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How Do Money and Tax Illusion Impact Long-Term Investments? An Experiment

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Keywords: Money Illusion - Tax Illusion - Inflation Aversion - Tax Aversion - Visual Salience - Rational Inattention - Nominal Anchoring - Long-term Investments
JELs: E31, G40, G51, H2

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July 6, 2026

Abstract

The wealth effects of inflation and taxes on long-term savings, such as retirement investments, can be substantial. Nonetheless, individuals misperceive the impact of both taxes and inflation. Based on a unified theoretical framework, we distinguish between potential cognitive mechanisms underlying tax and inflation misperceptions and derive their implications for investment behavior. Using an incentivized, pre-registered online experiment, we test how these misperceptions influence individual investment decisions. In our baseline setting, inflation and taxation affect investment outcomes equivalently in real or after-tax terms. The results show that—even though all participants were informed about the effects of inflation and taxes on investment returns—investment distortions remain significant in both settings. Distortions driven by money illusion clearly exceed those caused by tax illusion. We find that both rational inattention and anchoring contribute to these distortions, with anchoring appearing more persistent in the inflation setting. Money illusion is therefore not only larger than tax illusion but also harder to undo. Money and tax illusion become more pronounced when future tax and inflation rates are uncertain. We then test the effectiveness of different communication strategies in this setting. Additional tabular information, visualizations, and attention nudges do not systematically reduce money or tax illusion. We show that requiring participants to view real or after-tax consequences before decision making is the most effective intervention; voluntary access has weaker effects, and later display does not systematically reduce the distortions.

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1 Introduction

Future inflation and tax rates can have substantial wealth effects on the real returns of long-term investments. This makes it important to understand whether individuals correctly account for these effects when making long-term financial decisions.[1] Prior research documents substantial misperceptions in both domains, including money illusion and misperceptions about the wealth effects of inflation (e.g., Shafir et al., 1997; Schnorpfeil et al., 2023), as well as tax misperceptions in economic decision-making (e.g., Rees-Jones and Taubinsky, 2020; Blaufus and Milde, 2021; Blaufus et al., 2022). The relevance of both domains is also reflected in our pre-experiment survey: participants rank inflation and taxes first and second among the global economic challenges they are worried about (see Figure 1).

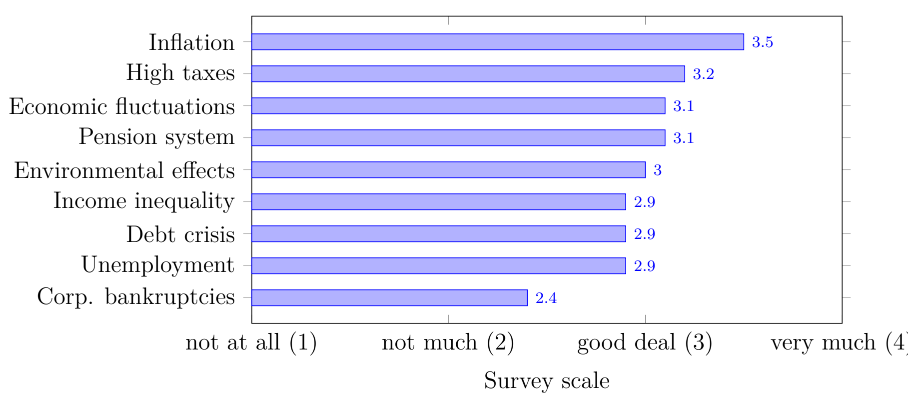


Figure 1: Pre-experiment survey results showing the perceived importance of economic issues.

[1]The German public pension fund offers an individual online pension calculator that has recently been extended with a version accounting for inflation, see `https://www.rentenuebersicht.de/` (available only in German). However, taxation of pension payments is not accounted for in the calculations.

Despite their economic similarity, inflation and taxation have largely been studied in separate streams of literature. This leaves an important gap in our understanding of their consequences for long-term financial decision-making. Both inflation and taxes reduce future consumption opportunities and can generate quantitatively similar effects on real investment returns. At the same time, they are associated with related behavioral phenomena, such as money and tax illusion. Yet, we do not know whether these phenomena reflect common underlying forces or whether individuals process inflation and taxation in fundamentally different ways. This distinction is important for policy design. If the same factors shape perceptions in both domains, communication strategies that improve decision-making in one context may also be effective in the other. If, however, inflation and tax perceptions are shaped by distinct processes, interventions need to be tailored to the specific context despite the economic similarity of the underlying problems.

Empirically identifying money and tax illusion is challenging because observed investment behavior may reflect several underlying cognitive and preference-based mechanisms that are difficult to distinguish in the field. In real-world settings, inflation and tax rates vary across time, institutional environments, macroeconomic conditions, and information environments, so that behavioral responses cannot easily be attributed to the way individuals process nominal, real, pre-tax, or after-tax outcomes. We therefore use an experimental set-up that provides a controlled environment to disentangle the mechanisms underlying money and tax illusion and to analyze the effectiveness of different communication strategies, including visualizations, tabular information, attention nudges, and switches between nominal/pre-tax and real/after-tax representations.

We develop a unified theoretical framework for studying money and tax illusion in long-term investment decisions. To structure this comparison, we draw on several mechanisms that can distort the processing of inflation and tax information, including calculation errors such as exponential growth bias (Stango and Zinman, 2009), aversion to inflation or taxes (Sussman and Olivola, 2011; Stantcheva, 2024), rational inattention due to costly information processing (Maćkowiak et al., 2023), and anchoring and insufficient adjustment as a general heuristic (Epley and Gilovich, 2006). We derive predictions for how these mechanisms affect investment behavior under certain and uncertain inflation or tax rates. The framework guides our experimental design.

We test these predictions using an incentivized, pre-registered online experiment in which participants make long-term investment decisions in a retirement-saving setting. To our knowledge, this provides the first direct experimental comparison of money and tax illusion, allowing us to compare their magnitude, examine their underlying mechanisms, and evaluate whether communication strategies mitigate them in similar ways.

The experimental design combines within-subject and between-subject variation. Within subjects, participants make decisions in both the inflation and tax settings and face certain as well as uncertain rates, with rate uncertainty present in stable, rising, and falling market scenarios. Between subjects, participants are randomly assigned to one of eight treatments that vary the communication strategies used to present inflation and tax information and whether participants can access real or after-tax payoff representations. In the baseline comparison with certain rates, the experiment is designed to make inflation and taxation directly comparable by holding real or after-tax consumption opportunities constant and varying only whether nominal payoffs are transformed into consumption through inflation adjustment or taxation.

Our sample consists of 882 U.S.-based participants with recent experience in tax filing and stock market participation. Based on their investment decisions, we document three main findings:

First, individuals exhibit substantial money and tax illusion in long-term investment decisions, leading to over-investment relative to real or after-tax benchmarks. This distortion is considerably larger in the inflation setting than in the tax setting. Under certain rates, over-investment amounts to about 10% of the endowment in the inflation setting, compared to an over-investment of about 4% in the tax setting. Rate uncertainty further increases these distortions.

Second, individuals process inflation and taxation differently even when consumption consequences are aligned across settings. Providing access to real or after-tax payoff consequences reduces over-investment in both settings, indicating that limited attention to these consequences contributes to both money and tax illusion. However, it matters when these adjusted consequences are displayed. Corrections are substantially stronger when adjusted payoff consequences are presented before participants form an initial nominal or pre-tax judgment. This pattern is consistent with anchoring in both settings, but the persistence of over-investment in the inflation setting suggests that nominal anchors are more difficult to overcome than pre-tax anchors.

Third, standard communication strategies are largely ineffective in mitigating these distortions. Providing additional tabular information, graphical visualizations, or attention nudges does not meaningfully reduce money or tax illusion. In contrast, interventions that allow participants to switch from nominal or pre-tax payoff displays to real or after-tax payoff displays before making their decision substantially reduce the bias and, in the tax setting, can eliminate it. These results suggest that effective communication must do more than add information: it must shape how decision-relevant consequences are presented before nominal or pre-tax anchors influence investment choices.

The paper proceeds as follows. Section 2 gives an overview of the different strands of literature to which the paper relates. Section 3 introduces our unified framework and derives predictions on the mechanisms underlying money and tax illusion as well as on the impact of uncertain tax and inflation rates. Section 4 describes the experimental design, Section 5 presents the results, and Section 6 concludes.

2 Related Literature

Our study connects two strands of literature. First, it relates to research on inflation and tax misperceptions in financial decision-making. This literature shows that individuals often fail to fully incorporate inflation and taxation into economic decisions, yet the two phenomena have not been studied within a common framework. Second, our study contributes to research on communication strategies and decision-interface design. This literature examines how the presentation of information shapes decision-making. We extend it by comparing the effectiveness of alternative communication strategies in reducing misperceptions in both the inflation and the tax setting.

We first discuss research on inflation and tax misperceptions in financial decision-making. In the inflation setting, prior work documents money illusion, limited inflation knowledge, difficulties in reasoning about percentages and real values, and systematic heterogeneity in inflation expectations and monetary-policy knowledge across individuals (Shafir et al., 1997; Fehr and Tyran, 2001; Hayo and Neuenkirch, 2014; van der Cruijsen et al., 2015; Blanchflower and Kelly, 2008; Dräger and Lamla, 2017; Coibion and Gorodnichenko, 2012, 2015; D'Acunto et al., 2019, 2021, 2023; Binetti et al., 2024; Reiche, 2025). More recent work studies how households respond to the wealth effects of inflation in financial decisions (Schnorpfeil et al., 2023) and the degree of inflation ignorance in investment (Branger et al., 2023). The latter is closest to our paper, as Branger et al. (2023) introduce an experimental framework based on nominal monetary and real consumption units to estimate the degree of money illusion in intertemporal investment decisions. Similar to their setting, we include treatments which allow participants to translate nominal outcomes into real purchasing power. However, the purpose of our design differs fundamentally. Branger et al. (2023) focus on identifying and structurally estimating money illusion within a CRRA-based asset allocation framework. In contrast, we do not seek to quantify the precise degree of money illusion. Instead, we develop a unified framework that allows a direct comparison of misperceptions regarding inflation and taxation by constructing environments in which the consumption consequences of the two are equivalent. This enables us to study whether economically similar distortions are processed through similar behavioral channels and whether interventions that improve the correct incorporation of inflation into investment choices also improve the incorporation of taxation.

In the tax setting, research shows that individuals frequently misperceive tax rates and fail to correctly incorporate tax consequences into economic decision-making, including retirement saving and investment-related choices (Fujii and Hawley, 1988; Feldman et al., 2016; Rees-Jones and Taubinsky, 2020; Blaufus and Milde, 2021; Blaufus et al., 2022). Related evidence also shows that individuals may react negatively to inflation or taxation beyond their monetary consequences: survey evidence documents inflation aversion and a preference for stable prices (Afrouzi et al., 2024; Binetti et al., 2024; Stantcheva, 2024), while tax research documents tax aversion and its effects on financial investment preferences (Sussman and Olivola, 2011).

Beyond misperceptions about the level and consequences of inflation and taxation, related work also examines how uncertainty about these rates shapes economic decision-making. Inflation expectations, even when biased, influence consumption and saving decisions (Dräger and Nghiem, 2021; Coibion et al., 2023; Dräger et al., 2024), and money illusion has been linked to aggregate price persistence, house prices, and stock market behavior (Fehr and Tyran, 2001; Brunnermeier and Julliard, 2008; Modigliani and Cohn, 1979; Cohen et al., 2005). Recent evidence further shows that information about inflation-induced wealth effects, such as the erosion of nominal mortgage debt, affects consumption and financing choices (Schnorpfeil et al., 2023). In the tax setting, tax uncertainty is associated with forecast errors and investment responses in firm settings (Bratten et al., 2017; Jacob et al., 2022), while individuals may ignore tax uncertainty in retirement saving decisions (Blaufus et al., 2025). Taken together, this literature establishes that both inflation and taxation can distort financial choices and that uncertain inflation and tax rates may further shape economic decisions. However, research on money illusion and tax misperceptions has largely developed separately. Our study brings both domains into a unified experimental investment setting that closely aligns the consumption consequences of inflation and taxation, allowing us to directly compare the magnitude of money and tax illusion under certain and uncertain rates and to examine whether the two distortions arise from similar or distinct behavioral processes

A second strand of literature investigates how communication strategies and decision interfaces affect decision-making under uncertainty. Communicating uncertainty may improve decisions because boundedly rational decision makers cannot attend to all available information and may neglect relevant information when it is not sufficiently salient (Hirshleifer and Teoh, 2003). At the same time, uncertainty increases the complexity of decision problems, which can impair information processing (Enke, 2020). Related work on nudging emphasizes that changes in the decision environment can direct attention to otherwise neglected information (e.g., Thaler and Sunstein, 2008). Communication strategies that increase salience, direct attention, or reduce complexity may therefore help decision makers process uncertain information more effectively.

Visualizations are one prominent way of making information more salient and easier to process. Prior research shows that visual displays capture attention more effectively than plain text or numbers (Kerren et al., 2008), evoke affective responses (Uhrig et al., 2016), facilitate pattern recognition (Ali et al., 2016), and help individuals process complex information (Chan and Park, 2015). In financial settings, visual properties of price charts affect investment decisions and perceived attractiveness (Grosshans and Zeisberger, 2018; Nolte and Schneider, 2018); return versus price representations influence forecasts of asset performance (Glaser et al., 2019); and informationally equivalent visualizations can lead to opposing judgments about time-series developments (Spiller et al., 2020). Recent evidence further shows that dynamic and vivid visual representations of stocks affect attention, arousal, and risk-taking behavior (Gu et al., 2025).

Our study contributes to this literature by comparing several communication strategies within the same investment environment and across both settings. We examine tabular information, graphical visualizations, attention nudges, and switches between nominal/pre-tax and real/after-tax payoff representations. The first three strategies primarily aim to increase salience or reduce the complexity of information about inflation and tax uncertainty. The switch treatments go further by changing when and how payoff consequences are represented in the decision interface. This allows us to test whether mitigating money and tax illusion requires merely making uncertain rate information more salient, or whether effective debiasing requires presenting real or after-tax consequences directly before nominal or pre-tax anchors are formed.

3 Inflation and Tax Misperceptions: A Theoretical Framework

3.1 Decision Framework

We examine the effects of taxes and inflation on decision-making. Specifically, we consider a simplified risk-taking decision over long horizons, which is typical for retirement savings. Here, we present a framework that accounts for a boundedly rational decision-maker (DM) when integrating inflation and tax information into investment decisions. This framework is closely linked to the experimental design discussed in the following section.

In our framework, the DM must undertake a long-term risky investment with a maturity of T. The DM has complete access to information regarding the asset's distribution and, in the absence of inflation or taxation, needs to evaluate only this prominent information when making a choice. In reality, however, the DM often needs to recall or acquire information about long-term risky investments, and perceptions of uncertainty are influenced by the interplay between cognitive constraints and the learning process about the risky asset

(Bohren et al., 2024). While we acknowledge the importance of this interplay, our interest lies in a different aspect: how perceptions of uncertainty regarding macroeconomic variables like inflation and taxation interact with wealth choices.

We consider the choice of a DM who allocates a fraction ϕ of his initial wealth–which we normalize to 1 for ease of exposition–to a risky asset or keeps the remaining fraction without interest. Then final (nominal) wealth of the DM depends on the return of the asset, which is uncertain (r_T) and the choice of ϕ which depends on the DM's preferences:

$$W_T = 1 + \phi r_T. \tag{1}$$

The existence of inflation and taxes has direct wealth effects, thus, the DM might adjust her long-term saving decision to mitigate these wealth effects.

It is well known that objective tax and inflation information is not perceived correctly by DMs. Misperception exists because the DM behaves in a rationally bounded way. Thus, how she incorporates inflation and tax information in r_T depends on these misperceptions. Yet, there is no single theory, which explains boundedly rational inflation or tax responses. Therefore, our model and experimental design will account for various factors that may impact the responses.

First, the DM might bias the expectation on future tax or inflation rates, which could stem from simplifying heuristics. That is, the DM expects the future rate $\hat{x}$ with $x \in \{\pi, \tau\}$ (π = inflation, τ = tax), where $\hat{\pi} \geq 0$ and $\hat{\tau} \in [0, 1)$, while the objective rate is given by x. As a consequence, the real return on the investment might be under- or overestimated.

Second, translating inflation and taxes correctly into r_T requires adjusting nominal returns based on simple calculations. These calculations vary in complexity for inflation and tax rates, resulting in the following potential biases for the real return:

$$1 + \hat{r}_T^{\pi} = (1 - \beta^{\pi}) \frac{1 + r_T}{(1 + \hat{\pi})^T} \tag{2}$$

$$1 + \hat{r}_T^{\tau} = (1 - \beta^{\tau})(1 + r_T)(1 - \hat{\tau}), \tag{3}$$

where $\hat{\pi}$ and $\hat{\tau}$ denote the perceived future inflation and tax rates, respectively. The parameter $0 \leq \beta^x \leq 1$ captures the degree of bias in calculation, with $\beta^x = 0$ indicating perfect calculation (no error), and $\beta^x > 0$ reflecting an overestimation of the impact of inflation or taxes on investment returns. An example would be the exponential growth bias (e.g., Stango and Zinman, 2009).

Third, the real return might be perceived differently than the nominal or pre-tax return due to either subconscious anchoring to nominal or pre-tax values (Epley and Gilovich, 2006) or due to rational inattention (Maćkowiak et al., 2023). We therefore introduce an illusion parameter $\eta^x \in [0, 1]$, which impacts the relation between nominal returns r_T and biased real returns $\hat{r}_T$ such that the perceived real return is given by

$$\tilde{r}_T^x = \hat{r}_T^x + \eta^x (r_T - \hat{r}_T^x), \tag{4}$$

with $\eta^x = 0$ (no illusion bias), perceived real returns $\tilde{r}_T^x$ equal (biased) real returns $\hat{r}_T^x$, while with $\eta^x = 1$ (complete illusion bias), perceived real returns $\tilde{r}_T^x$ then equal nominal returns r_T.

Thus, the objective of the DM is to maximize the following expected value function depending on her perceived wealth $\tilde{W}_T = 1 + \phi \tilde{r}_T^x$, i.e., the optimization problem of the DM is:

$$\max_{\phi} \mathbf{E}[v(\tilde{W}_T, \boldsymbol{\gamma})], \tag{5}$$

where $\boldsymbol{\gamma}$ presents a vector of risk, inflation and taxation aversion, which all reduce the willingness to invest in a risky asset, and where v is some value function with $v'(W) > 0$ and $v''(W) < 0$. Thus, the investment fraction ϕ depends on the perceived rate, the illusion parameter, the calculation bias and the aversion parameter, i.e., $\phi(\hat{x}, \eta^x, \beta^x, \boldsymbol{\gamma})$.

3.2 Certain Inflation and Tax Rates

For certain inflation and tax rates, perceived and objective rates coincide, i.e., $x = \hat{x}$, implying that differences in investment behavior under certainty do not arise from heterogeneity in expected inflation or tax rates, but from the way decision makers process these rates when translating nominal into real or after-tax returns. In our framework, the remaining distortions therefore operate through calculation bias β_x, illusion bias η_x, and aversion γ_x.

Both the illusion parameter η_x and the calculation bias parameter β_x affect the perceived real or after-tax return $\tilde{r}_T^x$ and thereby the attractiveness of the risky asset. As shown in Supplementary Appendix S5, both parameters admit a unified analytical treatment: they shift the perceived return distribution statewise, albeit in opposite directions. Under the maintained parameter restrictions, a higher η_x shifts perceived returns upward toward nominal returns and therefore induces a first-order stochastic dominance (FOSD) improvement of the perceived return distribution. By contrast, a higher β_x lowers perceived real or after-tax returns and therefore induces a FOSD deterioration of the perceived return distribution. Following Fishburn and Burr Porter (1976), such changes in the perceived return distribution imply corresponding changes in the optimal investment share for broad classes of utility functions. Supplementary Appendix S5 further confirms both comparative statics numerically for the calibration used in our experiment.

Our illusion parameter η_x addresses factors like rational inattention or nominal anchoring, which are both related to cognitive challenges when dealing with more complex calculations of real or after-tax returns. According to Equation (4), $\eta_x > 0$ increases the weight placed on nominal rather than real or after-tax returns. This gives, together with the above theoretical arguments, our first prediction:

Prediction 1: If money or tax illusion is present ($\eta_x > 0$), we expect an over-investment with certain inflation or tax rates compared to a scenario without inflation or taxes.

We next consider the calculation bias. Estimating after-tax returns is simpler than accurately accounting for inflation. In line with our retirement-saving setting, we model the tax treatment as deferred taxation of future investment payoffs,[2] as described by Equation (3). The after-tax return is simply calculated by multiplying with $(1 - \tau)$. Multiplication tasks are generally easier and faster to perform than division tasks (Mauro et al., 2003). In contrast, computing the real return requires division by $(1 + \pi)^T$ and thus the application of an exponential growth function. Prior research shows that many individuals suffer from an exponential growth bias, meaning they tend to linearize exponential functions (e.g., Stango and Zinman, 2009). This linearization would lead to an overestimation of the inflation effect compared to the tax effect. For example, using the 20-year investment horizon from our experimental setting, suppose the yearly inflation rate amounts to 2.34%; the DM might incorrectly adjust for inflation by subtracting 46.8% ($0.0234 \cdot 20$) from the nominal return (i.e., the DM assumes only 53.2% of the nominal return remains), instead of applying the correct exponential discounting, which would reveal a real value of 61.1% ($= \frac{1}{(1+0.0234)^{20}}$) of the nominal return. We thus assume a smaller calculation bias for after-tax returns than for inflation-adjusted returns, i.e. $\beta^\pi \geq \beta^\tau$. Since a higher β_x lowers the perceived return distribution and thereby weakly reduces the optimal investment share, our framework predicts the following:

[2] Under deferred taxation, contributions to the retirement account and investment returns accrue tax-free, while withdrawals in retirement are taxed. Together with immediate taxation—under which contributions are made out of after-tax income but withdrawals are tax-free—this is one of the standard forms of pension taxation (Blaufus and Milde, 2021). In our experimental setting, however, we isolate the taxation of future retirement payoffs and do not separately model the deductibility of contributions.

Prediction 2: A positive calculation bias, i.e. positive β^x, implies a reduction in the invested amount with all other parameters held constant. Thus, $\beta^\pi \geq \beta^\tau$ implies a lower investment for inflation than for tax rates.

Third, we turn to inflation and tax aversion. Given that we are interested in the decisions of the same DM, the risk aversion will not change between inflation and tax settings. Prior research indicates that some individuals exhibit significant tax aversion (Sussman and Olivola, 2011; Blaufus and Möhlmann, 2014) and inflation aversion (Scheve, 2004; De Roux and Hofstetter, 2014). Tax aversion refers to the phenomenon in which individuals perceive tax payments as an additional burden, disliking them more than other equivalent costs (Sussman and Olivola, 2011; Blaufus and Möhlmann, 2014). Inflation aversion, on the other hand, captures how a given level of inflation affects an individual's utility or life satisfaction compared to other economic factors, such as unemployment (Scheve, 2004; De Roux and Hofstetter, 2014; Stantcheva, 2024). Consequently, for tax-averse or inflation-averse DMs, our framework predicts a decrease in the investment fraction ϕ in the presence of taxes or inflation. Whether tax aversion and inflation aversion differ in their impact on investment behavior remains an empirical question.

Prediction 3: Higher aversion γ^x implies a decrease in the invested amount, with all other biases held constant. We do not expect to see a different impact on investment for taxes or inflation settings.

Finally, we aim at disentangling the impact of rational inattention and nominal anchoring on the illusion effect η_x. First, according to the theory of rational inattention (Maćkowiak et al., 2023), DMs are more likely to avoid the higher cognitive costs associated with computing the impact of inflation compared to taxes, as calculating inflation effects is inherently more complex (see above). Consequently, this increases the likelihood of neglecting inflation relative to taxation. Moreover, the perceived benefit of calculating inflation effects may be lower than in the tax context. Research on consumer behavior indicates that when costs are framed as small, for instance with recurring expenses such as daily or monthly payments, consumers tend to underestimate the total cumulative cost compared to when the total amount is presented upfront (Gourville, 1998). Thus, even if the effects of taxes and inflation are mathematically equivalent (i.e., $(1-\tau) = \frac{1}{(1+\pi)^T}$, as in our experiment), it is reasonable to assume that the smaller magnitude of the annual inflation rate (2.34% in the experiment), relative to the larger tax rate (37%), leads individuals to perceive a lower benefit from calculating the inflation effect. As a result, this may increase the likelihood that inflation information is neglected relative to tax information. Second, the use of the anchoring and adjustment heuristic (Tversky and Kahneman, 1974) could also explain why individuals focus on nominal or pre-tax values. According to this heuristic, individuals subconsciously anchor on information that is easy to process and salient and then make insufficient adjustments to this anchor when additional information is revealed (Epley and Gilovich, 2006). In the context of retirement savings, research shows that anchoring on pre-tax values can result in investments in lower-risk assets when retirement savings are subject to deferred rather than immediate taxation (Stinson et al., 2021) and lower retirement savings in the case of over-withholding taxes (Blaufus et al., 2025). Moreover, the findings of Branger et al. (2023) suggest that individuals subconsciously anchor on nominal returns, leading them to disregard inflation and thereby distorting long-term investment decisions. However, whether the nominal anchoring effect is more pronounced in a setting involving inflation rather than taxation remains theoretically unclear. We therefore base our prediction solely on the assumption that rational inattention implies a higher illusion parameter for inflation than for taxes.[3]

Prediction 4: Illusion bias η^x may be exacerbated by both rational inattention and nominal anchoring. We predict stronger rational inattention in the case of inflation due to the higher complexity involved and therefore higher illusion bias in the inflation setting: $\eta^\pi \geq \eta^\tau$.

[3]Notice that we use experimental manipulations to assess the relative importance of these two mechanisms.

3.3 Uncertain Inflation and Tax Rates

So far, we have considered a setting in which the payoff of the risky asset is uncertain, while inflation and tax rates are known with certainty. Thus, participants face investment risk, but not statistical uncertainty about the rates that determine how nominal payoffs translate into real or after-tax consumption. In reality, however, future inflation and tax rates are themselves uncertain. To capture this feature, we introduce rate uncertainty by providing participants with historical realizations of inflation and tax rates rather than a single known rate.

Predictions 1 to 4 may also carry over to this setting. However, our focus here is on whether uncertainty about inflation and tax rates generates additional distortions beyond those observed under certain rates. If participants use the historical mean as a proxy for expected inflation or taxation, investment decisions should broadly resemble those under certain rates unless rate uncertainty itself affects behavior. One caveat is that payoff equivalence is exact under certain rates but does not mechanically imply identical rational benchmarks under rate uncertainty. This is because the tax payoff conversion factor is linear, whereas the inflation payoff conversion factor is nonlinear in the annual inflation rate[4], and because the objective rate distributions may differ in their dispersion. We therefore compute rational benchmark investments under the actual rate distributions used in the experiment. As reported in Supplementary Table S1, these benchmarks indicate that the objective rate distributions themselves would not lead to a strong rational increase in investment: the benchmark effect is small in the inflation setting and negative in the tax setting for risk-averse decision makers. Hence, the certain-rate decision remains the relevant behavioral reference point, while the benchmark calculations clarify how large any purely mechani-

[4]The conversion factor determines how nominal future payoffs are translated into consumption units. In the tax setting, this factor is given by $1 - \tau$; in the inflation setting, it is given by $(1 + \pi)^{-T}$. Thus, the tax conversion factor is linear in the tax rate, whereas the inflation conversion factor is nonlinear in the annual inflation rate. By Jensen's inequality, $\mathbb{E}[(1 + \pi)^{-T}]$ generally differs from $(1 + \mathbb{E}[\pi])^{-T}$, so an uncertain inflation rate with the same mean as a certain inflation rate need not generate the same expected conversion factor.

cal rational adjustment would be. Likewise, aversion (γ^x) and calculation bias (β^x) should remain unchanged. The central question is therefore whether rate uncertainty affects the illusion bias η^x.

On the one hand, rate uncertainty may rationally increase attention to inflation and tax information in general and thereby induce decision makers to place greater weight on this information when making investment decisions, as the stakes involved in paying attention rise (Maćkowiak et al., 2023). As a result, the illusion parameter η^x, and hence the associated investment distortion, may decrease. In line with this reasoning, Branger et al. (2023) find that money illusion is less pronounced in the presence of normal distributed inflation risk than under certain inflation rates. On the other hand, rate uncertainty also increases informational complexity, and thereby the cost of processing information. In line with rational inattention (Maćkowiak et al., 2023) and complexity aversion (e.g., Umar, 2022), this may increase η^x and thereby raise investment. Hence, the net effect of rate uncertainty is an empirical question. Moreover, absent clear theoretical guidance, we do not expect these behavioral mechanisms to operate systematically differently in the tax and inflation settings.

Prediction 5: The effect of rate uncertainty on investment is ambiguous. We do not expect uncertainty to have a systematically different impact on investment in the tax and inflation settings.

Under rate uncertainty and with a potentially boundedly rational decision maker, the way statistical uncertainty is communicated becomes particularly important. If individuals already struggle to incorporate inflation and taxation when rates are known, the additional complexity created by uncertain rates may further impair decision-making. Information on historical performance and risk-reward profiles is therefore a mandatory component of key investor information for mutual funds in the EU.[5] Beyond such summary statistics, a range of communication tools may help individuals process uncertain inflation and tax rates, including visualizations, detailed tables, attention nudges, and switches between nominal/pre-tax and

[5]DIRECTIVE 2009/65/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 13 July 2009 (OJ L 302/32, 17.11.2009).

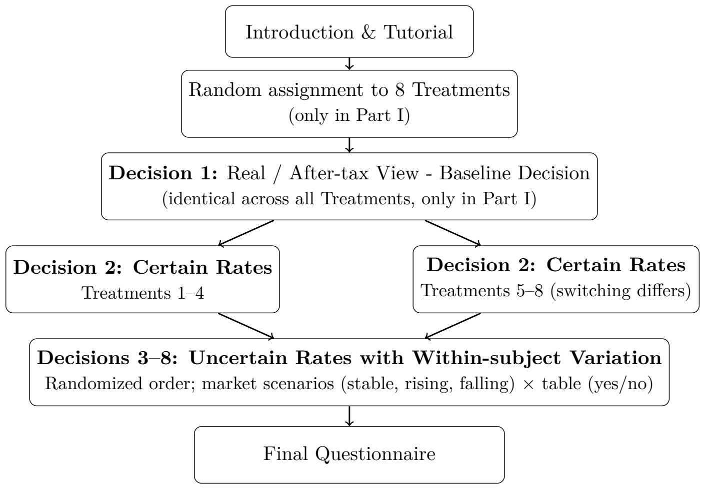
real/after-tax payoff representations. Existing theories of attention, salience, and information processing suggest that such interventions may affect decision-making, but they provide limited guidance on their relative effectiveness in reducing money and tax illusion. We therefore examine these communication strategies experimentally to provide causal evidence on how information design shapes the incorporation of inflation and taxation into long-term investment decisions.

4 Experimental Design

4.1 Identification Strategy and Design Overview

Our experiment is designed to compare money and tax illusion, identify the mechanisms underlying these distortions, and evaluate communication strategies that may mitigate them. Figure 2 summarizes the design. Participants make repeated incentivized long-term investment decisions in which they allocate an endowment between current consumption and a risky investment with a 20-year horizon. The experiment consists of two parts conducted on consecutive days, with one part covering the inflation setting and the other part covering the tax setting. The order of the two settings is randomized across participants. The experiment starts with a common benchmark decision without inflation or taxes, shown as Decision 1 in Panel A of Figure 2. This benchmark is elicited only once, at the beginning of Part I on the first day, and serves as the common reference point for both the tax and the inflation setting; Part II on the second day begins directly with the remaining setting. Participants then complete both the inflation and the tax setting in randomized order, with seven decisions in each setting: one decision with a certain rate (Decision 2) and six decisions with uncertain rates (Decisions 3–8).

Panel A: Experimental Flow–Part I and Part II



Panel B: Between-subject Treatments

Treatment	Visualization	Nudge	Switching
T1	No	No	None
T2	Yes	No	None
T3	No	Yes	None
T4	Yes	Yes	None
T5	No	Yes	Voluntary
T6	Yes	Yes	Voluntary
T7	No	Yes	Late (forced)
T8	No	Yes	Early (forced)

Figure 2: Experimental design. Panel A shows the experimental flow. Panel B summarizes the eight between-subject treatments.

The key identification feature is payoff equivalence under certainty between the tax and the inflation setting. Following the declining conversion rate mechanism of Branger et al. (2023), nominal monetary payoffs P^{MU} are converted into consumption units P^{CU}, which determine participants' actual bonus. We extend this logic by applying it to both inflation and taxation. In the tax setting, this conversion is given by $P^{CU} = P^{MU}(1-\tau)$; in the inflation setting, it is given by $P^{CU} = P^{MU}/(1+\pi)^{20}$. We calibrate the tax and inflation rates such that $1-\tau = 1/(1+\pi)^{20}$. Thus, for any given investment choice, taxation and inflation imply the same consumption consequences. Differences in investment behavior therefore cannot be attributed to differences in objective economic incentives.

We use this payoff equivalence to identify money and tax illusion. Decision 1 displays consumption consequences directly and serves as the benchmark. Decision 2 presents nominal or pre-tax payoffs together with a certain inflation or tax rate, while preserving the same real or after-tax consumption opportunities as in Decision 1. For the certain-rate decision, we use a tax rate of 37% and an annual inflation rate of 2.34%. The tax rate is based on historical U.S. federal individual income tax rates, while the inflation rate is calibrated to yield equivalent consumption consequences over the 20-year investment horizon and roughly corresponds to mean historical U.S. CPI inflation. Participants were shown the rounded annual inflation rate of 2.3%, while all CU conversions use the exact value of 2.34%. A change in investment from Decision 1 to Decision 2 therefore measures the extent to which participants fail to fully account for the inflation or tax transformation under certainty.

To identify the effect of rate uncertainty, we compare Decision 2 with decisions under uncertain rates in Decisions 3–8. In these decisions, participants receive information about hypothetical historical rates over the past 30 years. For inflation, the historical series are generated from a calibrated AR(1) process matched to historical U.S. inflation data. For taxation, the series are constructed to reflect the discrete nature of historical U.S. federal individual income tax rate changes. The baseline information, illustrated in Figure 4a, consists of the current rate, the rate 30 years ago, the historical mean, standard deviation, minimum, and maximum. Because we hold the long-run summary statistics constant across the stable, rising, and falling scenarios, the historical mean—and thus the rational expected-rate proxy—coincides with the corresponding certain rate from Decision 2 in all market scenarios. The stable scenario provides our cleanest comparison because there the recent rate path is also flat, so that any deviation from the certain-rate decision cannot be attributed to a perceived upward or downward trend. Absent an additional effect of rate uncertainty, investment behavior should therefore mirror the certain-rate decision. Deviations from this benchmark capture whether uncertainty about future inflation or tax rates amplifies or attenuates money and tax illusion.

Decisions 3–8 further vary the market scenario within subjects by presenting stable, rising, or falling historical rate paths. Across these scenarios, the long-run summary statistics are held constant, so that the variation isolates the role of perceived recent dynamics. Each scenario is shown once with and once without an additional table of historical rates, see Figure 4b. The table variation allows us to distinguish the effect of graphical presentation from the effect of providing detailed historical rate information.

Beyond these within-subject variations, participants are randomly assigned to one of eight between-subject treatments, summarized in Panel B of Figure 2. These treatments vary the main communication strategies used to present inflation and tax information: graphical visualizations, attention nudges, and access to real or after-tax payoff representations. The switch treatments further vary whether access to real or after-tax consequences is voluntary or forced and whether it occurs before or after an initial nominal or pre-tax judgment. This variation allows us to examine whether distortions can be reduced by making information more salient, by directing attention to future rates, or by changing when payoff consequences are represented in real or after-tax terms. The communication strategies are described in more detail in Section 4.3.

The experiment was programmed in oTree (Chen et al., 2016), pre-registered, and approved by the ethics committee of the German Association for Experimental Economic Research (GfeW).[6] Screenshots of the investment screen and of the information shown under certainty and uncertainty within each market scenario are provided in Supplementary Appendix S3. The instructions and full questionnaire are available in Supplementary Appendix S2 and Supplementary Appendix S4, respectively.

4.2 Investment Task and Payoff Structure

In each decision, participants are endowed with 10,000 monetary units (MU) and allocate this endowment between current safe consumption and a risky long-term investment with a 20-year horizon. The amount kept for current consumption is safe, whereas the investment payoff is uncertain and realized at the end of the investment horizon. The task is designed to capture intertemporal investment trade-offs under uncertainty.

The risky asset pays off according to a 10-state discrete distribution adapted from Vrecko and Langer (2013). Each state is equally likely and approximates a log-normal return process

[6] The pre-registrations are available at https://osf.io/j8ghr/?view_only=4535ddfcc6ce4f90b12890b2c0ae8bf6 and https://osf.io/anvjr/overview?view_only=9bdbe9526d374f6eaaf5312ce4c5c33d, and the ethics approval certificate at https://gfew.de/ethik/qW3dS1KL.

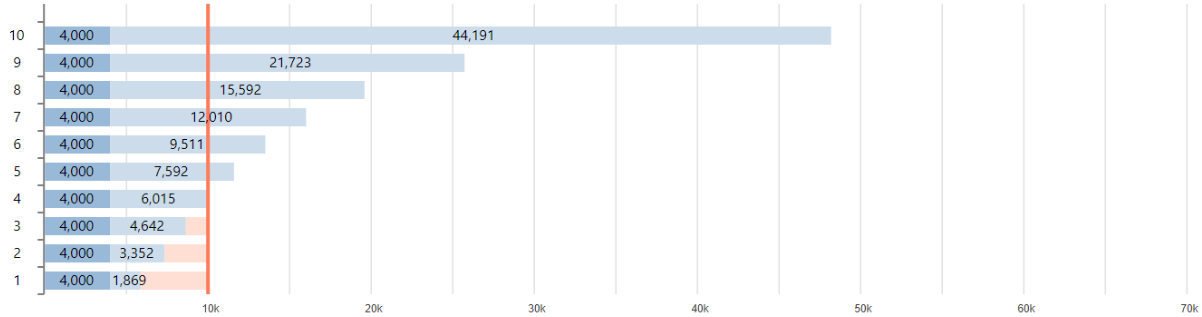


Figure 3: Visualization of Payoff Distribution

calibrated to long-run equity market data (S&P 500). The use of a discretized distribution allows participants to understand the risk structure while preserving stochastic richness (Vrecko and Langer, 2013; Nolte and Schneider, 2018).

To improve comprehension of the investment problem, we provide a graphical representation that jointly displays the safe and risky components of the decision (see Figure 3). The dark bars represent the amount kept for current consumption, while the light bars represent the possible future payoffs from the risky investment across the ten states. Participants adjust allocations via a slider, and payoff consequences update in real time.

As described in Section 4.1, participants' variable bonus is based on consumption units (CU) rather than nominal monetary units. The amount kept for current consumption is converted one-to-one into CU. Future investment payoffs are converted into CU according to the tax or inflation transformation introduced above. Thus, participants' incentives depend on real or after-tax consumption opportunities rather than nominal monetary payoffs.

For illustration, consider a participant who keeps 4,000 MU for current consumption and receives a future nominal investment payoff of 7,592 MU in one state (see state 5 in Figure 3). Under the certain rate setting with a tax rate of 37% or an inflation rate of 2.34% as described above, this is converted into CU as follows. In the tax setting, the future payoff is converted into $7{,}592 \cdot (1 - 0.37) = 4{,}782.96$ CU. In the inflation setting, the same nominal payoff is converted into $7{,}592/(1+0.0234)^{20} \approx 4{,}780.22$ CU. Thus, apart from minor rounding differences, the tax and inflation transformations imply the same total consumption opportunities.

Participants received a fixed payment of £3.20 for Part I and £1.90 for Part II, plus a variable bonus in each part. To determine the bonus, one investment decision from Part I and one investment decision from Part II were randomly selected for payment. Within each selected decision, one of the ten possible states of the risky investment was randomly drawn to determine the realized investment payoff. This payoff was converted into CU using the applicable tax or inflation transformation; for decisions under uncertain rates, the rate used for this conversion was randomly drawn from the historical rate series shown to participants in the respective decision.

The resulting CU were converted into British pounds at a fixed rate of £0.23 per 1,000 CU. The entire payment procedure was explained to participants in advance using detailed examples. Average total compensation amounted to £5.85 in Part I and £4.32 in Part II. The median completion time was 34.6 minutes in Part I and 19.9 minutes in Part II, corresponding to median hourly compensation of £10.14 and £13.03, respectively.

4.3 Communication Strategies (Between-Subject Variations)

The main communication strategies are varied between subjects and are summarized in Panel B of Figure 2. These treatments are designed to test whether money and tax illusion can be mitigated by making rate information more salient, by directing attention to future inflation or tax rates, or by changing when real or after-tax payoff consequences are represented in the decision interface. Treatments 1–4 vary the presentation of information under uncertain rates, while Treatments 5–8 introduce access to real or after-tax payoff representations. The latter treatments also affect the certain-rate decision because the switch can be used whenever nominal or pre-tax payoffs must be translated into real or after-tax consequences.

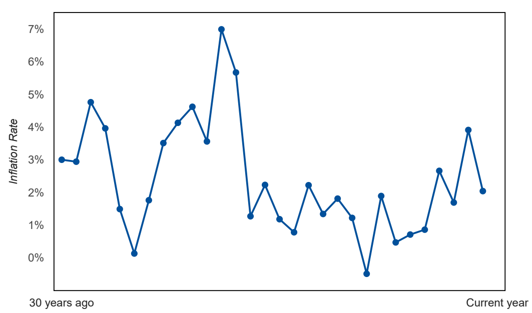
Potentially varying for investment decisions:	
Current year:	2.0% p.a.

Constant in every investment decision:	
30 years ago:	3.0% p.a.
Average over last 30 years:	2.3% p.a.
Standard deviation over the last 30 years:	1.6% p.a.
Minimum of the last 30 years:	-0.5% p.a.
Maximum of the last 30 years:	7.1% p.a.

(a) Baseline Information

Year	Inflation Rate (p.a.) (in %)	Year	Inflation Rate (p.a.) (in %)	Year	Inflation Rate (p.a.) (in %)
1995	3.0	2005	3.6	2015	1.2
1996	2.9	2006	7.0	2016	-0.5
1997	4.8	2007	5.7	2017	1.9
1998	4.0	2008	1.3	2018	0.5
1999	1.5	2009	2.2	2019	0.7
2000	0.1	2010	1.2	2020	0.9
2001	1.8	2011	0.8	2021	2.7
2002	3.5	2012	2.2	2022	1.7
2003	4.1	2013	1.3	2023	3.9
2004	4.6	2014	1.8	2024	2.0

(b) Table



(c) Visualization (stable market scenario)

Given the historical inflation rates in this scenario, what do you think will be the lowest possible, highest possible, and most likely annual (p.a.) inflation rate over the next 20 years?

Lowest inflation rate: % p.a. **Most likely inflation rate:** % p.a. **Highest inflation rate:** % p.a.

(d) Nudge

Switch view type:

Current view: Nominal / Real

Consumption units (CU) are based on an annual inflation rate of 2.3% (p.a.).

(e) Switch

Figure 4: Information environments across treatments: example screens from the inflation condition

Treatment 1 (*Baseline*) provides the baseline summary statistics on historical inflation or tax rates shown in Figure 4a. Treatment 2 (*Visualization*) supplements these summary statistics with a graphical representation of the historical rate series (see Figure 4c). This treatment tests whether a visual representation of the rate history helps participants process uncertainty and incorporate inflation or tax consequences more accurately.

Treatment 3 (*Nudge*) introduces an attention nudge. Before each investment decision under uncertain rates, participants state their expectations about the lowest, highest, and most likely annual inflation or tax rate over the next twenty years (see Figure 4d). This elicitation is designed to direct attention to rate uncertainty before the investment decision is made. Treatment 4 combines the nudge with the visualization component to test whether making the rate history visually salient and actively eliciting expectations jointly affect investment behavior.

Treatments 5–8 introduce a *switch* mechanism that allows participants to move from the nominal or pre-tax payoff view to the corresponding real or after-tax payoff view (see Figure 4e). Similar to the hybrid treatment in Branger et al. (2023), the switch provides direct access to payoff consequences expressed in real purchasing power. In our setting, however, the switch is one of several communication strategies and is used to study both whether participants seek out adjusted payoff information and whether the timing of exposure to such information affects decision-making. Across all switch treatments, the switch is combined with the nudge, because the elicited most likely rate is needed to compute the real or after-tax payoffs shown after switching under statistical uncertainty. Under certain rates, the real or after-tax view is computed using the provided certain rate. The switch treatments differ in whether access to the real or after-tax view is voluntary or mandatory and, in the latter case, whether exposure occurs before or after an initial nominal or pre-tax evaluation:

- In Treatment 5 (*Voluntary switch*), participants can optionally switch to the real or after-tax view but are not required to do so. This treatment allows us to study whether participants actively seek out adjusted payoff information.

- Treatment 6 (*Voluntary switch + Visualization*) combines the voluntary switch with the visualization component from Treatment 2.
- In Treatment 7 (*Late forced switch*), participants first make an investment decision based on the nominal or pre-tax view and are then required to switch to the real or after-tax view, after which they may revise their decision. This treatment allows us to examine the extent to which participants adjust their choices once adjusted payoff consequences become salient.
- In Treatment 8 (*Early forced switch*), participants are required to switch to the real or after-tax view before making an investment decision. They may subsequently return to the nominal or pre-tax view and revise their decision before finalizing it. Participants are thus exposed to adjusted payoff consequences before forming an initial nominal or pre-tax judgment.[7]

The variation across switch treatments allows us to assess the relative roles of rational inattention and anchoring as potential drivers of the illusion bias. If distortions primarily reflect rational inattention, requiring participants to inspect real or after-tax consequences should reduce the bias. If distortions also reflect anchoring, the timing of the switch should matter: a late forced switch still allows participants to form an initial judgment based on nominal or pre-tax payoffs, whereas presenting real or after-tax consequences before the investment decision should further attenuate the influence of such initial judgments. Comparing voluntary and late forced switching therefore provides evidence on whether participants actively seek out adjusted payoff information and whether they revise decisions once adjusted consequences become salient. The early forced switch serves as a benchmark for the maximum effect of presenting information in real or after-tax terms from the outset. Screenshots of all treatments are presented in Supplementary Appendix S3.

[7] Treatments 7 and 8 were conducted in a separate, later data collection wave than Treatments 1–6. After analyzing the first wave, we decided to examine the effects of switching to the real or after-tax view more closely, which motivated the forced-switch designs in Treatments 7 and 8. These treatments were pre-registered separately; see the pre-registration linked in the supplementary appendix.

5 Results

5.1 Sample

We conducted the experiment online via Prolific with participants located in the United States. We applied several pre-screening and exclusion criteria to ensure data quality and the relevance of participants. Only individuals between 21 and 65 years of age who reported being fluent in English were allowed to participate. Additionally, to target participants with relevant experience, we restricted participation to those who (i) had filed a personal income tax return within the past five years and (ii) reported being actively involved in the stock market. To further increase data integrity, we excluded participants with a Google reCAPTCHA v3 score below 0.3, as such a low score indicates a high probability of bot activity. We also excluded participants who did not use a desktop computer to complete the survey, as well as those using a proxy or VPN connection, based on IPHub detection.

During the experiment, participants had to pass two comprehension checks—one after the general instructions and one after the introduction of inflation or taxes—where each question could be answered incorrectly at most once. Participants also had to pass an attention check at the beginning of the experiment (*"Please select 'True' for this question"*). Finally, we conducted an honesty check by comparing the age stated at the beginning of the experiment with the birth year reported at the end; participants with implausible inconsistencies were excluded.

In line with our preregistration, we additionally excluded so-called speeders, defined as individuals whose total completion time within each treatment and part did not exceed 50% of the median completion time for the respective treatment and part.[8]

[8] In total, 450 (30.1%) participants failed one of the comprehension checks, 4 (0.3%) failed the attention question, 69 (4.6%) were excluded based on the pre-screening criteria described above, 77 (5.1%) were excluded as speeders, and 15 (1.0%) failed the honesty check.

A total of 882 individuals are included in the final sample and were assigned to one of eight between-subject treatments. Among these participants, 52.5% were male, with an average age of 40.2 years (SD = 11.1), which roughly corresponds to the median age in the U.S. Participants answered 2.8 of the three financial literacy questions correctly on average, a value somewhat higher than previously reported for the U.S. (Lusardi and Mitchell, 2011b). The percentage of high income is similar to the U.S. average. Table 1 provides descriptive statistics across all treatments.[9]

TABLE 1
Descriptive Statistics

		Treatment							
	All	1	2	3	4	5	6	7	8
Male	0.525	0.527	0.495	0.551	0.523	0.523	0.500	0.583	0.500
	(0.500)	(0.502)	(0.502)	(0.500)	(0.502)	(0.502)	(0.502)	(0.495)	(0.502)
Age	40.224	39.741	39.514	38.832	40.099	39.743	39.755	41.815	42.181
	(11.060)	(10.920)	(11.326)	(10.909)	(11.009)	(10.801)	(11.348)	(10.300)	(11.676)
High income	0.471	0.438	0.468	0.495	0.505	0.477	0.518	0.491	0.379
	(0.499)	(0.498)	(0.501)	(0.502)	(0.502)	(0.502)	(0.502)	(0.502)	(0.487)
Master's degree	0.304	0.223	0.284	0.355	0.324	0.303	0.318	0.315	0.310
	(0.460)	(0.418)	(0.453)	(0.481)	(0.470)	(0.462)	(0.468)	(0.467)	(0.465)
Risk taking	7.507	7.723	7.505	7.804	7.577	7.578	7.455	7.231	7.198
	(2.512)	(2.569)	(2.595)	(2.470)	(2.418)	(2.358)	(2.410)	(2.614)	(2.655)
Financial literacy	2.849	2.830	2.798	2.822	2.838	2.862	2.900	2.889	2.853
	(0.417)	(0.443)	(0.486)	(0.452)	(0.458)	(0.346)	(0.330)	(0.418)	(0.379)
Cognitive ability	2.173	2.125	2.128	2.103	2.198	2.055	2.200	2.306	2.267
	(1.061)	(1.049)	(1.081)	(1.090)	(1.127)	(1.096)	(1.056)	(0.981)	(1.016)
N	882	112	109	107	111	109	110	108	116

This table presents descriptive statistics across treatments. Variable definitions are provided in the appendix.

5.2 Tax and Money Illusion in Investment Decisions

5.2.1 Certain Tax and Inflation Rates (Predictions 1–4)

The objective of this subsection is to measure the amount of money or tax illusion bias η^x (Prediction 1) and to disentangle the effects of calculation bias β (Prediction 2), aversion bias γ^x (Prediction 3), and the degree to which the illusion bias η^x stems from rational

[9] To analyze potential systematic differences in sociodemographic characteristics across treatments, we conducted a joint χ^2 test using a multinomial logit model with all variables in Table 1 as independent variables. The purpose of the test was to evaluate the null hypothesis that there are no differences in sociodemographic characteristics across treatments. The results indicated that our randomization process achieved balanced sociodemographic characteristics across treatments (p = 0.911).

inattention or nominal anchoring (Prediction 4). We measure the role of these biases on investment decisions in the presence of certain inflation and tax rates. For Predictions 1–3 we compare the baseline investment decision (Decision 1) with the decision with certain rates (Decision 2) for Treatments 1–4 using fixed effects regression. For Prediction 4, we utilize Treatments 1–8 to disentangle the effect of rational inattention from nominal anchoring, again using fixed effects regression.

We proxy calculation bias by participants' *exponential growth bias*, measured through a scenario-based question in our post-experimental questionnaire that evaluates their ability to calculate the present value of a pre-tax savings goal under compound interest. We use this single item as a common calculation-skill proxy in both the tax and the inflation analyses. Inflation and tax aversion are measured using self-reported worry scales, where participants indicate the extent to which they are concerned about inflation and high taxes relative to other economic issues. Detailed descriptions of the measurement of these and all further independent variables are provided in the appendix.

We begin by examining the extent to which the presence of positive but certain taxes and inflation influence investment decisions (Prediction 1). Panel A of Table 2 shows that participants invest significantly more under both the tax setting (Model 1) and the inflation setting (Model 3) compared with the baseline condition without taxes or inflation (Decision 1), despite identical after-tax or real investment payoffs. The amount over-invested due to illusion is economically sizable at about 4% of the overall endowment in the tax setting and about 10% in the inflation setting. This difference is statistically significant, as indicated by the significant interaction effect between *Certain Rate* and *Tax Setting* in Model 1 of Panel B.[10]

Having established economically sizable over-investment under both certain taxes and certain inflation, we next examine which underlying mechanism accounts for these deviations. In our framework, over-investment may reflect a calculation bias β if participants fail to correctly translate nominal payoffs into after-tax or real payoffs. Alternatively, aversion bias γ^x may affect investment decisions if participants react differently to taxes or inflation because they perceive them as particularly burdensome. We therefore extend the baseline specification by interacting the certain-rate indicator with measures of calculation skills and setting-specific aversion.

The results in Models 2 and 4 in Panel A of Table 2 provide no evidence that calculation skills moderate the effect of taxes or inflation on investment behavior. Participants with low calculation skills do not invest significantly differently from those with high calculation skills in either the tax or the inflation setting, as indicated by the insignificant interaction effects of *Certain Rate* $\times$ *Low Calculation Skill.* This suggests that the observed over-investment is not primarily driven by participants' inability to calculate the payoff consequences of taxes or inflation. In terms of our framework, the evidence is therefore consistent with $\beta \approx 0$, contrary to Prediction 2.

Turning to aversion bias, we find that high tax or inflation aversion tends to reduce investment in the presence of certain rates, as indicated by the negative interaction coefficients of *Certain Rate* $\times$ *High Tax/Inflation Aversion.* This pattern is consistent with Prediction 3.

[10]Note that the baseline investment decision without certain inflation or tax rates is always elicited before the decision with certain rates, while the tax and inflation settings are randomized in their ordering between experimental days. This implies that the difference in illusion between the settings is immune to potential order effects. We argue that order effects on the average level of illusion due to the "no-rate" condition coming first are mitigated by the tutorial screens and that it improves the didactics of the experiment when the cognitive demand of investment decisions is raised sequentially. To further mitigate any concerns about potential order effects affecting the *average* level of illusion measured, we compare decisions with certain rates in each setting between those measured on day one (say, inflation setting was chosen first) to those elicited on day two (tax setting was chosen first). The results are shown in Table S2 in the Appendix and indicate that the amount of illusion within the tax or the inflation setting does not differ significantly between those who answered this on day one or day two of our experiment.

TABLE 2
Results: Certain Rates

Panel A: Investment Decisions (Tax and Inflation)

	Tax		Inflation	
	(1)	(2)	(3)	(4)
Certain Rate (vs. Real/After-tax View)	417.8***	672.3***	1,044***	1,251***
	(149.8)	(221.0)	(133.7)	(223.8)
Certain Rate x Low Calculation Skill (β)		-114.7		23.36
		(307.1)		(278.5)
Certain Rate x High Tax/Inflation Aversion ($\gamma^{\tau/\pi}$)		-508.2*		-376.8
		(304.8)		(275.2)
Constant	5,200***	5,200***	5,200***	5,200***
	(74.89)	(74.72)	(66.87)	(66.80)
Observations	878	878	878	878
Number of Participants	439	439	439	439
Model	FE	FE	FE	FE
Within R^2	0.017	0.024	0.122	0.126
F-test	7.780***	3.689**	60.99***	20.61***

Panel B: Investment Decisions (Tax vs. Inflation)

	(1)	(2)
Certain Rate (vs. Real/After-tax View)	1,047***	1,295***
	(178.4)	(248.1)
Tax Setting (vs. Inflation Setting)	5.333	212.9
	(249.4)	(346.6)
Certain Rate x Tax Setting	-632.0**	-835.8**
	(273.1)	(377.1)
Certain Rate x Low Calculation Skill (β)		-129.7
		(368.7)
Tax Setting x Low Calculation Skill (β)		-310.6
		(516.6)
Certain Rate x Tax Setting x Low Calculation Skill (β)		183.0
		(562.5)
Certain Rate x High Tax/Inflation Aversion (γ)		-572.9
		(370.7)
Tax Setting x High Tax/Inflation Aversion (γ)		-224.5
		(530.9)
Certain Rate x Tax Setting x High Tax/Inflation Aversion (γ)		354.9
		(593.1)
Constant	5,197***	5,183***
	(148.8)	(149.5)
Observations	1,317	1,317
Number of Participants	439	439
Model	FE	FE
Within R^2	0.061	0.064
F-test	21.37***	7.421***

This table presents fixed-effects regression estimates with *Investment* as the dependent variable. The regressions include observations from the first (*Real/After-tax View*) and second (*Certain Rate*) investment decisions in Treatments 1 to 4. Panel A reports separate estimates for the tax and inflation settings, while Panel B pools both settings and includes an interaction term to compare effects across them. *Certain Rate* is a dummy variable indicating the second investment decision under a fixed tax rate of 37% or a fixed inflation rate of 2.3%. *Investment* is the amount allocated to the risky investment in a given decision (in MU, ranging from 0 to 10,000). *Low Calculation Skill* indicates whether the participant failed to correctly estimate the required initial investment in a exponential growth scenario, allowing for a ±5% error margin. *High Tax [Inflation] Aversion* is a binary indicator equal to one if the participant expressed above-average concern about taxes [inflation] relative to other economic concerns (z-score > 1). In Panel B, *High Tax/Inflation Aversion* is defined analogously, but requires that the condition is met in both settings. Robust standard errors clustered at the participant level are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

The effect reaches statistical significance only in the tax setting, whereas the corresponding effect in the inflation setting is not statistically significant ($p = 0.172$). We therefore read the tax-aversion result as suggestive rather than conclusive, particularly because our aversion measure is a self-reported worry proxy that may capture recent personal exposure rather than a stable preference. Model 2 in Panel B yields no significant evidence that the aversion channel differs between the tax and inflation settings, as indicated by the insignificant three-way interaction between *Certain Rate*, *High Tax/Inflation Aversion*, and *Tax Setting*.

Overall, the main effects for *Certain Rate* show that participants invest significantly more under both tax and inflation settings than in the baseline without taxes or inflation, even after accounting for calculation skills and setting-specific aversion. We therefore find evidence of both tax illusion and money illusion ($\eta^x > 0$). Moreover, the larger investment response in the inflation setting indicates that money illusion induces a larger upward bias in investment than tax illusion ($\eta^\pi > \eta^\tau$).

Having shown that participants exhibit both tax and money illusion, we next examine whether these biases persist when real or after-tax returns are made directly accessible. This allows us to distinguish between two mechanisms underlying η^x. If the bias is primarily driven by nominal anchoring, simply providing access to real or after-tax returns may be insufficient, because participants may remain anchored on nominal returns. If, instead, the bias reflects rational inattention, making the adjusted returns salient or forcing participants to view them should reduce over-investment. This comparison relies on a design feature of the experiment: when participants use the switch, the displayed adjusted returns correspond to the payoff-equivalent real or after-tax returns underlying Decision 1.

Table 3 evaluates this mechanism empirically. For each setting, the first specification includes all participants, whereas the second restricts the voluntary-switch treatment to actual switch users, since the switch can affect decisions only if participants access the adjusted return information.[11] Models 1 and 2 show that, in the tax setting, the voluntary switch significantly reduces over-investment and effectively eliminates the bias due to tax illusion. This is reflected in the linear combination reported below the regression, which captures the remaining *Certain Rate* effect in the voluntary-switch treatment; the estimate is close to zero and statistically insignificant. A forced early switch yields a similar pattern: the corresponding linear combination is also small and insignificant, suggesting that forcing participants to view after-tax returns before making their decision largely eliminates tax illusion, even though the interaction term itself marginally misses significance at conventional levels ($p = 0.154$).

In the tax setting, the voluntary switch and the early forced switch both substantially reduce the over-investment associated with tax illusion. In both cases, the linear combinations reported below the regression are close to zero and statistically insignificant, indicating that access to after-tax consequences before or during the investment decision can largely eliminate the bias. This pattern is consistent with an important role of rational inattention: when after-tax consequences are made directly accessible at the relevant stage of the decision process – thus eliminating any rational inattention – participants choose comparable investment levels to the no-tax baseline condition.

However, the late forced switch provides no evidence of a systematic reduction in over-investment. The interaction between *Certain Rate* and *Late Switch* is close to zero and statistically insignificant, indicating that displaying adjusted returns only after participants have made an initial pre-tax choice does not measurably change the certain-rate effect. This result suggests that tax illusion cannot be attributed to rational inattention alone. Once participants have formed an initial judgment based on pre-tax payoffs, subsequent exposure

[11] Because the voluntary-switch specification conditions on actual switch use, we additionally examine selection into switch use. This check is important because the estimated effect among switch users could otherwise reflect systematic differences in who chooses to access the adjusted-return information. In a random-effects logit regression reported in Table S3 in Supplementary Appendix S1, we find no evidence that switch use is significantly related to gender (*Male*), higher education (*Master's Degree*), financial literacy (*Financial Literacy*), or cognitive ability (*Cognitive Ability*). The only significant predictor is low calculation skill (*Low Calculation Skill*), suggesting that participants with lower calculation skills are more likely to use the switch.

TABLE 3
Results: Certain Rates (Switch)

	Tax		Inflation	
	All	Switch used	All	Switch used
	(1)	(2)	(3)	(4)
Certain Rate (vs. Real/After-tax View)	417.8***	417.8***	1,044***	1,044***
	(149.8)	(149.8)	(133.7)	(133.8)
Certain Rate x Voluntarily Switch	-409.5*	-494.6*	-311.5	-517.6**
	(219.8)	(255.0)	(199.5)	(233.0)
Certain Rate x Late Switch (forced)	10.01	10.01	-277.8	-277.8
	(311.2)	(311.2)	(271.8)	(271.8)
Certain Rate x Early Switch (forced)	-419.5	-419.5	-710.8***	-710.8***
	(294.1)	(294.1)	(267.6)	(267.6)
Constant	5,063***	5,046***	5,063***	5,042***
	(48.42)	(51.49)	(43.45)	(46.37)
Observations	1,764	1,628	1,764	1,602
Number of Participants	882	814	882	801
Model	FE	FE	FE	FE
Within R^2	0.013	0.014	0.103	0.097
F-test	2.561**	2.594**	24.52***	20.29***
Effect of Certain Rate for ...				
Voluntarily Switch	8.219	-76.82	732.9***	526.8***
	(160.9)	(206.3)	(148.1)	(190.8)
Late Switch (forced)	427.8	427.8	766.7***	766.7***
	(272.8)	(272.8)	(236.6)	(236.7)
Early Switch (forced)	-1.724	-1.724	333.6	333.6
	(253.1)	(253.1)	(231.8)	(231.8)

This table presents fixed-effects regression estimates with *Investment* as the dependent variable. The regressions include observations from the first (*Real/After-tax View*) and second (*Certain Rate*) investment decisions of all eight treatments. *Investment* is the amount allocated to the risky investment in a given decision (in MU, ranging from 0 to 10,000). *Switch* indicates whether participants had access to a real payoff view in which payoffs were explicitly adjusted for inflation or taxes. The reported effects at the end of the table capture the marginal impact of *Certain Rate* within each switching regime, i.e., the change in investment from Decision 1 to Decision 2. They are computed as linear combinations of the estimated coefficients. Robust standard errors clustered at the participant level are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

to after-tax consequences appears insufficient to generate systematic correction. Thus, even in the tax setting, the timing of payoff representation matters.

In the inflation setting, the early forced switch significantly reduces over-investment due to money illusion, whereas the voluntary switch has a smaller significant effect only in the subsample of participants who actually used the switch. The late forced switch again does not significantly reduce the bias. Compared with the tax setting, money illusion is therefore more persistent: even when participants can access real payoff consequences, a substantial part of the initial over-investment remains unless the real view is enforced before the initial decision. Table S4 in the Appendix shows that this effect is not driven by how the switch affects investment decisions between the tax and the inflation setting, as triple interaction effects between the setting, certain rate and switch are insignificant in all cases. Thus the reason that the switch cannot fully eliminate money illusion comes from the fact that money illusion is overall significantly larger than tax illusion (see Table 2).

Taken together, the switch results suggest that rational inattention contributes to both tax and money illusion: when real or after-tax consequences are made accessible before or during the investment decision, over-investment is reduced. At the same time, the ineffectiveness of the late forced switch indicates that the bias cannot be explained by rational inattention alone. Once participants have formed an initial judgment based on nominal or pre-tax payoffs, subsequent exposure to real or after-tax consequences does not systematically undo the distortion. The results therefore suggest that the distortions reflect both rational inattention and the persistence of initial nominal or pre-tax judgments. This anchoring component appears more persistent in the inflation setting, where money illusion is overall larger and thus harder to eliminate, whereas tax illusion can be eliminated fully when after-tax consequences are made accessible early in the decision process. Together with the larger bias in the investment response under certain inflation rates in 2, the switch results thus support $\eta^{\pi} \geq \eta^{\tau}$.

5.2.2 Uncertain Tax and Inflation Rates (Prediction 5)

We next examine how investment behavior changes when tax and inflation rates become uncertain (Prediction 5). To isolate the effect of uncertainty, we compare the certain-rate decision (Decision 2) in Treatments 1–4 with the uncertain-rate decision in the stable market scenario. The regression includes treatment fixed effects. The results are presented in Table 4.

Models 1 and 2 show that uncertainty in tax or inflation rates significantly increases investment relative to the certain-rate decision. Interpreted against the rational benchmark reported in Supplementary Table S1, these increases are unlikely to reflect a mechanical

TABLE 4
Results: Uncertain Rates

	Tax (1)	Inflation (2)	All (3)
Uncertain Rate (vs. Certain Rate)	436.9***	248.1**	248.1**
	(97.41)	(97.52)	(97.55)
Tax Setting (vs. Inflation Setting)			-626.7***
			(136.1)
Uncertain Rate x Tax Setting			188.8
			(141.3)
Constant	5,618***	6,244***	6,244***
	(48.70)	(48.76)	(74.38)
Observations	878	878	1,756
Number of Participants	439	439	439
Model	FE	FE	FE
Within R^2	0.044	0.015	0.040
F-test	20.12***	6.470**	15.48***

This table presents fixed-effects regression estimates with *Investment* as the dependent variable. The regressions include observations from the second investment decision (*Certain Rate*) and the investment decision with an uncertain tax or inflation rate in the stable market scenario and without an additional table (*Uncertain Rate*) in Treatments 1–4. *Investment* is the amount allocated to the risky investment in a given decision (in MU, ranging from 0 to 10,000). Robust standard errors clustered at the participant level are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

response to the objective rate distributions: rational adjustment would imply only small changes in optimal investment in the inflation setting and lower optimal investment in the tax setting for risk-averse decision makers. The pooled evidence is therefore consistent with the interpretation that the additional complexity induced by uncertain rates increases behavioral distortions.

At the same time, the evidence should be interpreted with some caution. When we restrict the analysis to Treatment 1, which uniquely provides only summary statistics without additional graphical or attentional features, the estimated effects remain positive in both settings but are no longer statistically significant, with p-values of 0.133 in the tax setting and 0.292 in the inflation setting (see Table S5 in Supplementary Appendix S1). Thus, the direction of the Treatment 1 estimates is consistent with the estimates pooled across Treatments 1–4, but the smaller sample substantially reduces precision. This qualification is particularly relevant for the inflation setting, where the evidence for an uncertainty-induced increase in investment is less robust.[12]

Model 3 further shows that the coefficient on the interaction term *Uncertain Rate*× *Tax Setting* is not statistically significant. We therefore do not find evidence in the cross-setting specification that the behavioral effect of rate uncertainty differs systematically between the tax and inflation settings.

5.3 Communication Strategies to Mitigate Money and Tax Illusion

Finally, we analyze whether different communication strategies mitigate tax and money illusion under uncertain rates, as shown in Table 5. In this analysis, the benchmark is the real/after-tax decision. We therefore examine whether additional tables, graphical visualizations, attention nudges, or access to real/after-tax payoff representations reduce overinvestment relative to this benchmark. The communication strategies differ in how they intervene in the decision process. Tables provide detailed historical rate information beyond the baseline summary statistics. Graphical visualizations make the historical rate path visually salient. The attention nudge directs participants' attention to future tax or inflation rates before the investment decision by eliciting their expectations about these rates. Switches, by contrast, alter the representation of decision consequences by allowing participants to inspect the real or after-tax implications of their investment choices. The switch treatments further vary whether participants actively choose to access this information and whether they receive it before or after forming an initial nominal or pre-tax judgment. We first focus on the stable market scenario reported in Models 1 and 4. The results show

[12] We conduct two additional robustness checks. First, we re-estimate the specification using all treatments. This also includes Treatments 5–8, which differ fundamentally in their exposure to nominal versus real representations; these systematic differences are absorbed by treatment fixed effects. The results remain qualitatively unchanged (see Table S6 in Supplementary Appendix S1). Second, we additionally control for participants' stated most likely beliefs. Since these beliefs were elicited only in the nudge treatments, this robustness check is restricted to this subset of treatments. The main effect remains robust (see Table S7 in Supplementary Appendix S1.

TABLE 5
Results: Communication Strategies

	Tax			Inflation		
	Stable (1)	Rising (2)	Falling (3)	Stable (4)	Rising (5)	Falling (6)
Uncertain Rate (vs. Real/After-tax View)	631.2**	15.18	874.1***	1,325***	1,176***	1,547***
	(253.0)	(312.7)	(255.9)	(245.9)	(289.6)	(247.9)
Instruments						
Uncertain Rate x Table	9.821	-397.3*	225.9	98.21	-271.4**	-50.89
	(167.7)	(227.0)	(158.1)	(111.1)	(112.5)	(126.2)
Uncertain Rate x Nudge	519.2	518.5	382.9	31.07	-252.5	-107.1
	(406.4)	(447.8)	(397.6)	(367.8)	(406.3)	(370.4)
Uncertain Rate x Visualization	-5.562	48.12	371.8	-367.2	-530.0	-301.4
	(400.4)	(434.4)	(404.8)	(365.9)	(408.3)	(359.3)
Uncertain Rate x Voluntarily Switch	-586.2	-364.8	-753.3*	-669.8*	-449.1	-542.0
	(415.4)	(430.1)	(403.8)	(368.6)	(405.0)	(368.0)
Uncertain Rate x Late Switch (forced)	-339.4	-551.2	-414.4	-196.8	-182.6	-334.6
	(420.7)	(437.1)	(431.5)	(394.7)	(413.8)	(399.9)
Uncertain Rate x Early Switch (forced)	-1,159***	-1,299***	-876.0**	-782.8**	-879.4**	-1,031***
	(424.9)	(433.8)	(412.3)	(393.8)	(402.2)	(395.9)
Constant	5,063***	5,063***	5,063***	5,063***	5,063***	5,063***
	(61.39)	(66.28)	(63.64)	(59.61)	(64.58)	(58.93)
Observations	2,646	2,646	2,646	2,646	2,646	2,646
Number of Participants	882	882	882	882	882	882
Interactions	YES	YES	YES	YES	YES	YES
Model	FE	FE	FE	FE	FE	FE
Within R^2	0.050	0.018	0.094	0.130	0.069	0.152
F-test	4.319***	1.754**	8.241***	11.77***	5.672***	14.56***
Illusion Effect with ...						
Table	641.1**	-382.1	1,100***	1,423***	904.5***	1,496***
	(268.7)	(314.5)	(269.5)	(242.2)	(301.0)	(245.4)
Visualization	625.7**	63.30	1,246***	957.8***	645.9**	1,246***
	(310.4)	(301.5)	(313.7)	(270.9)	(287.9)	(260.1)
Nudge	1,150***	533.6*	1,257***	1,356***	923.4***	1,440***
	(318.1)	(320.6)	(304.3)	(273.5)	(285.0)	(275.2)
Voluntarily Switch	45.00	-349.7	120.8	655.2	726.8	1,005**
	(486.4)	(531.8)	(478.1)	(443.1)	(497.9)	(443.7)
Late Switch (forced)	291.9	-536.1	459.7	1,128**	993.3**	1,213**
	(490.9)	(537.4)	(501.7)	(465.1)	(505.1)	(470.5)
Early Switch (forced)	-527.8	-1,284**	-1.868	542.2	296.5	516.6
	(494.5)	(534.8)	(485.2)	(464.3)	(495.6)	(467.1)

This table presents fixed-effects regression estimates with *Investment* as the dependent variable. *Investment* is the amount allocated to the risky investment in a given decision (in MU, ranging from 0 to 10,000).The regressions include observations from the benchmark decision with the *Real/After-tax View* and from the uncertain-rate decisions across the different market scenarios, with and without an additional table, across all eight treatments. All regressions include interactions with the treatment variables (Table, Visualization, Nudge, and switching regime). Columns 1–3 report the tax treatment and Columns 4–6 the inflation treatment. Within each set of columns, the market scenario varies across stable, rising, and falling market scenarios. *Table* indicates whether historical inflation or tax rates were additionally presented in a detailed table within the six decisions with uncertain rates. *Nudge* indicates whether participants were prompted to state their expectations about inflation or tax rates before each decision with uncertain rates, as opposed to no such prompt (Treatments 5 to 8). *Visualization* indicates whether historical inflation or tax rates were additionally displayed graphically (Treatments 2, 4, and 6). *Switch* indicates whether participants had access to a real payoff view in which payoffs were explicitly adjusted for inflation or taxes during the decisions with uncertain rates. In Treatments 5–8, participants could switch from a nominal to a real view, whereas in Treatments 1–4 no switching option was available. *Voluntary Switch* denotes that participants could optionally switch to the real view. *Late Switch (forced)* denotes that participants made their initial investment decision based on nominal payoffs and were then required to switch to the real view, with the option to revise their decision afterwards. *Early Switch (forced)* denotes that participants were required to switch to the real view before making their initial investment decision, with the option to revise their decision afterwards. *Rising Market Scenario* and *Falling Market Scenario* indicate whether the historical rates presented showed an increasing or decreasing pattern in recent years, respectively, while maintaining the same long-term average, standard deviation, minimum, and maximum values as in the *Stable Market Scenario*.The reported effects at the end of the table capture the overall illusion effect within the respective treatment condition (Table, Visualization, Nudge, and switching regime), defined as the change in investment from the *Real/After-tax View* (Decision 1) to the decisions with uncertain rates. They are computed as linear combinations of the estimated coefficients. Robust standard errors clustered at the participant level are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

that additional tables, graphical visualizations, and attention nudges do not systematically reduce money or tax illusion under uncertain rates. Additional tables leave the illusion effect largely unchanged, graphical visualizations reduce money illusion only partially, and the attention nudge has little effect in either setting. The switch treatments provide more informative evidence. In the tax setting (Column 1), voluntary switching does not significantly reduce tax illusion, suggesting that many participants do not sufficiently incorporate adjusted payoff information even when it is readily available. Late forced switching also fails to produce a substantial correction, indicating that making after-tax consequences salient after an initial pre-tax judgment has been formed is often insufficient to change behavior. By contrast, the early forced switch substantially reduces tax illusion and eliminates the remaining distortion relative to the benchmark. Because participants are exposed to after-tax consequences before forming an initial pre-tax evaluation, this treatment can be interpreted as a benchmark for the maximum effect of presenting information in after-tax terms from the outset. A similar pattern emerges in the inflation setting (Column 4). Voluntary switching and early forced switching reduce money illusion, whereas late switching has no significant impact. The remaining illusion effects are statistically indistinguishable from zero under early switching, although the point estimates remain positive. Taken together, these findings suggest that providing access to real consequences is not sufficient by itself. Rather, the timing of information matters. Once participants have formed an initial judgment based on nominal or pre-tax outcomes, subsequent exposure to adjusted payoff consequences does not systematically eliminate the distortion. Overall, the results suggest that effective debiasing requires more than providing additional historical rate information, making historical rate paths visually salient, or directing attention to future rates. The strongest reductions in money and tax illusion occur when decision makers evaluate investment consequences in real or after-tax terms before nominal or pre-tax representations become the primary frame of reference. This interpretation is consistent with the evidence from voluntary and late switching: limited attention contributes to both distortions, but correcting them after an initial nominal or pre-tax judgment has been formed appears substantially more difficult. Considering rising and falling market scenarios as robustness checks, the main conclusions remain unchanged. In the inflation setting, the illusion effect remains large across both market trends, confirming the persistence of money illusion under different historical rate patterns. In the tax setting, the effects are weaker and less stable across market scenarios, but the overall pattern remains consistent with the stable scenario.

5.4 Heterogeneity Analyses

We next examine whether the documented illusion effects and the effectiveness of communication strategies differ systematically across participant characteristics. These analyses serve two purposes. First, they assess whether tax and money illusion under certain rates are concentrated among specific participant groups. Second, they examine whether communication strategies are more effective for some participants than for others.

Table S8 reports heterogeneity analyses for the certain-rate setting. We interact the *Certain Rate* indicator with a master's degree indicator, financial literacy, cognitive ability, and gender. The results show that participants with a master's degree exhibit a significantly smaller illusion effect. However, the estimated *Certain Rate* effect remains positive and statistically significant also for this group, indicating that a master's degree attenuates, but does not eliminate, over-investment in the presence of certain tax or inflation rates.

In contrast, we find no evidence that financial literacy, cognitive ability, or gender significantly moderate the illusion effect. This null result should be interpreted against the background that financial literacy and cognitive ability are relatively high in our sample and exhibit limited variation.[13] Overall, the heterogeneity analyses indicate that the illusion effect is not driven by a specific subgroup. Although participants with a master's degree exhibit a smaller bias, the *Certain Rate* effect remains positive and statistically significant across the characteristics we examine.

We further examine whether the effectiveness of communication strategies under uncertainty differs across participant characteristics. For each communication strategy, we estimate specifications that interact the uncertain-rate indicator, the strategy indicator, and

[13]Because financial literacy exhibits limited variation, we additionally estimate specifications using setting-specific literacy measures, interacting the *Certain Rate* indicator with *Tax Literacy* and *Inflation Literacy* (Table S9). These analyses also provide no evidence that setting-specific literacy significantly moderates the illusion effect.

participant characteristics, including gender, a master's degree, financial literacy, and calculation skill (Tables S10, S11, and S12). For graphical visualizations, we additionally test whether participants with a stronger visual learning style respond differently.[14] Overall, we find no systematic evidence that the effectiveness of communication strategies depends on participant characteristics. The only significant moderation is that participants with higher financial literacy invest less when exposed to the forced early switch. As this is an isolated effect among the characteristics and strategies we examine, we interpret it cautiously.

6 Conclusion

This paper provides the first direct experimental comparison of money and tax illusion in long-term investment decisions. By studying inflation and taxation within a unified framework that makes their effects on future consumption directly comparable, we show that individuals process the two settings differently. While both inflation and taxation distort investment decisions, money illusion is substantially larger than tax illusion under both certain and uncertain rates. Thus, even when the economic consequences of inflation and taxation are closely aligned, individuals do not respond to them in the same way.

Our results also provide evidence on the behavioral mechanisms underlying these distortions. Rational inattention and anchoring appear to contribute to both money and tax illusion, but with different relative importance. Making real or after-tax consequences accessible before or during the investment decision reduces over-investment, suggesting that participants are not always attentive to these consequences when they are embedded in nominal or pre-tax payoff representations. At the same time, the timing of payoff representation matters. Corrective information is more effective when it is presented before participants form an initial nominal or pre-tax judgment. This pattern is consistent with anchoring in

[14]We construct the visual learning style measure from five visual–verbal items of the Index of Learning Styles (Felder et al., 1988). We reverse-code the items and average them so that higher values indicate a stronger visual learning style. *High Visual Learner* is an indicator equal to one for values above 4.

both settings, with nominal anchoring appearing more persistent in the inflation setting. Thus, money illusion is not only larger than tax illusion, but also harder to undo.

When uncertainty about future inflation and tax rates is introduced, the distortions become even more pronounced. Standard communication strategies—including additional tables, graphical visualizations, and attention nudges—do not meaningfully reduce money or tax illusion when future inflation and tax rates are uncertain. By contrast, interventions that change how decision consequences are represented are substantially more effective. Voluntary access to real or after-tax consequences produces only limited improvements, suggesting that many participants do not actively seek out the relevant information. Likewise, requiring participants to inspect adjusted payoff consequences after an initial nominal or pre-tax evaluation does not systematically eliminate the distortions. The largest reductions occur when participants evaluate investment consequences in real or after-tax terms before nominal or pre-tax representations become the primary frame of reference. Taken together, these findings suggest that effective communication requires more than providing accurate, detailed, or salient information. It must shape how decision-relevant consequences are represented at the point where investment decisions are formed.

Additional analyses further suggest that the observed distortions are not confined to a narrow group of less sophisticated decision makers. We find little evidence that the main illusion effects or the effectiveness of communication strategies differ systematically with financial literacy, setting-specific knowledge, or most demographic characteristics. The distortions therefore appear to reflect broad features of how individuals process inflation and taxation rather than shortcomings of a particular subgroup.

While our results provide robust insights, several limitations should be acknowledged. Our tax setting captures deferred taxation of future retirement payoffs rather than periodic taxation of investment returns during the accumulation phase. This distinction matters because periodically taxed investment products may be cognitively closer to inflation: both taxes and inflation would then affect future consumption opportunities through repeated or cumulative adjustments over time. Our findings should therefore be interpreted as applying to a retirement-saving environment with deferred taxation. Future research could examine whether the difference between money and tax illusion changes when taxes are represented as recurring annual charges rather than as a future proportional reduction. The experimental setting also abstracts from real-world complexities such as market volatility, social interactions, institutional trust, and repeated feedback, all of which may influence long-term investment decisions outside the laboratory. Moreover, our sample consists of participants with recent tax-filing experience and stock-market participation. The observed effects may therefore represent a lower bound for the broader population. Finally, although the investment task was framed as long-term, participants received immediate experimental payoffs and did not learn from repeated real-world investment outcomes. At the same time, money or tax illusion might be even more pronounced in a real long-term setting compared to our hypothetical one. Future research could investigate whether similar patterns arise in more complex financial environments and how subjective beliefs about future inflation and taxation interact with the mechanisms documented here.

Our findings have important implications for policy and financial communication. They speak directly to current policy initiatives on pension tracking systems, pension dashboards, and retirement projections. For example, the European Commission recommends that Member States develop pension tracking systems that provide citizens with an overview of future retirement income and explicitly recognizes that cognitive and behavioural biases may hamper retirement planning (European Commission, 2025). Our results suggest that this policy objective requires more than improving financial literacy or making information available, more detailed, or visually salient. Even among participants with relatively high financial literacy and relevant tax-filing and stock-market experience, decision makers fail to fully account for inflation and taxes when evaluating long-term investment outcomes. The German public pension dashboard now includes a tool that accounts for the effect of potential future inflation—albeit only in a low range of potential inflation rates—but does not allow a similar adjustment for future taxation of pension payments.[15]

In conclusion, our results suggest that communication should be tailored to the type of distortion being addressed. For taxation, making after-tax consequences directly accessible at the point of decision substantially reduces misperceptions. For inflation, the challenge is greater because nominal anchors appear more persistent. Pension dashboards, retirement calculators, and investment interfaces should therefore avoid presenting nominal future balances as the primary reference point. Instead, projected outcomes should be displayed in real terms early and prominently, ideally by default. More generally, our findings highlight the importance of cognitively informed communication and interface design in supporting better long-term financial decisions.

[15] See `https://www.rentenuebersicht.de/` (available only in German).

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Appendix

Table A1: Control Variables and Definitions

Variable Name	Definition
Age	Age of the participant.
Belief	Participants' stated most likely future tax or inflation rate, elicited before the respective investment decision under uncertainty in the nudge treatments.
Certain Rate	Dummy variable equal to one for the investment decision with a certain tax or inflation rate (Decision 2).
Cognitive Ability	Number of correctly answered questions (0–3) in the three-item Cognitive Reflection Test from Frederick (2005), used as a proxy for cognitive ability.
Early Switch (forced)	Dummy variable equal to one if participants were required to switch to the real or after-tax view before making their investment decision.
Falling Market Scenario	Within-participant dummy variable equal to one if the historical tax or inflation rates were presented with a decreasing pattern in recent years, while maintaining the same long-term average, standard deviation, minimum, and maximum values as in the stable market scenario.
Financial Literacy	Number of correctly answered questions (0–3) on three financial literacy items from Lusardi and Mitchell (2008, 2011a).
High Income	Dummy variable equal to one if the participant's personal monthly net income after deduction of taxes and social security exceeds $4,500 (median split).

Continued on next page

Variable Name	Definition
High Tax Aversion	Dummy variable equal to one if the participant expresses above-average concern about high taxes relative to their own baseline level of concern about economic issues. It is based on a within-participant standardized z-score for the item *High taxes* from the self-reported worry scale and equals one if this z-score exceeds one.
High Inflation Aversion	Dummy variable equal to one if the participant expresses above-average concern about inflation relative to their own baseline level of concern about economic issues. It is based on a within-participant standardized z-score for the item *Inflation* from the self-reported worry scale and equals one if this z-score exceeds one.
Late Switch (forced)	Dummy variable equal to one if participants first made their investment decision based on nominal or pre-tax payoffs and were then required to switch to the real or after-tax view, with the option to revise their decision.
Low Calculation Skill	Dummy variable equal to one if the participant's reported initial investment in a compound-interest scenario, elicited in the pre-experimental survey before any investment decision or treatment, deviates by more than $\pm 5\%$ from the correct value. In the scenario, participants are asked how much they would need to invest today to reach a pre-tax savings goal of \$100,000 in 20 years at a constant annual interest rate of 2% with annual compounding (see Appendix Supplementary Appendix S4 for the exact wording).
Male	Dummy variable equal to one if the participant is male.
Master's Degree	Dummy variable equal to one if the participant has at least a Master's degree.

Continued on next page

Variable Name	Definition
Real/After-tax View	Dummy variable equal to one for the baseline investment decision in which nominal monetary units directly correspond to consumption units and no inflation or tax adjustment applies (Decision 1).
Risk Taking	Self-reported willingness to take risks on an 11-point scale from 1 (not at all willing) to 11 (very willing) (Dohmen et al., 2011).
Rising Market Scenario	Within-participant dummy variable equal to one if the historical tax or inflation rates were presented with an increasing pattern in recent years, while maintaining the same long-term average, standard deviation, minimum, and maximum values as in the stable market scenario.
Stable Market Scenario	Within-participant dummy variable equal to one if the historical tax or inflation rates were presented without a systematic increasing or decreasing pattern in recent years.
Table	Within-participant dummy variable equal to one for uncertain-rate decisions in which the historical tax or inflation rates were additionally presented in a detailed table, and zero for otherwise identical uncertain-rate decisions without such a table.
Tax Setting	Dummy variable indicating the experimental context. Equals 1 for the tax treatment and 0 for the inflation treatment. The assignment of tax and inflation settings across Parts I and II was randomized at the participant level.
Uncertain Rate	Dummy variable equal to one for investment decisions with uncertain tax or inflation rates (Decisions 3 to 8).
Visualization	Dummy variable equal to one if participants received a graphical visualization of the historical tax or inflation rates.

Continued on next page

Variable Name	Definition
Voluntary Switch	Dummy variable equal to one if participants could voluntarily switch from the nominal or pre-tax view to the real or after-tax view.

Supplementary Appendix to:

How Does Money and Tax Illusion Impact Long-Term Investments: An Experiment

This supporting information contains additional tables (Supplementary Appendix S1), the experimental instructions (Supplementary Appendix S2), screenshots of oTree (Supplementary Appendix S3), the questionnaire (Supplementary Appendix S4), and additional model analyses (Supplementary Appendix S5). We show information that is identical across treatments and experiments, and show specific treatment manipulations in square brackets and indicate when information differs across the three experiments. The experiment was pre-registered; the pre-registrations are available at osf.io/j8ghr and osf.io/anvjr, and the ethics approval certificate of the German Association for Experimental Economic Research (GfeW) at gfew.de/ethik/qW3dS1KL. The raw data were uploaded to OSF after data collection and are available from the authors upon reasonable request.

Supplementary Appendix S1 Additional Information and Tables

TABLE S1

Rational Benchmark: Optimal Investment under Certain versus Uncertain Rates

γ	Certain (tax = infl)	Tax Uncertain	Tax Δ	Inflation Uncertain	Inflation Δ	$\Delta\Delta$
0.5	7,710	6,810	−900	7,790	+80	+980
1 (log)	3,540	3,050	−490	3,550	+10	+500
2	1,600	1,370	−230	1,580	−20	+210
5	590	510	−80	580	−10	+70
10	290	250	−40	280	−10	+30

This table reports the rational benchmark investment, expressed in currency units (CU; endowment = 10,000), obtained by numerically maximizing expected utility over the joint distribution of the risky asset return (ten equiprobable states) and the rate. The decision maker is fully rational, i.e. free of illusion and calculation bias ($\eta = 0$, $\beta = 0$), with CRRA utility ($a = 0$); γ denotes relative risk aversion. The column *Certain* gives the optimum under the certain rate (the displayed mean of 2.34% for inflation and 37% for tax); the two values coincide because tax and inflation are payoff-equivalent under a *certain* rate. The *Uncertain* columns give the optimum when the rate is drawn from the actual historical distribution shown to participants (30 annual values; mean 2.34%, SD 1.6% for inflation; mean 37%, SD 18.5% for tax). Δ is the rational change relative to the certain decision, and $\Delta\Delta$ is the inflation–tax difference of these changes. Payoff equivalence is a certain-rate property: under uncertainty the linear after-tax factor $(1-\tau)$ preserves the mean, whereas the convex real factor $1/(1+\pi)^{20}$ raises it (Jensen), so the rational response differs across settings. The benchmark predicts $\Delta\Delta > 0$ (inflation reacting more positively than tax), the opposite sign of the observed pattern. Robust standard errors clustered at the participant level are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

TABLE S2
Order Effects: Certain Rates in Part 1 versus Part 2

	Tax (1)	Inflation (2)
Certain Rate (Part 1)	331.6	967.0***
	(204.0)	(181.8)
Certain Rate (Part 2)	500.4**	1,125***
	(218.7)	(196.8)
Constant	5,200***	5,200***
	(74.90)	(66.88)
Observations	878	878
Number of Participants	439	439
Model	FE	FE
Within R^2	0.018	0.123
F-test	3.938**	30.49***
Certain Rate Part 1 = Part 2 (p-value)	0.573	0.555

This table presents fixed-effects regression estimates with *Investment* as the dependent variable. *Investment* is the amount allocated to the risky investment in a given decision (in MU, ranging from 0 to 10,000). The regressions include observations from the baseline decision without taxes or inflation and the decision with certain tax or inflation rates in Treatments 1–4. *Certain Rate (Part 1)* and *Certain Rate (Part 2)* are indicator variables equal to one if the certain-rate decision was made in the first or second part of the study, respectively; the omitted baseline category is the initial decision without taxes or inflation. The reported p-value tests the null hypothesis that the certain-rate effect is equal across parts (*Part 1 = Part 2*). Robust standard errors clustered at the participant level are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

TABLE S3
Selection into Switch Use

	Switch Use (1)
Male	0.165
	(0.374)
Master's Degree	-0.397
	(0.399)
Financial Literacy	-0.390
	(0.560)
Cognitive Ability	0.286
	(0.197)
Low Calculation Skill	0.958**
	(0.434)
Constant	0.398
	(1.529)
Observations	3,066
Number of Participants	219
Wald χ^2	6.308

This table presents random-effects logit estimates with an indicator equal to one if a participant used the voluntary switch in a given round as the dependent variable. The estimation uses the voluntary-switch treatments (Treatments 5–6) and all rounds in which the switch was available; coefficients are reported as log-odds. *Financial Literacy* and *Cognitive Ability* enter as continuous scores, and *Low Calculation Skill* is an indicator for participants who did not correctly solve the exponential-growth task. Robust standard errors clustered at the participant level are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

TABLE S4
Results: Certain Rates by Setting (Switch)

	All	Switch used
	(1)	(2)
Certain Rate (vs. Real/After-tax View)	1,047***	1,047***
	(178.5)	(178.5)
Certain Rate x Voluntarily Switch	-480.2*	-716.4**
	(263.4)	(282.2)
Certain Rate x Late Switch (forced)	-259.7	-259.7
	(397.3)	(397.4)
Certain Rate x Early Switch (forced)	-697.7**	-697.7**
	(349.8)	(349.9)
Tax Setting (vs. Inflation Setting)	5.333	5.333
	(249.5)	(249.6)
Voluntarily Switch x Tax Setting	-338.9	-413.1
	(361.4)	(434.3)
Late Switch (forced) x Tax Setting	35.32	35.32
	(503.0)	(503.1)
Early Switch (forced) x Tax Setting	27.23	27.23
	(490.4)	(490.5)
Certain Rate x Tax Setting	-632.0**	-632.0**
	(273.2)	(273.3)
Certain Rate x Voluntarily Switch x Tax Setting	240.9	378.8
	(386.7)	(422.6)
Certain Rate x Late Switch (forced) x Tax Setting	252.4	252.4
	(529.1)	(529.3)
Certain Rate x Early Switch (forced) x Tax Setting	264.1	264.1
	(526.4)	(526.6)
Constant	5,099***	5,084***
	(98.34)	(104.0)
Observations	2,646	2,439
Number of Participants	882	840
Model	FE	FE
Within R^2	0.053	0.048
F-test	9.024***	7.204***

This table presents fixed-effects regression estimates with *Investment* as the dependent variable. The regressions pool both settings and include observations from the first (*Real/After-tax View*) and second (*Certain Rate*) investment decisions of all eight treatments. *Investment* is the amount allocated to the risky investment in a given decision (in MU, ranging from 0 to 10,000). *Switch* indicates whether participants had access to a real payoff view in which payoffs were explicitly adjusted for inflation or taxes during the decisions with uncertain rates. In Treatments 5–8, participants could switch from a nominal to a real view, whereas in Treatments 1–4 no switching option was available. *Voluntary Switch* denotes that participants could optionally switch to the real view. *Late Switch (forced)* denotes that participants made their initial investment decision based on nominal payoffs and were then required to switch to the real view, with the option to revise their decision afterwards. *Early Switch (forced)* denotes that participants were required to switch to the real view before making their initial investment decision, with the option to revise their decision afterwards. The three-way interactions with *Tax Setting* test whether the marginal impact of *Certain Rate* within each switching regime differs between the tax and the inflation setting (inflation is the reference setting). Robust standard errors clustered at the participant level are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

TABLE S5
Results: Uncertain Rates (only Treatment 1)

	Tax (1)	Inflation (2)	All (3)
Uncertain Rate (vs. Certain Rate)	345.5	189.3	189.3
	(228.3)	(179.0)	(179.2)
Tax Setting (vs. Inflation Setting)			-850.0***
			(308.2)
Uncertain Rate x Tax Setting			156.2
			(299.6)
Constant	5,905***	6,755***	6,755***
	(114.2)	(89.48)	(153.7)
Observations	224	224	448
Number of Participants	112	112	112
Model	FE	FE	FE
Within R^2	0.020	0.010	0.056
F-test	2.290	1.119	4.021***

This table presents fixed-effects regression estimates with *Investment* as the dependent variable. *Investment* is the amount allocated to the risky investment in a given decision (in MU, ranging from 0 to 10,000). The regressions include observations from the second investment decision (*Certain Rate*) and the investment decision with an uncertain tax or inflation rate in the stable market scenario and without an additional table (*Uncertain Rate*) in Treatment 1. Robust standard errors clustered at the participant level are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

TABLE S6
Results: Uncertain Rates (all Treatments)

	Tax (1)	Inflation (2)	All (3)
Uncertain Rate (vs. Certain Rate)	435.3***	265.3***	352.9***
	(69.28)	(72.50)	(84.58)
Tax Setting (vs. Inflation Setting)			996.2**
			(413.4)
Uncertain Rate x Tax Setting			67.58
			(117.5)
Constant	5,325***	5,903***	5,767***
	(34.64)	(36.25)	(62.82)
Observations	1,764	1,764	2,644
Number of Participants	882	882	661
Model	FE	FE	FE
Within R^2	0.043	0.015	0.044
F-test	39.47***	13.39***	22.66***

This table presents fixed-effects regression estimates with *Investment* as the dependent variable. *Investment* is the amount allocated to the risky investment in a given decision (in MU, ranging from 0 to 10,000). The regressions include observations from the second investment decision (*Certain Rate*) and the investment decision with an uncertain tax or inflation rate in the stable market scenario and without an additional table (*Uncertain Rate*) in all treatments. Robust standard errors clustered at the participant level are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

TABLE S7
Results: Uncertain Rates (with Beliefs)

	Tax (1)	Inflation (2)	All (3)
Uncertain Rate (vs. Certain Rate)	495.5***	482.7***	482.4***
	(131.4)	(140.0)	(135.7)
Tax Setting (vs. Inflation Setting)			1,460**
			(577.1)
Uncertain Rate x Tax Setting			-12.57
			(196.9)
Belief	-38.35*	-56.09	-55.02***
	(21.41)	(85.56)	(15.81)
Constant	6,848***	6,007***	6,004***
	(792.5)	(203.5)	(110.6)
Observations	436	436	872
Number of Participants	218	218	218
Model	FE	FE	FE
Within R^2	0.094	0.053	0.055
F-test	10.69***	5.978***	13.45***

This table presents fixed-effects regression estimates with *Investment* as the dependent variable. *Investment* is the amount allocated to the risky investment in a given decision (in MU, ranging from 0 to 10,000). The regressions include observations from the second investment decision (*Certain Rate*) and the investment decision with an uncertain tax or inflation rate in the stable market scenario and without an additional table (*Uncertain Rate*) in Treatments 3–4. *Belief* denotes participants' stated most likely annual tax or inflation rate for the next 20 years, elicited before the respective investment decision under uncertainty. Robust standard errors clustered at the participant level are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

TABLE S8
Heterogeneity in Tax and Money Illusion under Certain Rates

	High Education (1)	Financial Literacy (2)	Cognitive Ability (3)	Male (4)
Certain Rate	882.0***	740.3***	731.3***	572.0***
	(150.7)	(125.5)	(125.9)	(163.9)
Certain Rate x Master's Degree	-509.7*			
	(264.8)			
Certain Rate x Financial Literacy (mean-centered)		306.9		
		(216.7)		
Certain Rate x Cognitive Ability (mean-centered)			4.088	
			(105.2)	
Certain Rate x Male				303.6
				(247.2)
Constant	5,200***	5,200***	5,200***	5,200***
	(82.77)	(82.98)	(83.10)	(82.96)
Observations	1,317	1,317	1,317	1,317
Number of Participants	439	439	439	439
Model	FE	FE	FE	FE
Within R^2	0.043	0.040	0.039	0.041
F-test	18.58***	17.44***	17.72***	17.29***
Effect of Certain Rate by ...				
Characteristic	372.3*	1,047***	735.4***	875.7***
	(217.7)	(270.0)	(181.2)	(185.0)

This table presents fixed-effects regression estimates with *Investment* as the dependent variable. *Investment* is the amount allocated to the risky investment in a given decision (in MU, ranging from 0 to 10,000). The regressions include observations from the baseline decision without taxes or inflation and the decision with certain tax or inflation rates in Treatments 1–4. The models interact the *Certain Rate* indicator with participant characteristics to test whether tax and money illusion differ across participant groups. *Master Degree* and *Male* are indicator variables. *Financial Literacy* and *Cognitive Ability* are mean-centered before entering the interaction terms. Robust standard errors clustered at the participant level are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

TABLE S9
Heterogeneity by Domain-Specific Literacy under Certain Rates

	Tax (1)	Inflation (2)
Certain Rate	-2.589	692.6*
	(386.6)	(388.3)
Certain Rate x Tax Literacy	169.5	
	(146.9)	
Certain Rate x Inflation Literacy		152.6
		(166.1)
Constant	5,200***	5,200***
	(74.82)	(66.85)
Observations	878	878
Number of Participants	439	439
Model	FE	FE
Within R^2	0.020	0.124
F-test	4.404**	30.52***

This table presents fixed-effects regression estimates with *Investment* as the dependent variable. *Investment* is the amount allocated to the risky investment in a given decision (in MU, ranging from 0 to 10,000). The regressions include observations from the baseline decision without taxes or inflation and the decision with certain tax or inflation rates in Treatments 1–4. The models interact the *Certain Rate* indicator with domain-specific literacy to test whether the illusion effect under certain rates is moderated by participants' knowledge of the respective setting. *Tax Literacy* and *Inflation Literacy* are summative scores of correct answers to domain-specific knowledge questions. Their main effects are absorbed by the participant fixed effects because they are constant within participants. Robust standard errors clustered at the participant level are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

TABLE S10

Heterogeneity in the Effectiveness of Communication Strategies under Uncertain Rates (Part 1: Visualization and Attention Nudge)

Panel A: Graphical Visualization

	Male (1)	Master's Degree (2)	Financial Literacy (3)	Calculation Skill (4)	Visual Learner (5)
Uncertain Rate	608.0*** (139.0)	852.3*** (127.1)	782.3*** (102.8)	598.9*** (164.5)	745.2*** (119.6)
Uncertain Rate x Visualization	115.6 (215.1)	239.6 (212.3)	218.7 (170.1)	477.6 (290.2)	286.0 (197.0)
Uncertain Rate x Visualization x Male	222.5 (336.6)				
Uncertain Rate x Visualization x Master's Degree		-62.11 (347.5)			
Uncertain Rate x Visualization x Financial Literacy			-86.83 (331.5)		
Uncertain Rate x Visualization x Calculation Skill				-406.2 (357.9)	
Uncertain Rate x Visualization x Visual Learner					-242.7 (388.0)
Constant	5,063*** (65.25)	5,063*** (65.42)	5,063*** (65.48)	5,063*** (65.42)	5,063*** (65.48)
Observations	4,410	4,410	4,410	4,410	4,410
Number of Participants	882	882	882	882	882
Model	FE	FE	FE	FE	FE
Within R^2	0.045	0.044	0.043	0.044	0.043
F-test	28.46***	28.23***	28.33***	28.47***	28.22***

Panel B: Attention Nudge

	Male (1)	Master's Degree (2)	Financial Literacy (3)	Calculation Skill (4)
Uncertain Rate	538.0** (210.7)	1,006*** (188.2)	916.9*** (160.9)	931.6*** (253.5)
Uncertain Rate x Nudge	155.0 (244.0)	-87.96 (223.8)	-67.16 (187.0)	-218.2 (300.8)
Uncertain Rate x Nudge x Male	-422.3 (367.9)			
Uncertain Rate x Nudge x Master's Degree		184.0 (403.8)		
Uncertain Rate x Nudge x Financial Literacy			-265.7 (361.1)	
Uncertain Rate x Nudge x Calculation Skill				252.9 (383.6)
Constant	5,063*** (65.28)	5,063*** (65.47)	5,063*** (65.53)	5,063*** (65.51)
Observations	4,410	4,410	4,410	4,410
Number of Participants	882	882	882	882
Model	FE	FE	FE	FE
Within R^2	0.045	0.043	0.043	0.043
F-test	28.72***	28.10***	28.22***	28.23***

This table presents fixed-effects regression estimates with *Investment* as the dependent variable. *Investment* is the amount allocated to the risky investment in a given decision (in MU, ranging from 0 to 10,000). Each column is a separate regression that interacts the *Uncertain Rate* indicator with the respective communication strategy and one participant characteristic; the three-way interaction captures whether the characteristic moderates the strategy's effect. Observations are pooled across the tax and inflation settings and across all eight treatments; uncertain-rate decisions are restricted to the stable (no-trend) market scenario. *Male*, *Master's Degree*, *Calculation Skill* (correct growth-bias response), and *Visual Learner* are indicator variables; *Financial Literacy* is mean-centered. Robust standard errors clustered at the participant level are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

TABLE S11

Heterogeneity in the Effectiveness of Communication Strategies under Uncertain Rates (Part 2: Table)

	Male (1)	Master's Degree (2)	Financial Literacy (3)	Calculation Skill (4)
Uncertain Rate	701.2***	984.4***	901.2***	788.5***
	(110.0)	(105.0)	(84.69)	(141.9)
Table	-96.42	-86.16*	-73.89*	-30.82
	(59.15)	(46.74)	(39.46)	(58.27)
Table x Male	41.88			
	(79.48)			
Table x Master's Degree		38.58		
		(87.63)		
Table x Financial Literacy			175.2	
			(112.0)	
Table x Calculation Skill				-68.21
				(78.39)
Constant	5,063***	5,063***	5,063***	5,063***
	(65.33)	(65.48)	(65.54)	(65.53)
Observations	4,410	4,410	4,410	4,410
Number of Participants	882	882	882	882
Model	FE	FE	FE	FE
Within R^2	0.045	0.043	0.043	0.043
F-test	28.87***	28.63***	28.99***	28.98***

This table presents fixed-effects regression estimates with *Investment* as the dependent variable. *Investment* is the amount allocated to the risky investment in a given decision (in MU, ranging from 0 to 10,000). Each column is a separate regression that interacts the *Uncertain Rate* indicator with the *Table* treatment and one participant characteristic; the interaction with the characteristic captures whether it moderates the strategy's effect. Observations are pooled across the tax and inflation settings and across all eight treatments; uncertain-rate decisions are restricted to the stable (no-trend) market scenario. Because the table is shown only under uncertainty, its effect is identified directly (*Table*) rather than through an interaction with *Uncertain Rate*. *Male*, *Master's Degree*, and *Calculation Skill* (correct growth-bias response) are indicator variables; *Financial Literacy* is mean-centered. Robust standard errors clustered at the participant level are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

TABLE S12

Heterogeneity in the Effectiveness of Communication Strategies under Uncertain Rates (Part 3: Switch)

	Male	Master's Degree	Financial Literacy	Calculation Skill
	(1)	(2)	(3)	(4)
Uncertain Rate	844.9***	1,170***	1,069***	1,040***
	(163.0)	(148.9)	(122.6)	(196.4)
Uncertain Rate x Voluntary Switch	-225.9	-369.2	-282.2	-626.5*
	(227.6)	(236.3)	(186.3)	(331.0)
Uncertain Rate x Late Forced Switch	-202.1	-169.2	-178.0	-450.1
	(315.4)	(318.4)	(259.2)	(379.2)
Uncertain Rate x Early Forced Switch	-812.5**	-901.2***	-855.2***	-429.5
	(364.5)	(328.3)	(261.1)	(484.7)
Uncertain Rate x Voluntary Switch x Male	-85.24			
	(369.6)			
Uncertain Rate x Late Forced Switch x Male	57.53			
	(497.2)			
Uncertain Rate x Early Forced Switch x Male	-51.98			
	(524.2)			
Uncertain Rate x Voluntary Switch x Master's Degree		321.5		
		(374.8)		
Uncertain Rate x Late Forced Switch x Master's Degree		102.0		
		(546.8)		
Uncertain Rate x Early Forced Switch x Master's Degree		186.8		
		(540.7)		
Uncertain Rate x Voluntary Switch x Financial Literacy			-282.8	
			(394.0)	
Uncertain Rate x Late Forced Switch x Financial Literacy			443.5	
			(554.1)	
Uncertain Rate x Early Forced Switch x Financial Literacy			-1,304*	
			(676.6)	
Uncertain Rate x Voluntary Switch x Calculation Skill				550.2
				(398.8)
Uncertain Rate x Late Forced Switch x Calculation Skill				537.0
				(517.1)
Uncertain Rate x Early Forced Switch x Calculation Skill				-595.9
				(577.0)
Constant	5,063***	5,063***	5,063***	5,063***
	(64.94)	(65.06)	(64.94)	(64.94)
Observations	4,410	4,410	4,410	4,410
Number of Participants	882	882	882	882
Model	FE	FE	FE	FE
Within R^2	0.049	0.048	0.049	0.049
F-test	15.84***	15.81***	16.19***	17.03***

This table presents fixed-effects regression estimates with *Investment* as the dependent variable. *Investment* is the amount allocated to the risky investment in a given decision (in MU, ranging from 0 to 10,000). Each column is a separate regression that interacts the *Uncertain Rate* indicator with the switching regime and one participant characteristic; the three-way interaction captures whether the characteristic moderates the strategy's effect. The switching regime distinguishes the voluntary switch, the late forced switch, and the early forced switch, each relative to no switch. Observations are pooled across the tax and inflation settings and across all eight treatments; uncertain-rate decisions are restricted to the stable (no-trend) market scenario. *Male*, *Master's Degree*, and *Calculation Skill* (correct growth-bias response) are indicator variables; *Financial Literacy* is mean-centered. Robust standard errors clustered at the participant level are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Supplementary Appendix S2 Instructions

S2.1 Welcome Page

Welcome to our Study

Thank you very much for participating in this study. Before the main study will start, we ask you to read the following carefully. **Moreover, we will start with a few questions about yourself before the main study begins.**

1. Your Participation in this Study

Participation in this study is completely voluntary. If you drop out of the study, you will not be penalized, but you will not receive any compensation.

2. Confidentiality

The information you provide will be kept strictly confidential in accordance with legal requirements. Only the project manager and his team will have access to the anonymized raw data. All reports from this study will contain only fully anonymized data, which precludes re-identification of participants.

3. Possible Risks of the Study

In this study, no risks or adverse effects are expected beyond those normally experienced in daily life.

4. Declaration of Consent

If you wish to withdraw from the study, you can close your browser window at any time. If you wish to continue, please confirm the following:

☐ I understand that my participation is totally voluntary. I am free to withdraw at any time without having to give a reason.

☐ I agree that the data gathered in this study may be stored anonymously and securely.

☐ I agree to take part in the study.

S2.2 Instructions 1

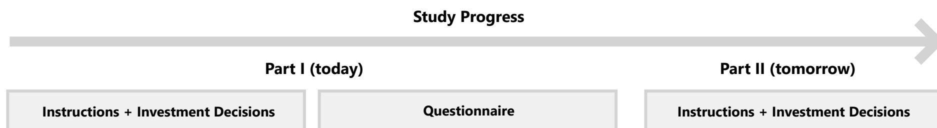
Thank you for answering the previous questions about yourself. Now we start with the main part and explain in detail what this is all about. If you need to review previous instructions, you can do so by clicking on *Previous instructions* in the top right corner of your screen.

1. Multi-part Study - Timeline

This study consists of two parts in total, as shown in the graphic below:

Part I: Today, you will be working on the first part. This part will take about 30 minutes.

Part II: If you successfully complete the first part, you will receive a new invitation on Prolific **tomorrow** to participate in the second part. Part II must be completed within 48 hours of receiving the invitation. The second part will take about 20 minutes to complete.



In each part, you must make several **investment decisions.** At the end of today's part, we also ask you to answer a few questions about yourself.

Please note that you will not receive payment until you have successfully completed both parts of the study.

2. Detailed Process of Part I

The timeline below shows the study process of today's part - the green boxes highlight your progress in the study.

Consider yourself living in a **fictional country**, where in today's part, you have to make eight long-term investment decisions.

3. Your Task

Today, you have monetary units of **10,000 MU.** You need to decide how many monetary units you want to keep for today, and how many monetary units you want to invest into a **long-term investment product** with a maturity of 20 years. In total, you have to make eight investment decisions.

The investment product is **risky**. That is, the **future payoff** that you receive back from your investment in 20 years can be higher than your initial investment amount, but it can also be lower. The amount you keep for today (i.e., the amount that you do not invest) is certain and unaffected by the development of the investment product.

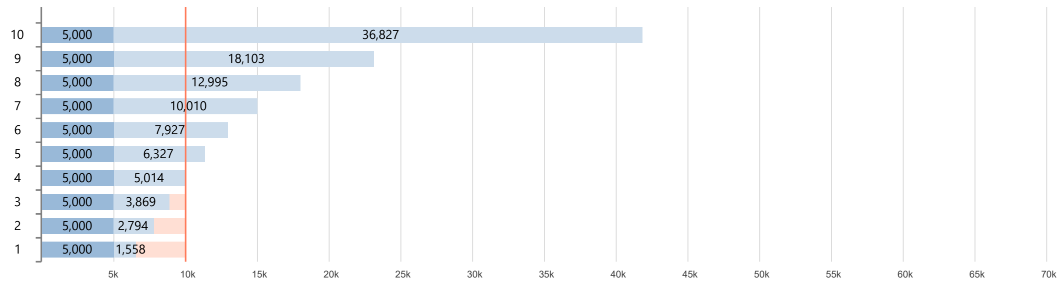
The amount you keep for today and the amount you invest in the long-term investment product always add up to 10,000 MU.

4. Your Decision Interface

Although many different realizations are possible in the real world, we replace the payoff with a simplified payoff diagram that mathematically correctly reflects the profit and loss states of the risky asset in just **ten states**. Each state has the same probability of occurring (i.e., 10%).

The following example illustrates the payoffs of a decision:

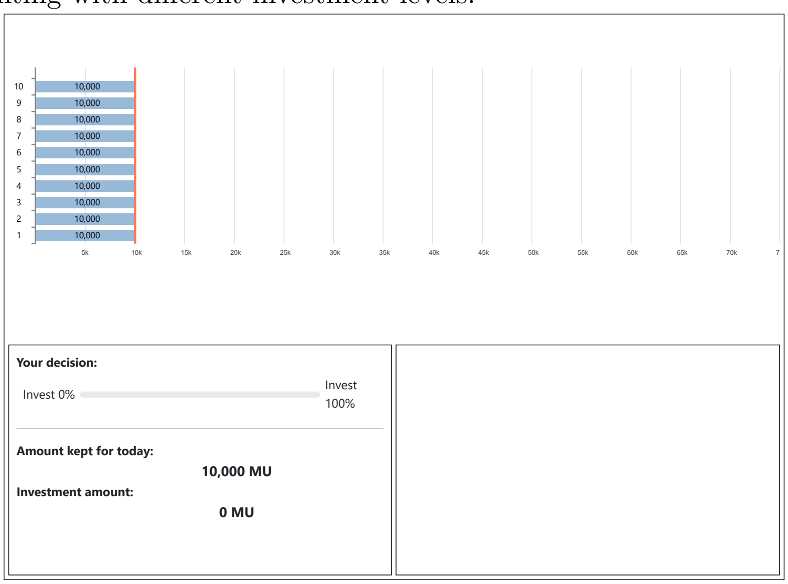
In this example, someone has decided to invest 5,000 MU and keep 5,000 MU for today. The **red line** indicates the initial wealth of 10,000 MU. The **dark blue** bars represent the amount of monetary units (MU) that were kept for today. This amount is unaffected by the outcome of the risky investment product. The remaining 5,000 MU are invested into the investment product. The **light blue bars** represent the 10 possible payoffs at the end of the 20-year investment horizon from the 5,000 MU investment. The **light red bars** show a possible loss of the risky investment.



In this example, the future payoffs from investing 5,000 MU range between 36,827 MU (State 10) and 1,558 MU (State 1). If the investment product yields State 10 at the end of the investment horizon, the profit would be (36,827 - 5,000) = 31,827 MU. If the investment product yields State 1, there would be a loss of (1,558 – 5,000) = -3,442 MU.

Your Decision Interface: Try it!

You can change the amount of monetary units (MU) that you keep for today and that you invest by positioning (clicking on the slider bar) and moving the slider in the lower left box. There is no harm in experimenting with different investment levels.



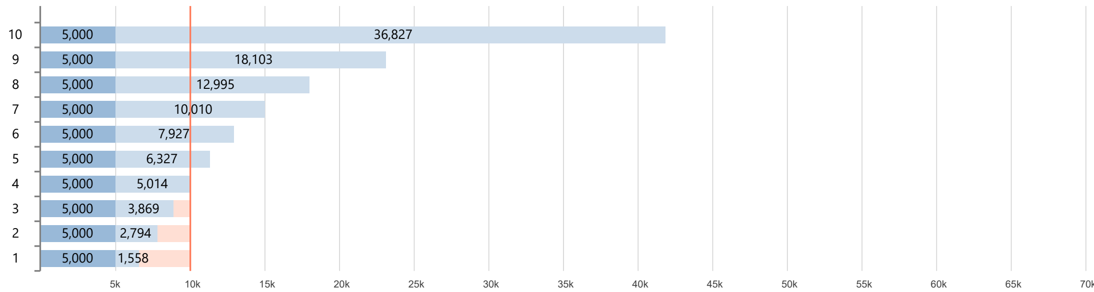
Try It!

Position the slider so that you invest between 6,500 MU and 7,000 MU (i.e., that you keep between 3,000 MU and 3,500 MU for today).

5. How Will You Get Paid?

In addition to the fixed compensation of £3.20, you will receive a **variable bonus**. From your eight investment decisions, only one will be randomly chosen and paid out. The variable bonus will depend on that decision.

The bonus part is determined in three steps:



- **Step 1:** In each investment decision, a random generator is first used to determine which of the 10 states of the risky investment product is relevant for the future payoff.
  For example, if state 7 were drawn (see graphic above), your payoffs would be as follows:

Today	In 20 years
5,000 MU	10,010 MU

- **Step 2:** For your bonus, at the end of the experiment, the monetary units (MU) will be converted to **CU (= consumption units)**. How many consumption units (CU) you receive for your monetary units (MU) may vary depending on your investment decisions. In the first investment decision, 1 consumption unit (CU) costs 1 monetary unit (MU).
  In this case you would receive the following consumption units:

Today	In 20 years
5,000 MU	10,010 MU

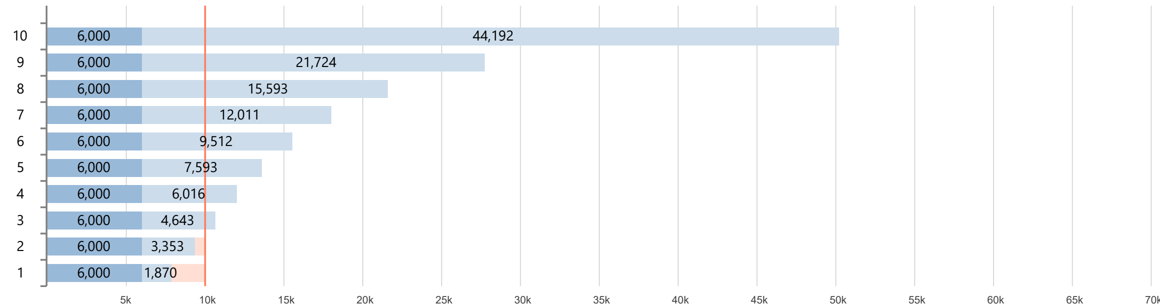
- **Step 3:** The consumption units (CU) are converted into Pounds. 1,000 CU is equivalent to £0.23.
  This would correspond to a bonus of:

(5,000 CU + 10,010 CU) / 1,000 CU * £0.23 = £3.45

Comprehension Questions

Before you start with your first investment decision, we would like to ask you to answer the following comprehension questions. If you have any questions, you can always look at the instructions again by clicking the *Previous instructions* button.

If you pass this comprehension check, you will proceed to the next page.



Question 1: In this example, you keep ____________ monetary units (MU) for today and you invest ____________ MU into the investment product.

Question 2: In this example, the highest possible payoff from your investment is ____________ MU. The lowest possible payoff from your investment is ____________ MU.

Question 3: The most probable payoff from the investment product amounts to:

- ☐ 44,192 MU
- ☐ 9,512 MU
- ☐ 1,870 MU
- ☐ All payoffs have the same probability of occurrence.

S2.3 Instructions 2 - Additional Aspects (Tax Setting)

Taxation

One factor that has to be considered when dealing with long-term investments is the **taxation of future payoffs** from the investment. Due to the taxation of future investment payoffs, your **consumption opportunities decrease** in the future.

Let's go back to the example from the first instructions and assume that the following payoff is relevant:

Today	In 20 years
5,000 MU	10,010 MU

In this experiment, **consumption opportunities are measured in consumption units (CU)**. Without taxation, 1 consumption unit (CU) is equal 1 monetary unit (MU). Because of future taxes on investment payoffs, the amount of consumption units (CU) will be less than the payoff from investment in the future (light blue bar).

The following examples show how future taxes on investment payoffs affect the consumption units (CU) in this experiment:

- Future tax rate of 0.0 %:

Today	In 20 years
5,000 MU	10,010 MU

- Future tax rate of 25.0 %:

Today	In 20 years
5,000 CU	7,507 CU

  The future consumption units are calculated as follows:

$$10{,}010 \text{ CU - } 25.0 \text{ \% * } 10{,}010 \text{ CU} = 7{,}507 \text{ CU}$$

- Future tax rate of 45.0 %:

Today	In 20 years
5,000 CU	5,505 CU

  The future consumption units are calculated as follows:

$$10{,}010 \text{ CU - } 45.0 \text{ \% * } 10{,}010 \text{ CU} = 5{,}505 \text{ CU}$$

As a reminder, your bonus in this experiment is based on the CU you receive. 1,000 CU is equivalent to £0.23.

3. Before-tax vs. after-tax view

To help you make your decision, you have the opportunity to switch between the before and after tax views. The **before-tax view** displays all payoffs in terms of monetary units (MU). The **after-tax view** displays the corresponding consumption units (CU). You can change the view type by clicking on the drop-down list in the box at the bottom right.

Try It!

Please switch to the after-tax view and click Next.

Before you start making your next investment decision, we would like to ask you to answer the following comprehension questions. If you have any questions, you can always look at the instructions again by clicking the *Previous instructions* button.

If you pass this comprehension check, you will proceed to the next page. However, if you answer a question incorrectly twice, you will not be able to continue with the study and you will be returned to Prolific.

Question 1: Assume that you have kept 3,000 monetary units (MU) **for today**. How many consumption units (CU) do you receive for these monetary units (MU)?

☐ Less than 3,000 CU

☐ Exactly 3,000 CU

☐ You cannot say, it depends on the tax rate.

☐ None of the above

Question 2: Which of the following statements regarding the taxation of the future payoffs that you receive back from your investment is correct?

☐ The future payoffs from your investment are tax-free.

☐ The future payoffs from your investment are subject to taxation. The level of taxation depends on the tax rate at the end of the investment horizon.

☐ The future payoffs from your investment are subject to taxation. The level of taxation depends on today's tax rate.

S2.4 Instructions 2 - Additional Aspects (Inflation Setting)

What is Inflation?

One factor that has to be considered when dealing with long investment horizons is **inflation**. The annual (= p.a.) inflation is measured by comparing the change in prices today to prices one year ago. For example, when you go to the supermarket today, you can buy fewer products than last year, even though you pay the same price. Therefore, your **consumption opportunities decrease over time** due to inflation.

Let's go back to the **example** from the first instructions and assume that the following payoff is relevant:

Today	In 20 years
5,000 MU	10,010 MU

In this experiment, **consumption opportunities are measured in consumption units (CU)**. Today, 1 consumption unit (CU) costs 1 monetary unit (MU). Due to inflation, the amount of consumption units (CU) that you can buy with a fixed amount of monetary units (MU) will decrease over time.

The following examples show how average annual inflation rates affect the consumption units (CU) in this experiment:

- Average inflation rate of 0.0% (p.a.):

Today	In 20 years
5,000 MU	10,010 MU

- Average inflation rate of 1.5% (p.a.):

Today	In 20 years
5,000 CU	7,432 CU

The future consumption units are calculated as follows:

$$\frac{10{,}010\ CU}{1.015^{20}} = 7{,}432 \text{ CU}$$

- Average inflation rate of 3.0% (p.a.):

Today	In 20 years
5,000 CU	5,542 CU

The future consumption units are calculated as follows:

$$\frac{10{,}010\ CU}{1.03^{20}} = 5{,}542 \text{ CU}$$

As a reminder, your bonus in this experiment is based on the CU you receive. 1,000 CU is equivalent to £0.23.

Comprehension Questions:

Before you start making your next investment decision, we would like to ask you to answer the following comprehension questions. If you have any questions, you can always look at the instructions again by clicking the *Previous instructions* button.

If you pass this comprehension check, you will proceed to the next page. However, if you answer a question incorrectly twice, you will not be able to continue with the study and you will be returned to Prolific.

Question 1: Assume that you have kept 3,000 monetary units (MU) **for today**. How many consumption units (CU) do you receive for these monetary units (MU)?

- ☐ Less than 3,000 CU
- ☐ Exactly 3,000 CU
- ☐ You cannot say, it depends on the tax rate.
- ☐ None of the above

Question 2: Assume that you have invested 7,000 monetary units (MU) into the investment product. How many consumption units (CU) can you buy at the end of the investment horizon?

- ☐ It depends only on the return of the investment product
- ☐ It depends only on the inflation rate
- ☐ It depends on both the return of the investment product and the inflation rate
- ☐ None of the above

Question 3: Assume that you receive 12,000 monetary units (MU) from your investment at the end of the investment horizon (20 years). In which scenario can you buy the most consumption units (CU) at the end of the investment horizon?

- ☐ The inflation rate is 0 %.
- ☐ The inflation rate is 2 %.
- ☐ The inflation rate is 4 %.product and the inflation rate
- ☐ You cannot say, there is missing information.

S2.5 Instructions 3 (Tax Setting)

1. Historical Tax Rates
Before each of the next 6 investment decisions, we will provide you with information on **historical tax rates over the past 30 years** from one fictional country, which is different for each investment decision. In reality, they may vary from country to country.
2. Uncertain Future Tax Rates
In the last investment decision, the **future tax rate was certain**. In reality, this is not the case. In the following 6 investment decisions, the future tax rate is uncertain. To convert monetary units (MU) to consumption units (CU) for your bonus from the investment, we randomly draw the future tax rate from the fictional historical tax rates.

Before you start making your next investment decision, we would like to ask you to answer the following comprehension question. If you have any questions, you can always look at the instructions again by clicking the *Previous instructions* button.

If you pass this comprehension check, you will proceed to the next page. However, if you answer this question incorrectly twice, you will not be able to continue with the study and you will be returned to Prolific.

Question 1: Which statement about the future tax rate is correct for the following 6 investment decisions?

- ☐ The future tax rate is certain at 37.0%.
- ☐ The future tax rate is uncertain. To convert monetary units (MU) to consumption units (CU) for your bonus from the investment, we randomly draw the future tax rate over the next 20 years from the fictional historical tax rates.
- ☐ The future tax rate is uncertain. To convert monetary units (MU) to consumption units (CU) for your bonus from the investment, we randomly draw the future tax rate over the next 20 years from any list.

S2.6 Instructions 3 (Inflation Setting)

1. Historical Inflation Rates

Before each of the next 6 investment decisions, we will provide you with information on **historical inflation rates over the past 30 years** from one fictional country, which is different for each investment decision. In reality, they may vary from country to country or due to different measurement methods.

2. Uncertain Future Inflation Rates

In the last investment decision, future inflation was certain. In reality, this is not the case. In the following 6 investment decisions, the **future inflation rate is uncertain**. To convert monetary units (MU) to consumption units (CU) for your bonus from the investment, we randomly draw the average future inflation rate over the next 20 years from the fictional historical inflation rates.

Comprehension Question

Before you start making your next investment decision, we would like to ask you to answer the following comprehension question. If you have any questions, you can always look at the instructions again by clicking the *Previous instructions* button.

If you pass this comprehension check, you will proceed to the next page. However, if you answer this question incorrectly twice, you will not be able to continue with the study and you will be returned to Prolific.

Question 1: Which statement about the average future inflation rate is correct for the following 6 investment decisions?

- ☐ The average future inflation rate is certain at 2.34%.
- ☐ The average future inflation rate is uncertain. To convert monetary units (MU) to consumption units (CU) for your bonus from the investment, we randomly draw the average future inflation rate over the next 20 years from the fictional historical inflation rates.
- ☐ The average future inflation rate is uncertain. To convert monetary units (MU) to consumption units (CU) for your bonus from the investment, we randomly draw the average future inflation rate over the next 20 years from any list.

S2.7 Instructions 1 - Part 2 (Inflation Setting)

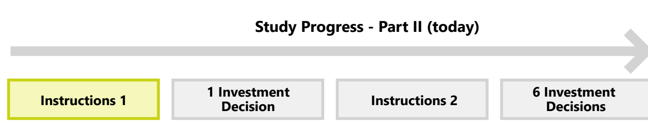
1. Multi-part Study - Timeline

In this second part of the study, the procedure is similar to the first part. One difference is that there are no taxes in this part (i.e., the tax rate is 0%).

In this second part, you will be asked to make a total of seven investment decisions. This part will take approximately 20 minutes to complete.

2. Detailed Process of Part II

The timeline below shows the study process of today's part - the green boxes highlight your progress in the study.



Consider yourself living in a **fictional country**, where in today's part, you have to make seven long-term investment decisions.

3. Your Task

Today, you have monetary units of **10,000 MU** again. As in the first part, you need to decide how many monetary units you want to keep for today, and how many monetary units you want to invest into a **long-term investment product** with a maturity of 20 years. In total, you have to make seven investment decisions.

Remember: **Monetary units (MU)** are later used to purchase **consumption units (CU)**. In the first investment decision, 1 consumption unit (CU) costs 1 monetary unit (MU). 1,000 CU is equivalent to £0.23. Your actual bonus will be converted into pounds at the end of the study.
As in the first part, the investment product is **risky**. That is, the **future payoff** that you receive back from your investment in 20 years can be higher than your initial investment amount, but it can also be lower. The amount you keep for today (i.e., the amount that you do not invest) is certain and unaffected by the development of the investment product.

4. What is Inflation?

See Section S2.4.

S2.8 Instructions 2 - Part 2 (Inflation Setting)

See Section S2.6.

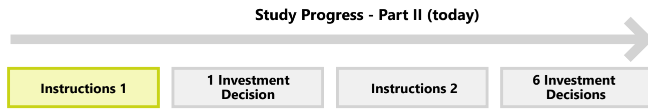
S2.9 Instructions 1 - Part 2 (Tax Setting)

1. Multi-part Study - Timeline

In this second part of the study, the procedure is similar to the first part. One difference is that there is no inflation in this part (i.e., the inflation rate is 0%).
In this second part, you will be asked to make a total of seven investment decisions. This part will take approximately 20 minutes to complete.

2. Detailed Process of Part II

The timeline below shows the study process of today's part - the green boxes highlight your progress in the study.



Consider yourself living in a **fictional country**, where in today's part, you have to make seven long-term investment decisions.

3. Your Task

Today, you have monetary units of **10,000 MU** again. As in the first part, you need to decide how many monetary units you want to keep for today, and how many monetary units you want to invest into a **long-term investment product** with a maturity of 20 years. In total, you have to make seven investment decisions.
Remember: **Monetary units (MU)** are later used to purchase **consumption units (CU)**. In the first investment decision, 1 consumption unit (CU) costs 1 monetary unit (MU). 1,000 CU is equivalent to £0.23. Your actual bonus will be converted into pounds at the end of the study.
As in the first part, the investment product is **risky**. That is, the **future payoff** that you receive back from your investment in 20 years can be higher than your initial investment amount, but it can also be lower. The amount you keep for today (i.e., the amount that you do not invest) is certain and unaffected by the development of the investment product.

4. Taxation

See Section S2.3.

S2.10 Instructions 2 - Part 2 (Tax Setting)

See Section S2.5.

Supplementary Appendix S3 Screenshots of oTree

S3.1 Investment Decisions

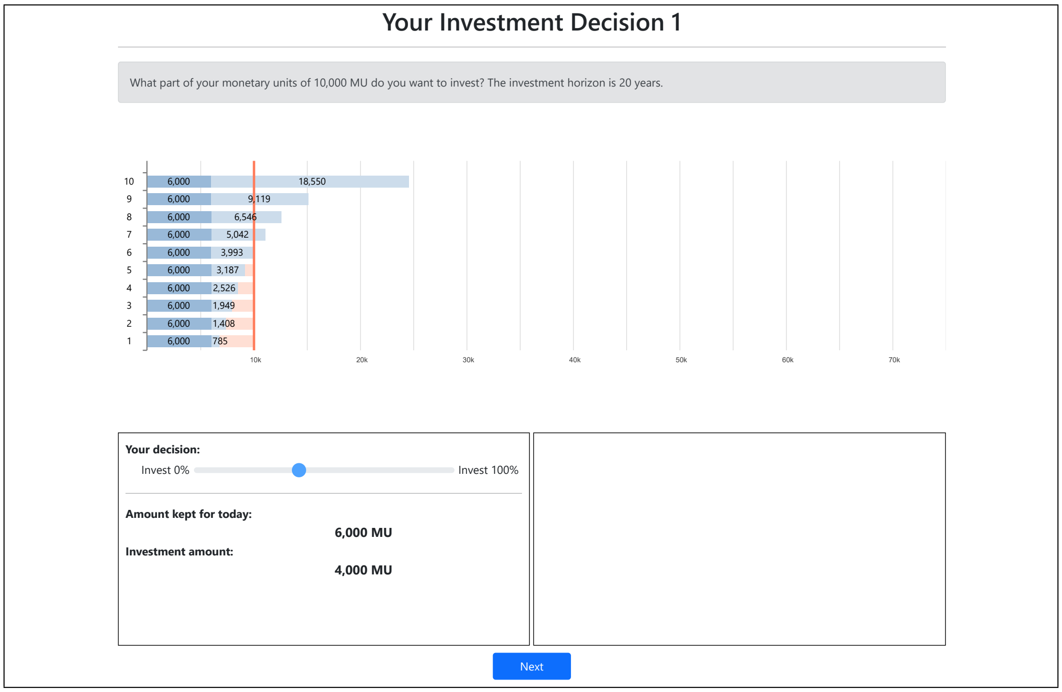


Figure S2.1: Investment Decision 1

S3.2 Information Screens Before Investment Decision 2

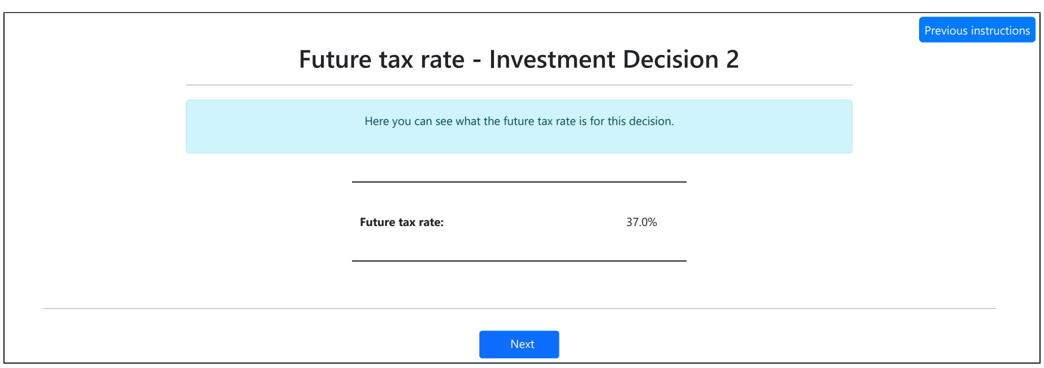


Figure S2.2: Information Before Investment Decision 2 - Tax

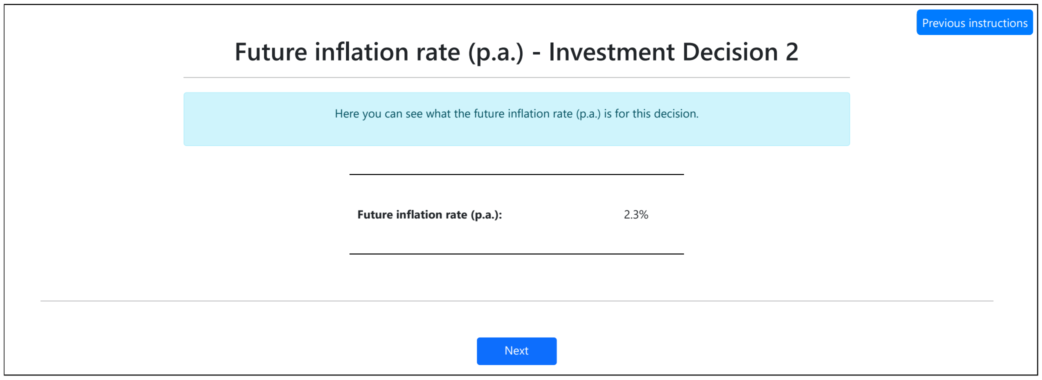


Figure S2.3: Information Before Investment Decision 2 - Inflation

S3.3 Investment Decision 2

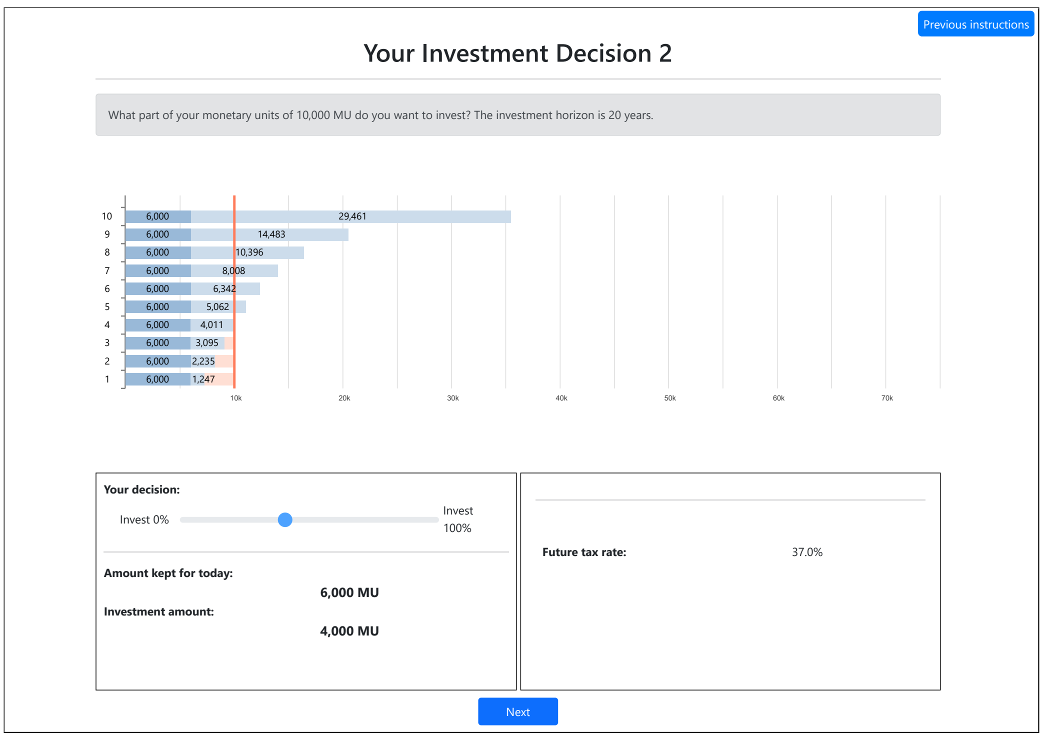


Figure S2.4: Investment Decision 2 - Tax

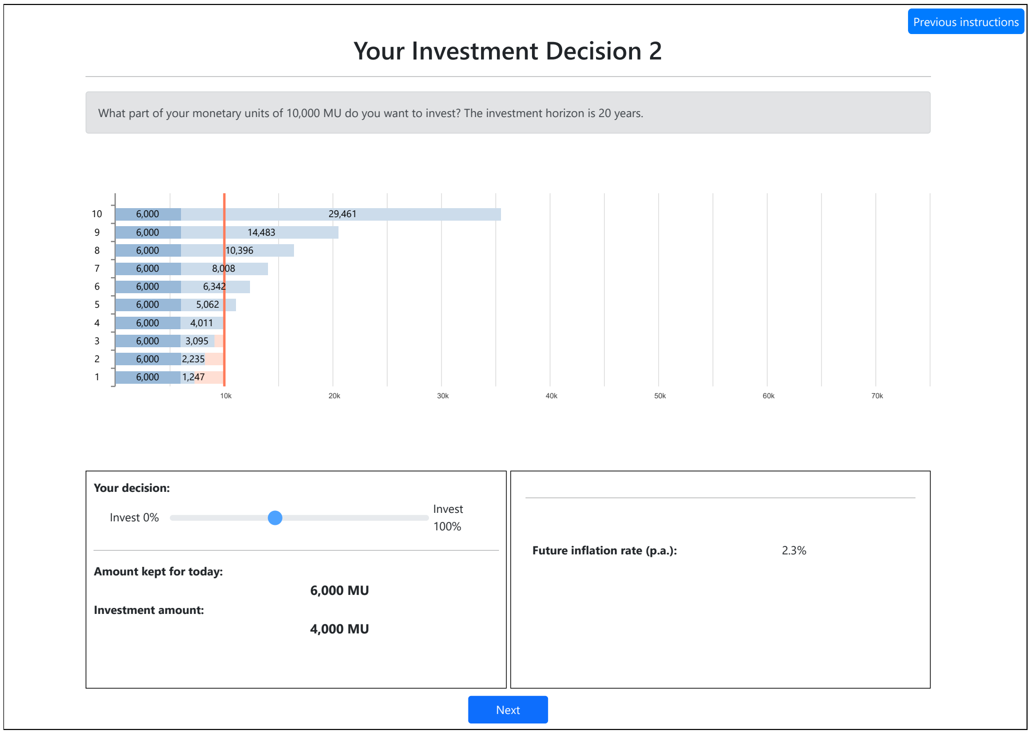


Figure S2.5: Investment Decision 2 - Inflation

S3.4 Information Screens Before Investment Decisions 3 to 8

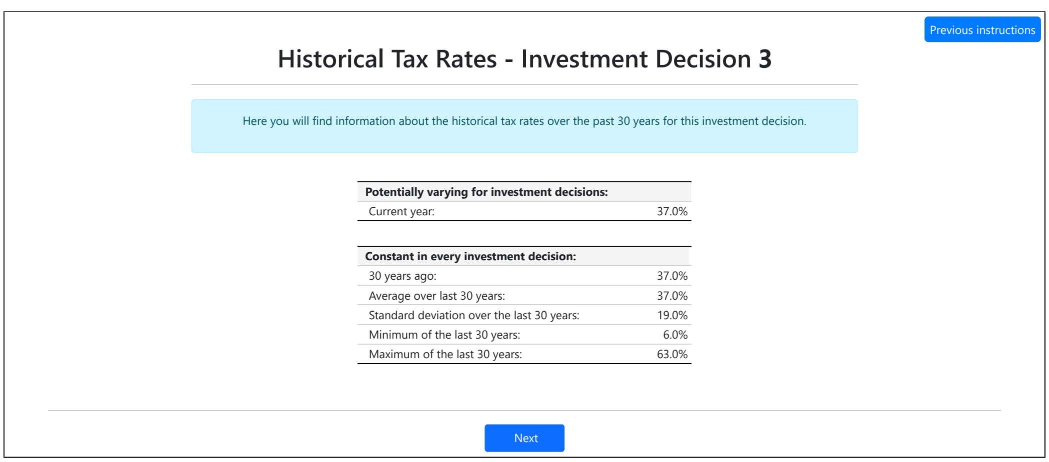
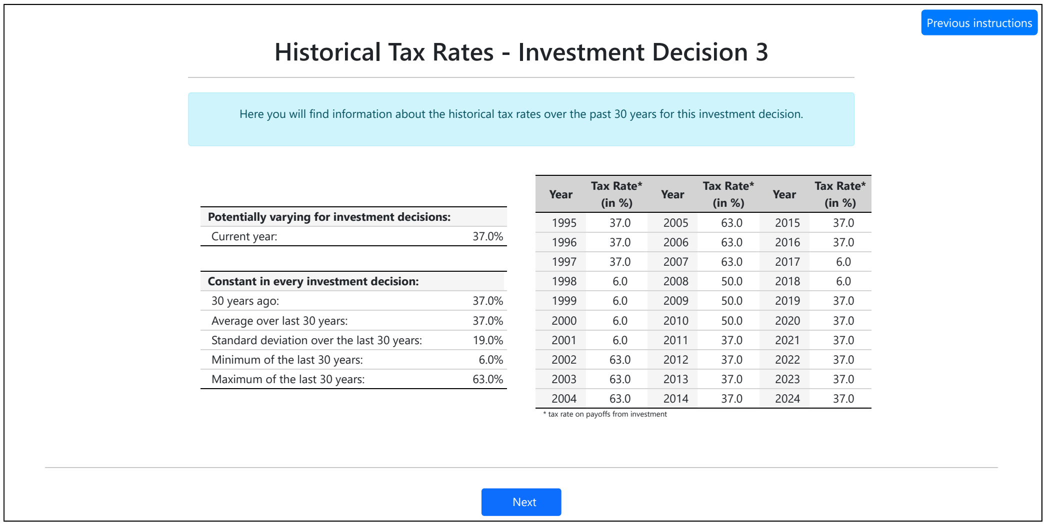


Figure S2.6: Information Before Investment Decisions 3 to 8 - Tax - Stable Market Scenario - No Visualization


Previous instructions

Historical Tax Rates - Investment Decision 3

Here you will find information about the historical tax rates over the past 30 years for this investment decision.

Potentially varying for investment decisions:	
Current year:	37.0%

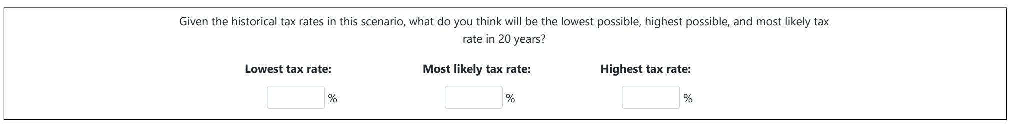
Constant in every investment decision:	
30 years ago:	37.0%
Average over last 30 years:	37.0%
Standard deviation over the last 30 years:	19.0%
Minimum of the last 30 years:	6.0%
Maximum of the last 30 years:	63.0%

Year	Tax Rate* (in %)	Year	Tax Rate* (in %)	Year	Tax Rate* (in %)
1995	37.0	2005	63.0	2015	37.0
1996	37.0	2006	63.0	2016	37.0
1997	37.0	2007	63.0	2017	6.0
1998	6.0	2008	50.0	2018	6.0
1999	6.0	2009	50.0	2019	37.0
2000	6.0	2010	50.0	2020	37.0
2001	6.0	2011	37.0	2021	37.0
2002	63.0	2012	37.0	2022	37.0
2003	63.0	2013	37.0	2023	37.0
2004	63.0	2014	37.0	2024	37.0

* tax rate on payoffs from investment

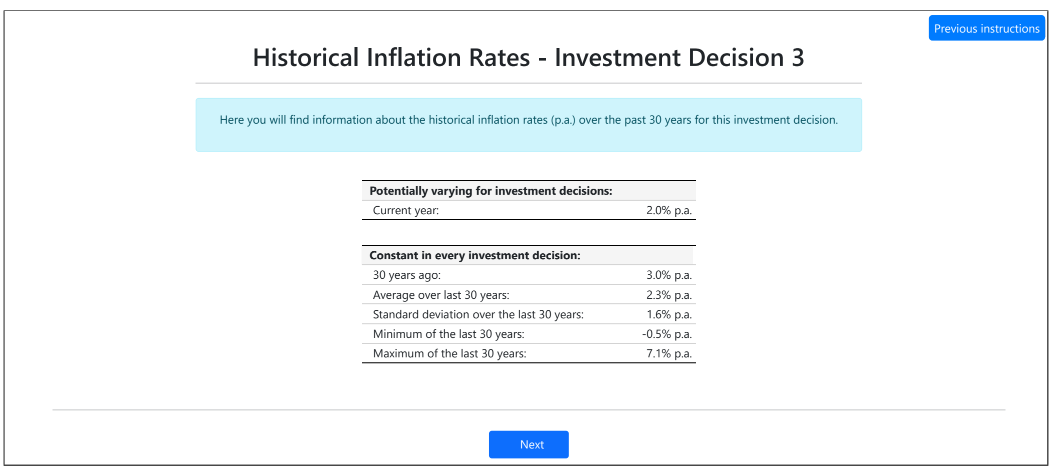
Next

Figure S2.7: Information Before Investment Decisions 3 to 8 - Tax - Stable Market Scenario - No Visualization - Table


Given the historical tax rates in this scenario, what do you think will be the lowest possible, highest possible, and most likely tax rate in 20 years?

Lowest tax rate: % **Most likely tax rate:** % **Highest tax rate:** %

Figure S2.8: Belief Elicitation Before Investment Decisions 3 to 8 - Tax


Previous instructions

Historical Inflation Rates - Investment Decision 3

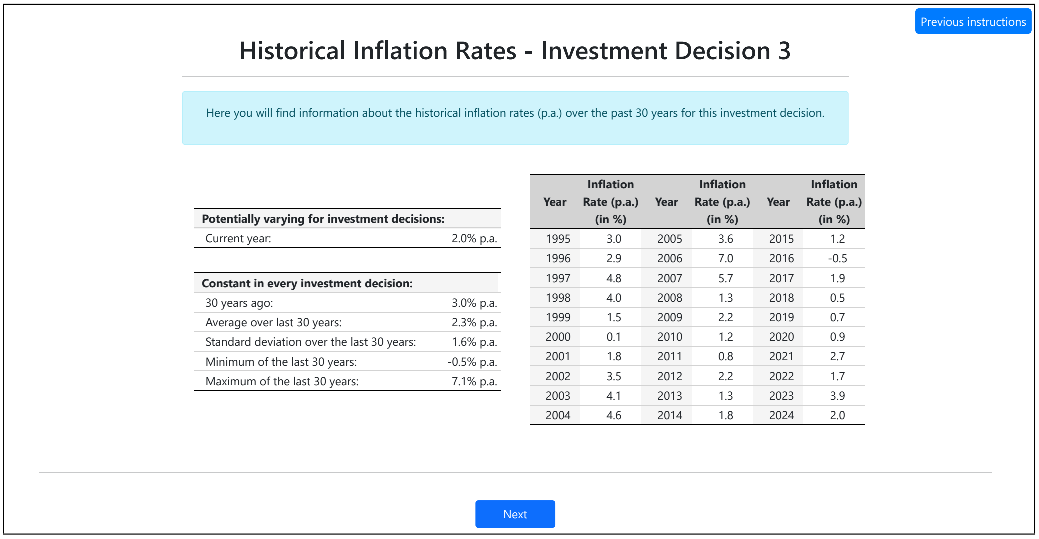
Here you will find information about the historical inflation rates (p.a.) over the past 30 years for this investment decision.

Potentially varying for investment decisions:	
Current year:	2.0% p.a.

Constant in every investment decision:	
30 years ago:	3.0% p.a.
Average over last 30 years:	2.3% p.a.
Standard deviation over the last 30 years:	1.6% p.a.
Minimum of the last 30 years:	-0.5% p.a.
Maximum of the last 30 years:	7.1% p.a.

Next

Figure S2.9: Information Before Investment Decisions 3 to 8 - Inflation - Stable Market Scenario - No Visualization



Previous instructions

Historical Inflation Rates - Investment Decision 3

Here you will find information about the historical inflation rates (p.a.) over the past 30 years for this investment decision.

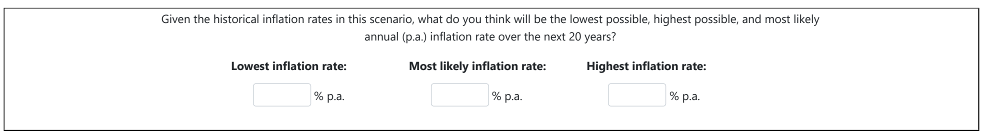
Potentially varying for investment decisions:	
Current year:	2.0% p.a.

Constant in every investment decision:	
30 years ago:	3.0% p.a.
Average over last 30 years:	2.3% p.a.
Standard deviation over the last 30 years:	1.6% p.a.
Minimum of the last 30 years:	-0.5% p.a.
Maximum of the last 30 years:	7.1% p.a.

Year	Inflation Rate (p.a.) (in %)	Year	Inflation Rate (p.a.) (in %)	Year	Inflation Rate (p.a.) (in %)
1995	3.0	2005	3.6	2015	1.2
1996	2.9	2006	7.0	2016	-0.5
1997	4.8	2007	5.7	2017	1.9
1998	4.0	2008	1.3	2018	0.5
1999	1.5	2009	2.2	2019	0.7
2000	0.1	2010	1.2	2020	0.9
2001	1.8	2011	0.8	2021	2.7
2002	3.5	2012	2.2	2022	1.7
2003	4.1	2013	1.3	2023	3.9
2004	4.6	2014	1.8	2024	2.0

Next

Figure S2.10: Information Before Investment Decisions 3 to 8 - Inflation - Stable Market Scenario - No Visualization - Table



Given the historical inflation rates in this scenario, what do you think will be the lowest possible, highest possible, and most likely annual (p.a.) inflation rate over the next 20 years?

Lowest inflation rate: % p.a.

Most likely inflation rate: % p.a.

Highest inflation rate: % p.a.

Figure S2.11: Belief Elicitation Before Investment Decisions 3 to 8 - Inflation

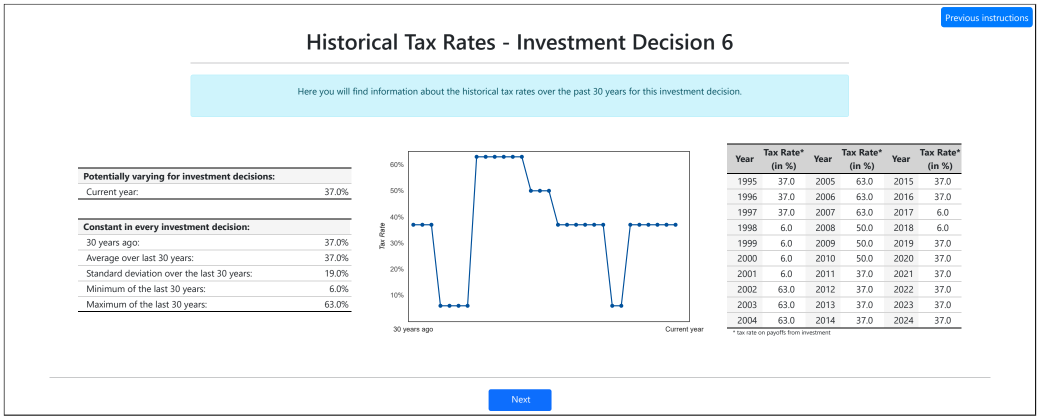


Figure S2.12: Information Before Investment Decisions 3 to 8 - Tax - Stable Market Scenario - Visualization

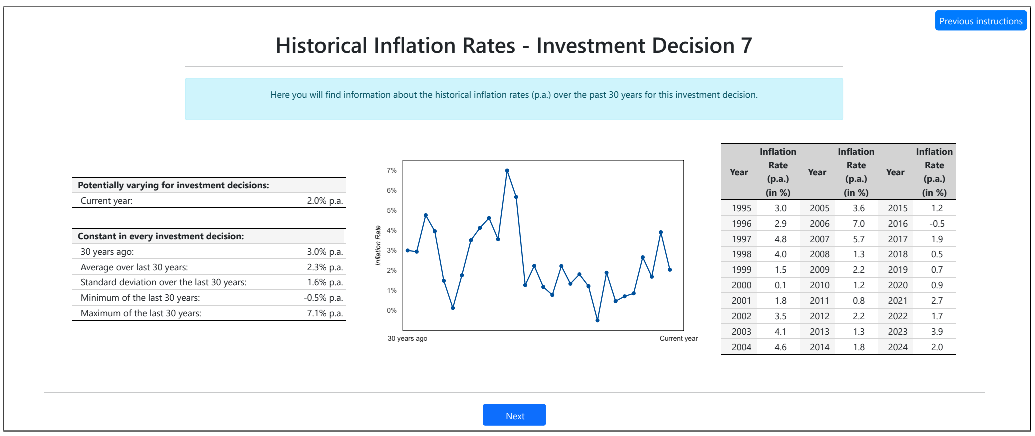


Figure S2.13: Information Before Investment Decisions 3 to 8 - Inflation - Stable Market Scenario - Visualization

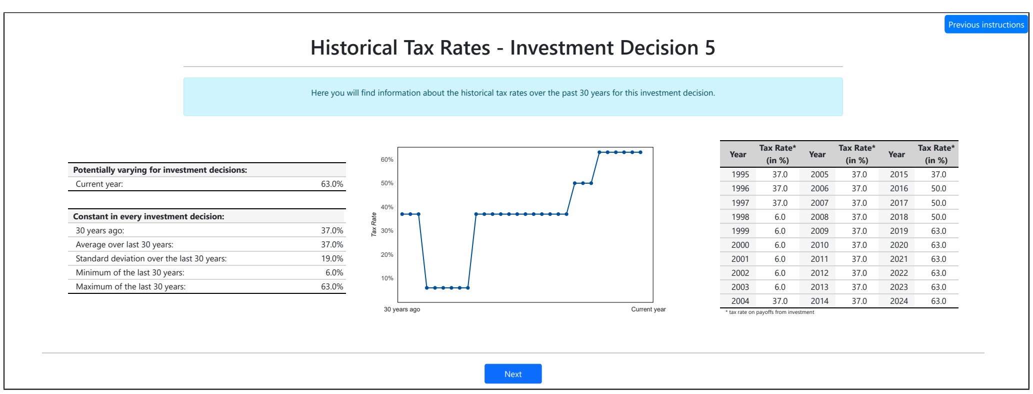


Figure S2.14: Information Before Investment Decisions 3 to 8 - Tax - Rising Market Scenario - Visualization

Figure S2.15: Information Before Investment Decisions 3 to 8 - Inflation - Rising Market Scenario - Visualization

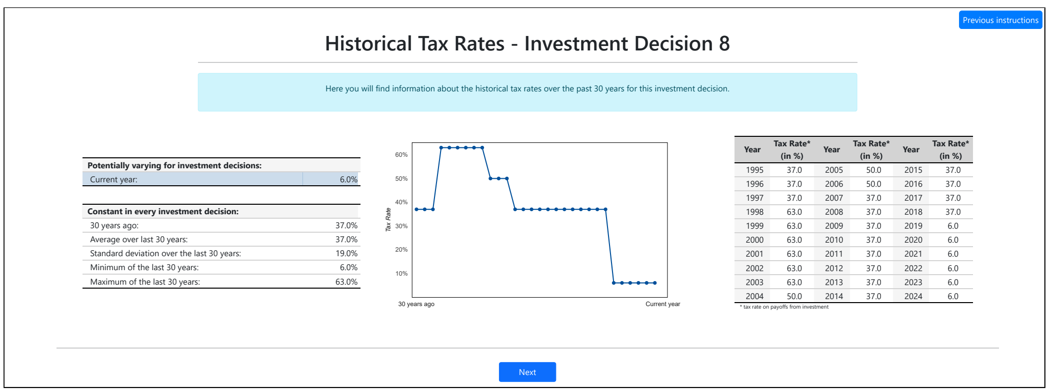


Figure S2.16: Information Before Investment Decisions 3 to 8 - Tax - Falling Market Scenario - Visualization

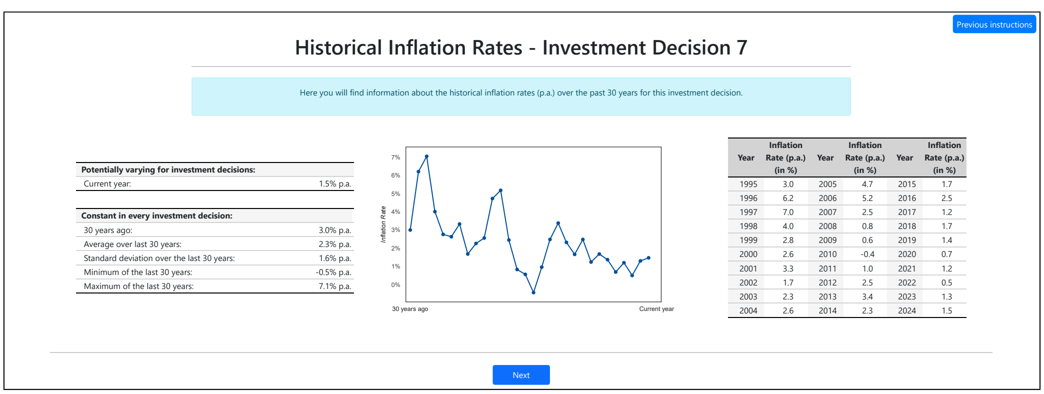


Figure S2.17: Information Before Investment Decisions 3 to 8 - Inflation - Falling Market Scenario - Visualization

S3.5 Investment Decisions 3 to 8

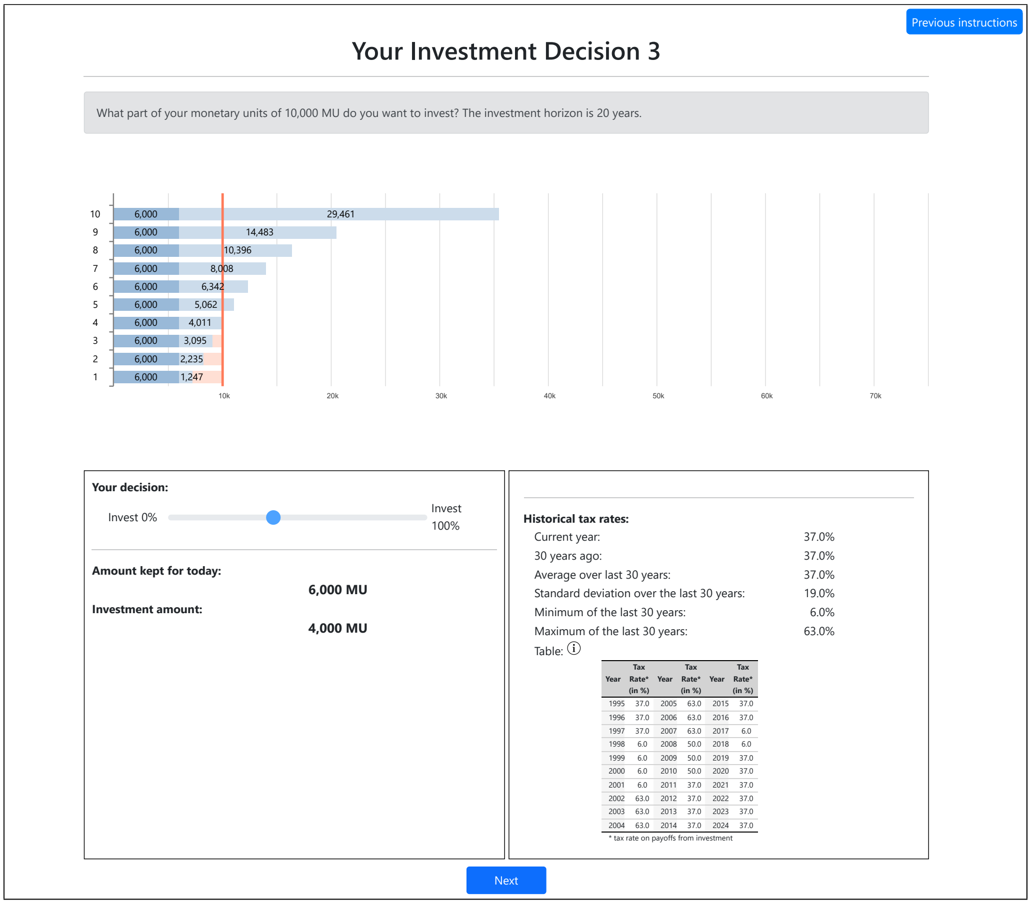
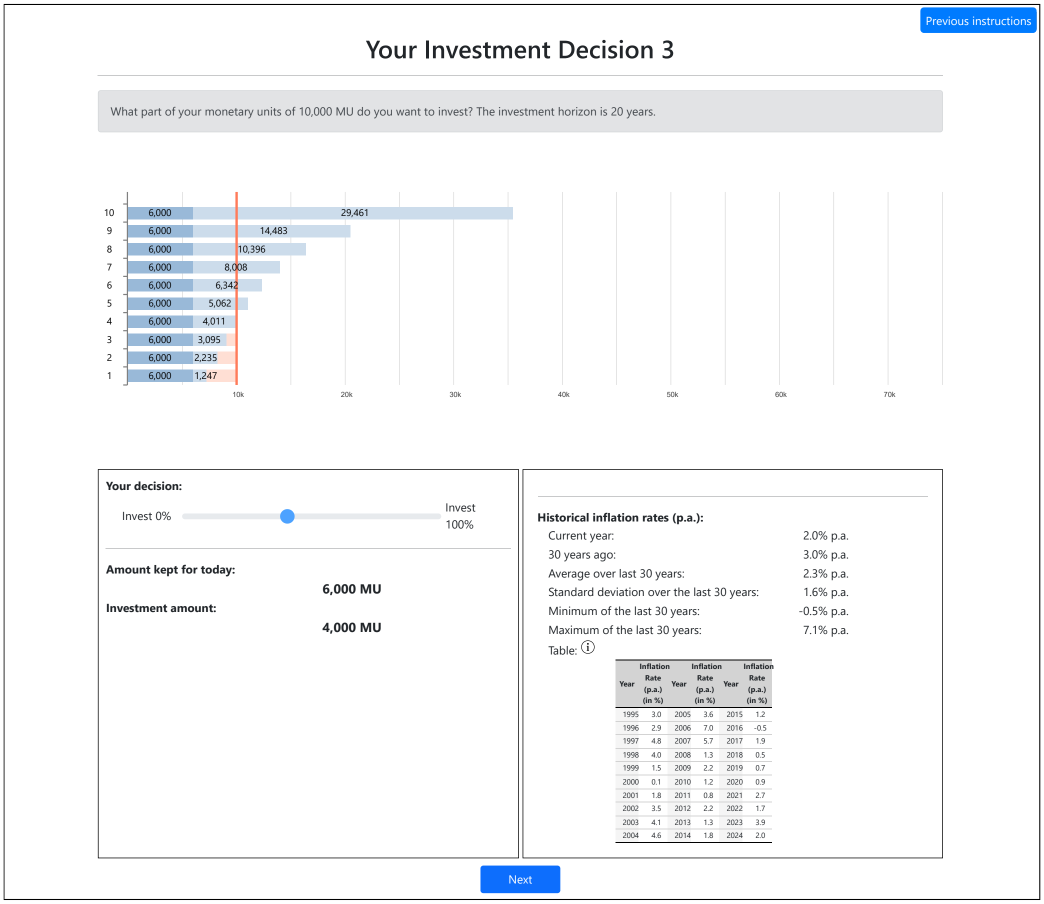


Figure S2.18: Investment Decisions 3 to 8 - Tax - Stable Market Scenario - No Visualization



Year	Inflation Rate (p.a.) (in %)	Year	Inflation Rate (p.a.) (in %)	Year	Inflation Rate (p.a.) (in %)
1995	3.0	2005	3.6	2015	1.2
1996	2.9	2006	7.0	2016	-0.5
1997	4.8	2007	5.7	2017	1.9
1998	4.0	2008	1.3	2018	0.5
1999	1.5	2009	2.2	2019	0.7
2000	0.1	2010	1.2	2020	0.9
2001	1.8	2011	0.8	2021	2.7
2002	3.5	2012	2.2	2022	1.7
2003	4.1	2013	1.3	2023	3.9
2004	4.6	2014	1.8	2024	2.0

Figure S2.19: Investment Decisions 3 to 8 - Inflation - Stable Market Scenario - No Visualization

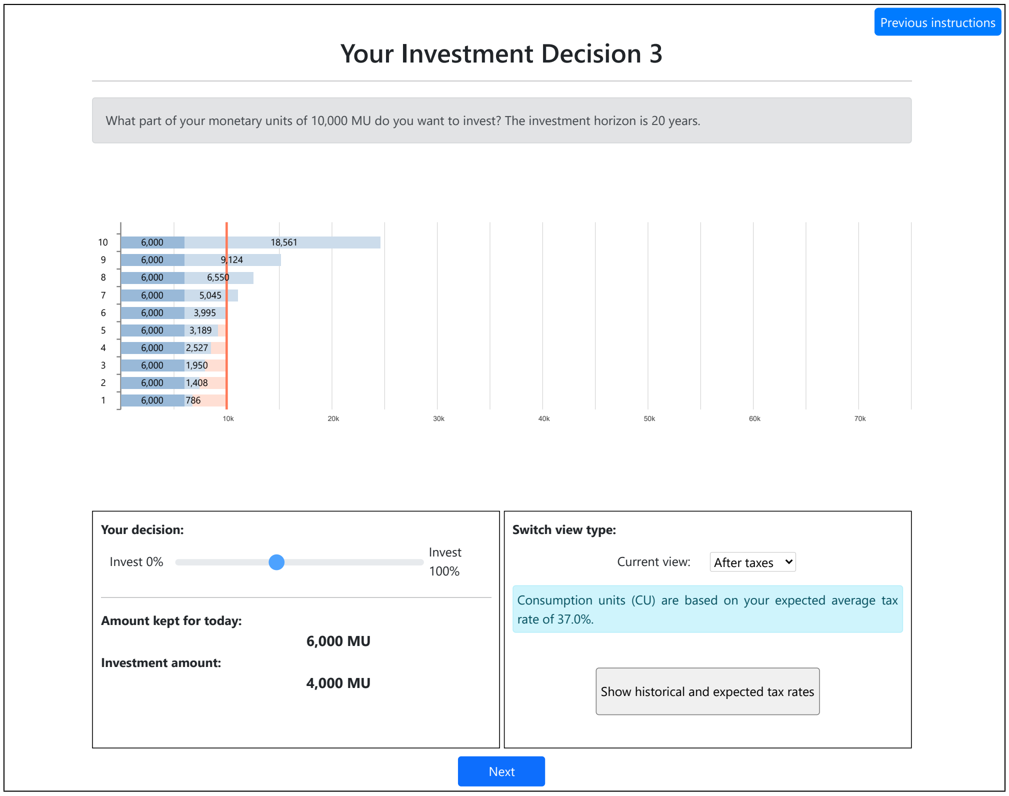


Figure S2.20: Investment Decisions 3 to 8 - Tax - Switch

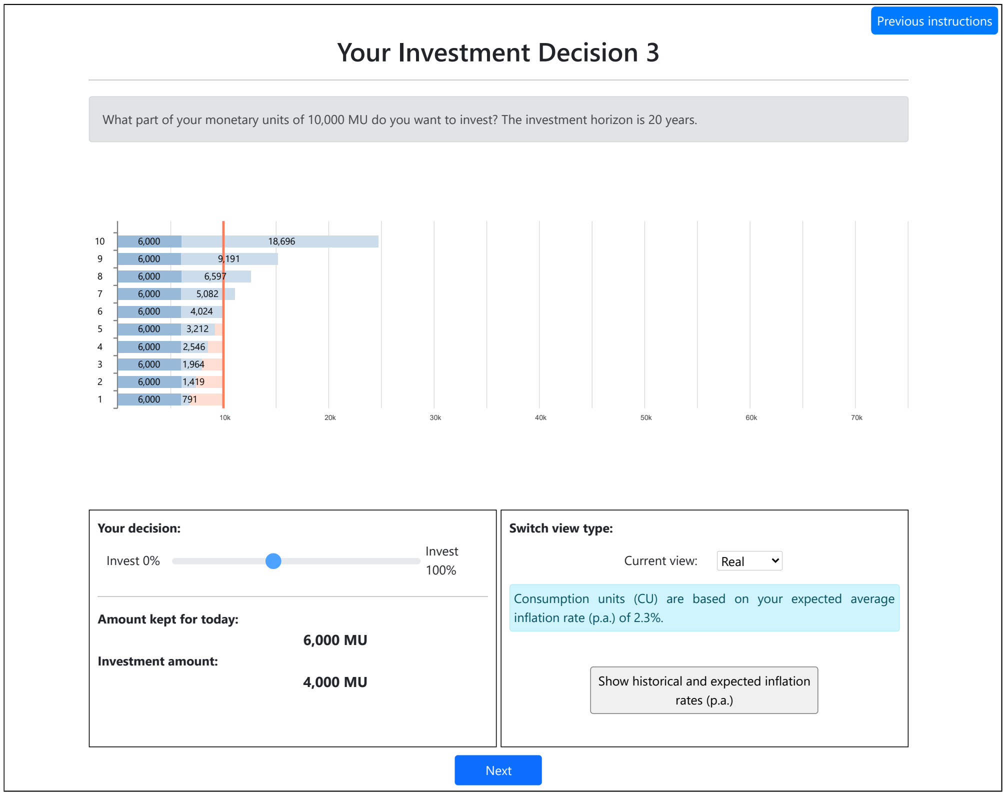


Figure S2.21: Investment Decisions 3 to 8 - Switch

Supplementary Appendix S4 Questionnaire

S4.1 Pre-screening Questions (Before Instructions)

Question 1: Are you active in the stock market?

- ☐ Yes, I actively invest (many trades in short term)
- ☐ Yes, I passively invest (holding stocks in longer term)
- ☐ No, I am not active in the stock market

Question 2: Have you filed a tax return in the last 5 years?

- ☐ Yes
- ☐ No

S4.2 Sociodemographic Questions (Before Instructions)

Question 1: Are you female, male or non-binary?

- ☐ female
- ☐ male
- ☐ non-binary

Question 2: How old are you?

[ ]

Question 3: How would you describe yourself: Are you willing to take risks in general, or do you avoid taking any risks?

not at all willing to take risks ☐—☐—☐—☐—☐—☐—☐—☐—☐—☐—☐ very willing to take risks

Question 4: How would you describe yourself: Are you generally a patient or an impatient person?

very impatient ☐—☐—☐—☐—☐—☐—☐—☐—☐—☐—☐ very patient

S4.3 Questionnaire (Before Treatment)

S4.3.1 Tax Literacy Questions (Tax Setting Only)

Question 1: Suppose a person with a 100,000 $ salary started making before-tax 401(k) contributions this calendar year without changing any of her contributions to other retirement savings accounts. What effect would this have on her taxable income this year?

☐ Corresponding to the contribution increasing taxable income

☐ Not affecting taxable income

☐ Corresponding to the contribution decreasing taxable income

☐ Don't know

Question 2: Suppose a person with a 100,000 $ salary started making Roth 401(k) contributions this calendar year without changing any of her contributions to other retirement savings accounts. What effect would this have on her taxable income this year?

☐ Corresponding to the contribution increasing taxable income

☐ Not affecting taxable income

☐ Corresponding to the contribution decreasing taxable income

☐ Don't know

Question 3: Frank's income is subject to a flat tax rate of 50 %. He would like to have an after-tax income of 80,000 $. What must his pre-tax income be to achieve this level of after-tax income?

Question 4: Lisa is single and earns 50,000 $, which is subject to a progressive tax schedule. Her next year's income increases by 5 % which matches the inflation rate of 5 %. The progressive tax schedule remains unchanged. In the next year, how much will she be able to buy with her income?

☐ More than today
☐ The same
☐ Less than today
☐ Don't know

S4.3.2 Inflation Literacy Questions (Inflation Setting Only)

Question 1: The rate of inflation in an economy is best described as the percentage increase in the ...

☐ ... overall level of money wages.
☐ ... overall price level of goods and services.
☐ ... the long-term interest rate.
☐ ... prices of stocks.
☐ Don't know

Question 2: Which of the following measures is most likely to lead to lower inflation?

☐ Lowering the short-term interest rate
☐ Lowering income taxes
☐ Raising the level of government spending
☐ Raising the short-term interest rate
☐ Don't know

Question 3: Which of the two financial products is likely to offer the highest real-net-wealth increase during unexpectedly high inflation?

☐ Savings products (e.g., cash, savings account, bonds, life insurance)
☐ Stocks
☐ Don't know

S4.3.3 Financial Literacy Questions (Part 1)

Question 1: Suppose you had £100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow?

- ☐ More than £102
- ☐ Exactly £102
- ☐ Less than £102
- ☐ Don't know
- ☐ Prefer not to say

Question 2: Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account?

- ☐ More than today
- ☐ Exactly the same
- ☐ Less than today
- ☐ Don't know
- ☐ Prefer not to say

Question 3: Buying a single company's stock usually provides a safer return than a stock mutual fund.

- ☐ True
- ☐ False
- ☐ Don't know
- ☐ Prefer not to say

S4.3.4 Attention Check Question (Part 1)

Question 4: Please select "True" for this question

- ☐ False
- ☐ True
- ☐ Don't know
- ☐ Prefer not to say

S4.3.5 Questions About Economic Challenges (Part 1)

To what degree are you worried about the following economic issues?

	very much	good deal	not much	not at all
Corporate bankruptcies	☐	☐	☐	☐
Inflation	☐	☐	☐	☐
Unemployment	☐	☐	☐	☐
Pension and social security systems	☐	☐	☐	☐
Income inequality	☐	☐	☐	☐
High taxes	☐	☐	☐	☐
Debt crisis	☐	☐	☐	☐
Environmental impacts of economic decisions	☐	☐	☐	☐
Economic fluctuations	☐	☐	☐	☐

S4.3.6 Savings Goal Calculation (administered during the inflation part)

Question 5: Your goal is to have a one-time after-tax payment of $100,000 in 20 years from today for your retirement. Today, you will invest an initial amount of money in your savings account for 20 years at a constant interest rate of 0% per year. Assume no additional deposits or withdrawals. In 20 years, the money is to be withdrawn from the savings account and will then be **taxed at a income tax rate of 37%**.

Question: How much do you need to invest today in order to reach your savings goal of **a one-time after-tax payment of $100,000 in 20 years**? Please provide your best estimate. ☐

S4.3.7 Exponential Growth Bias (administered during the tax part)

Question 6: Your goal is to have a one-time pre-tax payment of $100,000 in 20 years from today for your retirement. Today, you will invest an initial amount of money in your savings account for 20 years at a constant **interest rate of 2% per year**. Assume no additional deposits or withdrawals. Interest is compounded annually and reinvested into the account. In 20 years, the money is to be withdrawn from the savings account.

Question: How much do you need to invest today in order to reach your savings goal of **a one-time pre-tax payment of $100,000 in 20 years**? Please provide your best estimate.

S4.4 Questions at the End of the Experiment

S4.4.1 Sociodemographic Questions (Part 1)

Question 1: In which year were you born (e.g. 1962)?

Question 2: Please select your highest achieved educational degree.

- ☐ Below high school degree / no degree
- ☐ High school degree
- ☐ Vocational training degree
- ☐ Bachelor´s degree
- ☐ Master´s degree / professional degree beyond Bachelor´s
- ☐ Above Master´s degree

Question 3: What is your personal monthly net income after deduction of taxes and social security?

- ☐ less $500
- ☐ $500 - $1,000
- ☐ $1,000 - $1,500
- ☐ $2,500 - $2,000
- ☐ $2,000 - $ 2,500
- ☐ $2,500 - $3,000
- ☐ $3,000 - $3,500
- ☐ $3,500 - $4,000
- ☐ $4,000 - $4,500
- ☐ $4,500 - $5,000
- ☐ $5,000 - $ 5,500
- ☐ $5,500 - $ 6,000
- ☐ $6,000 and more

Question 4: Imagine that you have just inherited some money that you are planning to invest. You are deciding between two different bond options. Both have the same risk and 10-year maturities. The first bond is expected to pay $401 per year, but at the same time $100 in tax will be deducted automatically each year. The second bond's return is lower, $300 per year, but it will not be taxed. Which bond would you invest in?

☐ I would invest the money in the second bond.

☐ I would invest the money in the first bond.

S4.4.2 Question about Inflation (Inflation Setting)

Question 5: What is your best guess about the annual inflation rate that the Federal Reserve tries to achieve on average over the medium run (about 1-3 years)?

☐ _____ %

☐ Don't know

S4.4.3 Questions on Learning Type (Part 1)

Each of the following statements has two possible endings that represent opposite ends of a continuous scale. Please mark the box that best indicates where you fall on the scale.

Question 1: I prefer to get new information in ...

... pictures, diagrams, graphs, or maps. ☐—☐—☐—☐—☐ ... written directions or verbal information.

Question 2: In a book with lots of pictures and charts, I am likely to ...

... look over the pictures and charts carefully. ☐—☐—☐—☐—☐ ... focus on the written text.

Question 3: I like teachers ...

... who put a lot of diagrams on the board. ☐—☐—☐—☐—☐ ... focus on the time explaining.

Question 4: When I get directions to a new place, I prefer ...

... a map. ☐—☐—☐—☐—☐ ... written instructions.

Question 5: When someone is showing me data, I prefer ...

... charts or graphs. ☐—☐—☐—☐—☐ ... text summarizing the results.

S4.4.4 Cognitive Reflection Test (Part 1)

Question 1: A bat and a ball cost \$1.10 in total. The bat costs \$1.00 more than the ball. How much does the ball cost?

Question 2: If it takes 5 machines 5 minutes to make 5 widgets, how long would it take 100 machines to make 100 widgets?

Question 3: In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half of the lake?

Supplementary Appendix S5 The Effect of Illusion and Calculation Bias on Investment

This appendix characterizes how the illusion parameter η_x and the calculation bias parameter β_x affect the perceived return distribution and, in turn, the optimal investment share. We show that both parameters admit a unified analytical treatment: they shift the perceived risky return distribution statewise, albeit in opposite directions. An increase in η_x shifts perceived returns upward toward nominal returns, whereas an increase in β_x shifts perceived returns downward by exaggerating the impact of inflation or taxes on returns.

The decision maker chooses the investment share $\phi \in [0,1]$ to maximize expected utility over perceived terminal wealth:

$$\max_{\phi\in[0,1]} \mathbb{E}\left[u(W_T)\right], \tag{6}$$

where

$$W_T = W_0\left(1+\phi\tilde{r}_T^x\right), \tag{7}$$

with $W_0 > 0$ denoting initial wealth and $x \in \{\pi, \tau\}$ indicating the inflation or tax setting.

The perceived return is given by

$$\tilde{r}_T^x = \hat{r}_T^x + \eta_x(r_T - \hat{r}_T^x) = (1-\eta_x)\hat{r}_T^x + \eta_x r_T, \tag{8}$$

where r_T denotes the nominal return and $\hat{r}_T^x$ the biased real or after-tax return. For inflation and taxes, respectively,

$$1+\hat{r}_T^\pi = (1-\beta_\pi)\frac{1+r_T}{(1+\hat{\pi})^T}, \tag{9}$$

and

$$1+\hat{r}_T^\tau = (1-\beta_\tau)(1+r_T)(1-\hat{\tau}). \tag{10}$$

S5.1 Statewise effect of illusion and calculation bias

We first characterize how η_x and β_x affect the perceived return in each state.

Effect of illusion η_x. Holding β_x fixed, differentiating $\tilde{r}_T^x$ with respect to η_x yields

$$\frac{\partial\tilde{r}_T^x}{\partial\eta_x} = r_T - \hat{r}_T^x. \tag{11}$$

Hence, whenever $r_T \geq \hat{r}_T^x$, an increase in η_x weakly increases the perceived return in every state. In our setting, this condition is satisfied under the maintained parameter restrictions $\beta_x \in [0,1]$, $\hat{\pi} \geq 0$, and $\hat{\tau} \in [0,1)$, which imply $\hat{r}_T^x \leq r_T$ in both the inflation and tax setting.

Effect of calculation bias β_x. Holding η_x fixed, differentiating $\tilde{r}_T^x$ with respect to β_x gives

$$\frac{\partial\tilde{r}_T^x}{\partial\beta_x} = (1-\eta_x)\frac{\partial\hat{r}_T^x}{\partial\beta_x}. \tag{12}$$

Under the maintained parameter restrictions $\hat{\pi} \geq 0$, $\hat{\tau} \in [0, 1)$, and $\eta_x \in [0, 1)$, and for economically relevant gross returns $1 + r_T > 0$, the sign is negative in both settings. For the inflation setting,

$$\hat{r}_T^{\pi} = (1 - \beta_{\pi})\frac{1 + r_T}{(1 + \hat{\pi})^T} - 1, \tag{13}$$

so that

$$\frac{\partial \hat{r}_T^{\pi}}{\partial \beta_{\pi}} = -\frac{1 + r_T}{(1 + \hat{\pi})^T} < 0. \tag{14}$$

For the tax setting,

$$\hat{r}_T^{\tau} = (1 - \beta_{\tau})(1 + r_T)(1 - \hat{\tau}) - 1, \tag{15}$$

so that

$$\frac{\partial \hat{r}_T^{\tau}}{\partial \beta_{\tau}} = -(1 + r_T)(1 - \hat{\tau}) < 0. \tag{16}$$

Therefore,

$$\frac{\partial \tilde{r}_T^{x}}{\partial \beta_x} < 0 \tag{17}$$

in both settings. Thus, an increase in calculation bias lowers the perceived return in every state.

S5.2 Implications for the perceived return distribution

The previous results imply a statewise ordering of perceived returns. Let $\tilde{r}_T^x(\eta_x, \beta_x)$ denote the perceived return under parameters (η_x, β_x).
If $\eta_x' > \eta_x$, then

$$\tilde{r}_T^x(\eta_x', \beta_x) \geq \tilde{r}_T^x(\eta_x, \beta_x) \tag{18}$$

state by state. Hence, a higher illusion parameter induces a first-order stochastic dominance (FOSD) improvement of the perceived risky return distribution.
Conversely, if $\beta_x' > \beta_x$, then

$$\tilde{r}_T^x(\eta_x, \beta_x') \leq \tilde{r}_T^x(\eta_x, \beta_x) \tag{19}$$

state by state. Hence, a higher calculation bias induces a FOSD deterioration of the perceived risky return distribution.

S5.3 Implications for the optimal investment share

For an interior solution ϕ^*, the first-order condition is

$$\mathbb{E}\left[u'(W_T)\, W_0 \tilde{r}_T^x\right] = 0. \tag{20}$$

In general, direct comparative statics based on total differentiation of the first-order condition are ambiguous, because the sign depends on preference curvature and the interaction between wealth and returns. However, Fishburn and Burr Porter (1976) show that a FOSD improvement of the risky return distribution implies a weak increase in the optimal risky share provided that

$$R_p(W_T) < 1 + pR_a(W_T) \tag{21}$$

for all relevant states, where $R_a(W_T) = -u''(W_T)/u'(W_T)$ is absolute risk aversion, $R_p(W_T) = -W_T u''(W_T)/u'(W_T)$ is relative risk aversion, and p is the gross return on the safe asset. In our setting, the safe asset is cash, so that $p = 1$. Hence, the condition becomes

$$R_p(W_T) < 1 + R_a(W_T). \tag{22}$$

For CRRA utility, relative risk aversion is constant and equal to γ, i.e.

$$R_p(W_T) = \gamma. \tag{23}$$

Thus, the Fishburn-Porter condition is satisfied whenever $\gamma \leq 1$, since $R_a(W_T) > 0$ under risk aversion implies

$$\gamma \leq 1 < 1 + R_a(W_T). \tag{24}$$

Accordingly, for all CRRA utility functions with coefficient of relative risk aversion not exceeding one, a FOSD improvement in the perceived return distribution implies a weakly higher optimal investment share, while a FOSD deterioration implies a weakly lower optimal investment share. The same reasoning applies to the logarithmic case and to the class of power utility functions emphasized in Fishburn and Burr Porter (1976).
Taken together, these results imply that:

- an increase in η_x weakly raises the optimal investment share ϕ^*;
- an increase in β_x weakly lowers the optimal investment share ϕ^*,

for the analytically covered preference classes.

S5.4 Numerical analysis for the experimental calibration

To assess the effects of η_x and β_x in our experimental setting beyond the analytically covered case, we solve the optimization problem numerically for a wide range of utility functions. Specifically, we consider HARA utility functions of the form

$$u(W_T) = \frac{(W_T + a)^{1-\gamma}}{1-\gamma} \tag{25}$$

and CARA utility functions given by

$$u(W_T) = -\exp(-\alpha W_T). \tag{26}$$

Table S13 reports the optimal investment share ϕ^* for different values of η_x, holding all other parameters constant. Across all specifications, the optimal investment share increases monotonically in η_x. This holds not only for CRRA preferences with low levels of relative risk aversion, but also for very high levels (e.g., $\gamma = 10$), as well as for utility functions exhibiting decreasing, increasing, and constant relative risk aversion.
Table S14 reports the corresponding optimal investment shares for different values of β_x, holding all other parameters constant. Across all specifications, the optimal investment share decreases monotonically in β_x. This mirrors the result for η_x and confirms that the two parameters admit a symmetric comparative-static interpretation in our experimental environment, though with opposite signs.

Overall, the numerical results indicate that the directional predictions for both illusion and calculation bias hold robustly in the parameter range relevant for our experimental design, including preference specifications beyond the analytically covered cases.

	HARA									CARA		
γ	2.0	5.0	10.0	2.0	2.0	2.0	2.0	2.0	2.0			
a	0.0	0.0	0.0	100.0	500.0	2000.0	-100.0	-500.0	-1000.0			
α										0.0001	0.0002	0.0005
ARA	DARA	DARA	DARA	DARA	DARA	DARA	DARA	DARA	DARA	CARA	CARA	CARA
RRA	CRRA	CRRA	CRRA	IRRA	IRRA	IRRA	DRRA	DRRA	DRRA	DRRA	DRRA	DRRA
η												
0.0	0.162	0.060	0.029	0.162	0.167	0.189	0.156	0.151	0.141	0.278	0.141	0.054
0.1	0.193	0.070	0.035	0.197	0.204	0.231	0.189	0.183	0.174	0.329	0.162	0.068
0.2	0.229	0.079	0.039	0.229	0.237	0.270	0.226	0.216	0.204	0.378	0.189	0.077
0.3	0.262	0.095	0.045	0.262	0.270	0.310	0.254	0.247	0.234	0.420	0.210	0.087
0.4	0.294	0.105	0.049	0.294	0.304	0.349	0.288	0.278	0.262	0.467	0.234	0.095
0.5	0.322	0.114	0.054	0.329	0.341	0.389	0.322	0.308	0.288	0.513	0.254	0.102
0.6	0.351	0.124	0.060	0.357	0.372	0.424	0.349	0.337	0.317	0.562	0.277	0.113
0.7	0.380	0.133	0.064	0.389	0.399	0.460	0.380	0.365	0.346	0.607	0.304	0.121
0.8	0.414	0.147	0.070	0.418	0.433	0.493	0.406	0.389	0.372	0.648	0.322	0.128
0.9	0.443	0.152	0.072	0.445	0.460	0.527	0.433	0.418	0.399	0.692	0.346	0.140
1.0	0.467	0.167	0.079	0.467	0.493	0.564	0.467	0.445	0.423	0.736	0.365	0.147

Table S13: Simulation results for the optimal investment share ϕ^* as a function of η

	HARA									CARA		
γ	2.0	5.0	10.0	2.0	2.0	2.0	2.0	2.0	2.0			
a	0.0	0.0	0.0	100.0	500.0	2000.0	-100.0	-500.0	-1000.0			
α										0.0001	0.0002	0.0005
ARA	DARA	DARA	DARA	DARA	DARA	DARA	DARA	DARA	DARA	CARA	CARA	CARA
RRA	CRRA	CRRA	CRRA	IRRA	IRRA	IRRA	DRRA	DRRA	DRRA	DRRA	DRRA	DRRA
β												
0.0	0.162	0.060	0.029	0.162	0.167	0.189	0.156	0.151	0.141	0.278	0.141	0.054
0.1	0.098	0.037	0.019	0.098	0.104	0.120	0.098	0.094	0.086	0.180	0.092	0.037
0.2	0.034	0.013	0.006	0.034	0.038	0.038	0.034	0.032	0.027	0.069	0.034	0.013
0.3	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.4	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.6	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.7	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.8	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Table S14: Simulation results for the optimal investment share ϕ^* as a function of β