **klicken** auf den gewünschten Punkt auf der Linie.
- Sie **klicken** auf den Button Fixieren.

Eine **fixierte Entscheidung** können sie **korrigieren,** indem Sie erneut auf die Linie klicken oder erneut die Pfeil-Buttons benutzen.

Wenn Sie eine Entscheidung fixiert haben, erscheint ein Button Bestätigen (hier nicht angezeigt). **Durch Klicken auf Bestätigen geben Sie Ihre Entscheidung verbindlich ab.** Sie haben ab dann keine Möglichkeit mehr, Ihre Entscheidung zu revidieren, und Sie können nicht mehr zu einer früheren Entscheidungssituation zurückkehren.

<< >>

Figure K.27. Instructions in the time experiment, page 2, tab 6



Anleitung zum heutigen Experiment

Seite 1 | Seite 2 | Seite 3 | Seite 4 | Seite 5 | Seite 6 | **Seite 7**

Übungsaufgaben

Damit Sie sich mit der Eingabemethode vertraut machen können, werden Sie nun **drei Entscheidungsbildschirme zur Übung** sehen. In diesen Übungsaufgaben werden Sie allerdings noch keine eigenen Entscheidungen treffen. Stattdessen wird Ihnen vorgegeben, welche Beträge Sie jeweils für die frühere Auszahlung und die spätere Auszahlung einstellen sollen.

Nach korrekter Bearbeitung der Übungsaufgaben werden Sie dann Ihre eigenen Entscheidungen treffen.

Weiter

<< >>

Figure K.28. Instructions in the time experiment, page 2, tab 7

K.3.2 Time Experiment: Practice Tasks.

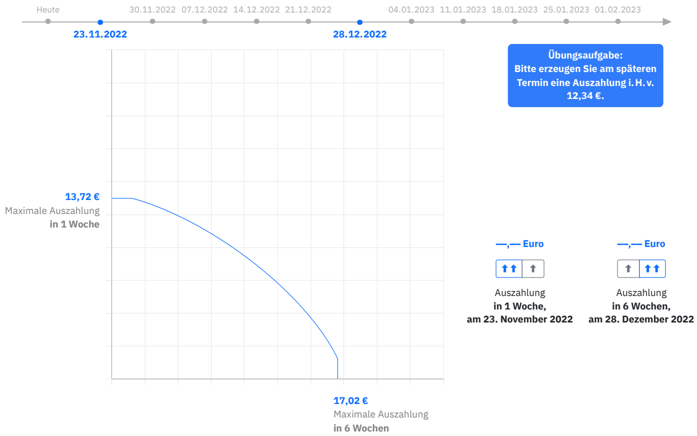


Figure K.29. Practice task no. 1 in the time experiment

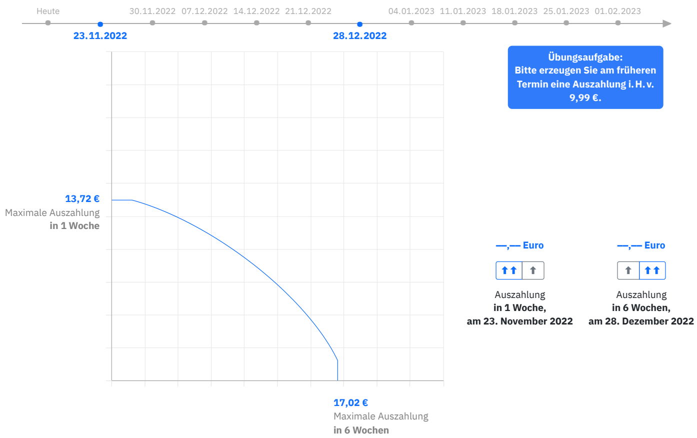


Figure K.30. Practice task no. 2 in the time experiment

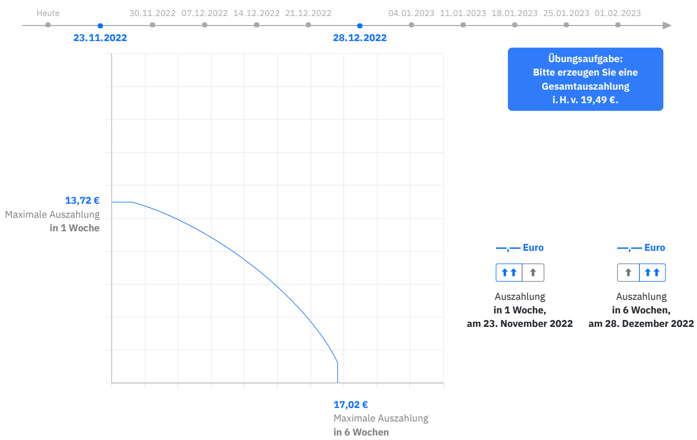


Figure K.31. Practice task no. 3 in the time experiment

K.3.3 Time Experiment: Example Decision Screens.

Figure K.32. Illustration of highlighted dates in the decision screen

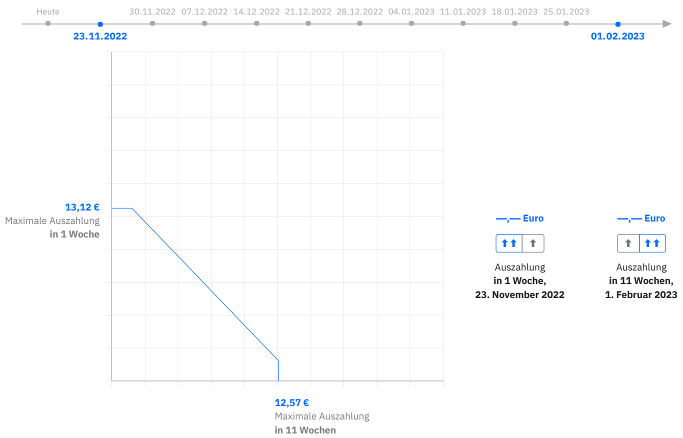


Figure K.33. Decision screen, linear, low stakes

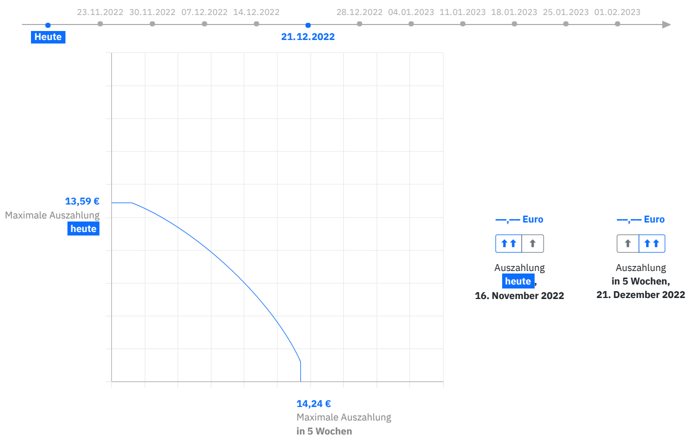


Figure K.34. Decision screen, strictly concave, low stakes

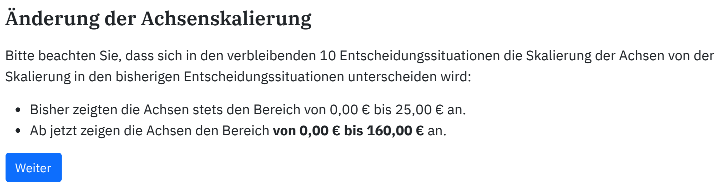


Figure K.35. Information screen to announce change of scaling in axes

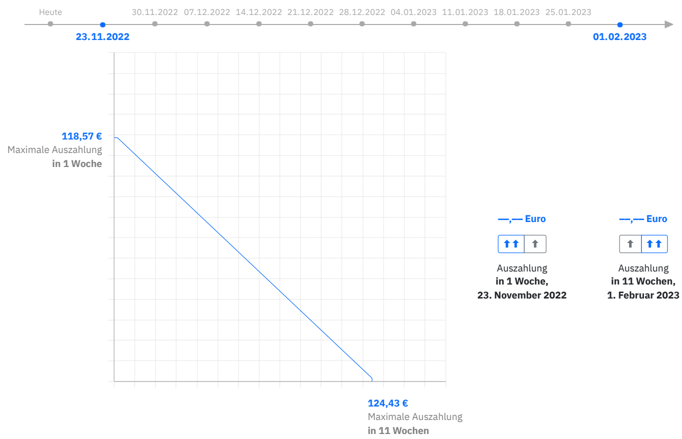


Figure K.36. Decision screen, linear, high stakes

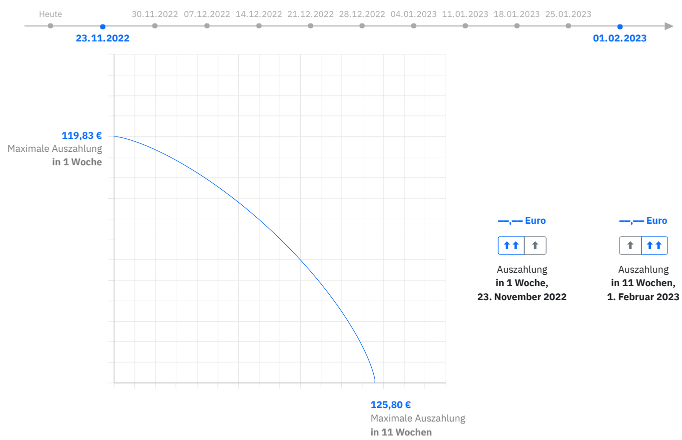
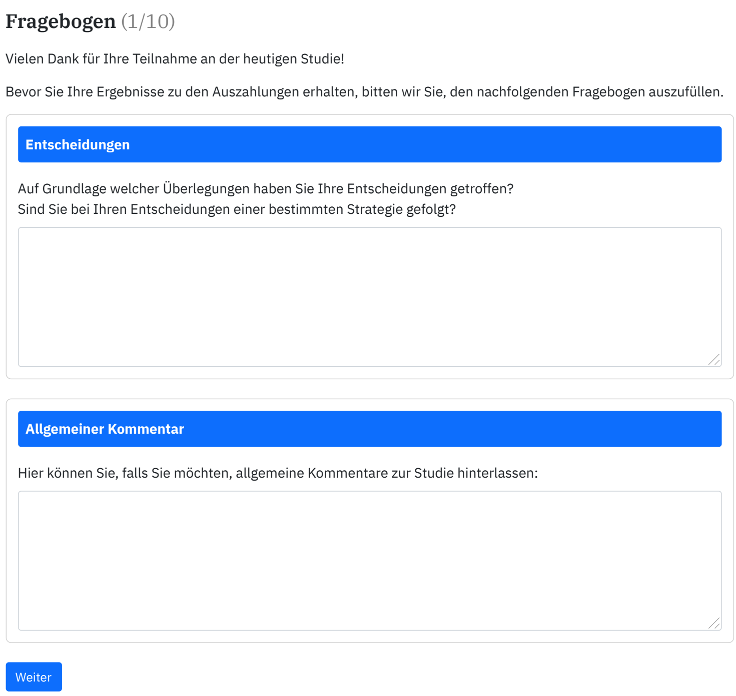


Figure K.37. Decision screen, strictly concave, high stakes

K.4 Survey

K.4.1 Survey on Sociodemographics and Preferences.


Fragebogen (1/10)

Vielen Dank für Ihre Teilnahme an der heutigen Studie!

Bevor Sie Ihre Ergebnisse zu den Auszahlungen erhalten, bitten wir Sie, den nachfolgenden Fragebogen auszufüllen.

Entscheidungen

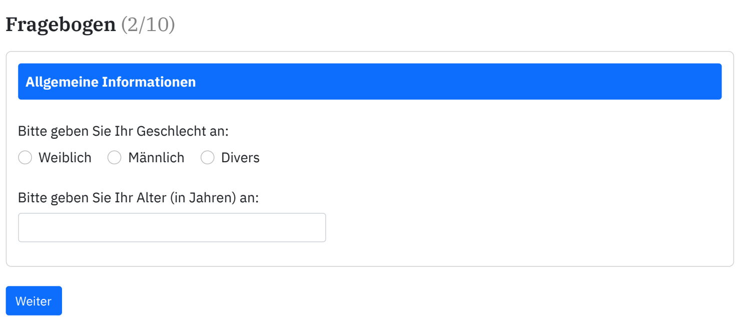
Auf Grundlage welcher Überlegungen haben Sie Ihre Entscheidungen getroffen?
Sind Sie bei Ihren Entscheidungen einer bestimmten Strategie gefolgt?

Allgemeiner Kommentar

Hier können Sie, falls Sie möchten, allgemeine Kommentare zur Studie hinterlassen:

Weiter

Figure K.38. Survey, page 1
(variables 1, 2: *comment_decision*, *comment_open*)


Fragebogen (2/10)

Allgemeine Informationen

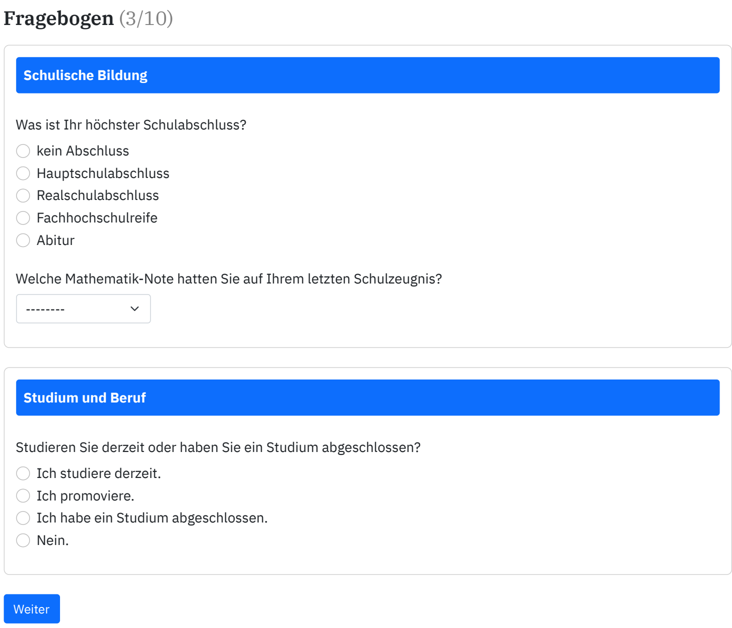
Bitte geben Sie Ihr Geschlecht an:

Weiblich Männlich Divers

Bitte geben Sie Ihr Alter (in Jahren) an:

Weiter

Figure K.39. Survey, page 2
(variables 3, 4: *gender*, *age*)



Fragebogen (3/10)

Schulische Bildung

Was ist Ihr höchster Schulabschluss?

- ○ kein Abschluss
- ○ Hauptschulabschluss
- ○ Realschulabschluss
- ○ Fachhochschulreife
- ○ Abitur

Welche Mathematik-Note hatten Sie auf Ihrem letzten Schulzeugnis?

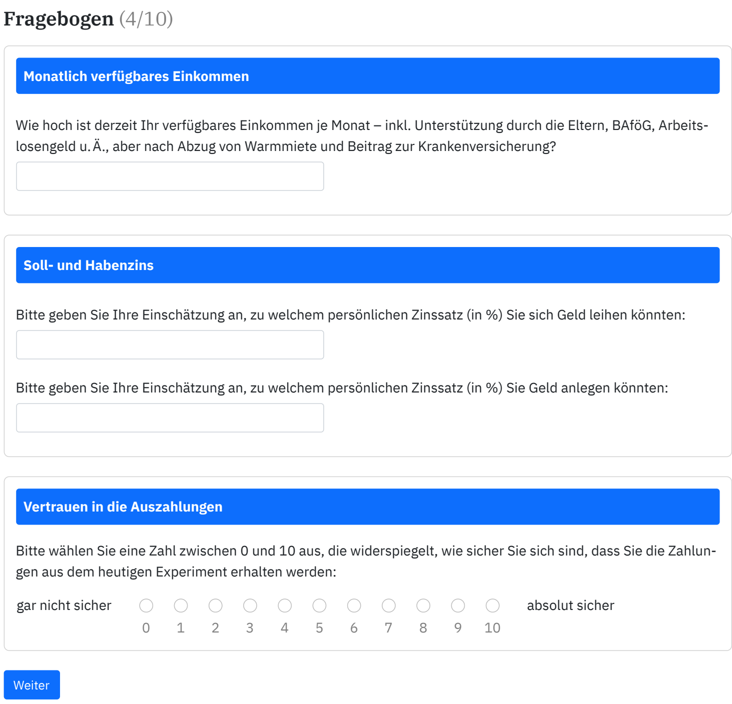
Studium und Beruf

Studieren Sie derzeit oder haben Sie ein Studium abgeschlossen?

- ○ Ich studiere derzeit.
- ○ Ich promoviere.
- ○ Ich habe ein Studium abgeschlossen.
- ○ Nein.

Weiter

Figure K.40. Survey, page 3
(variables 5, 6, 7, 8, 9: *school_finished*, *math_grade*, *studying_currently*, *study_field* if applicable, *current_occupation* if applicable)



Fragebogen (4/10)

Monatlich verfügbares Einkommen

Wie hoch ist derzeit Ihr verfügbares Einkommen je Monat – inkl. Unterstützung durch die Eltern, BAföG, Arbeitslosengeld u. Ä., aber nach Abzug von Warmmiete und Beitrag zur Krankenversicherung?

Soll- und Habenzins

Bitte geben Sie Ihre Einschätzung an, zu welchem persönlichen Zinssatz (in %) Sie sich Geld leihen könnten:

Bitte geben Sie Ihre Einschätzung an, zu welchem persönlichen Zinssatz (in %) Sie Geld anlegen könnten:

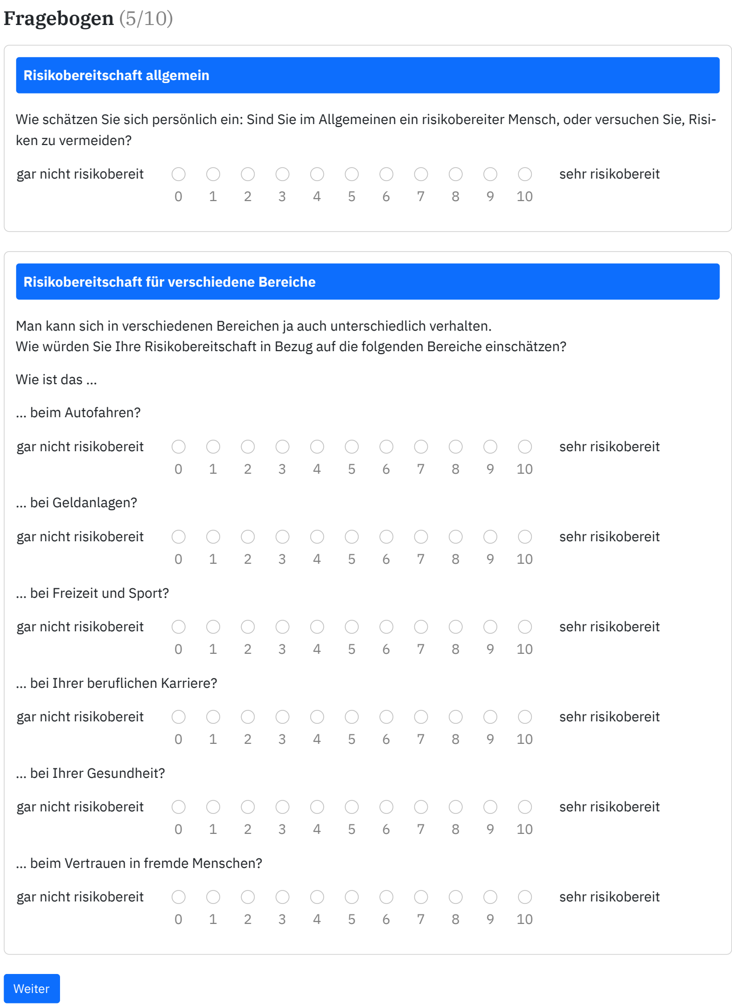
Vertrauen in die Auszahlungen

Bitte wählen Sie eine Zahl zwischen 0 und 10 aus, die widerspiegelt, wie sicher Sie sich sind, dass Sie die Zahlungen aus dem heutigen Experiment erhalten werden:

gar nicht sicher ○ 0 ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 ○ 8 ○ 9 ○ 10 absolut sicher

Weiter

Figure K.41. Survey, page 4
(variables 10, 11, 12, 13: *disposable_income*, *interest_loan*, *interest_save*, *trust_in_payments*)



Fragebogen (5/10)

Risikobereitschaft allgemein

Wie schätzen Sie sich persönlich ein: Sind Sie im Allgemeinen ein risikobereiter Mensch, oder versuchen Sie, Risiken zu vermeiden?

gar nicht risikobereit ○ 0 ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 ○ 8 ○ 9 ○ 10 sehr risikobereit

Risikobereitschaft für verschiedene Bereiche

Man kann sich in verschiedenen Bereichen ja auch unterschiedlich verhalten.
Wie würden Sie Ihre Risikobereitschaft in Bezug auf die folgenden Bereiche einschätzen?

Wie ist das ...

... beim Autofahren?

gar nicht risikobereit ○ 0 ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 ○ 8 ○ 9 ○ 10 sehr risikobereit

... bei Geldanlagen?

gar nicht risikobereit ○ 0 ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 ○ 8 ○ 9 ○ 10 sehr risikobereit

... bei Freizeit und Sport?

gar nicht risikobereit ○ 0 ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 ○ 8 ○ 9 ○ 10 sehr risikobereit

... bei Ihrer beruflichen Karriere?

gar nicht risikobereit ○ 0 ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 ○ 8 ○ 9 ○ 10 sehr risikobereit

... bei Ihrer Gesundheit?

gar nicht risikobereit ○ 0 ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 ○ 8 ○ 9 ○ 10 sehr risikobereit

... beim Vertrauen in fremde Menschen?

gar nicht risikobereit ○ 0 ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 ○ 8 ○ 9 ○ 10 sehr risikobereit

Weiter

Figure K.42. Survey, page 5
(variables 14, 15, 16, 17, 18, 19, 20: *SOEP_risk_general*, *SOEP_risk_driving*, *SOEP_risk_financial*, *SOEP_risk_leisure_sport*, *SOEP_risk_career*, *SOEP_risk_health*, *SOEP_risk_trust*)

Fragebogen (6/10)

Geduld

Wie schätzen Sie sich persönlich ein: Sind Sie im Allgemeinen ein Mensch, der ungeduldig ist oder der immer sehr viel Geduld aufbringt?

gar nicht geduldig ○ 0 ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 ○ 8 ○ 9 ○ 10 sehr geduldig

Impulsivität

Wie schätzen Sie sich persönlich ein: Sind Sie im Allgemeinen ein Mensch, der lange überlegt und nachdenkt, bevor er handelt, also gar nicht impulsiv ist – oder jemand, der ohne lange zu überlegen handelt, also sehr impulsiv ist?

gar nicht impulsiv ○ 0 ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 ○ 8 ○ 9 ○ 10 sehr impulsiv

Weiter

Figure K.43. Survey, page 6
(variables 21, 22: *SOEP_patience_general*, *SOEP_impulsivity_general*)

Fragebogen (7/10)

Hypothetische Geldanlage

Überlegen Sie bitte, was Sie in folgender Situation tun würden.

Stellen Sie sich vor, dass Sie in einer Lotterie 100.000 Euro gewinnen. Unmittelbar nach Erhalt des Gewinns bekommen Sie von einer angesehenen Bank ein Angebot für eine Geldanlage, die Folgendes beinhaltet:

- Es gibt eine Chance, das Geld innerhalb von zwei Jahren zu verdoppeln.
- Es gibt aber auch ein gleich hohes Risiko, die Hälfte des eingesetzten Geldes zu verlieren.
- Sie können das Geld ganz oder teilweise in folgender Weise anlegen oder das Angebot ablehnen.

Welchen Teil des Lotteriegewinnes würden Sie für die einerseits riskante, andererseits gewinnversprechende Geldanlage einsetzen?

○ Den ganzen Betrag von 100.000 Euro.
○ Den Betrag von 80.000 Euro.
○ Den Betrag von 60.000 Euro.
○ Den Betrag von 40.000 Euro.
○ Den Betrag von 20.000 Euro.
○ Überhaupt nichts, ich würde das Angebot ablehnen.

Verwendung von unerwartetem Einkommen

Stellen Sie sich vor, Sie bekommen unerwartet 10.000 Euro geschenkt.

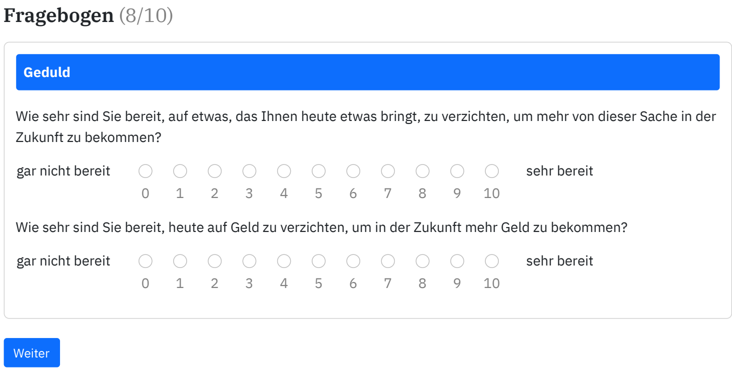
Wie würden Sie dieses Geld verwenden? Wie viel davon würden Sie sparen, wie viel verschenken und wie viel ausgeben?

Sie können den Betrag entweder aufteilen oder nur für einen Zweck verwenden.

Sparen	0	Euro	
Verschenken	0	Euro	
Ausgeben	0	Euro	
Summe	0	Euro	Die Summe muss 10.000 Euro betragen.

Weiter

Figure K.44. Survey, page 7
(variables 23, 24: *SOEP_risk_100000*, *SOEP_spending_10000*)


Fragebogen (8/10)

Geduld

Wie sehr sind Sie bereit, auf etwas, das Ihnen heute etwas bringt, zu verzichten, um mehr von dieser Sache in der Zukunft zu bekommen?

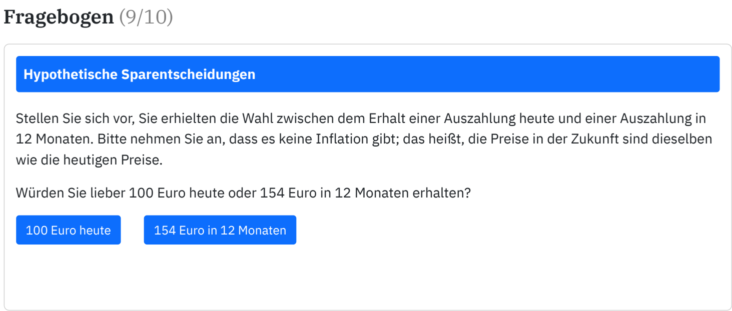
gar nicht bereit 0 1 2 3 4 5 6 7 8 9 10 sehr bereit

Wie sehr sind Sie bereit, heute auf Geld zu verzichten, um in der Zukunft mehr Geld zu bekommen?

gar nicht bereit 0 1 2 3 4 5 6 7 8 9 10 sehr bereit

Weiter

Figure K.45. Survey, page 8
(variables 25, 26: *GPS_patience*, *GPS_patience_money*)


Fragebogen (9/10)

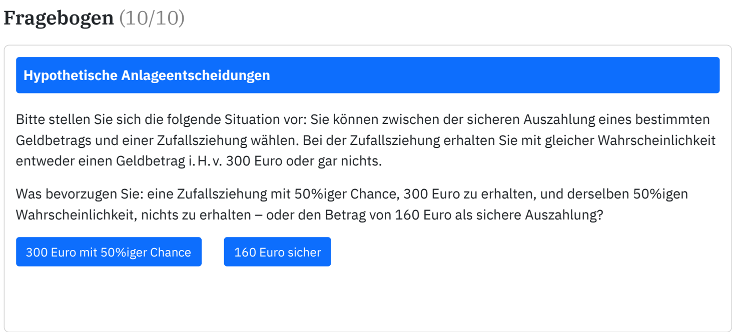
Hypothetische Sparentscheidungen

Stellen Sie sich vor, Sie erhielten die Wahl zwischen dem Erhalt einer Auszahlung heute und einer Auszahlung in 12 Monaten. Bitte nehmen Sie an, dass es keine Inflation gibt; das heißt, die Preise in der Zukunft sind dieselben wie die heutigen Preise.

Würden Sie lieber 100 Euro heute oder 154 Euro in 12 Monaten erhalten?

100 Euro heute | 154 Euro in 12 Monaten

Figure K.46. Survey, page 9
(variable 27: *GPS_time_staircase*)


Fragebogen (10/10)

Hypothetische Anlageentscheidungen

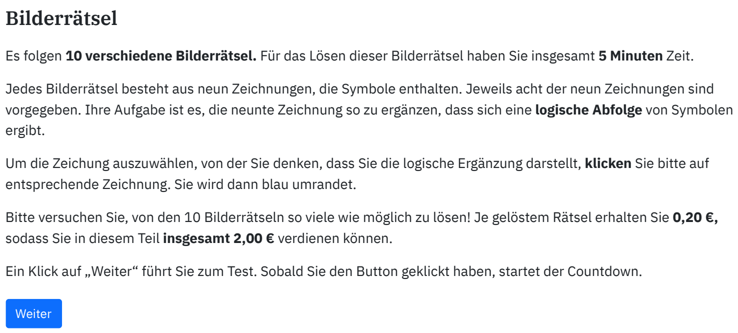
Bitte stellen Sie sich die folgende Situation vor: Sie können zwischen der sicheren Auszahlung eines bestimmten Geldbetrags und einer Zufallsziehung wählen. Bei der Zufallsziehung erhalten Sie mit gleicher Wahrscheinlichkeit entweder einen Geldbetrag i. H. v. 300 Euro oder gar nichts.

Was bevorzugen Sie: eine Zufallsziehung mit 50%iger Chance, 300 Euro zu erhalten, und derselben 50%igen Wahrscheinlichkeit, nichts zu erhalten – oder den Betrag von 160 Euro als sichere Auszahlung?

300 Euro mit 50%iger Chance | 160 Euro sicher

Figure K.47. Survey, page 10
(variable 28: *GPS_risk_staircase*)

K.4.2 IQ test (“Picture Quiz”).



Bilderrätsel

Es folgen **10 verschiedene Bilderrätsel.** Für das Lösen dieser Bilderrätsel haben Sie insgesamt **5 Minuten** Zeit.

Jedes Bilderrätsel besteht aus neun Zeichnungen, die Symbole enthalten. Jeweils acht der neun Zeichnungen sind vorgegeben. Ihre Aufgabe ist es, die neunte Zeichnung so zu ergänzen, dass sich eine **logische Abfolge** von Symbolen ergibt.

Um die Zeichung auszuwählen, von der Sie denken, dass Sie die logische Ergänzung darstellt, **klicken** Sie bitte auf entsprechende Zeichnung. Sie wird dann blau umrandet.

Bitte versuchen Sie, von den 10 Bilderrätseln so viele wie möglich zu lösen! Je gelöstem Rätsel erhalten Sie **0,20 €,** sodass Sie in diesem Teil **insgesamt 2,00 €** verdienen können.

Ein Klick auf „Weiter“ führt Sie zum Test. Sobald Sie den Button geklickt haben, startet der Countdown.

Weiter

Figure K.48. Explanation of the Raven task

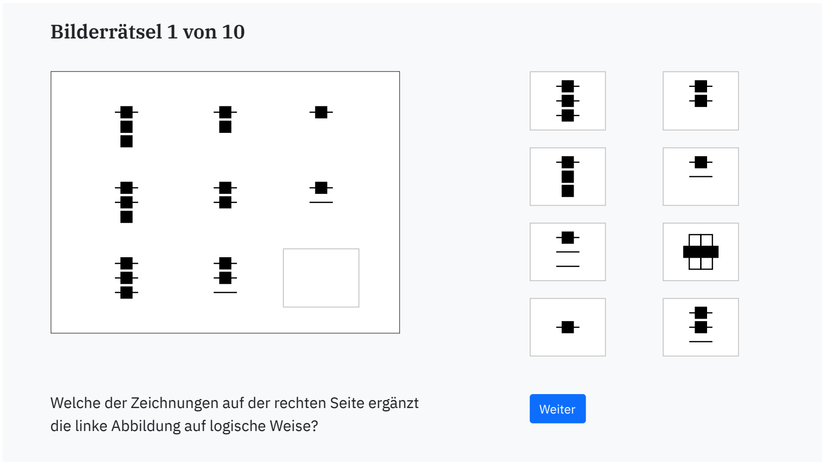


Figure K.49. Example of the Raven task
(variable 29: *raven_iq_score*)

K.5 Information Screens

K.5.1 Information Screens, Risk Experiment.

Ziehung der auszahlungsrelevanten Runde

Um aus den 46 getroffenen Enscheidungen die **auszahlungsrevelante Entscheidung** zu bestimmen, zieht der Computer nun eine Zufallszahl.

Konkret zieht der Computer eine ganze Zahl aus dem Intervall 1 bis 46, wobei jede dieser Zahlen mit derselben Wahrscheinlichkeit gezogen wird.

10

Die vom Computer zufällig bestimmte auszahlungsrevelante Entscheidungssituation ist **Entscheidungssituation Nr. 10.**

Weiter

Figure K.50. Random selection of the decision that counts in the risk experiment

Auszahlungsinformationen

Es wurde **Entscheidungssituation 10** als die für Sie **auszahlungsrelevante** Entscheidungssituation ausgelost.

Die nachfolgende Tabelle fasst die von Ihnen in der auszahlungsrelevanten Entscheidungssituation getroffene Entscheidung zusammen.

In der auszahlungsrelevanten Runde galten die beiden in der folgenden Tabelle angegebenen Wahrscheinlichkeiten. In Anbetracht dieser Wahrscheinlichkeiten haben Sie folgende Beträge für die beiden möglichen Auszahlungen gewählt:

	Höhe der Auszahlung aus Ihrer Entscheidung	Wahrscheinlichkeit der Auszahlung
Auszahlung 1	57,31 €	50 %
Auszahlung 2	7,25 €	50 %

Um aus den beiden möglichen Auszahlungen diejenige zu bestimmen, die Sie tatsächlich erhalten, zieht der Computer eine Zufallszahl. Konkret zieht der Computer eine ganze Zahl aus dem Intervall 1 bis 100, wobei jede dieser Zahlen mit derselben Wahrscheinlichkeit gezogen wird. Es gilt:

- Falls die gezogene Zahl gleich 50 oder kleiner ist, erhalten Sie Auszahlung 1.
- Falls die gezogene Zahl gleich 51 oder größer ist, erhalten Sie Auszahlung 2.

015

Die vom Computer zufällig bestimmte Zahl ist 15.

Da **15 ≤ 50,** ist die Ihnen zustehende Auszahlung **Auszahlung 1** und beträgt **57,31 €.**

Zusätzlich erhalten Sie **1,20 €** basierend auf Ihrem Abschneiden beim Lösen der Bilderrätsel. Dieser Betrag wird Ihnen in 3 Tagen, am 24. November 2022, überwiesen.

Gerne können Sie sich diese Seite ausdrucken und aufbewahren bzw. einen Screenshot dieses Bildschirms anfertigen.

Sämtliche Auszahlungen werden unverzüglich in Auftrag gegeben.

Sollten Sie hierzu Fragen haben, wenden Sie sich bitte an bonneconlab@uni-bonn.de.

Experiment beenden

Figure K.51. Information screen in the risk experiment

K.5.2 Information Screens, Time Experiment.

Ziehung der auszahlungsrelevanten Runde

Um aus den 82 getroffenen Enscheidungen die **auszahlungsrevelante Entscheidung** zu bestimmen, zieht der Computer nun eine Zufallszahl.

Konkret zieht der Computer eine ganze Zahl aus dem Intervall 1 bis 82, wobei jede dieser Zahlen mit derselben Wahrscheinlichkeit gezogen wird.

18

Die vom Computer zufällig bestimmte auszahlungsrevelante Entscheidungssituation ist **Entscheidungssituation Nr. 18.**

Weiter

Figure K.52. Random selection of the decision that counts in the time experiment

Auszahlungsinformationen

Es wurde **Entscheidungssituation 18** als die für Sie **auszahlungsrelevante** Entscheidungssituation ausgelost.

Die nachfolgende Tabelle fasst die von Ihnen in der auszahlungsrelevanten Entscheidungssituation getroffene Entscheidung zusammen.

Sie werden am **21. November 2022** und am **26. Dezember 2022** die folgenden Beträge auf Ihr Konto überwiesen bekommen:

Datum der Auszahlung	Höhe der Auszahlung aus Ihrer Entscheidung
21.11.2022	6,35 €
26.12.2022	15,01 €
Gesamt	**21,36 €**

Sie erhalten noch heute eine Nachricht per E-Mail von uns, in der diese Daten noch einmal aufgeführt werden. Darüber hinaus erhalten Sie nach der letzten Zahlung eine weitere E-Mail, sodass Sie den Erhalt der versprochenen Auszahlungen mit geringstmöglichem Aufwand werden überprüfen können.

Zusätzlich erhalten Sie **1,20 €** basierend auf Ihrem Abschneiden beim Lösen der Bilderrätsel. Dieser Betrag wird Ihnen in 3 Tagen, am 24. November 2022, überwiesen.

Gerne können Sie sich diese Seite ausdrucken und aufbewahren bzw. einen Screenshot dieses Bildschirms anfertigen.

Sämtliche Auszahlungen werden unverzüglich in Auftrag gegeben.

Sollten Sie hierzu Fragen haben, wenden Sie sich bitte an bonneconlab@uni-bonn.de.

Experiment beenden

Figure K.53. Information screen in the time experiment

Appendix References

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