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# Households' Response to the Wealth Effects of Inflation<sup>\*</sup>

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## Abstract

We study the redistributive effects of inflation combining administrative bank data with an information provision experiment during an episode of historic inflation. On average, households are well-informed about prevailing inflation and are concerned about its impact on their wealth; yet, while many households know about inflation eroding nominal assets, most are unaware of nominal-debt erosion. Once they receive information on the debt-erosion channel, households update upwards their beliefs about nominal debt and their own real net wealth. These changes in beliefs causally affect actual consumption and hypothetical debt decisions. Our findings suggest that real wealth mediates the sensitivity of consumption to inflation once households are aware of the wealth effects of inflation.

**JEL codes:** D12, D14, D83, D84, E21, E31, E52

**Keywords:** Inflation Beliefs, Information Treatment, Consumption, Monetary Policy

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# 1 Introduction

After having been dormant for decades, inflation in 2022 reached levels not seen by many households during their lifetimes. Households typically dislike high inflation because average nominal incomes do not keep up with inflation spikes in the short run. However, some households might benefit from unexpected inflation: it erodes the real value of debt with fixed nominal interest obligations (Fisher, 1933),<sup>1</sup> redistributing wealth from nominal savers to borrowers (Auclert, 2019). These redistributive effects can be sizable, given the large nominal positions held by households (Doepke and Schneider, 2006).

Yet, little is known about whether households are aware of these distributional consequences of inflation and how they adjust their economic decisions to the induced effects on their real net wealth. Empirically, how households adjust their consumption-savings choices to the erosion of nominal positions is unclear (Leombroni et al., 2020). For example, households might be unaware of the wealth effects of inflation because of money illusion (e.g., Cohen, Polk, and Vuolteenaho, 2005; Modigliani and Cohn, 1979). Moreover, even households that are aware of these wealth effects might primarily adjust their consumption to realized payments rather than unrealized capital gains (e.g., Di Maggio, Kermani, and Majlesi, 2020; Lettau and Ludvigson, 2004).

We study the extent to which households are aware of the erosion channel of nominal positions, how awareness affects beliefs about nominal positions and own real net wealth, and how these beliefs feed into hypothetical financing choices, consumption plans, and actual consumption decisions using administrative data. To study these questions, we run a large randomized control trial (RCT) on customers of a major German bank in which participants receive information on inflation-induced erosion of either nominal assets, or nominal debt. We

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<sup>1</sup>See also Bhamra et al., 2023; Kang and Pflueger, 2015; and Gomes, Jermann, and Schmid, 2016.

find participating households, on average, are well-informed about the current inflation rate and concerned about its impact on wealth. However, while households are largely aware of inflation-induced nominal-asset erosion, they have limited knowledge about the debt-erosion channel of inflation. Consequently, respondents who receive information about nominal-debt erosion have more positive beliefs about debt, as well as update upwards perceptions and expectations of their own real net wealth. Households' changes in beliefs have real effects: they plan to spend more, update actual consumption ex post, and choose a higher share of debt financing in a hypothetical real-estate investment.

We implemented the RCT on several thousand bank customers in July 2022 when inflation in Germany was at a 70-year high of 8.7%. We first ask questions on knowledge about the erosion channel. Respondents also estimate the recent change in their real net wealth and decompose their balance sheet, allowing us to calculate their net nominal position. The subsequent information experiment builds the core of our survey. We randomly assign respondents into two treatment groups and one control group. The treatment groups receive information on the current inflation rate, an explanation that unexpected inflation hurts savers / benefits debtors because it erodes nominal positions, and a calculation of the current change in real value of a representative savings product / loan. The single difference between the two treatments is that one discusses the erosion of savings, whereas the other discusses the erosion of loans. The control group only receives information about the current inflation rate. Hence, we inform all participants about prevailing inflation but only subjects in the treatment conditions learn about the erosion channel of inflation. By comparing the groups, we can thus isolate the effect of information about the erosion channel of inflation. Post-treatment, we elicit beliefs about nominal positions, own wealth, and the economy. Moreover, we ask respondents about their spending plans, they perform a

hypothetical real-estate investment, and we track their actual spending using bank data.

We have three main findings. First, we document asymmetric awareness of the erosion channel. Households on average are well-informed about nominal-asset erosion. For example, 75% of respondents believe the impact of unexpected inflation on fixed-rate savings products is very negative or negative. However, knowledge about loan erosion is more limited. Only 9% of respondents believe the impact of unexpected inflation on fixed-rate loans is very positive and 25% believe it is positive. This limited awareness of debt erosion, including of debtors, with possibly high marginal propensities to consume (MPC) (Auclert, 2019), suggests muted responses to the redistributive effects of inflation, at least in the short run.

This limited awareness is surprising, because survey respondents are on average better educated than the average German, have large nominal positions (e.g., 55% have outstanding debt), and care about inflation and its wealth effects. Which characteristics then predict awareness of the erosion channel? First, awareness only weakly varies by households' net nominal position. That is, debtors, for example, are not significantly more aware of the redistributive effects of inflation. Second, business education, wealth, and stock ownership correlate with awareness. Third, general knowledge about inflation, such as an accurate perception of current inflation, predicts awareness of the wealth effects of inflation.

Second, providing information on the erosion channel, in particular on debt, affects beliefs about nominal positions and own real net wealth. We ask respondents to rank household balance-sheet items in terms of their inflation protection. The savings-erosion treatment group assigns a worse inflation-protection rank to savings products than the control group. Respondents who receive the loan treatment rank loans more favorably. In addition, learning about inflation-induced debt erosion reduces general debt aversion, suggesting that information effects extend beyond the context of inflation. Knowledge about the wealth effects of

inflation hence impacts beliefs about nominal positions.

Treated respondents also update their real-net-wealth perception and expectation. Conditioning on pre-treatment estimates of wealth changes, we find respondents who receive the savings-erosion information on average estimate their change in real net wealth over the past and next 12 months 1.6–1.8 percentage points lower than respondents in the control group. Learning about inflation-induced loan erosion, instead, increases wealth estimates relative to the control group by 2.5–2.9 percentage points. This effect is large: it corresponds to around 50% of the average estimate of -5.6% in the control group. Respondents report less awareness of the information provided on loan erosion than on savings erosion, suggesting the differential treatment effects reflect asymmetric prior awareness.

We then study heterogeneity in the treatment effect on real-net-wealth estimates. Respondents with a positive net nominal position (net savers) drive the negative average effect of the savings treatment, but the economic magnitude remains modest. The positive perceived-wealth effect of the loan treatment comes from respondents with a negative net nominal position (net debtors), who on average estimate their past- and next-12-month change in real net wealth five percentage points higher. Furthermore, we study heterogeneity in respondents' ability to map the loan-treatment information into their own wealth situation. The sensitivity of the perceived-wealth effect of the loan treatment to net nominal positions is strongest for respondents with high cognitive abilities or relatively high interest in the topic of inflation (Agarwal and Mazumder, 2013; D'Acunto et al., 2022).

Third, learning about inflation-induced nominal-debt erosion has real effects both in survey data and in actual account-transaction data from our partner bank. We focus on the effects of the debt-erosion treatment because only this treatment generates sizable effects on beliefs. We study households' spending plans as well as their actual spending over the

weeks following our survey intervention compared to the previous weeks. Learning about debt erosion leads to higher planned and actual spending, both in reduced-form and in instrumental-variable estimations. The estimates map into MPCs of close to 3%, in line with estimates from the literature on MPCs from unrealized capital gains (e.g., [Chodorow-Reich, Nenov, and Simsek, 2021](#); [Di Maggio, Kermani, and Majlesi, 2020](#)). Our results suggest that changes in real net wealth affect households' consumption response to inflation, conditional on households being aware of the wealth effects of inflation.

Finally, we show another real effect of learning about debt erosion, on hypothetical debt choices. In the survey, respondents engage in a hypothetical real-estate transaction using both equity and debt. Respondents in the loan treatment choose real estate of similar value compared to respondents in the control group. However, the two groups differ in their preferred debt/price ratio, which is significantly higher in the loan-treatment group. Moreover, the loan treatment tilts the mortgage choice towards fixed- rather than adjustable-rate mortgages, with longer fixation periods for nominal interest rates. These choices likely reflect treatment-induced shifts in beliefs about the inflation-hedging properties of long-maturity fixed debt and an accompanying reduction in debt aversion.

**Related literature** We contribute to several strands of literature. First, we build on the literature on the consequences of inflation-induced debt erosion that goes back to [Fisher \(1933\)](#). [Doepke and Schneider \(2006\)](#) document the net nominal positions of different economic actors in the U.S. over time and study the redistributive effects of different surprise-inflation scenarios within and across these groups. A key finding of their paper is that young households with large existing debt positions benefit at the expense of wealthy middle-aged households. [Auclert \(2019\)](#) studies theoretically the redistributive effects of monetary policy on spending based on differential MPCs of winners and losers of the wealth effects

of inflation. [Coibion et al. \(2017\)](#) document inequality dynamics due to monetary policy, including by household net wealth. [Brunnermeier et al. \(2023\)](#) show that firms with more nominal liabilities at the onset of the German hyperinflation in the 1920s increase their employment once inflation starts rising. We are the first to study how households perceive and adjust to the redistributive effects of inflation, using an information provision experiment paired with administrative bank data.

Second, we contribute to a burgeoning literature on households' response to inflation. Evidence on the sensitivity of spending to inflation expectations is mixed. Some studies report a positive effect of expectations on spending, consistent with an intertemporal-substitution motive, while other studies find households associate higher expected inflation with worse economic outcomes and hence spend less if researchers do not condition on economic outlook (see [D'Acunto, Malmendier, and Weber \(2023\)](#) and [Weber et al. \(2022\)](#) for recent surveys of work in this area). We add to this literature by showing that wealth effects of inflation contribute to the consumption-inflation sensitivity.

Beyond effects on spending, the literature studies how households seek protection from inflation. [Botsch and Malmendier \(2020\)](#) find that experiencing high inflation in the 1970s is associated with an aversion to adjustable-rate mortgages. [Leombroni et al. \(2020\)](#) use an asset-pricing model to link high inflation expectations in the 1970s to a portfolio shift toward housing. [Braggion, von Meyerinck, and Schaub \(2023\)](#) find investors purchase fewer stocks when facing higher inflation during the hyperinflation in Germany in the 1920s. [Schnorpfeil, Weber, and Hackethal \(2023\)](#) use an RCT to study the effects of beliefs about inflation on portfolio choices. We add to these papers by showing that learning about inflation-induced debt erosion has a positive effect on beliefs about debt and increases debt financing.

Third, a recent literature in economics employs information-provision experiments to



study how ordinary consumers, who make consumption, savings, and investment decisions in the field, perceive economic policies and phenomena, as well as their effects (e.g., [Andre et al., 2022](#); [D'Acunto et al., 2022](#); [Stantcheva, 2021, 2023b](#)).<sup>2</sup> We contribute to this literature by analyzing how households perceive the wealth effects of inflation, how they map information about these effects into their own economic situation in an experimental setting, and how exogenous changes in their economic situation feed into real-world choices.

## 2 Experimental design and data

In this section, we discuss the survey design and characteristics of our sample. Section [2.1](#) focuses on the survey design, with an emphasis on the information-provision section, whereas Section [2.2](#) describes the bank data as well as the sample composition and characteristics.

### 2.1 Experiment

We implemented the RCT on several thousand bank customers in July 2022. The survey consists of three sections: a pre-treatment section on demographics, respondents' balance sheet, and economic beliefs; an information-provision section; and a post-treatment section on economic beliefs, hypothetical and planned economic choices, and additional background characteristics. Online Appendix [B](#) contains the survey questions translated to English.

**Pre-treatment section** Respondents start by answering two questions on their educational background. We then assess respondents' marginal propensity to save, consume, and pay down debt in the three months following a hypothetical one-time payment of €10,000 (see, e.g., [Fuster, Kaplan, and Zafar, 2020](#)), framed as either a gain or a loss. In addition,

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<sup>2</sup>See also the excellent reviews on how to run surveys and implement information-provision experiments by [Haaland et al. \(2023\)](#) and [Stantcheva \(2023a\)](#).

respondents receive a slight variation of this question asking about their hypothetical response to noticing by chance that their own net wealth is €10,000 higher or lower than previously thought. We randomize the order of the two questions. These two questions allow us to infer differential hypothetical spending responses to unexpected actual payments versus unexpected changes in perceived net wealth with no actual cash flows involved.

Respondents then answer questions about the economy and its impact on their net wealth. These questions include the importance of macroeconomic factors, such as inflation and GDP, for own wealth; the consumption response to recent changes in these factors; the perception of current and forecasts of future inflation; and whether holding cash, fixed-rate savings products, stocks, real estate, and fixed-rate loans provide a hedge against an unexpected surge in inflation. These questions aim to elicit existing knowledge about inflation-induced erosion of nominal assets and liabilities.

Furthermore, we ask respondents to provide a decomposition of their balance sheet into nominal assets (we mention cash, bonds, and life insurances as examples), stocks, real estate, other assets (we mention vehicles and gold as examples), and nominal liabilities (divided into mortgages and consumer loans).<sup>3</sup> Respondents state the value of each balance-sheet item as a fraction of their gross wealth. Given the cognitive burden of this question, we carefully explain the concept of gross wealth and provide several examples. Moreover, we provide a warning message if the sum of respondents' assets differs from their gross wealth. The median time survey participants spent on the balance-sheet-decomposition screen is more than two minutes, indicating that they carefully answer the question.

Respondents also estimate the change in their real net wealth over the past 12 months. We follow the design in the New York Fed Survey of Consumer Expectations ([Armantier](#)

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<sup>3</sup>We follow [Adam and Zhu \(2015\)](#) in classifying life insurances as nominal claims, as insurance companies in the euro area predominantly invest in nominal assets.

et al., 2017) and first elicit a directional estimate before asking for a point prediction, on a scale from -60% to 60%. We familiarize respondents to net and gross wealth in the preceding balance-sheet-decomposition task, by providing a simple sample balance sheet to differentiate between gross and net wealth and by stating their net wealth as a fraction of their gross wealth. As we discuss in Section 2.2 below, the elicited responses appear meaningful.

**Treatment section** The second part of the survey contains the information provision experiment. The objective of the intervention is to generate exogenous variation in knowledge about inflation-induced erosion of nominal assets and liabilities. To generate this variation, we randomly divide the sample into three equally-sized groups, two of which receive information and one serves as a control group. The two treatments are similar, other than that one focuses on the erosion of nominal assets, whereas the other focuses on the erosion of nominal liabilities. Our specific treatments are:

*The **current inflation rate in Germany is 8.7%**, the highest rate in more than 70 years. That is, goods and services priced at €100 one year ago now cost €108.7 on average. This price increase has a relatively **negative effect on savers**: the savings amount (e.g., checking account, bond, life insurance) is unchanged nominally or lower, but worth less in real terms as a consequence of money depreciation.*

*As an example, consider a €50,000 savings product with a three-year maturity that you took out one year ago. The real value of the savings product has already fallen sharply, and will depreciate further if inflation remains high:*

**€50,000 savings value one year ago ↓ €38,800 real value today**

*The **inflation-induced savings depreciation** thus has a negative effect on the real net wealth of savers.*

*Note: the numbers come from current calculations by the Universities of Chicago and Frankfurt ([calculation details](#)).*

Respondents in the loan-erosion treatment group read the following text:

*The **current inflation rate in Germany is 8.7%**, the highest rate in more*

than 70 years. That is, goods and services priced at €100 one year ago now cost €108.7 on average. This price increase has a relatively **positive effect on borrowers**: the loan amount is unchanged nominally, but worth less in real terms as a consequence of money depreciation.

As an example, consider a €50,000 loan with a three-year maturity that you took out one year ago. The real value of the loan has already fallen sharply, and will depreciate further if inflation remains high:

**€50,000 loan value one year ago ↓ €38,800 real value today**

The **inflation-induced loan depreciation** thus has a positive effect on the real net wealth of borrowers.

Note: the numbers come from current calculations by the Universities of Chicago and Frankfurt ([calculation details](#)).

Respondents assigned to the control group receive only the first two sentences on inflation. We provide this information, instead of having a fully passive control group, because information on current inflation being historically high can have a confounding effect on post-treatment beliefs and choices. By comparing respondents in the treatment groups with respondents in the control group, we can identify the effect of learning about the inflation-induced erosion of nominal assets and liabilities and absorb any effect that the information about the current inflation level might have.

The numbers in the treatments come from a simple present-value calculation. Real changes in the positions' present value occur because future nominal cash flows are discounted at higher interest rates. Discount rates increase linearly over the course of one year, because inflation in 2021–22 increased gradually. We disregard any reallocation or reinvestment after the products' maturity. We thereby assume exposure to nominal erosion ends at maturity, or that inflation suddenly drops back to its baseline level.<sup>4</sup> At the end of the treatment text, respondents can click on a button to see calculation details (19% of respondents do so).

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<sup>4</sup>This assumption is similar to the lower-bound scenario by Doepke and Schneider (2006), who calculate wealth effects of inflation assuming that households switch to inflation-indexed securities once their nominal positions expire.

**Post-treatment section** Following the information intervention, we first elicit 12-month-ahead expectations for real-estate prices, the unemployment rate, interest rates, and respondent’s income. If the treatments affect some of these expectations, it might be through these expectations that respondents alter their choices. For example, [Coibion et al. \(2023\)](#) show that people’s macroeconomic outlook causally affects their consumption.

We then ask survey participants about planned spending on nondurables and durables. Following [Roth and Wohlfart \(2020\)](#), respondents state their consumption plans for multiple nondurables categories over the next four weeks relative to the previous four weeks. Response options, on a five-point scale, range from “much less” to “much more.” The short time window mitigates concerns that changes in inflation or other economic news confound the responses. On durables spending, we ask whether respondents plan to make major purchases over the next 12 months, such as buying a car or an apartment. If they do, we ask them to state the amount they plan to spend. These self-reported spending plans are useful because (i) we cannot observe actual account transactions of all respondents, (ii) we can distinguish between nondurables and durables spending, and (iii) we can corroborate treatment effects on actual spending with spending plans.

We again elicit respondents’ perception about the past-12-month change in their real net wealth, as well as their expectation for the next 12 months. This time, respondents directly provide a point estimate, with answer options between -60% and 60%. We elicit posteriors for real net wealth changes in a different format compared to priors to mitigate concerns of survey fatigue and demand effects, following [Coibion, Gorodnichenko, and Weber \(2022\)](#).<sup>5</sup> We are therefore able to study the instantaneous revision in own-wealth perceptions and expectations in response to the provided information.

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<sup>5</sup>[De Quidt, Haushofer, and Roth \(2018\)](#) show that demand effects tend to be small in settings like ours.

The final belief questions relate to nominal assets and debt. We elicit beliefs about the relative wealth protection that savings products, stocks, real estate, and fixed-rate loans provide. In addition, we ask about debt aversion (Almenberg et al., 2021). Moreover, respondents engage in a hypothetical real-estate transaction. They choose a preferred purchase price and sources of financing, with up to €500,000 equity and up to €500,000 coming from a mortgage. Respondents also choose whether they prefer an adjustable- or a fixed-rate mortgage, and if they choose the latter, the length of the fixation period.

The last section of the survey elicits respondents' risk tolerance, money illusion (Shafir, Diamond, and Tversky, 1997), and the value of their nominal positions. After completion, we ask respondents how interesting they found the survey and they can leave comments.

## 2.2 Data

**Survey administration** We run the survey experiment in partnership with a large German bank. The bank offers both retail-banking and brokerage services. In July 2022, the bank sent out a short email to around 215,000 customers, inviting them to participate in a survey on inflation administered by Goethe University Frankfurt. The survey was in the field for two weeks. After the first week, the bank sent out a reminder email, informing customers they have one week left to complete the survey. During the field period, inflation in Germany was at 8.7%, the highest rate in more than 70 years.

Overall, 3,846 bank customers complete the survey. 45% of respondents complete the survey within a day after the bank sent the invitation email, and 43% of the responses came in within a day after the reminder email. The overall response rate is 1.8%, which is comparable to other surveys of the bank and the median response time is 18.3 minutes.<sup>6</sup>

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<sup>6</sup>When compared to bank customers who receive a survey invitation but do not participate, respondents

**Administrative bank data** The partnering bank provides us with data on customer demographics and, importantly, categorized account transactions. Demographic information include age, gender, marital and employment status, and zip code. Account transactions come from the bank’s personal-financial-management (PFM) tool, which registers customers’ in- and outflows and classifies them into more than 50 categories.<sup>7</sup>

Broad spending categories include expenses on living (e.g., groceries and clothing); housing (e.g., rent and furniture); leisure (e.g., restaurants and events); mobility (e.g., cars and fuel); health (e.g., pharmacies and hospitals); occupation and education (e.g., office supplies and tuition fees); insurances, loans, and investments; cash withdrawals; credit cards; and online shopping. Income categories include salaries, other forms of regular income (e.g., pension and rental income), additional sources of income (e.g., tax refunds and children’s allowances), and capital income (e.g., dividends).

Around one third of transactions are uncategorized. These transactions usually constitute payments to a party unknown to the categorization algorithm, such as peer-to-peer transactions or transfers between accounts. We omit uncategorized transactions for our main consumption measures, because we do not know whether these transactions reflect consumption. In a robustness test, we incorporate uncategorized transactions identified by the bank as likely representing consumption to our spending measures.

We consider three measures of consumption. Total spending subtracts from all categorized outflows those related to investments, insurances, and loans. We also split total spending into discretionary and nondiscretionary spending, following [D’Acunto, Rossi, and](#)

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are more likely to be male, use the partnering bank’s online banking, have outstanding loans with the bank, have a securities portfolio with the bank, and have higher income.

<sup>7</sup>The bank defines categories based on the classification used by the German Federal Statistical Office. The tool is similar to personal-finance apps such as Mint; an important difference, however, is that the tool is embedded in the bank’s online-banking environment.

Weber (2023). Discretionary spending includes categories such as clothing, leisure, cash withdrawals, and online shopping. Nondiscretionary spending is the difference between total and nondiscretionary spending. Appendix Table A1 details all categories as well as the subcomponents of our different measures of consumption.

**Sample selection** Together with the bank, we select the survey sample based on two criteria. First, because of the importance of observing actual consumption choices, all bank customers with an activated PFM tool and who had received any cash inflows over the past six months receive a survey invitation. We randomly incentivize survey participation with either a voucher, or participation in a lottery. All payoffs are in the form of online-shopping vouchers.<sup>8</sup> Second, bank customers who do not satisfy the above criteria but have an outstanding mortgage or consumer loan at the partnering bank receive a survey invitation, which comes with the lottery incentive (15% of the selected sample). Given their outstanding debt, these customers should be particularly exposed to inflation-induced debt erosion.

Given noise in survey data (D’Acunto, Fuster, and Weber, 2021), we take two steps to filter respondents. First, we omit 563 respondents who make wrong or implausible entries in the balance-sheet-decomposition task: those who enter a negative share of a balance-sheet item relative to gross wealth; a share greater than one, that is, the value of a single balance-sheet item exceeds gross wealth; a share of nominal assets equal to zero; or a value of an outstanding mortgage, consumer loan, or the sum of the two that is equal to gross wealth.<sup>9</sup> Second, we drop respondents who take less than seven minutes or more than 120 minutes to complete the survey, roughly corresponding to the 1.5th and 98.5th percentile. After these

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<sup>8</sup>Survey responses do not systematically differ by type of participation incentive.

<sup>9</sup>Most respondents (10%) that we screen out enter mortgage and/or consumer-loan values that sum up to the value of their gross wealth. Because we ask respondents for the sum of assets to equal 100% of gross wealth, some respondents might have mistakenly assumed that the sum of all liabilities should also equal 100% gross wealth. We are unable to calculate the net nominal position of these survey respondents.



two steps, 3,190 individuals remain in the baseline sample. The results are robust to not performing any of these two screening steps.

Our sample to analyze treatment effects on spending using bank data comprises 2,671 bank customers. We arrive at this smaller sample because some survey participants with outstanding debt at the bank have not activated the PFM tool, and hence we cannot observe their account transactions. Moreover, we want to ensure that our bank-customer sample actively uses the observed bank accounts. We therefore require the sample to receive at least €100 as average regular income per month on observable accounts.<sup>10</sup>

**Sample characteristics** Table 1 reports summary statistics for our sample, with basic demographics in the top panel. 45% of respondents are female and the average age is 48 years. The educational level is relatively high, with 48% having completed college, around 20% of them in business. We benchmark our sample against the most recent (2017) wave of the Bundesbank's Panel on Household Finances (PHF), which is a representative survey of German households' finances and comprises the German data for the ECB's Household Finance and Consumption Survey. In the PHF, the share of the population with completed college education is 29%. 72% of the sample is employed (54% in the PHF).

Regarding household finances, respondents' average gross wealth is €386,000 (€238,000 in the PHF). Average nominal assets are 43% (37% in the PHF) and mean nominal debt is 17% of gross wealth (10% in the PHF). The average net nominal position is hence 26% of gross wealth. We follow Auclert (2019) and Doepke and Schneider (2006) by defining the net nominal position as all nominal assets minus all nominal liabilities. Similar to Auclert (2019), we exclude indirect nominal positions, which originate from investment intermediaries and the ownership of firms, to reduce complexity for respondents. We operationalize this measure

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<sup>10</sup>The consumption results do not rely on the cutoff choice.

by taking the sum of cash and fixed-rate savings products minus the sum of mortgage and consumer loans.<sup>11</sup> Respondents estimate the value of each balance-sheet position relative to their gross wealth, so the net nominal position is naturally scaled by gross wealth. 54% of respondents own stocks and 59% own real estate (20% and 44% in the PHF, respectively).

The middle panel of Table 1 presents statistics on average monthly spending and income. We calculate the individual-level average based on the six months preceding the survey. Total spending amounts to €1,844 for the average respondent, with around 50% of it being discretionary spending. Average regular income, constituting of, among other things, salaries, pensions, children's allowances, and rental income, is €2,862. Gross individual income in the PHF is €2,274 on average.<sup>12</sup>

The bottom panel of Table 1 reports statistics for respondent beliefs, elicited prior to the information provision. The average perceived inflation rate is 8.8%, close to the actual inflation rate of 8.7%. 75% of respondents have a perception error of at most 1.5 percentage points, likely because they actively acquire information about inflation when it is high (Cavallo, Cruces, and Perez-Truglia, 2017, Weber et al., 2023). Respondents expect inflation to remain high, with a mean one-year forecast of 10.4% and a five-year forecast of 10.7%. Cross-sectional dispersion increases with the forecast horizon. The estimated average change in the respondents' real net wealth over the past 12 months is -7.5%. Many respondents state that inflation matters for their own wealth, and relatively more so than GDP growth and the level of interest rates. Overall, respondents on average are relatively well-educated and wealthy, have accurate inflation perceptions, and are subjectively (given their beliefs) and

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<sup>11</sup>We do not distinguish between fixed- and variable-rate loans in the balance-sheet-decomposition task to reduce complexity and because around 90% of loans in Germany have a fixed rate. Our bank partner only offers fixed-rate loans (though mortgagors in the prolongation period can have a variable rate).

<sup>12</sup>In our bank data, we observe net flows, such as salaries net of taxes. We restrict income to be at least €100 to ensure some account usage; nonetheless, our respondents can receive income on accounts unobservable to us. We include the same restriction in the PHF for consistency.

objectively (given their large nominal positions) strongly exposed to changes in inflation.

**Integrity of randomization** Appendix Table A2 reports a balancing table for the two treatment groups and the control group. Our sample is largely well-balanced across groups for a wide array of demographic characteristics and perceptions and beliefs. The three groups are also statistically indistinguishable from each other in terms of actual average spending and income. Overall, only a few imbalances occur, such as for gender and wealth. To address these slight imbalances, we include a set of control variables in all specifications.

**Reliability of survey responses** We try to alleviate concerns about inaccurate or untruthful reporting in our survey (Stantcheva, 2023a). First, we attempt to mitigate inaccuracies in responses by carefully explaining the concepts we aim to elicit, tracking time spent on the questions, and filtering the sample. In addition, we test for reliability of survey responses using administrative data provided by the bank partner (Dutz et al., 2022). We focus on the reliability of reported outstanding debt because these data are particularly important for our analysis, the balance-sheet-decomposition task is demanding, and holding debt in Germany may be stigmatized (e.g., D’Acunto, Schnorpfel, and Weber, 2022).

Appendix Figure A1 shows the association between outstanding debt reported in the survey and at the partnering bank in the month of survey participation. For debt reported in the survey, we take the mid point of the debt-balance range respondents select. Outstanding debt at the partnering bank increases monotonically with survey-reported debt. Importantly, virtually no survey respondent has outstanding debt with the partnering bank when stating in the survey they have zero debt. The debt level we observe in the bank data is generally lower than what survey participants report, indicating that some of the debt is held with other institutions, underscoring the importance of using surveys to elicit the overall household balance-sheet positions. The correlation between survey-reported and bank debt is 0.49.

### 3 Prior knowledge about the wealth effects of inflation

**Level of knowledge** We start by documenting respondents’ prior knowledge of the wealth effects of inflation. Figure 1 shows a large share of respondents appears aware of inflation-induced erosion of nominal assets. The top panel displays the distribution of beliefs about how a surprise increase in inflation affects nominal positions. 88% of respondents believe that the impact on cash on hand is “very negative” or “negative,” whereas that number is 75% for fixed-interest savings products. The bottom panel of Figure 1 reports respondents’ relative ranking of nominal assets, stocks, real estate, and nominal loans in terms of wealth protection provided against unexpected inflation.<sup>13</sup> 70% of respondents ascribe relatively poor inflation protection (rank 3 or 4) to nominal assets.<sup>14</sup>

Pre-existing knowledge about the erosion of nominal liabilities appears more limited, however. 25% of respondents believe that the impact of unexpected inflation on those with a fixed-rate loan is “rather positive,” and only 9% believe it is “very positive” (top panel). Similarly, 62% assign a relatively poor inflation-protection rank, of 3 or 4, to fixed-rate loans (bottom panel). Overall, the findings indicate asymmetric knowledge about the erosion of nominal assets versus nominal debt. Incomplete knowledge is necessary for the information intervention to plausibly have scope to affect beliefs and hence choices. We therefore expect stronger responses to the loan-erosion than to the savings-erosion treatment.

**Heterogeneity in knowledge** According to models of endogenous information acquisition, awareness of the wealth effects of inflation should vary with exposure (e.g., [Maćkowiak, Matějka, and Wiederholt, 2023](#)). Households with greater exposure to nominal positions

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<sup>13</sup>We show statistics for the control group only, as we ask this question post-treatment. We discuss how the treatments affect responses to this question below.

<sup>14</sup>The majority of respondents assign the best inflation protection (rank 1) to real estate, consistent with [Malmendier and Wellsjo \(2023\)](#), who show that inflation protection is a key motivation for homeownership.

might hence exhibit greater ex-ante awareness. Figure 2 documents how prior knowledge about the wealth effects of inflation varies by respondents' net nominal position. Consistent with greater awareness among those who are more exposed, respondents with a negative net nominal position have a more positive perception about the impact of unexpected inflation on fixed-rate loans (left scale), though the magnitudes are small.<sup>15</sup> Beliefs about the impact on savings products do not vary by net nominal position (also left scale).<sup>16</sup> Small differences in knowledge by net nominal position do not translate into differences in respondents' self-reported consumption response to the recent increase in inflation (right scale).<sup>17</sup>

Which other individual characteristics explain knowledge about the wealth effects of inflation? Table 2 shows results of regressions of beliefs about the impact of unexpected inflation on balance-sheet items, including nominal assets and debt.<sup>18</sup> Two results stand out. First, business education, higher wealth, and stockholdings predict knowledge about the inflation-induced erosion of nominal assets (Columns 1–2) and nominal debt (Column 5). Second, general knowledge about inflation correlates with awareness about the wealth effects of inflation. Specifically, respondents who consider inflation to be important for their wealth, have an accurate perception of current inflation, or expect inflation to be lower in five years than they perceive it today appear more knowledgeable. Appendix Table A3 shows results for a more comprehensive set of correlates.

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<sup>15</sup>We abstain from analyzing differences in the inflation-protection ranking (bottom panel of Figure 1) by net nominal position because of the smaller sample size coming from a restriction to the control group.

<sup>16</sup>Appendix Table A3 confirms these patterns in a multivariate analysis, controlling for a wide array of demographic characteristics, perceptions and expectations, as well as wealth.

<sup>17</sup>Consistent with limited variation in prior knowledge by net nominal position, Appendix Figure A2 shows that knowledge about the information provided in the treatments does not vary by net nominal position. If anything, knowledge about savings erosion is lower for respondents with a positive net nominal position.

<sup>18</sup>The number of observations is lower than the 3,190 of the baseline sample because we trim the 1% tails of perceived and expected inflation, elicited as point estimates.

## 4 The effects of information treatments on beliefs

In this section, we investigate how providing information about the wealth effects of inflation in the survey experiment shifts beliefs of our participants. To characterize average effects of the information interventions, we estimate variants of the following equation:

$$posterior_i = const + \sum_{j=1}^2 \beta_j I\{i \in treat\ j\} + \gamma prior\ rnw_i + controls_i + error_i, \quad (1)$$

where  $posterior_i$  is a post-treatment measure of beliefs of respondent  $i$ .  $I\{i \in treat\ j\}$  indicates whether respondent  $i$  received treatment  $j$ . The omitted category is the control group, so coefficients  $\{\beta_j\}_{j=1}^2$  can be interpreted as being relative to the control group. Because we randomize the treatments, controls help with the precision of the estimates but have no material effect on the point estimates.  $prior\ rnw_i$  refers to estimates of past real-net-wealth change. We control for two wealth estimates because the elicitation occurs in two steps, first with a directional and then with a point estimate. Other  $controls_i$  include a quadratic polynomial in the respondent's age, risk tolerance measured on a 1–5 ordinal scale, the log of gross wealth (1% tails winsorized), and a rich set of dummy variables for a respondent's gender, marital status, educational level (equal to one for college degree or higher), a business degree, employment status, debt and stock holdings, net nominal position relative to gross wealth (<-50%, -50% to <-25%, etc.), accuracy of perceived current inflation (<1.5 pp deviation from actual rate), expectation that inflation will be lower in five years (1% tails of inflation estimates trimmed), whether survey participation is based on the voucher or lottery incentive, and whether participation is after the reminder email sent by the bank.

## 4.1 Effects on beliefs about nominal positions

Table 3 presents the results of estimating Equation 1 with and without controls. In Columns 1–4, the dependent variable captures beliefs about relative inflation protection provided by nominal assets and debt. The survey question reads: “With which of the following financial instruments would you expect the most positive real-net-wealth impact in times of unexpectedly high inflation?” Respondents rank nominal assets, stocks, real estate, and nominal liabilities. Hence, responses are on a 1–4 ordinal scale, which we reverse for simplicity so that a higher number indicates a better hedge against unexpectedly high inflation.<sup>19</sup> In Columns 5–6, the dependent variable proxies debt aversion, based on reported agreement with the statement “I am uncomfortable with taking on debt.” Five possible responses range from “completely disagree” to “completely agree.”

Provision of information about the wealth effects of inflation impacts beliefs about nominal positions. Respondents who learn about inflation-induced erosion of nominal savings attach a significantly poorer inflation-protection ranking to nominal assets (Column 1–2). Provision of the loan-erosion treatment has a significantly positive effect on the ranking of nominal debt (Columns 3–4). We do not find strong evidence of cross-learning, that is, respondents who learn about the erosion of nominal assets due to unexpectedly high inflation do not infer high inflation also erodes nominal debt, and vice versa.<sup>20</sup> Moreover, learning about inflation-induced loan erosion reduces individuals’ debt aversion, indicating that effects extend beyond the direct inflation context (Columns 5–6). Overall, knowledge about the wealth effects of inflation impacts beliefs about nominal assets and debt, opening up the possibility to affect economic choices, which we discuss in Section 5.2.

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<sup>19</sup>The reduced sample size is due to the fact that respondents were not required to respond to the question.

<sup>20</sup>A statistically weakly significant coefficient on the loan-treatment indicator in Columns 1–2 is partially mechanical, compensating for the treatment-induced effect on the ranking of nominal debt.

## 4.2 Effects on perceived real net wealth

**Average effects** Table 4 quantifies the treatment effects on perceived changes in real net wealth, again based on estimating Equation 1. Importantly, we control for pre-treatment perceptions of changes in real net wealth. Panel A displays results from OLS estimations. The savings treatment has an insignificantly negative effect on perceived wealth changes over the past 12 months (Columns 1–2), the next 12 months (Columns 3–4), and the sum of past and expected changes (Columns 5–6). The loan treatment, instead, significantly increases perceived changes in real net wealth. When we consider the sum of the last and next 12 months, survey participants in the loan treatment group report an almost three-percentage-point-higher change in real net wealth. This effect is economically sizable and corresponds to about 50% of the average estimate of -5.6% in the control group.

Panel B of Table 4 reports results from Huber-robust regressions. Huber regressions allow us to systematically control for outliers and influential observations (see, e.g., Coibion, Gorodnichenko, and Ropele, 2019), which is useful because of rounding, heaping, mean reversion, and survey noise. We find that estimates are quite similar to the ones using OLS, in particular on wealth changes over the past and next 12 months (Columns 5–6), with coefficients generally more precisely estimated. In estimations below that involve perceptions of wealth changes, we therefore focus on Huber regressions to mitigate the impact of extreme observations and for increased precision.<sup>21</sup>

In addition to quantitative wealth-change estimates, we analyze treatment effects on qualitative wealth perceptions. Appendix Table A4 shows survey respondents in the loan-treatment group have significantly more positive perceptions about their wealth in the con-

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<sup>21</sup>The variation in the number of observations across specifications is because (i) Huber regressions weight observations, with particularly influential observations receiving a weight of zero, and (ii) regressions with controls (Columns 2, 4, and 6) include trimmed inflation perceptions (1% tails).



text of unexpected inflation than survey participants in the control group. Specifically, the loan treatment induces more positive responses to a question on the effect of inflation on the respondents' real net wealth over the last twelve months (Columns 1–2). The loan treatment also increases agreement to the statement that with their current balance sheet, respondents are well-prepared for times of high inflation (Columns 4–5). The effects of the savings treatment are insignificant throughout.

To sum up, the loan-erosion treatment leads to higher perceived changes in real net wealth, whereas the effect of the savings-erosion treatment is limited. Success of the information provision in shaping perceptions likely reflects that respondents have limited prior knowledge about inflation-induced erosion of nominal debt. Differential prior knowledge about the erosion of nominal assets versus debt also shows up in respondents' stated knowledge about the treatment information they receive. Appendix Figure A2 shows that respondents report less awareness of the loan- than the savings-erosion information. Our findings imply that consequences of the redistributive effects of unexpected inflation are likely muted in the short run in light of limited awareness of inflation-induced erosion of nominal debt.

The information provision on nominal-debt erosion is therefore able to induce significant exogenous variation in perceptions of real-net-wealth changes. As a result, this treatment can serve as an instrument to help us identify how and whether wealth effects of inflation due to nominal-debt erosion affect spending. Information on nominal-savings erosion, instead, does not shift beliefs sufficiently to serve as a strong first stage. We thus focus on the effects of the loan treatment on spending, through perceived wealth, in Section 5.1.

**Heterogeneity by net nominal position** Do treatment effects on real-net-wealth perceptions vary with net nominal exposure? Table 5 reports results of regressing changes in real net wealth on a treatment indicator interacted with respondents' net nominal position.

Estimates of wealth changes again focus on the past 12 months (Columns 1–2), the next 12 months (Columns 3–4), and the sum of the two (Columns 5–6). The effect of the savings treatment is insignificant for respondents with a negative net nominal position and respondents with a positive net nominal position have a significantly lower wealth perception than those with a negative net nominal position. Respondents in the loan-treatment group with a negative net nominal position relative to respondents in the control group with a negative net nominal position report significantly higher changes in real net wealth. In our preferred specification on perceived past and expected future wealth changes with the full set of controls (Column 6), the difference between the two groups amounts to five percentage points. This effect negates nearly fully the reported average change in real net wealth of -5.8% of respondents with a negative net nominal position in the control group.

Figure 3 graphically illustrates treatment effects by net nominal position. Based on a regression of changes in real net wealth over the past and next 12 months, we plot coefficients and 95% confidence bounds on the interaction of a treatment indicator and respondents' net nominal position. We group the net nominal position into bins of less than -50% of gross wealth, -50% to less than 0%, 0% to 50%, and more than 50%. The estimated change in real net wealth of respondents with a net nominal position of less than -50% to gross wealth is 7.1 percentage points higher in the loan-treatment group than in the control group, whose average estimate is -1.2% (left panel). Hence, the economic magnitude of the treatment effect for highly exposed respondents is sizable. The treatment effect monotonically falls with decreasing nominal-debt exposure. The pattern is comparable albeit much weaker for the savings-erosion treatment: respondents with a net nominal position of more than 50% of gross wealth have a 2.9 percentage points lower estimate of real-net-wealth changes than

similar respondents in the control group.<sup>22</sup>

Two additional pieces of evidence corroborate the mediating role of net nominal exposure for the effects of the loan treatment. First, Appendix Table A4 documents respondents in the loan-treatment group with a negative instead of a positive net nominal position express a more positive qualitative perception about the effect of the recent rise in inflation on their real net wealth (Column 3). Similarly, agreement to the statement that with their balance sheet, respondents are well-positioned to cope with high inflation is stronger for those with a negative net nominal position (Column 6). In both cases, however, differences by net nominal position are not statistically significant.

Second, Appendix Figure A3 shows the cross-sectional raw-data relationship between prior beliefs about respondents' past-12-month change in real net wealth and posterior beliefs about past- and future-12-month changes in real net wealth.<sup>23</sup> In Panel A, we restrict the sample to respondents with a positive net nominal position. The panel reveals that, among net savers, those who receive the savings treatment tend to have lower posterior estimates of wealth changes. In Panel B, the sample includes only respondents with a negative net nominal position. Among net debtors, posterior wealth-change estimates are higher in the loan-treatment than in the control group. Moreover, the effect of the treatment does not appear to be driven by respondents with extreme prior real-net-wealth estimates.

**Comprehension of treatment information** Incorporating information about inflation-induced nominal-debt erosion into estimates of changes in own real net wealth is challenging. Two features of our study likely help respondents to map the treatment information into their own wealth situation. First, respondents are well-educated on average, interested in

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<sup>22</sup>Positive coefficients for those with a negative net nominal position are unlikely to reflect cross-learning, because Table 3 shows that the savings-erosion treatment does not impact beliefs about nominal debt.

<sup>23</sup>We do not elicit the expected 12-month change in real net wealth pre-treatment to avoid survey fatigue when asking the same question twice (Stantcheva, 2023a).

inflation, and take their time to go through the survey. Second, we carefully introduce concepts such as changes in real terms and net wealth, with respondents providing plausible responses on questions involving these concepts. Nonetheless, variation in respondents' ability to incorporate the treatment information into their perceptions of real net wealth may exist. Specifically, differential treatment reactions may reflect heterogeneity in cognitive abilities and interest in the topic of inflation (D'Acunto et al., 2022).

We analyze heterogeneity in respondents' ability to map the loan-treatment information into their own wealth situation in Figure 4, displaying results of regressions of perceived changes in real net wealth on the loan-treatment indicator for different subsamples. In Panel A, we limit the sample to respondents with a negative net nominal position. Importantly, we additionally split the sample by education and beliefs about inflation as proxies for cognitive abilities and interest in inflation. We argue that respondents who completed higher education, expect inflation to be lower in five years, have a relatively accurate perception of current inflation (deviation from the actual rate of at most 0.5 percentage points), or consider inflation to be relatively important should be better able to incorporate the loan-treatment information into beliefs about their own real net wealth. We indeed find treatment effects on real net wealth of highly educated respondents or those with general knowledge or interest in inflation are relatively high and significant (6.9–8.3 pp) compared to those without these characteristics (2.1–3.6 pp).<sup>24</sup> Importantly, on the subsample of respondents with a positive net nominal position (Panel B), the loan-treatment effects on real net wealth are close to zero, independent of the subsample we consider. These findings suggest that respondents with greater ability or with a higher relative interest in the topic are better able to map the implications of inflation-induced nominal-debt erosion to their own net nominal exposure.

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<sup>24</sup>Appendix Table A5 displays the full regression output.

## 5 Wealth effects of inflation and economic choices

In this section, we study the real effect of learning about the wealth effects of inflation on economic choices. In Section 5.1, we link exogenous variation in respondents' knowledge of the effect to planned and actual spending. In Section 5.2, we study how knowledge feeds into debt financing in a hypothetical real-estate investment.

### 5.1 Effects on spending

**Spending data** Do the large changes in perceived real net wealth generated by the loan-erosion information treatment have any effect on spending decisions? We investigate this question using two data sets. First, in the survey, we elicit planned changes in spending on a wide category of nondurable goods and services over the next four weeks relative to the previous four weeks, following Roth and Wohlfart (2020). We elicit these plans via a five-point Likert scale, ranging from “much less” to “much more.” Respondents additionally state whether they plan to buy big-ticket items over the next 12 months, as in Coibion, Gorodnichenko, and Weber (2022). Second, the partnering bank provides us with categorized transaction-level account data. We use the bank data to study actual changes in spending in the 30–90 days after survey participation relative to the 30–90 days before.

The two data sets are complementary to each other. All respondents report spending plans, allowing us to test for effects of the information treatment on intended spending on both nondurable goods and services as well as larger durable goods. The survey data are useful because the administrative bank data (i) do not cover all respondents, (ii) do not necessarily comprise all spending decisions, as respondents may spend from accounts unobservable to us, and (iii) cannot fully distinguish between nondurable and large/durable

spending because big spending categories are cash withdrawals, credit cards, and online shopping, which can entail both. However, the bank data provide a useful check on whether respondents actually follow through with their spending plans.

We first verify that spending plans and actual spending are positively related. Naturally, the correlation will be substantially below one because of survey noise, measurement error, spending in accounts at other banks, other news after our survey intervention that affect actual spending, and the fact that we elicit planned spending via a Likert scale. Appendix Table A6 shows results of regressions of actual spending changes on planned changes in nondurable (Panel A) and large/durable spending (Panel B). We consider actual changes in spending over the 30 days (Columns 1, 4, and 7), 60 days (Columns 2, 5, and 8), and 90 days (Columns 3, 6, and 9) after survey participation relative to before. Planned changes in nondurable spending are the average across categories such as groceries and restaurants. On durable spending, we take the sum across categories such as real estate and cars (the sum is around one; that is, respondents plan to purchase one large/durable item over the next 12 months). We standardize both survey-based measures.

In regressions of actual total and discretionary spending, coefficients on planned spending tend to be significantly positive. Moreover, the association strengthens with the length of the event window, even for the four-week plan on nondurable goods and services as the independent variable, suggesting that changes in planned spending only gradually translate into actual changes in spending. In terms of economic magnitude, a one-standard-deviation increase in planned nondurable spending coincides with €37 (60 days) and €98 (90 days) higher actual discretionary spending, and with €59 (60 days) and €88 (90 days) for large/durable items. Overall, these results indicate that spending plans are consistent with actual measures of spending, which is comforting given that self-reported spending is

the only type of information available for all respondents.

**Planned spending** Table 6 links the loan-erosion information treatment, through its effect on perceived changes in real net wealth, to planned spending. We run regressions of spending plans for each nondurable category (Columns 1–4) and, because of its low frequency, the sum of planned purchases on durable goods (Column 5). To make nondurable and durable spending comparable, we standardize both measures. As a first step, we show that spending plans are significantly positively correlated with respondents’ post-treatment estimates of changes in their real net wealth over the past and next 12 months (Panel A).<sup>25</sup> This result indicates that respondents who perceive a more positive change in their perceived net wealth plan to reduce spending by less, as we find that the control group on average expects to reduce spending on nondurable goods and services over the next four weeks. The single nondurable-spending category not significantly correlated with perceptions of real-net-wealth changes is groceries. Respondents on average do not plan to alter spending on groceries as a function of their real-net-wealth change, which likely reflects its largely non-discretionary nature.

In Panel B, we observe a positive reduced-form effect of the loan-erosion treatment on planned spending. Households in the loan-treatment group expect to spend significantly more on restaurants (Column 2) and leisure (Column 3) than comparable respondents in the control group. Economically, the treatment increases planned spending by 11% of a standard deviation. The effect on planned spending on clothing (Column 4) and durable items (Column 5) is positive but statistically insignificant. As expected, planned spending on groceries does not vary across groups (Column 1).

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<sup>25</sup>We include all respondents in the estimation sample. We account for this choice by adding a treatment indicator to the list of controls. Results are similar when restricting the sample to the control group. Moreover, we abstain from controlling for pre-treatment estimates of changes in real net wealth, because we do not want to relate spending plans to perceived changes in real net wealth that arise as respondents go through the survey. When we add pre-treatment estimates as controls, the coefficient on the post-treatment wealth-change estimate is still significantly positive but weaker.

We then examine how treatment-induced knowledge about nominal-debt erosion caused by unexpected inflation affects planned spending through its impact on own real-net-wealth perceptions. We estimate the following specification:

$$spend_i = \beta \textit{posterior} \textit{rnw}_i + \gamma \textit{prior} \textit{rnw}_i + \textit{controls}_i + \textit{error}_i. \quad (2)$$

*spend<sub>i</sub>* measures either planned spending on nondurable or durable goods and services, or actual spending. *posterior rnw<sub>i</sub>* is the sum of the post-treatment estimate of past- and next-12-month change in perceived real net wealth. We instrument this variable using Equation 1. By using the loan-erosion treatment as a source of exogenous variation in perceived wealth, the instrumental-variables approach can resolve possible endogeneity. *prior rnw<sub>i</sub>* again refers to the pre-treatment directional and point estimate of the past-12-month change in real net wealth. *controls<sub>i</sub>* are similar to Equation 1. We run Huber-robust regression in the first stage and OLS in the second stage when studying planned spending. Following Coibion, Gorodnichenko, and Weber (2022), we use Huber regression in the first stage and a jackknife approach in the second stage to control for outliers and influential observations in both stages when analyzing actual spending.

Panel C of Table 6 reports the results from estimating Equation 2. The Kleibergen-Paap F-statistic for the first stage is 10.3, which is non-homoskedasticity robust in settings like ours with a single endogenous regressor (Andrews, Stock, and Sun, 2019). The coefficient on posterior real-net-wealth changes is significantly positive for the planned change in spending on restaurants (Column 2) and leisure (Column 3). An one-percentage-point increase in perceived real net wealth causes planned spending to go up by around 4% of a standard deviation.<sup>26</sup> The coefficient is positive but insignificant for clothing (Column 4) and durables

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<sup>26</sup>The economic magnitude of the coefficient on real net wealth is substantially above the magnitudes



(Column 5). Again, exogenous variation in perceived wealth changes does not causally affect planned spending on groceries (Column 1). The results indicate that knowledge about the wealth effects of inflation transmits to spending through its effect on wealth perceptions.

**Actual spending** We now turn to the treatment effects on actual spending. In Table 7, we report effects on total spending, as well as nondiscretionary and a discretionary spending separately. Panel A presents reduced-form evidence of a significantly positive effect of the loan-erosion information on total and discretionary spending. Comparing the loan-treatment group with the control group in the 60 days following survey participation, relative to the 60 days prior, the treatment group increases total spending by €187 and discretionary spending by €121. Economically, the effect on discretionary spending constitutes a 6% increase in spending over the average measured spending in the 60 days pre-treatment. The magnitudes are roughly similar over a 90-day window. Effects are weaker over a 30-day horizon, likely because it takes time to adjust spending.

Panel B reports results from an IV regression based on Equation 2. The Kleibergen-Paap F-statistic varies between 7.4 and 10.9, rejecting that the worst-case bias of two-stage least squares exceeds 15–20% of the worst-case error of OLS. We find a positive relation between instrumented posterior real-net-wealth perceptions and total and discretionary spending. Effects are strongest when considering spending over the 60 days post-treatment relative to pre-treatment: a one-percentage-point increase in real net wealth raises total spending by €92 and discretionary spending by €70. Again, the effect on nondiscretionary spending is close to zero and insignificant. The patterns are hence similar to the reduced-form evidence (Panel A), albeit statistical significance is more sparse.

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shown in Panel A. This difference possibly in part reflects that in the absence of news, perceptions of real net wealth are sticky, and households are unlikely to make large adjustments to their short-term spending plans as a consequence. When households receive news about real net wealth instead, for example due to our information intervention, the updating of perceptions can cause larger changes in spending plans.

To gauge the economic magnitudes, we translate the average treatment effects into MPCs using back-of-the-envelope calculations. The loan-erosion treatment increases perceived and expected real net wealth by 2.5 percentage points on average (Table 4). Average net wealth of our respondents is €326,000, corresponding to an increase of €8,150. Hence, with an average treatment effect on total spending of €187 over 60 days (Panel A of Table 7), the estimates translate into an MPC of 2.3%. We calculate a comparable MPC of 2.8% based on the IV regression (Panel B of Table 7), as a one-percentage-point increase in perceived real net wealth (€3,260) induces €92 more total spending. These magnitudes are consistent with estimates from the literature on the stock-market-wealth effect on consumption.<sup>27</sup>

Appendix Table A7 illustrates the robustness of the treatment effects on actual spending. In Panel A, we estimate treatment effects using OLS instead of Huber-robust regressions. Economic magnitudes remain non-trivial but estimates become a bit more noisy. In Panel B, we add uncategorized spending to our measures of total and discretionary spending. We restrict transactions to uncategorized non-integer outflows of below €100, which according to the bank are more likely to constitute consumption (rather than, e.g., peer-to-peer transfers). Treatment effects are slightly larger on average. Results are also robust to additionally controlling for changes in regular income, such as salary, pension, and children's allowances (Panel C), because inflation-induced changes in real net wealth can alter the demand for leisure (Doepke and Schneider, 2006). Similarly, in Panel D, we add other post-treatment expectations to our standard set of controls. These additional controls include expectations about house prices, unemployment, own economic situation, and interest rates, and could in principle confound the loan-treatment effect on spending.<sup>28</sup> The loan-treatment coefficients

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<sup>27</sup>Chodorow-Reich, Nenov, and Simsek (2021) calculate an MPC of three percent in a quantitative model, a magnitude similar to the central scenario in the review by Poterba (2000). Di Maggio, Kermani, and Majlesi (2020) report an MPC of below three percent for the top ten percent of the wealth distribution.

<sup>28</sup>As the loan treatment might alter these expectations, we sacrifice econometric rigor by estimating such

become slightly larger when controlling for these expectations.

**Perceived real-net-wealth change as the underlying mechanism** We interpret our results as reflecting how knowledge about the wealth effects of inflation, through own real-net-wealth perceptions, impacts spending. Our approach, based on Equation 2, yields a “total” estimate of how exogenous variation in these perceptions ultimately affects spending. However, the loan-erosion information provision could alter other perceptions and expectations, which in turn could shape spending choices. For example, households, realizing that debt erosion harms banks’ profits, might expect increases in interest rates. Table 8 reports insignificant loan-treatment effects on a set of other expectations: house prices, unemployment, own income, general optimism, and interest rates.<sup>29</sup> This result suggests knowledge about the wealth effects of inflation indeed affects spending through perceived wealth.

Our results suggest households spend out of perceived wealth gains likely because of increased confidence about their household balance sheet. Indeed, respondents state that their hypothetical MPC out of such unrealized gains is smaller but close to their MPC out of realized gains (Appendix Figure A4). 51% of respondents have a positive MPC out of realized gains and 43% spend out of unrealized gains.<sup>30</sup> Households that receive the loan-erosion information report more positive beliefs about debt, both in the context of inflation and generally, than those in the control group (Table 3). Treated respondents also agree more with the statement that with their balance sheet they are well-positioned for high inflation (Appendix Table A4). Higher household spending might thus reflect greater perceived financial security and confidence about own wealth. This channel is consistent with Fisher (1933) who posits changes in real debt feed into economic activity through consumer

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a model (Angrist and Pischke, 2009).

<sup>29</sup>The point estimate on expected house prices is marginally significant but negative and therefore is unlikely to drive the positive effect of the loan-erosion treatment on consumption.

<sup>30</sup>10% of respondents would spend less, a fraction similar to Fuster, Kaplan, and Zafar (2020).

confidence. More generally, this channel supports the view that autonomous fluctuations in consumer sentiment causally affect consumption (e.g., [Angeletos and La'O, 2013](#)).

## 5.2 Effects on debt financing

Can more positive beliefs about nominal debt induced by the loan-erosion information provision affect debt choices? Table 9 documents effects of the loan-erosion treatment on choices in a hypothetical real-estate investment task. Respondents purchase real estate with up to €500,000 in equity and €500,000 in debt. We also elicit preferences on the mortgage type: adjustable (ARM) versus fixed rate (FRM) and, conditional on selection of a FRM, the length of the fixed-rate period.

Panel A reports reduced-form evidence that survey participants in the loan-treatment and control group are similar in their preferred home value on average. However, the two groups differ significantly in their preferred financing structure. Information about inflation-induced debt erosion increases the average mortgage size by nearly €18,000. This increase leads to a three-percentage-points higher debt/price ratio, relative to an average of 49%. Moreover, the treatment group prefers a FRM over an ARM.

In Panel B, we analyze the effect of the loan-erosion treatment through the perceived inflation protection of debt. We therefore instrument beliefs about the relative inflation protection provided by nominal debt using the loan-erosion-treatment dummy (Columns 3–4 of Table 3 report the first stage). The Kleibergen-Paap F-statistics for the first stage are between 15 and 20. Treatment-induced increases in the perceived inflation protection of nominal debt reduce reliance on equity, increase reliance on debt, and hence lead to a higher debt/price ratio of the transaction. A one-unit increase in the perceived inflation protection of debt (ranging from 1 to 4) increases this ratio by 16 percentage points. These

results indicate that knowledge about inflation-induced erosion of nominal liabilities affects hypothetical financing choices through its positive impact on beliefs about debt.

## 6 Conclusion

We causally study the wealth effects of inflation in an information-provision experiment on customers of a large German bank. On average, households are well-informed about prevailing inflation levels and are highly concerned about the impact of inflation on their wealth. Yet, they know surprisingly little about the reduction in the real value of nominal debt due to surprise inflation. Once we inform respondents about the erosion channel of nominal debt, they increase estimates of their current and expected real net wealth and causally increase their planned and actual consumption. Moreover, treated respondents differ in leverage choices in a hypothetical real-estate transaction. Our results document the redistributive nature of surprise inflation across households and provide causal estimates for how individuals adjust behavior following inflation-induced redistribution of wealth.

Our findings also inform the recent heterogeneous agent New Keynesian (HANK) literature that focuses on the transmission of economic policy, while at the same time being consistent with micro data on the wealth distribution and the composition of wealth (Bayer, Born, and Luetticke, 2023; Kaplan, Moll, and Violante, 2018). In the baseline HANK model, unexpected inflation boosts the economy because the beneficiaries, those with a negative net nominal position, also have higher MPCs than the losers (Auclert, 2019). This result hinges on the assumption that all agents have full information rational expectations (FIRE), that is, they are aware of the Fisher channel and adjust their consumption accordingly. Our finding that net debtors, who are the agents with typically higher MPCs, are largely unaware of the

debt-erosion channel suggests that the direct effects of redistribution might be limited in the short run. Based on our findings, it would be interesting to extend this HANK framework to allow for information frictions and other deviations from FIRE that are consistent with micro survey evidence (Weber et al., 2022). One possible avenue could be following the modeling strategy of Auclert, Rognlie, and Straub (2020) who introduce information rigidity to jointly get large impact MPCs at the micro level and humped-shaped macro responses.

On the policy side, understanding optimal monetary policy in general and the implications for the optimal inflation target in particular remain largely unexplored in a framework that deviates from FIRE (Coibion, Gorodnichenko, and Wieland, 2012; Dávila and Schaab, 2023). Moreover, our results suggest suboptimal debt choices at the individual level given a large fraction of our survey population was initially uninformed about the debt erosion caused by surprise inflation. In addition, wealthier, more educated survey participants, which are overrepresented in our sample relative to the German population, are better informed about inflation-induced nominal-position erosion, which raises the concern of a countervailing redistribution from less informed households to better informed households (D'Acunto et al., 2023). This concern could possibly be countervailed through information campaigns and robo-advise (D'Acunto and Rossi, 2023).

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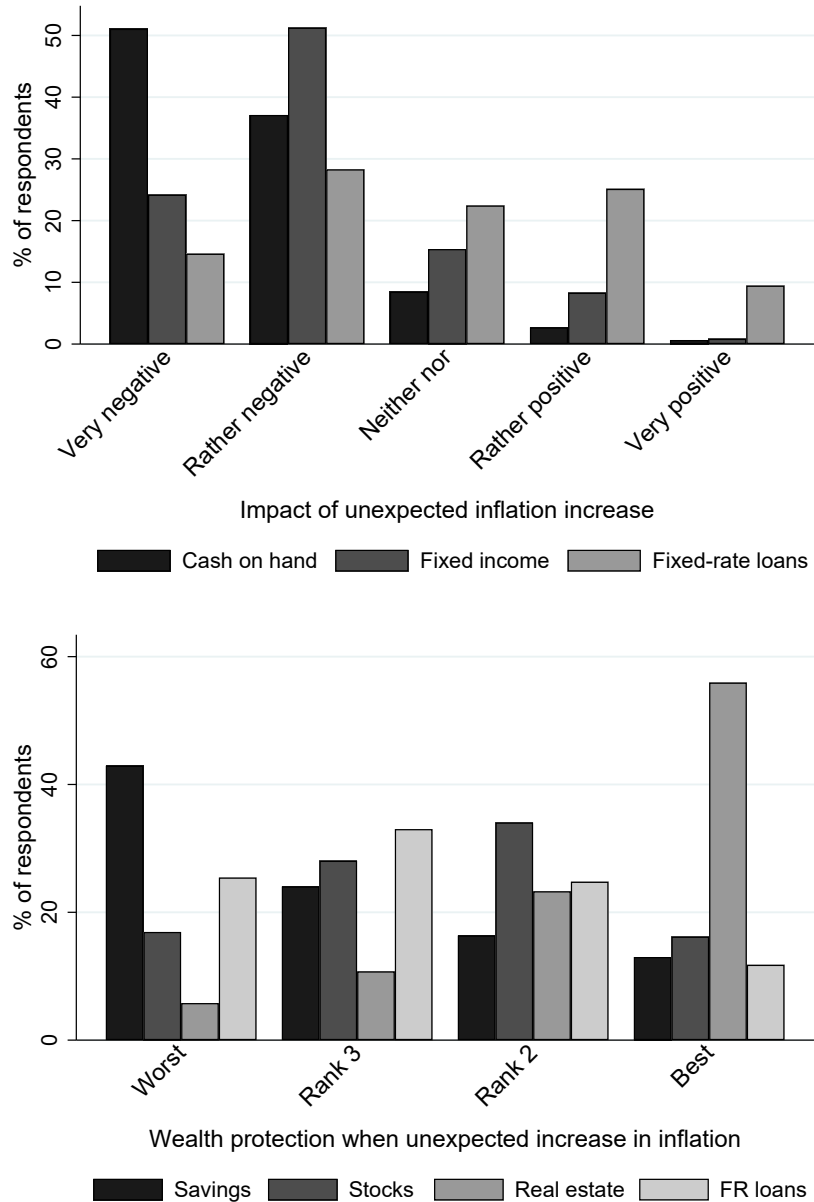


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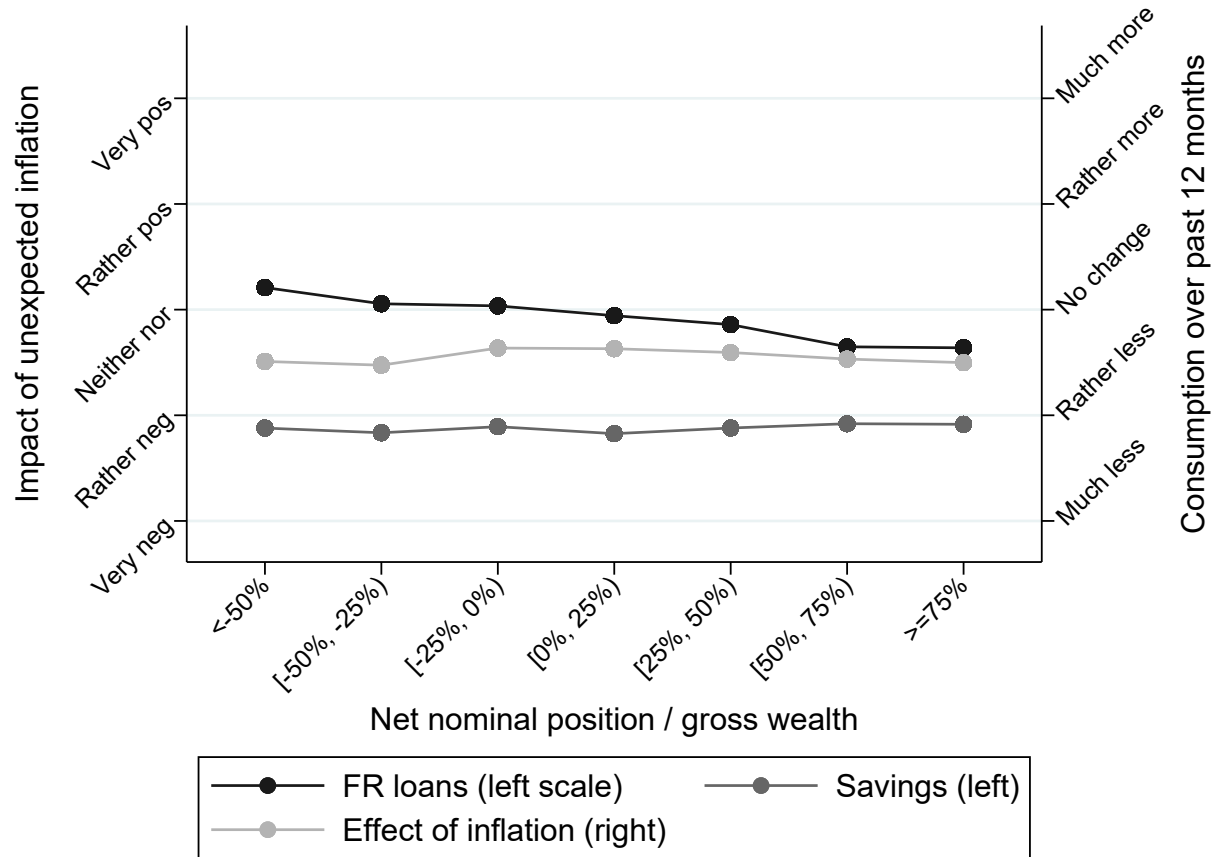
# Figures and Tables

Figure 1: Prior knowledge about the wealth effects of inflation



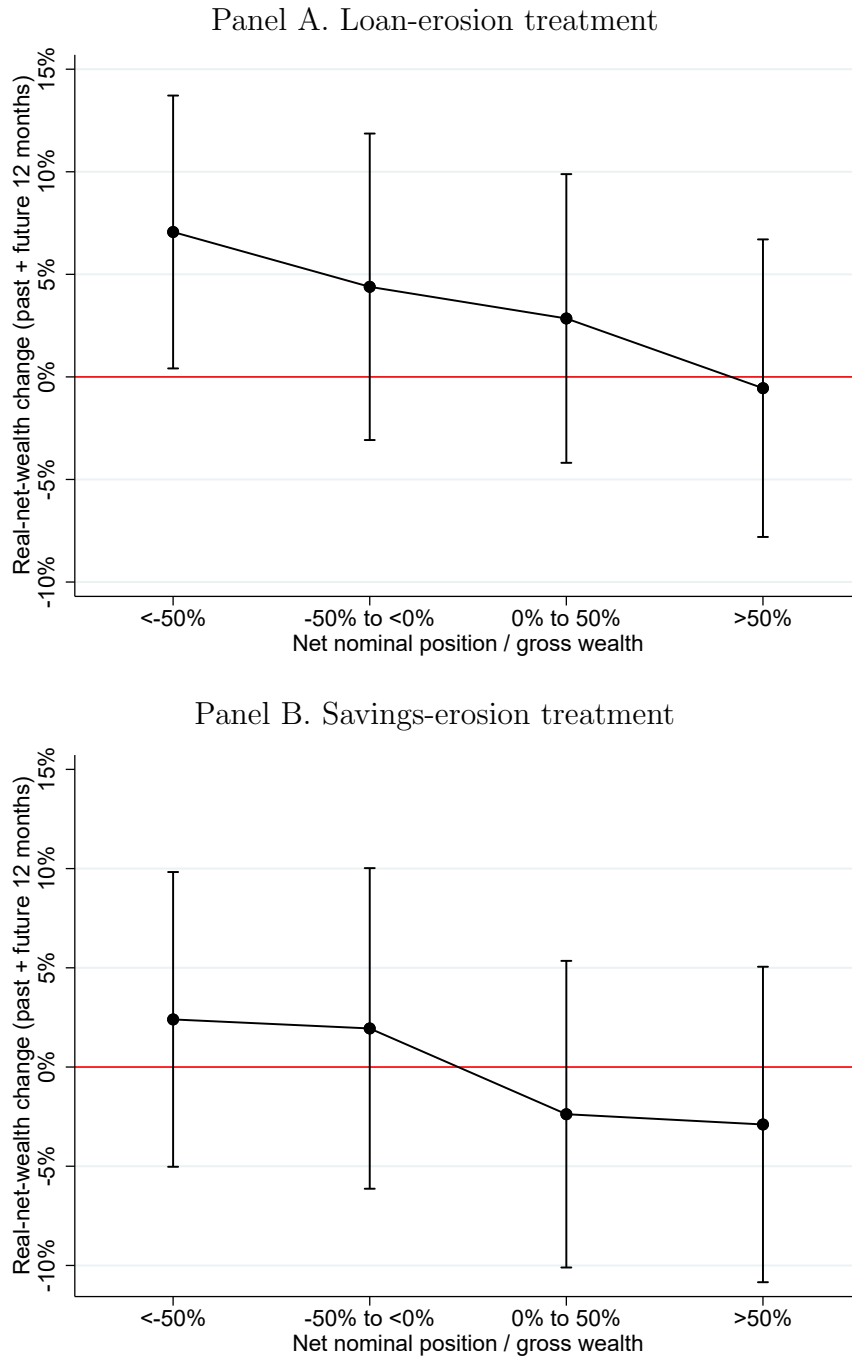
*Notes:* The figures show the distribution of beliefs about how financial instruments fare during an unexpected increase in inflation. The top panel shows the distribution of responses to “What do you think, is an unexpected increase in inflation positive or negative for owners of the following financial products?” For fixed income, we list savings accounts, bonds, and life insurances as examples. The bottom panel shows the distribution of responses to “With which of the following financial products would you expect the highest real-net-wealth return during unexpectedly high inflation? Please state “1” for the product with the best inflation protection, “2” for [...]” We plot responses of the control group only, as we pose this question post-treatment. We list examples of savings products.

Figure 2: Prior knowledge about the wealth effects of inflation by NNP



Notes: Referring to the left vertical axis, we plot average responses by respondents' net nominal position to the question "What do you think, is an unexpected increase in inflation positive or negative for owners of the following financial products?" *FR loans* refers to fixed-rate loans. *Savings* are the average of cash on hand and fixed income. For fixed income, we list savings accounts, bonds, and life insurances as examples. Referring to the right vertical axis, we plot average responses by respondents' net nominal position to the question "Have you consumed rather more or less as a consequence of changes in the following factors over the past 12 months, such as abstained from a purchase or purchased something extra?" One of the factors we ask about is the rate of inflation.

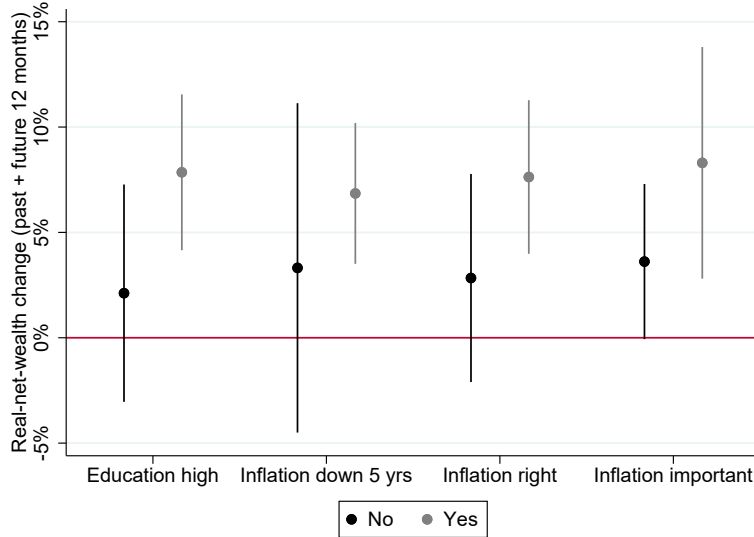
**Figure 3: Treatment effect on changes in perceived real net wealth by NNP**



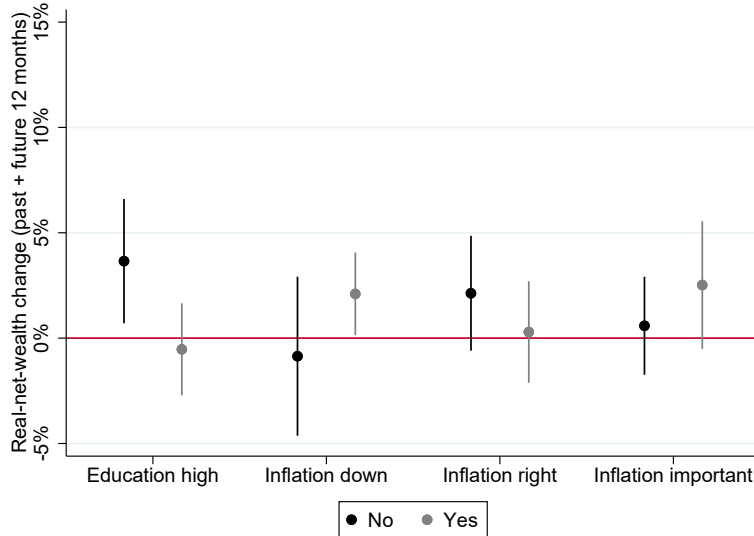
*Notes:* The figures report coefficients and 95% confidence bounds from regressions of respondents' post-treatment perceptions of changes in real net wealth over the sum of the past and next 12 months. We regress these perceptions on a loan-treatment (Panel A) or savings-treatment indicator (Panel B), interacted with respondents' net nominal position as a fraction of their gross wealth. We describe the treatments in detail in Section 2.1. Regressions include the standard set of controls. Results are from Huber-robust regressions to control for outliers and influential observations. Standard errors are robust to heteroscedasticity.

**Figure 4: Heterogeneity in loan-treatment effect on perceived real net wealth**

Panel A. Subsample of households with negative net nominal position



Panel B. Subsample of households with positive net nominal position



*Notes:* The figures report coefficients and 95% confidence bounds on the loan-treatment indicator from regressions of respondents' post-treatment perceptions of changes in real net wealth over the past and next 12 months. We describe the treatment in detail in Section 2.1. In Panel A, these regressions are limited to households with a negative NNP; in Panel B, regressions are limited to households with a positive NNP. Moreover, we split the sample by another respondent characteristic: *Education high*, which equals one for completed higher education and zero otherwise; *Inflation down 5 yrs*, which is one if the rate of inflation expected in five years is below currently perceived inflation; *Inflation right*, which is one if currently perceived inflation deviates by at most 0.5 pp from actual inflation; and *Inflation important*, which is one if respondents perceive inflation to be substantially more important for their own wealth than the average of GDP growth, stock prices, and interest rates. Regressions include the standard set of controls. Results are from Huber-robust regressions to control for outliers and influential observations. Standard errors are robust to heteroscedasticity.

**Table 1: Descriptive statistics**

<i>Data sources:</i>	PHF	Bank sample				
<i>Statistics:</i>	Mean	Mean	SD	P25	P50	P75
<b>Demographic characteristics</b>						
Female (0/1)	0.50	0.45	0.50	0.00	0.00	1.00
Age (years)	52.97	48.08	15.08	36.00	48.00	60.00
University completed (0/1)	0.29	0.48	0.50	0.00	0.00	1.00
Business at university (0/1)		0.10	0.30	0.00	0.00	0.00
Employed (0/1)	0.54	0.72	0.45	0.00	1.00	1.00
Gross wealth (€k)	238.13	385.57	659.37	25.00	120.83	463.02
Nominal assets / gross wealth (%)	37.21	42.67	33.66	10.00	30.00	79.00
Nominal debt / gross wealth (%)	10.12	16.78	22.88	0.00	5.00	30.00
Homeowner (0/1)	0.44	0.59	0.49	0.00	1.00	1.00
Stockholdings (0/1)	0.20	0.54	0.50	0.00	1.00	1.00
<b>Spending and income</b>						
Total spending (avg./month)		1,844	1,202	1,001	1,604	2,385
Nondiscretionary spending (avg./month)		818	584	397	702	1,106
Discretionary spending (avg./month)		978	763	432	785	1,329
Regular income (avg./month)	2,274	2,862	2,002	1,457	2,381	3,826
<b>Perceptions and expectations</b>						
Inflation rate today (%)		8.78	6.24	7.00	7.90	8.00
Inflation rate in 12 months (%)		10.39	9.80	6.00	8.50	10.00
Inflation rate in five years (%)		10.67	15.07	3.00	5.00	10.50
Real-net-wealth change past 12 months (%)		-7.45	14.91	-14.00	-6.00	0.00
Inflation important for own wealth (0–4)		2.37	1.02	2.00	2.00	3.00
GDP growth important for own wealth (0–4)		1.73	1.06	1.00	2.00	2.00
Interest rates important for own wealth (0–4)		1.34	1.14	0.00	1.00	2.00

*Notes:* This table reports summary statistics for respondents' characteristics (survey data), spending and income (bank data), and perceptions and expectations (survey data). We present the variables' mean, standard deviation (SD), 25th percentile (P25), median (P50), and 75th percentile (P75). We compare our respondents to a representative German sample from the 2017 wave of the Bundesbank's Panel on Household Finances. In our sample, we winsorize the 1% tails of gross wealth. Spending and income measures are monthly averages spanning the six months preceding the survey, and are winsorized at the 97.5th percentile. The belief variables reported in the table refer to priors elicited before the treatment. Priors on inflation and own real net wealth are point estimates, with the 1% tails trimmed. The baseline number of observations is 3,190.

**Table 2: Correlates of beliefs about balance-sheet effects of unexpected inflation**

<i>Dependent variable:</i>	Unexpected inflation increase positive or negative for...				
	cash	fixed income	stocks	real estate	FR loans
	(1)	(2)	(3)	(4)	(5)
Female (0/1)	-0.039 (0.028)	0.001 (0.032)	-0.117*** (0.034)	-0.042 (0.040)	-0.141*** (0.042)
Age group					
>35 to 45 years	0.000 (0.045)	-0.053 (0.051)	-0.139*** (0.053)	-0.228*** (0.063)	-0.029 (0.064)
>45 to 55 years	-0.003 (0.046)	-0.113** (0.052)	-0.125** (0.054)	-0.145** (0.064)	-0.066 (0.067)
>55 to 65 years	-0.017 (0.047)	-0.227*** (0.053)	-0.201*** (0.056)	-0.118* (0.066)	-0.103 (0.069)
>65 years	0.062 (0.051)	-0.249*** (0.054)	-0.089 (0.059)	-0.065 (0.068)	-0.088 (0.074)
University completed (0/1)	-0.114*** (0.032)	0.041 (0.036)	0.080** (0.038)	-0.015 (0.043)	0.062 (0.047)
Business at university (0/1)	-0.095** (0.042)	-0.031 (0.058)	-0.012 (0.056)	0.059 (0.066)	0.260*** (0.075)
Log gross wealth	-0.066*** (0.010)	-0.032*** (0.011)	0.015 (0.011)	0.087*** (0.014)	0.121*** (0.014)
Stockholdings (0/1)	-0.090*** (0.032)	-0.019 (0.036)	-0.027 (0.039)	-0.008 (0.045)	0.164*** (0.048)
Real estate (0/1)	0.112*** (0.036)	0.090** (0.040)	0.000 (0.042)	0.078 (0.050)	-0.063 (0.051)
Inflation relatively important	-0.121*** (0.030)	-0.048 (0.034)	0.005 (0.035)	0.119*** (0.041)	0.090** (0.045)
Accurate inflation perception (0/1)	-0.120*** (0.036)	-0.057 (0.038)	0.037 (0.040)	0.093* (0.048)	0.028 (0.049)
Inflation lower in five years (0/1)	-0.104*** (0.033)	0.056 (0.036)	0.123*** (0.039)	0.110** (0.046)	0.304*** (0.047)
Observations	3,134	3,134	3,134	3,134	3,134
R-squared	0.06	0.02	0.02	0.04	0.09

*Notes:* This table reports estimates of regressions of beliefs about the impact of an unexpected inflation increase on various balance-sheet items, measured on an ordinal scale from 0 (“very negative”) to 4 (“very positive”). For *fixed income*, we list savings accounts, bonds, and life insurances as examples. *FR loans* refers to fixed-rate loans. *Inflation relatively important* measures respondents’ beliefs about the importance of inflation for own wealth relative to the average importance of GDP growth, interest rates, and stock prices. *Accurate inflation perception* is a dummy equal to one if respondents’ estimate of current inflation is at most 1.5 pp off actual inflation. *Inflation lower in five years* indicates the expectation that inflation will be lower in five years than it is perceived today. Robust standard errors are in parentheses. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .



**Table 3: Treatment effects on beliefs about nominal positions**

<i>Dependent variable:</i>	Inflation-protection ranking					
	Nominal assets		Nominal debt		Debt aversion	
	(1)	(2)	(3)	(4)	(5)	(6)
Treat: savings erosion	-0.131*** (0.047)	-0.133*** (0.045)	0.050 (0.043)	0.055 (0.044)	0.043 (0.049)	0.053 (0.048)
Treat: loan erosion	-0.085* (0.048)	-0.084* (0.046)	0.196*** (0.045)	0.187*** (0.045)	-0.136*** (0.050)	-0.142*** (0.048)
Controls	N	Y	N	Y	N	Y
Avg. Y control group	1.97	1.96	2.23	2.23	2.65	2.65
Observations	2,977	2,928	2,977	2,928	3,190	3,134
R-squared	0.00	0.11	0.01	0.04	0.00	0.11

*Notes:* This table reports regression estimates of beliefs about nominal positions in each treatment group relative to the control group. To elicit the beliefs about inflation protection (Columns 1–4), we ask: “With which of the following financial products would you expect the highest real-net-wealth return during unexpectedly high inflation?” Respondents rank *nominal assets*, stocks, real estate, and *nominal debt* relative to each other, with higher numbers indicating better performance. For *nominal assets*, we list cash on hand, savings accounts, bonds, and life insurances as examples. In Columns 5–6, the dependent variable measures agreement with the statement “I am uncomfortable with taking on debt.” Five possible responses range from “completely disagree” to “completely agree.” We describe the treatments in detail in Section 2.1. The list of controls is in Section 4. *Observations* are lower in Columns 1–4 because respondents may skip this question and lower in odd-numbered columns because we trim the 1% tails of inflation beliefs that serve as controls. Robust standard errors are in parentheses. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table 4: Treatment effect on perceived changes in real net wealth**

<i>Dependent variable:</i>	Change in real net wealth					
	Last 12 months		Next 12 months		Last + next 12 months	
	(1)	(2)	(3)	(4)	(5)	(6)
<b>Panel A. Estimation based on OLS</b>						
Treat: savings erosion	-0.932 (0.648)	-0.807 (0.646)	-0.835 (0.769)	-0.981 (0.773)	-1.767 (1.217)	-1.788 (1.222)
Treat: loan erosion	1.490** (0.676)	1.743*** (0.666)	1.260 (0.769)	1.204 (0.761)	2.749** (1.222)	2.947** (1.207)
Observations	3,190	3,134	3,190	3,134	3,190	3,134
R-squared	0.17	0.19	0.10	0.13	0.18	0.20
<b>Panel B. Estimation based on robust regression</b>						
Treat: savings erosion	-1.428*** (0.391)	-1.247*** (0.386)	-0.741 (0.508)	-0.737 (0.511)	-1.809** (0.786)	-1.606** (0.781)
Treat: loan erosion	0.441 (0.398)	0.602 (0.392)	1.025** (0.517)	1.543*** (0.517)	1.793** (0.794)	2.495*** (0.787)
Observations	3,123	3,059	3,165	3,112	3,161	3,099
R-squared	0.46	0.48	0.24	0.26	0.38	0.40
Controls for prior beliefs	Y	Y	Y	Y	Y	Y
Controls for demographics	N	Y	N	Y	N	Y
Avg. Y control group	-2.51	-2.55	-3.11	-3.01	-5.62	-5.56

*Notes:* This table reports the perception and expectation of changes in the real net wealth in each treatment group relative to the control group. Columns 1 and 2 consider real-net-wealth changes estimated over the past 12 months, Columns 3 and 4 refer to changes estimated over the next 12 months, and Columns 5 and 6 show estimates of changes over the last plus next 12 months. Panel A reports estimates from ordinary least squares regressions; results in Panel B are from Huber-robust regressions to control for outliers and influential observations. We describe the treatments in detail in Section 2.1. The list of controls is in Section 4. *Observations* are lower in odd-numbered columns because we trim the 1% tails of inflation beliefs that serve as controls. Robust standard errors are in parentheses. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table 5: Treatment effect on perceived changes in real net wealth by NNP**

<i>Dependent variable:</i>	Change in real net wealth					
	Last 12 months		Next 12 months		Last + Next 12 months	
	(1)	(2)	(3)	(4)	(5)	(6)
Treat: savings erosion	0.283 (0.748)	0.559 (0.730)	-0.092 (0.956)	0.517 (0.953)	0.711 (1.523)	1.632 (1.508)
Treat: loan erosion	1.155 (0.769)	1.658** (0.752)	2.254** (1.001)	2.895*** (0.984)	3.859** (1.559)	5.017*** (1.528)
NNP $\geq$ 0	0.971 (0.606)	1.208** (0.603)	0.502 (0.804)	0.999 (0.820)	1.388 (1.222)	2.280* (1.241)
Treat: savings erosion $\times$ NNP $\geq$ 0	-2.278*** (0.879)	-2.529*** (0.859)	-0.764 (1.126)	-1.673 (1.125)	-3.204* (1.773)	-4.447** (1.762)
Treat: loan erosion $\times$ NNP $\geq$ 0	-0.942 (0.900)	-1.513* (0.880)	-1.500 (1.167)	-1.880 (1.154)	-2.606 (1.808)	-3.546** (1.784)
Controls for prior beliefs	Y	Y	Y	Y	Y	Y
Controls for demographics	N	Y	N	Y	N	Y
Avg. Y omitted group	-2.52	-2.74	-3.15	-3.22	-5.56	-5.82
Observations	3,127	3,059	3,165	3,112	3,158	3,101
R-squared	0.46	0.48	0.24	0.26	0.38	0.39

*Notes:* This table reports the perception and expectation of changes in the real net wealth in each treatment group relative to the control group. Columns 1 and 2 consider changes estimated over the past 12 months, Columns 3 and 4 refer to changes estimated over the next 12 months, and Columns 5 and 6 show estimates of changes over the past plus next 12 months. We describe the treatments in detail in Section 2.1.  $NNP \geq 0$  equals one if the respondent has a non-negative net nominal position and is zero otherwise. *Controls for prior beliefs* include a directional and a point estimate of past-12-month changes in real net wealth. *Controls for demographics* include a quadratic polynomial in the respondent's age, risk tolerance, the log of gross wealth, and dummy variables for the respondent's gender, marital status, educational level, business-related university degree, employment status, beliefs about inflation (trimmed at 1% tails), voucher instead of lottery survey-participation incentive, and whether participation follows a reminder email sent to encourage survey participation. Results are from Huber-robust regressions to control for outliers and influential observations. Robust standard errors are in parentheses. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table 6: Perceived changes in real net wealth and planned spending**

<i>Dependent variable:</i>	Planned spending				
	Groceries	Restaurants	Leisure	Clothing	Durables
	(1)	(2)	(3)	(4)	(5)
<b>Panel A. Endogenous regression</b>					
RNW change	0.001 (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.003*** (0.001)
Controls for prior RNW	N	N	N	N	N
Observations	3,134	3,134	3,134	3,134	3,134
R-squared	0.04	0.16	0.13	0.10	0.08
<b>Panel B. Reduced form</b>					
Treat: loan erosion	-0.007 (0.043)	0.110*** (0.041)	0.108** (0.042)	0.042 (0.042)	0.069 (0.043)
Controls for prior RNW	Y	Y	Y	Y	Y
Observations	2,088	2,088	2,088	2,088	2,088
R-squared	0.04	0.16	0.12	0.10	0.09
<b>Panel C. Instrumental variable</b>					
RNW change	-0.010 (0.017)	0.037* (0.019)	0.041** (0.020)	0.015 (0.017)	0.027 (0.019)
Controls for prior RNW	Y	Y	Y	Y	Y
Observations	2,065	2,065	2,065	2,065	2,065
1 <sup>st</sup> stage F-stat	10.31	10.31	10.31	10.31	10.31
Controls for demographics	Y	Y	Y	Y	Y
Avg. Y	0.00	0.00	0.00	0.00	0.00

*Notes:* This table reports estimates from regressions of planned spending. In Columns 1–4, we measure changes in planned spending on various nondurables over the next four weeks relative to the last four weeks on a five-point scale, ranging from “much less” to “much more.” In Column 5, the dependent variable is the number of durable items expected to purchase over the next 12 months. *RNW change* is the post-treatment point estimate of last- and next-12-month changes in own real net wealth. In Panels B and C, we omit the savings-erosion treatment group. In Panel C, we instrument *RNW change* using the loan-erosion treatment. The list of controls is in Section 4. Results are from OLS regressions (Huber robust in first stage in Panel C). Robust standard errors are in parentheses. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table 7: Perceived changes in real net wealth and actual spending**

<i>DV:</i>	Total			Nondiscretionary			Discretionary		
<i>Window:</i>	30	60	90	30	60	90	30	60	90
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<b>Panel A. Reduced form</b>									
T: loan	65.6*	186.5***	166.9**	-4.8	21.7	38.2	40.8*	121.0***	132.8**
	(36.4)	(59.6)	(78.4)	(15.8)	(24.3)	(33.1)	(24.7)	(40.8)	(55.8)
N	1,465	1,513	1,477	1,431	1,414	1,405	1,451	1,488	1,497
R2	0.03	0.03	0.02	0.03	0.02	0.03	0.03	0.04	0.03
<b>Panel B. Instrumental variable</b>									
RNW	29.8	92.4**	42.6	0.9	7.8	18.0	33.2*	70.3**	55.8
	(24.1)	(44.5)	(46.2)	(8.7)	(13.8)	(20.3)	(19.4)	(34.2)	(38.7)
N	1,460	1,469	1,452	1,451	1,441	1,429	1,447	1,465	1,458
F-stat	8.49	8.83	8.12	10.92	10.51	9.01	8.00	8.18	7.35
Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
Avg. Y	-267.0	-308.4	-22.8	-92.6	-46.6	58.7	-147.2	-222.9	-240.3

*Notes:* This table reports estimates from regressions of actual spending. We study total (Columns 1–3), nondiscretionary (Columns 4–6), and discretionary (Columns 7–9) spending, as described in Section 2.2. We compare individual-level aggregate spending in the 30, 60, and 90 days following survey participation relative to the same time window pre-participation respectively. *RNW* is the post-treatment point estimate of the sum of last- and next-12-month changes in own real net wealth. We instrument this estimate using the loan-erosion information treatment. We omit the savings-erosion treatment group from the estimations. Section 2.1 entails detailed descriptions of the treatments. All regressions include the standard set of controls, described in Section 4. Results in Panel A are from Huber-robust regressions to control for outliers and influential observations. In Panel B, we use Huber regressions in the first stage and a jackknife procedure in the second stage. Robust standard errors are in parentheses. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table 8: Treatment effects on other expectations**

<i>Dependent variable:</i>	12-month expectation				Change in interest rates	
	House prices	Unemployment	Own income	Optimism	One year	Five years
	(1)	(2)	(3)	(4)	(5)	(6)
Treat: loan erosion	-0.087* (0.047)	-0.058 (0.040)	-0.036 (0.038)	-0.005 (0.048)	-0.036 (0.101)	-0.274 (0.183)
Controls	Y	Y	Y	Y	Y	Y
Avg. Y control group	2.46	2.58	1.66	1.92	1.49	2.64
Observations	2,088	2,088	2,088	2,088	2,067	2,065
R-squared	0.09	0.04	0.11	0.11	0.04	0.11

*Notes:* This table reports expectations of the loan-erosion treatment group relative to the control group. In Columns 1–3, we study 12-month-ahead expectations using a five-point scale, ranging from “much lower” to “much higher.” The dependent variable in Column 4 measures agreement, on a five-point scale ranging from “completely disagree” to “completely agree,” to the statement “I am optimistic about the future.” In Columns 5–6, we compare point estimates of expected interest rates relative to the perceived current interest rate (1% tails trimmed). Section 2.1 entails detailed descriptions of the treatments. The list of controls is in Section 4. Results are from OLS regressions. Robust standard errors are in parentheses. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table 9: Perceived inflation protection of debt and real-estate investment**

<i>Dependent variable:</i>	Price (€k)	Equity (€k)	Debt (€k)	Debt/price	FRM
	(1)	(2)	(3)	(4)	(5)
<b>Panel A. Reduced form</b>					
Treat: loan erosion	5.474 (7.574)	-9.829 (6.254)	17.770*** (6.202)	0.031*** (0.009)	0.073* (0.039)
Observations	2,082	2,088	2,088	2,082	2,088
R-squared	0.19	0.11	0.12	0.06	0.06
<b>Panel B. Instrumental variable</b>					
Debt as inflation hedge	0.067 (44.590)	-67.138* (36.228)	83.528** (40.753)	0.160** (0.065)	0.321 (0.268)
Observations	1,914	1,940	1,933	1,913	1,910
1 <sup>st</sup> stage F-stat	17.70	20.29	16.89	18.46	15.12
Controls	Y	Y	Y	Y	Y
Avg. Y control group	542.79	280.25	260.48	0.48	2.22

*Notes:* This table reports estimates from regressions of features of a hypothetical real-estate transaction. Column 1 is on the preferred hypothetical purchase price, capped at €1,000,000; Column 2 considers the equity stake, capped at €500,000; Column 3 refers to the size of the mortgage, also capped at €500,000; Column 4 features the debt-to-price ratio; and Column 5 is on an ordinal-scale variable that takes on 0 if respondents choose an adjustable-rate mortgage, 1 in case of a mortgage with a five-year fixed-rate period, 2 for a 10-year fixed-rate period, 3 for a 20-year fixed-rate period, and 4 for a 30-year fixed-rate period. Section 2.1 entails detailed descriptions of the treatments. To elicit beliefs about *Debt as inflation hedge*, we ask: “With which of the following financial products would you expect the highest real-net-wealth return during unexpectedly high inflation?” Respondents rank nominal assets, stocks, real estate, and nominal debt relative to each other, with higher numbers indicating higher relative returns. We instrument the perceived inflation protection of nominal debt using the loan-erosion information treatment. The list of controls is in Section 4. In Panel A, results are from Huber-robust regressions to control for outliers and influential observations. In Panel B, we use OLS in the first stage and a jackknife procedure in the second stage. Robust standard errors are in parentheses. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

Online Appendix:  
Households' Response to the Wealth Effects of Inflation

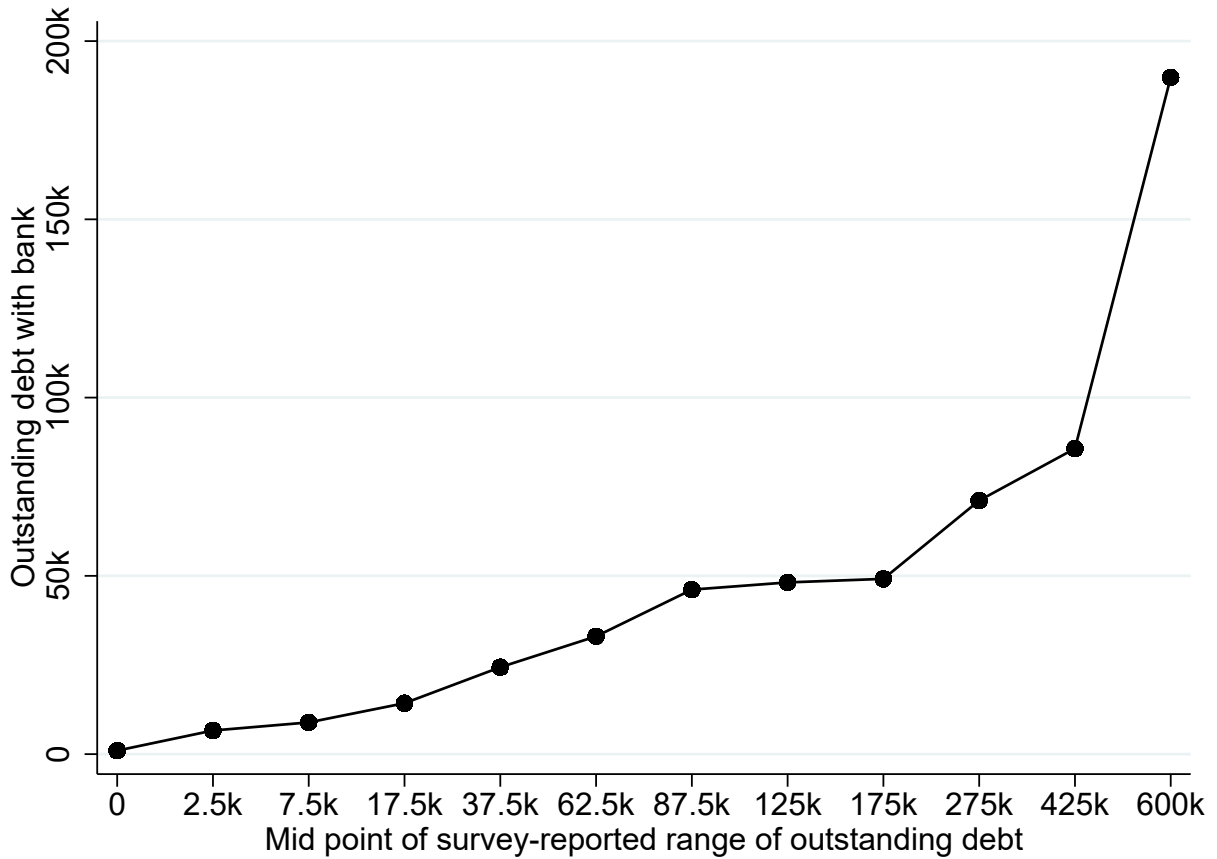
Philip Schnorpfel, Michael Weber, and Andreas Hackethal

*Not for Publication*



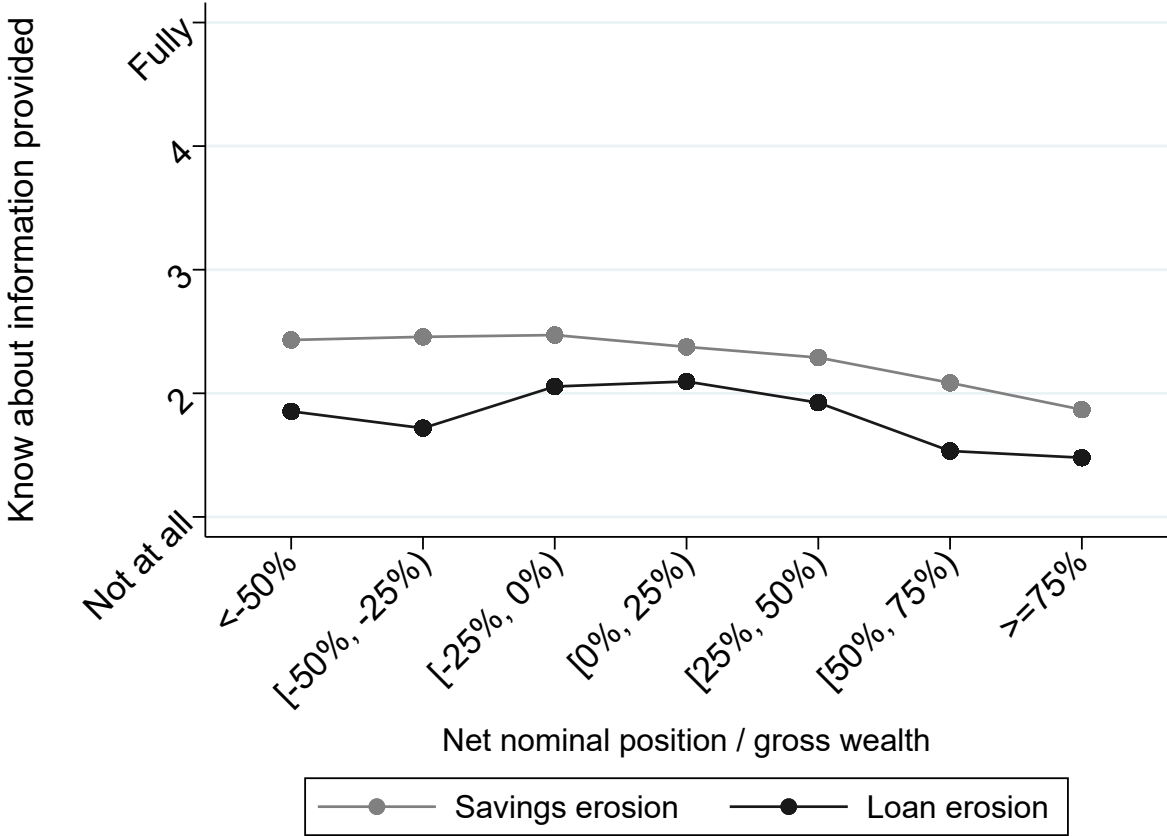
## A Appendix figures and tables

Figure A1: Association between debt reported in survey and data from bank



*Notes:* This figure documents respondents' average debt balance with our bank partner in the month of survey participation for each mid point of outstanding-debt bandwidth reported by respondents in the survey. The debt balance at the bank includes consumer and mortgage debt. In the survey, households select the value of their outstanding debt, if any, from various ranges we provide. We take the respective mid point of the ranges we ask about.

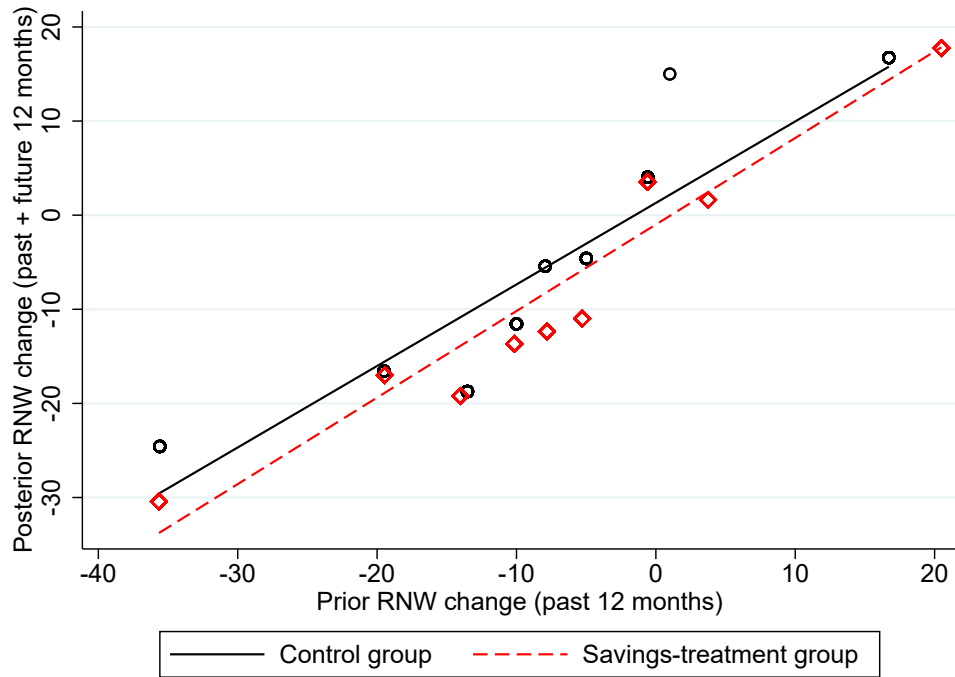
Figure A2: Knowledge about information provided by treatment and NNP



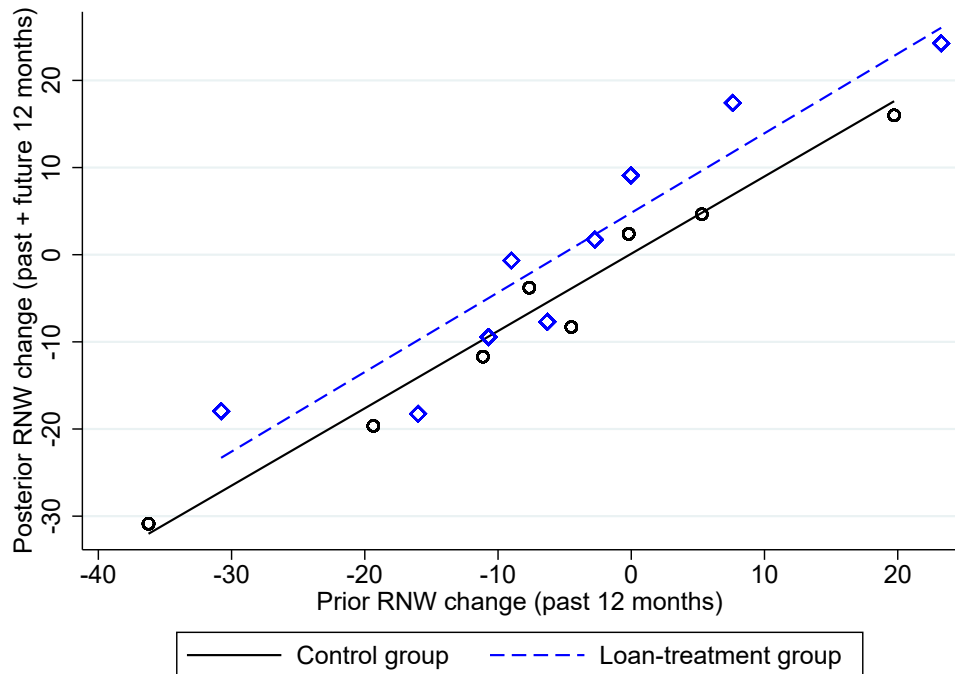
Notes: The figure shows respondents' stated knowledge about the treatment information. We plot averages by treatment (savings erosion vs. debt erosion) and net nominal position as a fraction of gross wealth. Naturally, the control group does not receive this question.

**Figure A3: Treatment effects on beliefs about RNW changes by prior and NNP**

Panel A: Effect of savings-erosion treatment on positive-NNP subjects

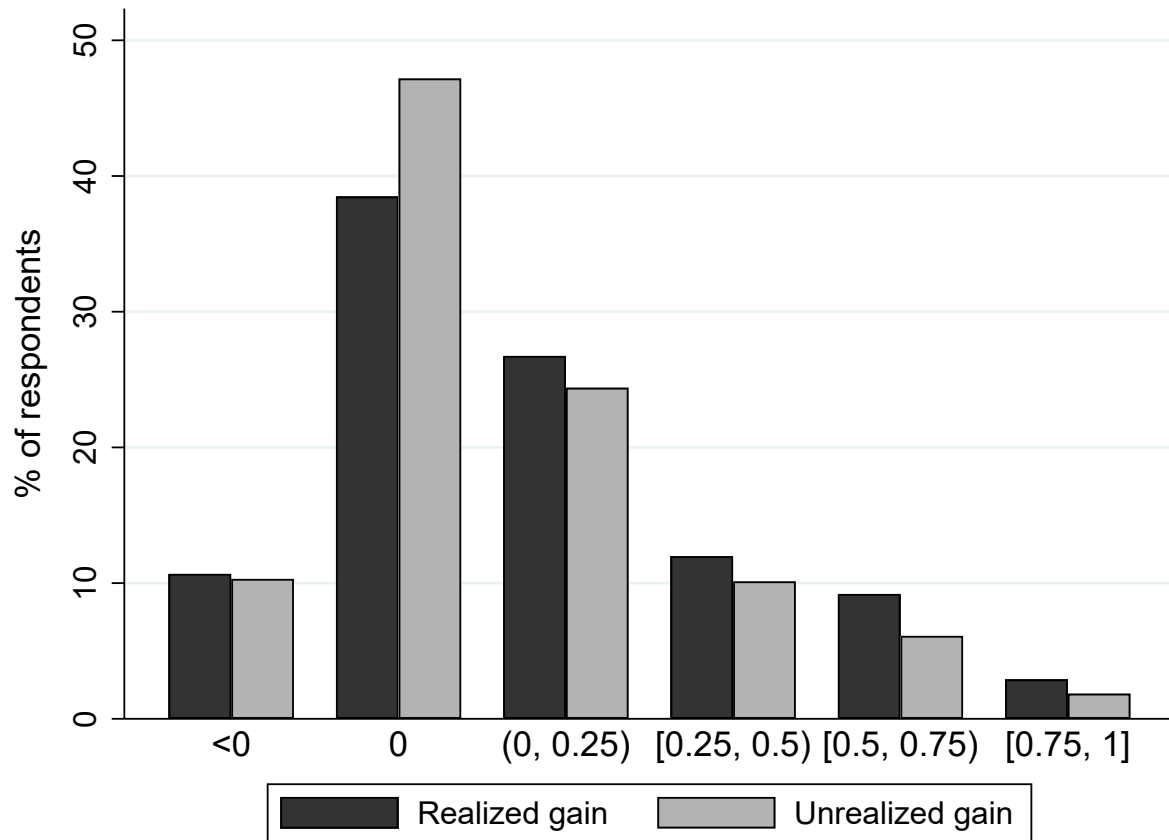


Panel B: Effect of loan-erosion treatment on negative-NNP subjects



*Notes:* This figure reports binscatter plots of respondents' post-treatment beliefs about changes in their real net wealth over the last 12 months plus next 12 months, conditional on pre-treatment estimates of past-12-month RNW changes. In Panel A, the sample comprises respondents with a positive net nominal position. In Panel B, the sample contains respondents with a negative NNP.

Figure A4: Marginal propensity to consume out of realized vs. unrealized gains



*Notes:* This figure shows a histogram of MPCs for two gain scenarios. On realized gains, we pose the following question: “Please consider a hypothetical situation where you unexpectedly receive a one-time payment of €10,000 today. How would you change your spending behavior over the next three months as a consequence of that?” On the unrealized-gain scenario, we ask: “Please consider that today you carefully calculate your total wealth, from which you subtract the value of outstanding loans. You are surprised to realize that you own €10,000 more than previously believed. How would you change your spending behavior over the next three months as a consequence of that?” Respondents use a slider to indicate a spending response between €-10,000 and €10,000.

**Table A1: Consumption categories**

	Total spending	Nondiscretionary spending	Discretionary spending
	(1)	(2)	(3)
<b>Living</b>			
Groceries	Yes		Yes
Clothing	Yes	Yes	
Multimedia	Yes		Yes
Hairdresser/wellness	Yes	Yes	
Drugstore	Yes		Yes
Pets	Yes		Yes
Cafeteria	Yes		Yes
Gifts	Yes	Yes	
Other living expenses	Yes	Yes	
<b>Housing</b>			
Rent	Yes		Yes
Energy and water	Yes		Yes
Furniture / home accessories	Yes	Yes	
Housing fees	Yes		Yes
Domestic help	Yes		Yes
Property taxes	Yes		Yes
Renovations	Yes	Yes	
Other housing expenses	Yes		Yes
<b>Leisure</b>			
Restaurants/cafes/bars	Yes	Yes	
Events/tickets	Yes	Yes	
Sports/fitness	Yes	Yes	
Hobbies/clubs/associations	Yes	Yes	
Vacation / travel expenses	Yes	Yes	
Books/music/movies/apps	Yes	Yes	
Electronics/computers/games	Yes	Yes	
Subscriptions	Yes		Yes
Other leisure expenses	Yes	Yes	
<b>Transportation</b>	Yes		Yes

*continued*

**Table A1** continued

	Total spending	Nondiscretionary spending	Discretionary spending
	(1)	(2)	(3)
<b>Health</b>			
Pharmacy	Yes		Yes
Physician	Yes		Yes
Glasses / contact lenses	Yes		Yes
Hospital	Yes		Yes
Other health expenses	Yes		Yes
<b>Children</b>			
Activities and toys	Yes	Yes	
Children's clothing	Yes	Yes	
Childcare	Yes		Yes
School fees	Yes		Yes
Other expenses on children	Yes	Yes	
<b>Career</b>			
Office supplies / teaching material	Yes		Yes
Business travel	Yes		Yes
Tuition	Yes		Yes
Continuing education	Yes		Yes
Other career-related expenses	Yes		Yes
<b>Other outflows</b>			
Donations	Yes	Yes	
Cash withdrawals	Yes	Yes	
Credit card	Yes	Yes	
Online purchases	Yes	Yes	

*Notes:* This table reports spending categories coming from the partner bank's PFM tool, and how we assign them to the three spending measures. Details on these measures are in Section 2.2.

**Table A2: Balancedness across treatment arms**

	Control group (1)	Treat: savings (2)	p-value (1)=(2) (3)	Treat: loan (4)	p-value (1)=(4) (5)	p-value (2)=(4) (6)
<b>Demographic characteristics</b>						
Female (0/1)	0.48	0.45	0.20	0.42	0.01***	0.14
Age (years)	48.34	47.82	0.43	48.06	0.66	0.71
University completed (0/1)	0.51	0.47	0.07*	0.47	0.10*	0.88
Business at university (0/1)	0.10	0.10	0.90	0.11	0.57	0.65
Employed (0/1)	0.71	0.71	0.96	0.73	0.32	0.34
Gross wealth (€k)	407.25	401.13	0.84	348.09	0.03**	0.06*
Nominal assets / gross wealth (%)	43.09	41.55	0.29	43.37	0.85	0.21
Nominal debt / gross wealth (%)	17.06	15.94	0.25	17.35	0.77	0.16
Homeowner (0/1)	0.60	0.60	0.99	0.57	0.25	0.25
Stockholdings (0/1)	0.54	0.55	0.41	0.53	0.91	0.35
<b>Spending and income</b>						
Total spending (avg./month)	1,870	1,840	0.63	1,808	0.32	0.60
Nondiscretionary spending (avg./month)	837	799	0.21	813	0.42	0.64
Discretionary spending (avg./month)	985	994	0.81	949	0.36	0.25
Regular income (avg./month)	2,847	2,899	0.62	2,813	0.74	0.40
<b>Perceptions and expectations</b>						
Inflation rate today (%)	8.62	8.87	0.34	8.85	0.40	0.93
Inflation rate in 12 months (%)	10.22	10.55	0.44	10.41	0.65	0.76
Inflation rate in five years (%)	10.50	10.77	0.67	10.73	0.72	0.95
Real-net-wealth change past 12 months (%)	-7.61	-7.12	0.44	-7.63	0.97	0.43
Inflation important for own wealth (0–4)	2.39	2.31	0.09*	2.42	0.52	0.02**
GDP growth important for own wealth (0–4)	1.76	1.73	0.41	1.69	0.11	0.42
Interest rates important for own wealth (0–4)	1.40	1.29	0.03**	1.33	0.19	0.41

*Notes:* This table shows means for different observable characteristics of respondents in each treatment arm (Columns 1, 2, and 4). We provide a check of balance of means across arms in Columns 3, 5, and 6. We winsorize the 1% tails of gross-wealth estimates. Spending and income measures are monthly averages spanning the six months preceding the survey, and are winsorized at the 97.5th percentile. The belief variables reported in the table refer to priors elicited before the information treatment. Priors on inflation and own real net wealth are point forecasts, with the 1% tails trimmed. The baseline number of observations is 3,190.

**Table A3: Full set of correlates of beliefs about balance-sheet effects of inflation**

<i>Dependent variable:</i>	Unexpected inflation increase positive or negative for...				
	cash	fixed income	stocks	real estate	FR loans
	(1)	(2)	(3)	(4)	(5)
Female (0/1)	-0.021 (0.030)	0.012 (0.034)	-0.113*** (0.037)	-0.048 (0.043)	-0.173*** (0.044)
Age group					
>35 to 45 years	-0.009 (0.048)	-0.049 (0.056)	-0.094 (0.057)	-0.150** (0.069)	0.048 (0.070)
>45 to 55 years	-0.017 (0.050)	-0.102* (0.057)	-0.080 (0.060)	-0.046 (0.071)	0.034 (0.074)
>55 to 65 years	-0.043 (0.053)	-0.200*** (0.059)	-0.154** (0.063)	-0.027 (0.074)	0.024 (0.077)
>65 years	0.040 (0.073)	-0.205*** (0.079)	-0.079 (0.085)	0.020 (0.095)	-0.001 (0.107)
East Germany (0/1)	0.013 (0.036)	-0.005 (0.041)	0.001 (0.043)	0.023 (0.049)	-0.045 (0.053)
University completed (0/1)	-0.102*** (0.033)	0.045 (0.037)	0.071* (0.038)	-0.025 (0.044)	0.060 (0.048)
Business at university (0/1)	-0.093** (0.042)	-0.040 (0.060)	-0.031 (0.056)	0.056 (0.067)	0.243*** (0.076)
Married (0/1)	-0.008 (0.030)	0.033 (0.036)	0.000 (0.037)	0.042 (0.043)	-0.008 (0.046)
Retired (0/1)	0.008 (0.065)	-0.012 (0.071)	0.021 (0.079)	-0.047 (0.084)	-0.047 (0.099)
Student (0/1)	-0.040 (0.076)	0.008 (0.078)	0.036 (0.084)	0.218** (0.101)	0.107 (0.103)
Employee (0/1)	0.008 (0.033)	0.011 (0.041)	-0.003 (0.042)	-0.032 (0.050)	-0.142*** (0.053)
Craftsman (0/1)	0.151** (0.068)	-0.086 (0.075)	-0.172** (0.082)	-0.243** (0.096)	-0.239*** (0.093)
Risk tolerance	0.000 (0.016)	0.027 (0.017)	0.056*** (0.018)	0.021 (0.021)	0.061*** (0.023)
Money illusion (0/1)	0.032 (0.032)	0.003 (0.037)	-0.035 (0.037)	0.033 (0.043)	-0.197*** (0.049)
Inflation relatively important	-0.117*** (0.030)	-0.049 (0.035)	0.008 (0.036)	0.105** (0.042)	0.091** (0.045)
Accurate inflation perception (0/1)	-0.119*** (0.037)	-0.063 (0.039)	0.033 (0.040)	0.096** (0.048)	0.021 (0.049)
Inflation lower in five years (0/1)	-0.086**	0.056	0.116***	0.093**	0.265***

*continued*



**Table A3 continued**

<i>Dependent variable:</i>	Unexpected inflation increase positive or negative for...				
	cash	fixed income	stocks	real estate	FR loans
	(1)	(2)	(3)	(4)	(5)
	(0.034)	(0.036)	(0.039)	(0.046)	(0.048)
Log gross wealth	-0.065***	-0.042***	0.013	0.090***	0.116***
	(0.010)	(0.012)	(0.012)	(0.015)	(0.015)
Stockholdings (0/1)	-0.106***	-0.040	-0.060	-0.022	0.141***
	(0.033)	(0.039)	(0.041)	(0.048)	(0.050)
Homeowner (0/1)	0.122***	0.035	0.034	0.080	-0.103*
	(0.043)	(0.048)	(0.052)	(0.060)	(0.060)
Net nominal position / gross wealth					
-50% to <-25%	0.021	-0.070	-0.069	-0.022	-0.139
	(0.076)	(0.102)	(0.100)	(0.118)	(0.129)
-25% to <0%	0.081	0.024	0.002	-0.220**	-0.174
	(0.069)	(0.091)	(0.087)	(0.106)	(0.115)
0% to <25%	0.103	-0.095	0.061	-0.070	-0.301***
	(0.065)	(0.086)	(0.085)	(0.102)	(0.110)
25% to <50%	0.119*	-0.072	0.010	-0.096	-0.288**
	(0.072)	(0.093)	(0.091)	(0.109)	(0.117)
50% to <75%	0.162**	-0.135	0.001	-0.199*	-0.316**
	(0.078)	(0.097)	(0.098)	(0.116)	(0.123)
≥75%	0.055	-0.152	0.100	-0.017	-0.195
	(0.079)	(0.100)	(0.100)	(0.118)	(0.125)
Participation following reminder (0/1)	0.032	0.006	0.017	-0.078**	-0.012
	(0.028)	(0.032)	(0.033)	(0.039)	(0.042)
Participation incentive voucher (0/1)	-0.025	0.014	0.044	-0.002	-0.009
	(0.029)	(0.034)	(0.035)	(0.041)	(0.044)
Observations	3,091	3,091	3,091	3,091	3,091
R-squared	0.07	0.02	0.03	0.05	0.11

*Notes:* This table reports estimates of regressions of beliefs about the impact of an unexpected inflation increase on various balance-sheet items, measured on an ordinal scale from 0 (“very negative”) to 4 (“very positive”). For *fixed income*, we list savings accounts, bonds, and life insurances as examples. *FR loans* refers to fixed-rate loans. *Inflation relatively important* measures respondents’ beliefs about the importance of inflation for own wealth relative to the average importance of GDP growth, interest rates, and stock prices. *Accurate inflation perception* is a dummy equal to one if respondents’ estimate of current inflation is at most 1.5 pp off actual inflation. *Inflation lower in five years* indicates the expectation that inflation will be lower in five years than it is perceived today. *Participation following reminder* indicates survey participation after the bank sent a reminder email to the selected respondents. *Participation incentive voucher* equals one if the respondent received a guaranteed voucher (rather than a lottery ticket) for survey participation. Robust standard errors are in parentheses. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table A4: Treatment effects on beliefs about own wealth**

<i>Dependent variable:</i>	Inflation positive effect on RNW			Strong balance sheet when inflation		
	(1)	(2)	(3)	(4)	(5)	(6)
Treat: savings erosion	-0.009 (0.032)	-0.014 (0.031)	-0.018 (0.065)	0.042 (0.045)	0.026 (0.042)	0.118 (0.078)
Treat: loan erosion	0.096*** (0.032)	0.104*** (0.032)	0.170** (0.070)	0.072 (0.044)	0.094** (0.041)	0.143* (0.076)
NNP $\geq$ 0			-0.020 (0.052)			-0.031 (0.069)
Treat: savings erosion $\times$ NNP $\geq$ 0			0.006 (0.074)			-0.113 (0.092)
Treat: loan erosion $\times$ NNP $\geq$ 0			-0.087 (0.079)			-0.064 (0.090)
Controls	N	Y	Y	N	Y	Y
Avg. Y omitted group	-0.36	-0.36	-0.34	1.71	1.72	1.90
Observations	3,190	3,134	3,134	3,190	3,134	3,134
R-squared	0.00	0.03	0.03	0.00	0.18	0.17

*Notes:* This table reports beliefs about own wealth in the context of inflation of respondents in each treatment group relative to those in the control group. Columns 1–3 consider beliefs about the impact of inflation on respondents’ real net wealth over the past 12 months. The question reads: “What has been the impact of the following factors on the change of your real net wealth over the past 12 months?” Five response options range from “very negative” to “very positive.” From the response to inflation we subtract the average response to the other factors we ask about (Ukraine conflict, COVID-19, climate change, economic growth). Columns 4–6 refer to agreement to the statement that the respondent’s balance sheet is well-suited for high inflation. Five response options range from “completely disagree” to “completely agree.” Section 2.1 entails detailed descriptions of the treatments.  $NNP \geq 0$  is a dummy equal to one if the respondent has a non-negative net nominal position and zero otherwise. The list of controls is in Section 4. Results are from OLS regressions. Robust standard errors are in parentheses. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table A5: Heterogeneity in loan-treatment effect on perceived change in RNW**

<i>Dependent variable:</i>	Real-net-wealth change over last + next 12 months			
<i>Characteristic:</i>	Education high	Inflation down in 5	Inflation accurate	Inflation important
	(1)	(2)	(3)	(4)
<b>Panel A. Subset with negative NNP and characteristic satisfied</b>				
Treat: loan erosion	7.852*** (1.877)	6.850*** (1.699)	7.630*** (1.851)	8.302*** (2.785)
Observations	270	353	270	199
R-squared	0.45	0.42	0.57	0.46
<b>Panel B. Subset with negative NNP and characteristic not satisfied</b>				
Treat: loan erosion	2.115 (2.619)	3.317 (3.956)	2.836 (2.507)	3.615* (1.872)
Observations	255	166	249	327
R-squared	0.45	0.35	0.36	0.40
<b>Panel C. Subset with positive NNP and characteristic satisfied</b>				
Treat: loan erosion	-0.532 (1.111)	2.101** (0.999)	0.290 (1.227)	2.520 (1.544)
Observations	751	927	735	667
R-squared	0.47	0.43	0.46	0.39
<b>Panel D. Subset with positive NNP and characteristic not satisfied</b>				
Treat: loan erosion	3.655** (1.503)	-0.858 (1.923)	2.130 (1.388)	0.586 (1.185)
Observations	831	621	819	914
R-squared	0.30	0.31	0.34	0.32
Controls	Y	Y	Y	Y
Avg. Y control group	-5.62	-5.62	-5.62	-5.62

*Notes:* This table reports estimates of regressions of perceived RNW changes on various subsamples based on respondent characteristics: *Education high*, which equals one for completed higher education and zero otherwise; *Inflation down in 5*, which is one if the rate of inflation expected in five years is below currently perceived inflation; *Inflation accurate*, which is one if currently perceived inflation deviates by at most 0.5 pp from actual inflation; and *Inflation important*, which is one if respondents perceive inflation to be substantially more important for their own wealth than the average of GDP growth, stock prices, and interest rates. In Panels A and C, we run regressions on the subsample of respondents who satisfy a characteristic, respectively. In Panels B and D, we consider the subsamples of respondents not satisfying a characteristic. Moreover, we split the sample based on respondents' net nominal position (negative in Panels A and B, non-negative in Panels C and D). Section 2.1 entails detailed descriptions of the treatment. The list of controls is in Section 4. Results are from Huber-robust regressions to control for outliers and influential observations. Standard errors are robust to heteroscedasticity. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table A6: Correlation between planned and actual changes in spending**

<i>Dep. var.:</i>	Total			Nondiscretionary			Discretionary		
<i>Window:</i>	30	60	90	30	60	90	30	60	90
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<b>Panel A. Planned nondurables spending</b>									
Nondurables	44.6** (18.2)	62.4** (30.6)	111.9*** (41.2)	18.2** (8.4)	18.2 (12.6)	9.4 (17.1)	17.6 (12.4)	36.9* (20.5)	97.6*** (30.1)
N	1,466	1,514	1,472	1,432	1,413	1,407	1,455	1,489	1,493
R2	0.03	0.03	0.02	0.04	0.02	0.03	0.03	0.04	0.04
<b>Panel B. Planned durables spending</b>									
Durables	17.9 (18.6)	76.7** (30.0)	54.7 (40.9)	6.4 (8.0)	5.0 (12.3)	-5.7 (16.2)	4.8 (12.5)	58.8*** (21.3)	88.3*** (29.2)
N	1,465	1,514	1,476	1,431	1,414	1,405	1,453	1,490	1,494
R2	0.03	0.03	0.02	0.03	0.02	0.03	0.03	0.04	0.04
Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
Avg. Y	-217.2	-174.5	91.8	-91.8	-37.2	84.1	-130.2	-124.4	-153.5

*Notes:* This table reports estimates from regressions of actual spending on planned spending. We study total (Columns 1–3), nondiscretionary (Columns 4–6), and discretionary (Columns 7–9) spending, as described in Section 2.2. We compare individual-level aggregate spending in the 30, 60, and 90 days following survey participation relative to the same time window pre-participation, respectively. In Panel A, *Nondurables* is the average planned change in spending across nondurables categories (groceries, restaurants, leisure, clothing) over the next four weeks relative to the past four weeks. Five response options range from “much less” to “much more.” In Panel B, *Durables* is the sum of planned spending across large/durables categories (real estate, vehicles, large household items, large vacations, luxury goods, others) over the next 12 months. The list of controls is in Section 4. Results are from Huber-robust regressions to control for outliers and influential observations. Robust standard errors are in parentheses. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table A7: Robustness of treatment effects on actual spending**

<i>Dep. var.:</i>	Total			Nondiscretionary			Discretionary		
<i>Window:</i>	30	60	90	30	60	90	30	60	90
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<b>Panel A. Estimation using OLS</b>									
T: loan	117.9*	264.1**	136.2	44.3	85.9*	48.8	56.2	177.6**	116.1
	(68.2)	(102.5)	(136.8)	(31.2)	(51.6)	(72.0)	(51.7)	(74.6)	(96.3)
N	1,514	1,514	1,514	1,514	1,514	1,514	1,514	1,514	1,514
R2	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03
<b>Panel B. Adding uncategorized spending to total and discretionary spending</b>									
T: loan	66.1*	190.6***	177.8**	-4.8	21.7	38.2	39.3	130.9***	141.1**
	(37.0)	(60.6)	(79.7)	(15.8)	(24.3)	(33.1)	(25.6)	(41.6)	(56.4)
N	1,466	1,513	1,483	1,431	1,414	1,405	1,455	1,489	1,493
R2	0.03	0.03	0.02	0.03	0.02	0.03	0.03	0.04	0.03
<b>Panel C. Adding change in income as control</b>									
T: loan	69.6*	171.8***	162.3**	-4.0	21.1	34.4	42.0*	117.9***	129.3**
	(37.0)	(59.9)	(76.6)	(15.8)	(24.0)	(32.9)	(25.1)	(41.1)	(55.5)
N	1,466	1,512	1,480	1,435	1,411	1,404	1,455	1,491	1,498
R2	0.03	0.04	0.03	0.04	0.03	0.03	0.03	0.04	0.04
<b>Panel D. Adding controls for other expectations</b>									
T: loan	73.4**	198.8***	166.0**	-1.5	22.8	42.4	44.4*	130.5***	131.8**
	(36.8)	(60.2)	(79.5)	(16.0)	(24.7)	(33.7)	(25.5)	(41.3)	(55.8)
N	1,448	1,494	1,459	1,414	1,402	1,390	1,437	1,467	1,471
R2	0.04	0.03	0.02	0.04	0.03	0.03	0.03	0.04	0.04
Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
Avg. Y	-267.0	-308.4	-22.8	-92.6	-46.6	58.7	-147.2	-222.9	-240.3

*Notes:* This table shows estimates from regressions of actual spending. We study total (Columns 1–3), nondiscretionary (Columns 4–6), and discretionary (Columns 7–9) spending, as described in Section 2.2. We compare individual-level aggregate spending in the 30, 60, and 90 days following survey participation relative to the same time window pre-participation respectively. In Panel A, we use OLS rather than Huber-robust regressions. In Panel B, we add uncategorized non-integer outflows worth less than €100 to total and discretionary spending. In Panel C, we add regular income (such as salary, pension, children’s allowances) to the list of controls. In Panel D, we add to the list of controls the 12-months-ahead expectation about house prices, unemployment, and own income; general optimism; and expectations about changes in interest rates over the next 12 months and 5 years. Section 2.1 entails detailed descriptions of the treatment. The list of controls is in Section 4. Results are from Huber-robust regressions (other than in Panel A). Robust standard errors are in parentheses. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

## B Experimental instructions

This appendix provides the survey instructions translated from German into English. We use green text in parentheses to highlight aspects of the survey design. We show non-numerical response options to the questions using a), b), c), and so forth.

### B.1 Welcome screen

#### Welcome to this survey by Goethe University Frankfurt!

The survey will take **about 10 minutes**. Your responses will be aggregated and only be used for scientific research. If you feel you are unfamiliar with some of the survey topics, that is fine. We just ask you for your best guess. Since we are interested in your unfiltered opinion, please refrain from using external sources (e.g., Google).

In return for your completed participation, you will receive an **Amazon voucher worth €10** [if voucher version] / get the **chance to win one of 50 Amazon vouchers worth €50** [if lottery version]. To receive the voucher [if voucher version] / To receive the voucher in case of a win [IF lottery version], you can enter your e-mail address at the end of the survey. Your email address will only be used to send you the voucher.

Please do not use the “Back” button in your browser, as this may require restarting the survey.

Do you have questions? Please contact us at [umfrage@finance.uni-frankfurt.de](mailto:umfrage@finance.uni-frankfurt.de).

### B.2 Pre-treatment section

**Q1:** What is your highest level of educational attainment?

- a) Currently pursuing apprenticeship or studies (no degree yet)
- b) Finished apprenticeship at training college or company
- c) Finished apprenticeship at technical school or university of cooperative education
- d) Obtained Bachelor, graduated from university of applied sciences or technical college
- e) Diploma or Master, finished teacher training
- f) Finished doctorate studies
- g) Other professional degree
- h) No degree (and not currently pursuing apprenticeship or studies)

[Ask if Q1=d), e), or f)]

**Q1.1:** In what field of study did you obtain your highest educational attainment?

- a) Economics and Business Administration
- b) Computer Science
- c) Law
- d) Medicine or Psychology
- e) Engineering
- f) Other field of study

[Randomized order of Q2 and Q3]

[Randomized assignment to either gain frame, or loss frame in Q2 and Q3]

**Q2:** Please imagine that you unexpectedly receive [if gain frame] / have to make [if loss frame] a **one-time payment of €10,000** today. How would this change your spending **over the next three months?**

*Please click and drag the sliders below. [Range is from €-10,000 to €10,000, in €100 increments]*

How much more/less would you save?

How much more/less would you spend?

How much higher/lower would your outstanding loans be?

**Q3:** Please imagine that today you carefully calculate the total value of your assets and subtract from it the value of possible outstanding loans. You realize to your own surprise that you have **€10,000 more** [if gain frame] / less [if loss frame] than previously assumed. How would this change your spending **over the next 3 months?**

*Please click and drag the sliders below. [Range is from €-10,000 to €10,000, in €100 increments]*

How much more/less would you save?

How much more/less would you spend?

How much higher/lower would your outstanding loans be?

**Q4:** To what extent does your wealth situation depend on the following factors?

Response options: Not at all – Very little – Somewhat – Strongly – Very strongly

[Factors presented in randomized order]

Inflation rate

Economic growth

Stock prices

Interest rates

**Q5:** Have you consumed rather more or less as a consequence of changes in the following factors **over the past 12 months**, such as abstained from a purchase or purchased something extra?

Response options: Much less – Rather less – No change – Rather more – Much more

[Factors presented in randomized order]

Inflation rate

Economic growth

Stock prices

Interest rates

**Q6:** What do you think is the current rate of inflation in Germany, and what will it be in the future?

Note: the rate of inflation is the percentage change in overall prices in the economy in the last 12 months, most commonly measured by the Consumer Price Index. A falling price level is commonly known as “deflation”.

*If you think there was deflation, please enter a negative value. You may enter up to one decimal point.*

Current rate of inflation: \_\_\_\_%

Expected rate of inflation in one year: \_\_\_\_%

Expected rate of inflation in five years: \_\_\_\_%

**Q6.1:** How certain are you about your responses?

Response options: 1 (“Not at all certain”) – 2 – 3 – 4 – 5 (“Very certain”)

Current rate of inflation

Expected rate of inflation in one year

Expected rate of inflation in five years

**Q7:** What is the composition of your household’s **gross wealth**? Gross wealth includes all assets, without deducting outstanding loans. For example, if you bought property financed by a loan, only the current value of the property is part of gross wealth, without deducting the outstanding loan amount.

Example: a household has €20 of cash, €80 of real estate, and €40 of loans. Gross wealth is therefore €100. Cash constitutes 20% and real estate 80% of gross wealth.

*Please enter “0” if a category does not apply to you. The sum of your entries should equal 100%.*

Cash and fixed-rate savings (e.g., saving accounts, bonds, life insurances): \_\_\_\_%

Stocks: \_\_\_\_%

Real estate (owner-occupied or investment): \_\_\_\_%

Other (e.g. vehicles, gold): \_\_\_\_%

**Total (the sum should equal 100): [Sum of values above] %**



[If the total of the asset entries does not equal 100%, the following message is displayed: “Please make sure that the sum of your entries equals 100%.”]

How large are outstanding loans as a share of your gross wealth? Example: a household has €100 of gross wealth and €40 of loans. Loans have a 40% share of gross wealth.

*Enter a “0” if you do not have any outstanding debt.*

Mortgages: \_\_\_\_%

Consumer loans: \_\_\_\_%

[As soon as the respondent makes a loan entry, the following text is displayed.]

Your outstanding loans make up [sum of share of mortgages and consumer loans]% of your gross wealth. Thus, your net wealth is [1 - (sum of share of mortgages and consumer loans)]% of your gross wealth.

**Q8:** For some of the following questions, we kindly ask you to provide information about **real-value changes**. These changes take inflation into account. For example, an investor who earns a 5% annual return would achieve a real return of -2% with 7% inflation. Thus, despite having a positive nominal return, this investor experiences a loss in purchasing power.

Now, please think about the **net wealth** of your household. This is your gross wealth minus your outstanding loans. How has the real value of your net wealth changed **in the past twelve months**?

Real value gain: Net worth has increased more than inflation.

Net wealth has increased similar to inflation.

Real value loss: Inflation has increased more than net wealth.

[If a) or c) in Q8, ask the following question]

**Q8.1:** Please estimate **how positively** [if a)] / **negatively** [if c)] your net wealth has changed in real terms.

*Please click and drag the slider below.*

Positive real change in % [if a)] / Negative real change in % [if c)]. [Slider ranging from 1% to 60%]

**Q9:** What do you think, is an **unexpected increase in inflation** rather positive or negative for owners of the following financial instruments?

Response options: Very negative – Rather negative – Neither nor – Rather positive – Very positive

Cash on hand

Fixed-rate products (e.g., time deposits, bonds, life insurances)

Stocks

Real estate

Fixed-rate loans

**Q9.1:** How certain are you about your responses?

Response options: 1 (“Not at all certain”) – 2 – 3 – 4 – 5 (“Very certain”)

### B.3 Treatment section

[Control group]

The current inflation rate in Germany is **8.7%**. This is the highest rate in more than 70 years. That is, goods and services priced at €100 one year ago now cost €108.70 on average.

[Savings-erosion treatment group]

The **current inflation rate in Germany is 8.7%**, the highest rate in more than 70 years. That is, goods and services priced at €100 one year ago now cost €108.7 on average. This price increase has a relatively **negative effect on savers**: the savings amount (e.g., checking account, bond, life insurance) is unchanged nominally or lower, but worth less in real terms as a consequence of money depreciation.

As an example, consider a €50,000 savings product with a three-year maturity that you took out one year ago. The real value of the savings product has already fallen sharply, and will depreciate further if inflation remains high: **€50,000 savings value one year ago ↓ €38,800 real value today**

The **inflation-induced savings depreciation** thus has a negative effect on the real net wealth of savers.

Note: the numbers come from current calculations by the Universities of Chicago and Frankfurt (**calculation details**).

[Loan-erosion treatment group]

The **current inflation rate in Germany is 8.7%**, the highest rate in more than 70 years. That is, goods and services priced at €100 one year ago now cost €108.7 on average. This price increase has a relatively **positive effect on borrowers**: the loan amount is unchanged nominally, but worth less in real terms as a consequence of money depreciation.

As an example, consider a €50,000 loan with a three-year maturity that you took out one year ago. The real value of the loan has already fallen sharply, and will depreciate further if inflation remains high: **€50,000 loan value one year ago ↓ €38,800 real value today**

The **inflation-induced loan depreciation** thus has a positive effect on the real net wealth of borrowers.

Note: the numbers come from current calculations by the Universities of Chicago and Frankfurt (**calculation details**).

[Text presented to respondents who click on “calculation details” button]

Calculation details: “To determine the present value of a fixed-rate savings product [if savings treatment] / loan [if loan treatment], we calculate the present value of future interest payments and

principal repayments (discounted cash flow). The present value calculation involves discounting each payment using a discount rate. This step allows to make comparable payments that occur at different points in time. The discount rate takes into account the inflation expectation prevailing at the respective time periods.

In our calculation, the discount rate is set at 3% one year ago (1% + 2% inflation expectation) and then increases linearly to 9.7% today (1% + 8.7% inflation expectation). This increase in the discount rate significantly reduces the present value of future payments. The inflation data used is based on the Harmonized Consumer Price Index from the German Federal Statistical Office. [If savings treatment] Additionally, the calculation assumes that the savings product every month pays interest at an annualized rate of 0.3%. [If loan treatment] Additionally, the calculation assumes a nominal interest rate of 3%, an annual repayment rate of 3%, and monthly payments.”

[Treatment groups only]

**Q10:** Have you known about the information on the impact of inflation on loans [if loan treatment] / savings [if savings treatment]?

Response options: 1 (“Completely unknown”) – 2 – 3 – 4 – 5 (“Completely known”)

## B.4 Post-treatment section

**Q11:** What do you expect the following economic factors to be **in twelve months**?

Response options: Much lower – Rather lower – No change – Rather higher – Much higher

Stock prices

Real-estate prices

Unemployment rate

Own net income

**Q12:** What do you estimate to be the **interest rate** for a newly contracted loan with a five-year maturity and fixed interest rate currently? And what interest rate do you expect for the future?

*Please enter up to one decimal place.*

Current annual interest rate: \_\_\_\_%

Annual interest rate in one year: \_\_\_\_%

Annual interest rate in five years: \_\_\_\_%

**Q13:** Compared to the past four weeks, do you plan to spend more or less **in the next four weeks** on the following:

Response options: Much less – Somewhat less – Similar amount – Somewhat more – Much more

Groceries

Eating out at restaurants

Leisure activities (e.g., movies/theater, vacations, hobbies)

Clothing, shoes

**Q14:** Do you plan to purchase any of the following products or take a major vacation **within the next twelve months**?

*Multiple choices are possible.*

- a) House or apartment
- b) Car or other vehicle
- c) Household item or electronic device (e.g., refrigerator, sofa, mobile phone)
- d) Major vacation
- e) Luxury item (e.g., watch, jewelry)
- f) Other
- g) None of the above

[If Q14 is not answered with g), ask Q14.1 in the next screen.]

**Q14.1:** How much do you plan to spend on the house or apartment [if a)], the car or other vehicle [if b)], the household item or electronic device [if c)], the major vacation [if d)], the luxury item [if e)], other major products [if f)]?

- a) €\_\_\_%
- b) I do not know or prefer not to answer

**Q15:** We would like to ask you again about the **net wealth** of your household. There is no right or wrong answer here. Please estimate the **real-value change** of your net wealth **in the past twelve months**, as well as the expected change **in the next twelve months**.

*Please click and drag the sliders below. [Sliders ranging from -60% to 60%]*

Real change of net wealth in the past twelve months

Expected real change of net wealth in the next twelve months

**Q15.1:** How certain are you about your estimates?

Response options: 1 (“Not at all certain”) – 2 – 3 – 4 – 5 (“Very certain”)

Real change of net wealth in the past twelve months

Expected real change of net wealth in the next twelve months

**Q16:** In your opinion, what impact did the following factors have on the **real value** of your **net wealth in the past twelve months**?

Response options: Very negative – Rather negative – None – Rather positive – Very positive

[Randomized order]

Inflation

Ukraine conflict

COVID-19

Climate change and policies

Economic development

**Q17:** With which of the following financial products would you expect the **highest real-net-wealth return during unexpectedly high inflation?**

*Please assign a “1” to the financial product with the best inflation protection, a “2” to the second-best protection, a “3” to the third-best, and a “4” to the fourth-best inflation protection.*

Savings products (e.g., cash, savings account, bonds, life insurance)

Stocks

Real estate

Fixed-rate loans

**Q18:** Imagine you want to **buy property**. You can use up to €500,000 in borrowed capital (bank loan) and €500,000 in equity (savings) for the purchase. How much money would you use to buy the property, and how would you finance it?

*Please click and drag the sliders below.*

Purchase price [Slider ranging from €0 to €1,000,000]

Equity used [Slider ranging from €0 to €500,000]

You would finance the property using €[purchase price - equity used] of borrowed capital.

Fixed-rate period [Response options: “None” – “5 years” – “10 years” – “20 years” – “30 years”]

Note: the mortgage term describes the period for which the agreed interest rate in the loan contract is fixed.

**Q19:** To what extent do you agree with the statements below?

Response options: “Strongly disagree” – “Somewhat disagree” – “Neither agree nor disagree” – “Somewhat agree” – “Strongly agree”

[Randomized order]

- a) One should use savings to buy something for themselves.
- b) Taking on loans makes me uncomfortable.
- c) I am concerned about high inflation.
- d) With my balance sheet, I am well-equipped for times of high inflation.
- e) I am optimistic about the future.

- f) I expect to work more in the coming months than in the previous months.
- g) Unexpected high inflation leads to a redistribution of wealth from savers to borrowers.

**Q20: You are now nearing the end of the survey. We just have a few more questions about you.**

When making personal savings or investment decisions, how would you generally describe your **risk tolerance**?

Response options: 1 (“Not at all willing to take risks”) – 2 – 3 – 4 – 5 (“Very risk tolerant”)

**Q21:** Imagine that your income and expenses are about 10% higher than they were a year ago. At that time, you were planning to sell a high-quality watch but did not get around to it due to lack of time. The price of this watch has since increased from €10,000 to €11,000. Would you now be more inclined to sell your watch compared to a year ago?

- a) Yes, more inclined to sell
- b) No, more inclined to keep
- c) Unchanged

**Q22:** How would you estimate the combined value of the cash holdings and interest-bearing assets (such as savings accounts, bonds, life insurance) of your household?

[Dropdown menu]

- a) 0 to under €2,500
- b) €2,500 to under €5,000
- c) €5,000 to under €10,000
- d) €10,000 to under €25,000
- e) €25,000 to under €50,000
- f) €50,000 to under €75,000
- g) €75,000 to under €100,000
- h) €100,000 to under €150,000
- i) €150,000 and above

**Q23:** How would you estimate the outstanding value of all the loans of your household?

[Dropdown menu]

- a) €0 (no loans)
- b) €1 to under €5,000
- c) €5,000 to under €10,000
- d) €10,000 to under €25,000

- e) €25,000 to under €50,000
- f) €50,000 to under €75,000
- g) €75,000 to under €100,000
- h) €100,000 to under €150,000
- i) €150,000 to under €200,000
- j) €200,000 to under €350,000
- k) €350,000 to under €500,000
- l) €500,000 and above

**Q24:** How interesting did you find this survey?

Response options: 1 (“Not at all interesting”) – 2 – 3 – 4 – 5 (“Very interesting”)

**Q25:** Do you have any suggestions or feedback regarding our survey? Please share them here (**optional**).

[Text field]

**Q26: Thank you for participating in our survey!**

As a token of appreciation for your participation, you will receive an Amazon voucher worth €10 [if voucher] or a chance to win one of 50 Amazon vouchers worth €50 [if lottery]. To receive the voucher, simply confirm that you would like to be contacted by us for the purpose of voucher delivery and provide your email address in the next step.

- a) Yes, I would like to receive the voucher [if voucher] / participate in the voucher lottery [if lottery]
- b) No, I do not want to receive the voucher [if voucher] / do not want to participate in the voucher lottery [if lottery]

[If Q26 is answered with a), present Q26.1 in the same screen]

**Q26.1:** Please provide your email address for voucher delivery:

Enter email address:

Confirm email address:

[Closing text below]

Thank you once again for your participation! Your answers have been saved. You may now close this window in your browser.

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