THE CAUSAL EFFECTS OF INFLATION UNCERTAINTY ON HOUSEHOLDS' BELIEFS AND ACTIONS

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Abstract: We implement a survey-based randomized information treatment that generates independent variation in the inflation expectations and the uncertainty about future inflation of European households. This variation allows us to assess how both first and second moments of inflation expectations separately affect subsequent household decisions. We document several key findings. First, higher inflation uncertainty leads households to reduce their subsequent durable goods purchases for several months, while a higher expected level of inflation increases them. Second, an increase in uncertainty about inflation induces households to tilt their portfolios towards safe and away from riskier asset holdings. Third, higher inflation uncertainty encourages household job search consistent with a strong precautionary motive for labor supply, leading to higher subsequent employment among the unemployed and less part-time employment among the already-employed. Finally, we document that the level of inflation expectations has a different effect from uncertainty in inflation expectations and thus it is crucial to take into account both to measure their separate effects on decisions and in policy communication.

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1. Introduction

The 2021-2023 global surge of inflation rekindled debates about the effects of inflation on the macroeconomy and specifically how households respond to price increases. A key element of these debates is how inflation expectations amplify and propagate inflationary shocks. While recent research focused on how point predictions for inflation affect beliefs and actions, there is virtually no evidence on the (distinct) effects of consumer uncertainty about inflation. In this paper, we fill this gap using a randomized information treatment in the European Central Bank's Consumer Expectations Survey (CES) that allows us to characterize and quantify the effects of inflation expectations and uncertainty on household decisions.

At the heart of the paper is a randomized control trial (RCT) in which we provide different information treatments that generate exogenous variation in the first and second moments of households' beliefs about future inflation. We do so by using different types of information treatments, with some providing information about the level of inflation whereas others provide information about higher moments. While all the treatments tend to affect both the level and the uncertainty of respondents' beliefs about inflation, they do so to a different extent, which helps to separately identify the effects of interest. We show that the information treatments are powerful and essential in identifying the significant effects of expectations on various decisions that are tracked in subsequent survey rounds.

The randomized information treatments help us address a number of empirical challenges that have otherwise made answering this question difficult. First, expectations are clearly endogenous, which makes it difficult to establish their causal effect on households' decisions. For example, inflation expectations correlate with time-varying unobserved characteristics such as optimism and can be revised *because of* spending decisions. Furthermore, since high inflation tends to be more volatile inflation, inflation uncertainty (second moment) should be systematically related to point predictions of inflation (first moment), making it hard to disentangle uncertainty effects from level effects. Second, measurement of uncertainty in surveys is a relatively new development and hence only a handful of surveys gather this information. Linking this information with actual household behavior that is tracked, e.g., via a high frequency panel is even more rare. Third, with a long period of low and stable inflation in advanced economies, there has been limited historical variation in inflation uncertainty, making time series methods difficult to use. Because we measure

both first and second moments of inflation uncertainty and include treatments that cause them to move differently relative to one another, we can tackle these identification challenges.

Our first key result is that higher inflation uncertainty reduces households' subsequent durable goods purchases for several months, with the effects only fading out after approximately 4 months. The effect is economically large: a doubling in inflation uncertainty leads to a 23% reduction in the probability of buying a durable good over each of the next two months. In contrast, controlling for uncertainty, an increase in the first moment of expected inflation raises the probability of a household purchasing a durable good in subsequent months, consistent with households moving up their purchases in anticipation of higher future prices. This result highlights the importance of distinguishing the first and second moment effects of inflation expectations on consumption and durable goods spending. In particular, conditional on the identified negative effects of uncertainty on durable goods purchases, we observe a clear positive first moment effect of inflation expectations that is consistent with intertemporal substitution. This results also helps to enrich the interpretation of estimated negative causal effect of inflation expectations on durable goods purchases for US and Dutch households as found in Coibion et al. (2022, 2023). These authors conjectured that this negative effect likely reflected the fact that when inflation expectations (exogenously) increased, they triggered revisions in other beliefs, such as adopting a more pessimistic economic outlook. Our results suggest that one channel through which these more pessimistic beliefs could operate relates to uncertainty. Moreover, controlling for this channel directly, one is able to "recover" a conditional first moment effect from inflation beliefs that highlights the importance of intertemporal substitution.

Our second main result focuses, instead, on households' portfolio decisions and draws from two independent pieces of evidence. First, following the information provision stage of our RCT, we asked households how they would allocate a windfall sum of money across different assets, as in Beutel and Weber (2023). We find that higher inflation uncertainty leads households to prefer to allocate a larger share of this windfall to checking and savings accounts (i.e., liquid assets). Second, in addition to this *hypothetical* scenario question, households were asked to report their *actual* portfolio allocations in a subsequent survey wave. This allows us to also determine whether and how the change in beliefs affected actual portfolio decisions. With actual portfolio shares, we find larger effects overall that are qualitatively in line with those from the scenario question. Higher inflation uncertainty induces households to move their funds away from retirement accounts and

stocks held directly and instead increase their checking and savings accounts, whereas higher inflation expectations have the opposite effect. To the best of our knowledge, we are the first to provide direct causal evidence from an RCT linking inflation expectations and uncertainty to the actual portfolio decisions of households.

Our third main result is on the labor supply and job search decisions of households in response to their beliefs about inflation. We find that more uncertainty about inflation leads respondents to plan to search more actively for jobs. But not only does inflation uncertainty affect what households *predict* they will do in terms of future job search, we also find that their ex-post job *outcomes* are consistent with these predictions. When households become uncertain about inflation, they are more likely to move out of unemployment and part-time work into full-time work in subsequent months. This provides direct causal evidence of a precautionary or insurance motive for labor supply (e.g., Swanson 2012), the first of which we are aware.

Changes in beliefs about future inflation have broad-based effects on other consumer decisions and plans as well. For example, we find that when households become more uncertain about future inflation, they tend to report that they will shop more intensively for goods and services, such as by doing more online shopping, comparing prices across stores, etc. This result also aligns with the discouragement or postponement effects of inflation uncertainty that we estimate on the purchases of big-ticket items. Higher uncertainty about inflation also makes households more likely to report that they would choose a fixed rate mortgage if they were purchasing a home, thereby trying to shift some of the extra interest rate risk to the lender. Uncertainty about future inflation also affects household views about monetary policy. Respondents who become more uncertain about inflation think it will likely take longer for inflation to return to 2%. However, they remain just as confident in the ECB's ability to maintain price stability over a three-year horizon as those with lower inflation uncertainty. This implies that while inflation uncertainty represents a distinct channel that can affect household behavior, it hardly affects central bank credibility.

Our paper is most closely related to a large literature that studies how inflation expectations affect the economic decisions of households and firms. An early important contribution by Bachmann et al. (2015) found little correlation between households' expectations of inflation and their views about whether then was a good time to purchase large durable goods. Some subsequent work found evidence more in line with the intertemporal substitution channel (Burke and Ozdagli

2023, Crump et al. 2022, Dräger and Nghiem 2021, Duca-Radu et al. 2021). A more recent strand has used information treatments to assess the causal effect of inflation expectations on household spending (Coibion et al. 2022, 2023). These papers found that higher inflation expectations led to reductions in durable goods spending in subsequent months, arguing that they were identifying the *total* effect of inflation expectations, which could capture multiple channels. Relative to these papers, we contribute by separately identifying the effects of first and second moments of inflation expectations. By separating the uncertainty channel, we find that the direct effect of inflation expectations on durable goods spending is actually positive. But because inflation expectations and inflation uncertainty are strongly positively correlated and have differential effects on durable goods purchases, any estimation that includes only one of the two will combine the two effects. This mechanism extends beyond durable goods purchases. We find, for example, a very similar result for labor supply. Whereas Pilossoph and Ryngaert (2024) find that households with higher inflation expectations tend to search more for work, our findings suggest that this is happening through the higher inflation uncertainty that goes along with higher inflation expectations. When one controls for the latter, higher inflation expectations by households actually lead them to search less, and their subsequent job outcomes reflect this reduced search effort.

In emphasizing the importance of uncertainty and separately identifying first and second moments, our paper also relates closely to the literature on uncertainty that followed Bloom (2009). Early work focused on how to measure uncertainty (e.g., Bloom et al. 2018, Baker et al. 2016, Jurado et al. 2015, Binder 2017, Berger et al. 2019). Other work has focused on the identification challenge of separating the effects of first and second moments. One early strategy was to utilize timing restrictions in vector-autoregressions (e.g., Caldara et al. 2016, Jurado, Ludvigson and Ng 2015, Bachmann et al. 2013). More recent work has tried to identify more clearly exogenous variation in uncertainty. Baker et al. (2020), for example, emphasize how political shocks or natural disasters can differentially affect first and second moments of economic growth to identify the aggregate effects of uncertainty shocks. Bloom et al. (2019) use Brexit as another setting that speaks to the aggregate effects of macroeconomic uncertainty. Alfaro et al. (2021) exploit industries' differential exposure to first moment shocks (e.g., effects of oil prices on mining vs airlines) with their similar exposure to second moment shocks to identify the effects of exogenous variation in uncertainty on U.S. publicly held firms' investment, employment, sales and balance sheet positions. Closest to us are recent papers using RCT methods such as Coibion et al. (2024) and Kumar et al.

(2024) who use this approach to identify the effects of uncertainty about GDP growth on households and firms, respectively.

In contrast to this literature on real uncertainty, we focus on inflation uncertainty. While inflation uncertainty can lead to real uncertainty and therefore induce the typical precautionary channels emphasized in this literature, it can have additional effects. For example, uncertainty about inflation can induce portfolio reallocation as some assets may be viewed as better inflation hedges. Uncertainty about inflation can also lead to uncertainty about interest rates, which again could lead to portfolio reallocation away from assets that are subject to interest rate risk, as well as to reductions in large durable goods purchases whose costs could vary with future interest rates. On the debt side, such uncertainty could lead households to choose a fixed-rate mortgage rather than an adjustable-rate one. In a similar spirit, real wage cuts via inflation may have effects different from those from unemployment.

In focusing on inflation uncertainty rather than real uncertainty, we are closely related to two very recent papers that tackle the same question. Kostyshyna and Petersen (2024) use an RCT design to induce variation in both inflation expectations and uncertainty in a Canadian survey of households, which they then link to scanner level data on spending. Fischer et al. (2024) apply a very similar RCT design to a British survey of households which they use to characterize how inflation uncertainty affects planned spending behavior. While we have a very similar RCT identification strategy as they do, all of which follow Coibion et al. (2024), we build on these papers along several important dimensions. First, unlike Fischer et al. (2024), we use actual ex-post spending decisions rather than planned spending as an outcome. Second, whereas Kostyshyna and Petersen (2024) also use ex-post spending data, we are able to separately identify the effects of inflation expectations from those of inflation uncertainty while they do not. Controlling for both channels is critical for identifying that higher inflation expectations lead to more durable goods spending once one conditions on uncertainty. Third, we consider other important margins of adjustment on the part of households, including portfolio rebalancing (both scenario-based and actual portfolio re-allocations) and labor supply decisions, as well as some additional metrics such as the choice of mortgage or trust in the central bank. Fourth, our sample size is much larger than either paper, which helps cut through the noise in survey responses. We view the three papers as complementary and as jointly providing a comprehensive view of how inflation uncertainty affects consumer decisions.

Our paper also contributes to the household finance literature. Recent work has increasingly tried to combine expectations elicited in surveys, information treatments, and data on individuals' portfolios, but none has yet been able to combine all three. Giglio et al. (2021), for example, run surveys on Vanguard investors in which they can link beliefs about future returns to the actual investment decisions recorded by Vanguard, but they do not have randomized variation in beliefs. Beutel and Weber (2023) and Coibion et al. (2024) use RCTs in surveys of households to generate exogenous variation in beliefs about future stock returns and macroeconomic uncertainty, but the outcomes are limited to hypothetical questions about how households would invest a hypothetical windfall, not actual portfolios. The closest to this are Weber et al. (2023) and Gorodnichenko and Yin (2024), who combine beliefs about future returns, information treatments that generate exogenous variation in those beliefs, and follow-up survey rounds that measure investment in cryptocurrency or stocks. Relative to these, we measure the *actual* portfolio allocations of respondents across a wide range of asset classes, and we are able to combine this with exogenous variation in beliefs about both first and second moments of inflation. We find that this combination is important: results using actual ex-post portfolio allocations after two months tend to be larger and more precise than those found using hypothetical questions posed immediately after the information treatment. Our results indicate that households engage in significant rebalancing of their portfolios in the face of higher inflation uncertainty, raising the share allocated into the (safe and liquid) checking/savings accounts while reducing the amount of funds committed to (risky) stocks and (illiquid) retirement accounts.

The paper is organized as follows. Section 2 discusses the survey and how it is used to measure expectations and decisions. It also describes and analyses the information treatment. Section 3 presents results on the effects of inflation uncertainty on spending decisions while section 4 focuses on the effects on financial portfolios. Section 5 turns to how inflation uncertainty affects job search decisions. Section 6 considers some other margins along which beliefs about inflation can affect consumer decisions and beliefs. Finally, section 7 concludes.

2. Survey design and information treatments

In this section, we first briefly describe the CES and the design of the special-purpose module. The module also included the information treatment, which we describe, and we analyze its effects on beliefs about future inflation.

2.1 The ECB's Consumer Expectations Survey

We use micro data from the ECB's Consumer Expectations Survey (CES), an online monthly panel survey measuring euro area consumer expectations and behavior. The CES was launched in a pilot phase in January 2020 interviewing households every month in the six largest euro area economies (Belgium, France, Germany, Italy, the Netherlands, Spain). Since January 2022 the survey was expanded to cover five additional countries (Austria, Greece, Finland, Ireland, Portugal) and achieved its target sample size of approximately 19,000 households across all eleven countries by April 2022.

A detailed description of the survey can be found in Georgarakos and Kenny (2022) and a first evaluation of the survey in ECB (2021). The sample is comprised of anonymized responses from approximately 3,000 households in each of France, Germany, Spain, and Italy and 1,000 households in each of the remaining countries. Respondents are invited to answer online questionnaires every month and can stay in the panel for a maximum period of 24 months after joining. Half of participants in the four largest euro area countries are recruited by phone via random dialing, while the remainder are drawn from existing samples. Survey weights are employed to help ensure that the data are nationally representative. As the eleven countries covered by the CES account collectively for more than 95 percent of the euro area GDP, the survey also provides good coverage for the overall household sector in the euro area. Following recruitment, all respondents receive and complete a set of online survey questionnaires at different frequencies. Initially, each respondent completes a background questionnaire, which covers a range of important but relatively time-insensitive information (e.g., family situation, education, financial literacy). More time-sensitive information is collected at higher frequency. For example, respondents report every month various expectations regarding macroeconomic variables (e.g., on inflation, GDP growth, unemployment) and own economic situation (e.g., household income, financial sentiment) as well as whether they purchased a big-ticket item over the past month. Every quarter respondents provide the amount spent on various non-durable items and their labor search activity.

The CES has many desirable features for the purposes of our study. First, the survey is large (~19,000 respondents from nationally representative samples across the 11 largest euro area countries) which gives us statistical power to separately identify the effects of interest. Second, the survey is conducted frequently (every month) and features a panel structure that allows us to track respondents over time and investigate if information treatments affect their choices (consumer

spending, portfolio allocations, job market search, etc.). Third, the experiment was conducted at a time of elevated uncertainty about inflation (September 2023) which provides a highly relevant context in which to create variation in perceived inflation uncertainty.

2.2 Measuring inflation expectations and uncertainty

As part of the CES, all survey respondents are presented each month with the following question about inflation:

> *Now, we would like you to think about how much prices in general in the country you currently live in are likely to change **in 12 months from now**. We realise that this question may take a little more effort. Below you see ten possible ways in which prices could change. Please distribute 100 points among them, to indicate how likely you think it is that each price change will happen. The sum of the points you allocate should total 100.*
>
> Prices will **increase** by 12% or more ____
> Prices will **increase** by 8% or more, but less than 12% ____
> Prices will **increase** by 4% or more, but less than 8% ____
> Prices will **increase** by 2% or more, but less than 4% ____
> Prices will **increase** by 0% or more but less than 2% ____
> Prices will **decrease** by more than 0% but less than 2% ____
> Prices will **decrease** by 2% or more, but less than 4% ____
> Prices will **decrease** by 4% or more, but less than 8% ____
> Prices will **decrease** by 8% or more, but less than 12% ____
> Prices will **decrease** by 12% or more ____

This type of question is commonly used in inflation surveys and was developed in particular by the New York Federal Reserve for their Survey of Consumer Expectations (see e.g., Bruine De Bruin et al. 2011). From it, one can deduce estimates of the mean and standard deviation of the perceived distribution of possible inflation outcomes that are respondent-specific. These measures from the September 2023 wave will form our "prior" inflation beliefs of consumers.

Later in the survey and following the information provision stage, we elicited, once more, the subjective inflation probability distribution. To avoid irritating respondents with the repetition of an identical question, and in line with standard survey design practice we asked the following question to measure post treatment inflation expectations and uncertainty:

> *Below you see three possible scenarios, starting with the LOWEST percentage change in prices in general and ending with the HIGHEST percentage change over the next 12*

months. What do you think will be the approximate percentage change in prices in general for each of the scenarios?

Subsequently, respondents were invited to provide specific inflation/ deflation rates for each of the three scenarios:

> *Now we ask you to think about the chance of the changes in prices you entered in the previous screen actually happening over the next 12 months. Please assign a percentage chance to each of the price changes you entered to indicate how likely you think it is that this price change will actually happen over the next 12 months. Your answers can range from 0 to 100, where 0 means there is absolutely no chance that this price change will happen, and 100 means that it is absolutely certain that the price change will happen. The sum of the points you allocate should total to 100.*

This question follows the structure developed by Altig et al. (2022) who use five scenarios to measure the uncertainty of firms about future sales. We use a simplified version with three scenarios which is simpler to answer for households but still allows us to quantify the first and second moments of respondents' inflation expectations. From this question, we elicit "posterior" beliefs about inflation.

To examine how the different survey questions discussed above impact the measurement of inflation expectations Panel A of Figure 1 plots the distribution of mean inflation forecasts for the two questions from the control group of respondents, i.e., the set of respondents who were not provided with any information and for whom priors and posteriors should be similar. Panel B of Figure 1 does the same for the two measures of inflation uncertainty (for which we use the standard deviation). Focusing on the first moments, we can see in Panel A that reported mean forecasts from the first question (the pre-specified bins) are a bit higher on average and more likely to be concentrated on integer values like 5% or 10%, when respondents assign 100% to a single bin. The distribution of responses from the second question is smoother, albeit with a larger tail of very large answers (>20%) that are infeasible using the bins question. The first moments coming from the two questions are highly correlated, as can be seen in Panel D of Figure 1, although the slope coefficient between the two is well below 1, reflecting the different design of the two questions.[1]

Results are similar for second moments. The overall distributions of responses for inflation uncertainty are very close (Panel B), and the two measures of uncertainty are strongly positively correlated (Panel D) although again the slope coefficient between the two is well below 1. Panel

[1] Appendix Figure 3 plots time series of actual inflation and the moments of inflation expectations.

C plots the correlation between first and second moments of inflation expectations. For forecasts between 3% and 8%, we can see that the relationship is positive and very similar across the two sets of questions. However, they tend to differ for very low expectations and very high expectations. On the high end, the issue is that bins do not allow for precise inflation forecasts above 14%. Respondents who expect high inflation must therefore assign a large weight to the top bin, making their uncertainty measure look low. In contrast, this is not an issue with the scenarios question and with that formulation the link between first and second moments remains positive at the high end. There is another discrepancy that arises between the two measures for low inflation forecasts: the scenarios question suggests that those with low inflation forecasts tend to have low uncertainty, whereas using the bins question, those with low inflation forecasts tend to have high uncertainty. In this case, it is unclear what is causing the discrepancy.

Table 1 presents additional descriptive statistics for the first and second moments broken down by country using the bins question (see Appendix Table 1 for equivalent results using the scenarios question). In every country, inflation expectations are quite dispersed. Countries where there is more disagreement about the future level of inflation also tend to be the countries where average uncertainty about inflation is highest. Inflation expectations and uncertainty are both the highest in Greece, while mean forecasts are lowest in the Netherlands and average uncertainty is lowest in Germany. When we regress implied means and standard deviation from the reported subjective expectations on respondent characteristics, we generally find results consistent with earlier studies (e.g., Armantier et al. 2013). For example, female respondents have higher inflation expectations and higher uncertainty. Respondents with high uncertainty for inflation also exhibit high uncertainty in their future income growth, while the relationship between implied means for inflation and personal income growth is much weaker and has an inverted-U shape (Appendix Figure 1). More generally, consistent with earlier studies (e.g., Kamdar 2018), we find that respondents associate high inflation with a bad state of the economy.

2.3 The information treatment

As part of the special module in the September 2023 wave, respondents were asked to participate in an additional survey that included the information treatment. More specifically, we randomly allocated surveyed households into four groups.[2] The first group serves as the basis for

[2] Appendix Table 11 documents that observable characteristics of the respondents do not predict treatment status.

comparisons ('control' group) and did not receive any information (i.e., after the pre-treatment stage proceeds directly to the third stage). The second group (treatment 1) was informed about the average professional forecast for inflation in the euro area.

> T1 (first moment): *The average prediction among professional forecasters is that inflation in the euro area will be at 2.5% over the next 12 months.*

The provided information is similar to the one that has been used in a number of RCT's across several countries and inflation environments in order to exogenously move household inflation expectations (see Coibion et al. 2022, 2023 and Weber et al. 2023).

The third group (treatment 2) was informed, instead, about the difference between the lowest and the highest predictions about inflation among professional forecasters. This difference (in percentage points) is described as a significant one and it is also communicated that professional forecasters are very uncertain about the evolution of inflation.

> T2 (second moment): *Professional forecasters are exceptionally uncertain right now about inflation compared to recent years. As a result, there is a significant difference of 3.1 percentage points between the lowest and the highest predictions about inflation in the euro area over the next 12 months.*

This information aims to influence primarily the uncertainty that respondents perceive about future inflation.

The last group (treatment 3) was provided with a combination of the two pieces of information above, i.e., both about the mean inflation forecast and the significant uncertainty surrounding this:

> T3 (first and second moment): *The average prediction among professional forecasters is that inflation in the euro area will be at 2.5% over the next 12 months. At the same time, professional forecasters are exceptionally uncertain right now about inflation compared to recent years. As a result, there is a significant difference of 3.1 percentage points between the lowest and the highest predictions about inflation in the euro area over the next 12 months.*

The effects of the treatments on the first and second moments of respondents' expectations are presented visually in Figure 2. Panel A is a binscatter showing the relationship between prior inflation expectations and posterior expectations for each treatment group separately. For the treatment groups, the slope of the relationship between the two is much flatter than for the control group. This indicates that respondents' posteriors are much less closely related to their priors after receiving the

information treatment than is the case for the control group. This is exactly what one would expect if the respondents in the treatment group are assigning weight to the newly received information in forming their posteriors. Those with initially high inflation expectations tend to revise their beliefs downwards, whereas those with initially low inflation expectations tend to revise their beliefs upward. The effects are particularly strong for treatments 1 and 3 which include information about the average forecast of professionals. But even treatment 2, which only provided information about the difference in professionals' forecasts, affects the inflation forecasts of households.

Panel B of Figure 1 plots the corresponding binscatter but this time for respondents' (log) uncertainty about inflation. We observe a similar pattern in that posterior and prior uncertainties are much more closely related for the control group than any of the treatment groups, consistent with households in the treatment group responding to the provided information. Those in treatment groups 1 and 3 who received information about the average forecast of professionals tend to reduce their uncertainty across the board, consistent with earlier results with growth forecasts in Coibion et al. (2024). Jointly the effects of the information treatments therefore seem to be quite powerful in changing the expectations of respondents, both in terms of their first and second moments. In Appendix Table 3, we present the regression estimates underlying Figure 1. F-statistics for the slope coefficients being different from the control group are all above 100, which confirms the strength of the treatment effects on inflation expectations and uncertainty.[3]

2.4 Measuring the effects on decisions

To quantify the effects of inflation expectations and uncertainty on household decisions, we rely on a rich set of information collected in the CES. For example, for durable goods purchases, respondents are asked every month if, in the previous month, they have purchased any of the following major goods and services: a house, a car, a large durable good, a vacation package, a luxury item, or any other durable good. Respondents had also been asked prior to information treatments if they planned to purchase any durable goods (of each type) in the next 12 months. This provides us with a measure of their spending plans. With non-durable goods and services, survey respondents are asked every three months to provide a detailed breakdown of their spending

[3] While our approach utilizes this instantaneous (i.e. within the same survey wave) adjustment of inflation expectations and uncertainty to the treatments, it is worth noting that the information treatments have somewhat persistent effects on beliefs for several months (see Appendix Table 9).

by category. This information was collected in October of 2023 and again in January of 2024, which allows us to assess effects on non-durable spending.

To measure financial portfolios, we utilize two independent pieces of information. First, following the information treatment, survey respondents were asked a scenario question about how they would allocate a hypothetical windfall gain across different assets:

> *"Imagine that you receive a one-off windfall of €10,000 to save or invest in financial assets. Please indicate in which of the following asset categories you would save/invest this amount."*

Subsequently they were presented with options which include cash, checking and savings accounts, individually held stocks, mutual funds, retirement accounts, bonds, cryptocurrency and "other" investments. Respondents assign euro amounts to each category that must sum to €10,000. This hypothetical portfolio question has previously been used in e.g., Christelis et al. (2024) Coibion et al. (2024) and Beutel and Weber (2023) to study how different expectations affect financial decision-making. While this question helps to address potential inertia in portfolio allocations, it is based on a scenario and focuses on investments at the margin. To complement this, we also make use of the fact that once per year the CES includes a household finance module that asks respondents to report their financial asset holdings. With this question (asked in November 2023), we are therefore able to assess how inflation expectations and uncertainty affect *actual* portfolio allocations.

With labor market decisions, we rely on several measures. First, as part of the CES's regular monthly and quarterly modules, all respondents are asked about how intensely they intend to search for a job in the coming months. That is, respondents are asked how many job applications they plan to submit over the next month. Unemployed respondents (i.e., those who are not working but searching for work) are also asked about their subjective probability for finding a job over the next three months. Employed workers are asked about their subjective probabilities that they will lose their job in the next three months as well as that they will be looking for a job in the next three months. These questions therefore allow us to measure the expected job search intensity of respondents. In addition to these, the CES asks respondents every month about their employment status. From this question we can determine whether respondents are employed, unemployed (not working but searching for a job) or out of the labor force (not working and not searching for a job). Among the employed, we can differentiate between those with full-time or part-time work. We are

therefore also able to assess some actual employment outcomes, both in terms of unemployed workers being hired as well as movements between part-time and full-time work.

With these measures of outcomes, we can estimate the causal effects of inflation expectations (1st and 2nd moments) on various choices made by households. Following Coibion et al. (2024) and Kumar et al. (2023), our baseline econometric specification is given by:

$$Outcome_{i,t+h} = \alpha_1 Post_{i,t}^{mean} + \beta_1 Post_{i,t}^{uncert} + \alpha_2 Prior_{i,t}^{mean} + \beta_2 Prior_{i,t}^{uncert} + \gamma Plan_{i,t+h|t} + Controls_{i,t} + error_{i,t+h}, \quad (1)$$

where the dependent variable is some outcome variable (e.g., consumer spending), $Plan$ is the pre-treatment plan of household i for this outcome variable (e.g., whether a household plans to buy a car over the next 12 months) when available, $Controls$ is a vector of respondent/household characteristic (e.g. income, gender, employment status, age, number of children, etc.). $Post_{i,t}^{mean}$ is the posterior (immediately after treatment) belief of household *i* for the future inflation in the euro area and $Post_{i,t}^{uncert}$ is the posterior (after treatment) uncertainty of household *i* about the future inflation in the euro area. This specification therefore includes both first and second moments of households' inflation expectations, which is important because of the strong correlation between first and second moments shown in Figure 1. We instrument for both first and second moments of posterior beliefs using the treatments as follows:

$$Post_{i,t}^{mean} = a_0 + \sum_{j=1}^{3} a_j \times I\{i \in Treat\ j\} + \sum_{j=1}^{3} b_j \times I\{i \in Treat\ j\} \times Prior_{i,t}^{mean} + \sum_{j=1}^{3} c_j \times I\{i \in Treat\ j\} \times Prior_{i,t}^{uncert} + Controls_{i,t} + error_{i,t} \quad (2')$$

$$Post_{i,t}^{uncert} = \tilde{a}_0 + \sum_{j=1}^{3} \tilde{a}_j \times I\{i \in Treat\ j\} + \sum_{j=1}^{3} \tilde{b}_j \times I\{i \in Treat\ j\} \times Prior_{i,t}^{mean} + \sum_{j=1}^{3} \tilde{c}_j \times I\{i \in Treat\ j\} \times Prior_{i,t}^{uncert} + Controls_{i,t} + error_{i,t}. \quad (2'')$$

This first stage specification essentially consists of regressing posteriors on priors along with an interaction of priors with treatment group indicators, effectively reproducing the visual evidence presented in Figure 2. The first stage is estimated by Huber regression which assigns a weight of 0 to observations that are identified as outliers. A jackknife approach is applied in the second stage to identify and remove outliers at that stage. Some observations are dropped due to missing values for outcome or control variables or due to panel attrition when using data from multiple waves.

Before turning to these econometric estimates however, it is worthwhile exploring another approach to examine the link between beliefs and decisions that draws from hypothetical questions. These questions have often been found to yield similar results as experimental or quasi-experimental methods (see e.g., Colarieti et al. 2024 and Kumar et al. 2023). Respondents in the September 2023 wave were asked the following hypothetical question prior to the information treatment stage:

> *Please think about the ways in which uncertainty about changes in prices in general in the country you currently live in may (or may not) affect your decisions.*
>
> *If **uncertainty about changes in prices in general [increases/decreases]**, I would like to…*

Subsequently, respondents were presented with a list of possible decisions and/or actions and can select between 'Yes' or 'No' for each of them. We show results from this hypothetical question in Table 2, focusing on the difference in the probability that respondents say they would make such a decision between those who (randomly) received "increase" in inflation uncertainty in the question formulation versus those who received a "decrease". The largest difference is that those facing an increase in uncertainty are more likely to reduce their spending to put aside more money, which conforms with the precautionary channel. Respondents facing more uncertainty also report that they would spend time on shopping effort, through online shopping, switching stores, and substituting across goods to reduce costs. Another possible margin of adjustment is in their financial portfolio: households are more likely to respond that they would adopt a less risky portfolio when facing higher uncertainty than lower uncertainty. The third visible margin of adjustment is in terms of labor search. Households report that higher inflation uncertainty would make them more likely to search for another job or try to increase their income in other ways. Hence, answers to this hypothetical question suggest that inflation uncertainty is likely to affect, at least to some extent, spending decisions, portfolio allocations and job search decisions. It may also alter people's shopping behavior. We now turn to whether this is in fact using the information experiment described in Section 2.3 as this will help us to identify the causal effect of interest and separate the role of first and second moments of respondents' beliefs about inflation.

3. The effects of expected inflation and inflation uncertainty on spending decisions

The first decision that we investigate regards the effects of inflation expectations and uncertainty on different types of spending. We first consider durable goods purchases and then spending on non-durables and services.

3.1 Durable goods purchases

We begin by examining durable goods purchases one-month after the information treatment by estimating equation (1). We report the results in Panel A of Table 3. For five out of six durable goods, we can reject the null that higher inflation uncertainty has no effect on durable goods spending. The effects are economically large. For example, an (exogenously) increased inflation uncertainty by 1%, i.e., by less than one standard deviation (which amounts to 1.63, see Table 1), decreases the probability of buying a durable good (electronics, refrigerator, etc.) over the next month by about 0.23 percentage points, for a given level of inflation expectations (column 2 of Table 3). Given that the average prevalence of durable goods purchases is about 18.5% our estimate implies that a 1% increase in uncertainty will reduce the unconditional likelihood of buying durable goods in the follow-up month by more than 1%. Thus, we can claim that higher inflation uncertainty leads to reductions in large durable goods purchases in the following month, which is consistent with the prediction of (s,S) models with uncertainty (see Caplin and Leahy 2010 for a survey).

We also find that the effect of the level of inflation expectations on durable goods purchases is, if anything, positive. The belief that prices will rise more rapidly seems to induce a forward shift in the timing of durable goods purchases, especially for large durable goods like refrigerators but also seemingly for houses and luxury goods. Coefficients are positive for every category, although we cannot always reject the null that the effects are zero. The positive effect of the level of inflation expectations on durable goods purchases is striking. Coibion et al. (2023, 2022) found the opposite effect in the U.S. and Netherlands respectively, despite using a similar RCT identification strategy. The main difference between our estimating approach and theirs is that we take into account not just inflation expectations but also inflation uncertainty and can separate their two effects. In Panel B, we re-estimate the same specification with only the level of inflation expectations, as in these earlier papers, and now find a clear negative effect of inflation expectations for every category of durable goods purchases. This illustrates the importance of accounting for uncertainty as an alternative inflation expectation channel. Inflation expectations and uncertainty are positively correlated but have opposite effects on spending. As a result, not

controlling for uncertainty can give the impression that higher inflation expectations, by themselves, reduce durable goods purchases. In fact, our evidence suggests the opposite.[4]

One limitation of the results in Panel A of Table 3 is that they measure the effect on durable goods purchases within the month following our experiment. Because these are large expenditures, it may take more time for expectations to actually affect these purchases. Since households are asked every month whether they made any durable goods purchases, we estimate equation (1) for subsequent months as well and plot the results for different time horizons in Figure 3 for each type of durable goods purchase.[5] Consistent with the intuition above, we estimate some effects that are relatively stronger over time. For example, there are clear negative effects of inflation uncertainty on car purchases and vacations after two months, and for luxury items and other types of durable goods the effects peak at three months after the treatment. The same is true for the effect of the level of inflation expectations on durable goods purchases. We can reject the null of no effect at some horizon for every type of durable good, with almost all of them displaying a positive peak response two to three months after the information treatment.

How important is the information treatment for identification here? In Panel C of Table 3, we reproduce our baseline estimates for the month after the treatment but estimating equation (1) by OLS. In other words, we do not explicitly utilize the exogenous variation in beliefs created by the information treatments. We find no clear pattern when using OLS, which is consistent with significant endogeneity of expectations. Appendix Figure 2 shows that this holds across horizons as well. Without instrumenting for first and second moments using the (exogenous) variation stemming from information treatments, we would find little to no effect of either first or second moment on durable goods purchases. This illustrates the importance of explicitly using the information treatments from the RCT in the estimation.

[4] Our information treatments likely generate revisions in beliefs for other macroeconomic variables. While we need information treatments targeting these other variables to have a clear picture about the possible effects of cross-learning, we can include priors and posteriors for other variables as controls in specification (1) to obtain suggestive evidence: if there controls do not affect the estimates of interest on the first and second moments of posterior inflation expectations, one may be more confident that the estimated effects do not stem solely from cross-learning. To this end, we include posterior and prior expectations for the GDP growth rate as controls in specification (1) and report results in Appendix Table 17. We find that the estimates on the first and second moments of posterior inflation expectations are not affected by including these additional controls.

[5] We verify that treatment status does not predict participation in post-treatment survey waves (Appendix Table 10), thus panel attrition is orthogonal to our information treatments and unlikely to affect our inference.

To assess whether these results are driven by a narrow group of respondents, we explore how our results vary across subsamples. To preserve space, we present subsample results for durables one month after the treatment (Table 4) and for other categories in the online appendix (Appendix Table 12). We focus on sample splits by liquidity status (if respondents have sufficient financial resources to meet an unexpected payment equal to one month of household income), region (North vs. South), household income, and financial literacy. In short, although we find some variation in the point estimates, we generally cannot reject the null that the coefficients are the same. For example, the purchases of respondents in the Southern countries tend to be somewhat more sensitive to the level and uncertainty about future inflation, but the differences are not statistically significant. This pattern does not necessarily mean that there is no heterogeneity in the responses. Instead, we view these results as indicating the need for larger samples to detect variation across subgroups.

3.2 Spending on non-durable goods and services

Every three months, households in the CES are asked to provide detailed information on their non-durable goods and services spending over the last month. These measures are available one and four months after the information treatment. Thus, we can estimate how inflation expectations and uncertainty affect spending on non-durables and services at different horizons. We estimate equation (1) using the log of total spending as the dependent variable and report estimates in Table 5. At both the 1-month and 4-month horizons, we find that we cannot reject the null of zero effects for both the level of inflation expectations and the uncertainty about inflation.[6] This imprecision could reflect the fact that self-reported spending data may be too noisy to allow for sufficiently precise inference. For instance, Coibion et al. (2022), using a survey of households participating in the Nielsen Homescan panel, found that estimated effects of inflation expectations on non-durable spending were more precise when using actual spending data from Nielsen than self-reported spending measures from the survey.

Even though the effects of inflation expectations and uncertainty on overall non-durable and services spending is ambiguous, we may still be able to discern if households are reallocating their spending across different categories. In the CES, households are asked to provide estimates of their monthly spending on food, utilities, etc. We therefore re-estimate equation (1) using the budget share allocated to each category as the dependent variable, both 1 month and 4 months after the treatment. The results are presented in Table 6. Overall, we do not find evidence for significant reallocation of

[6] We find similar results for the subsamples (Appendix Table 13).

spending across goods. There were a few categories for which we can sometimes reject the null of zero effect, but quantitatively the effects are small. For example, after one month, our results indicate that a doubling of inflation uncertainty lowers spending on utilities by just 5%. We interpret these estimates as pointing toward very limited reallocation of spending across non-durables and services.

3.3 Recap

Jointly, these results therefore indicate that when facing higher inflation uncertainty, households tend to reduce their purchases of durable goods while seemingly sustaining their spending on non-durables and services. Thus, their total spending should be falling in response to higher uncertainty, consistent with a precautionary motive. This is broadly in line with answers to the hypothetical question in Table 2, in which people facing higher inflation uncertainty - compared with people facing lower uncertainty - state that they would try to spend less and put aside more money.

4. The effects of expected inflation and inflation uncertainty on financial portfolios

Responses to the hypothetical question point toward another important margin of adjustment: financial portfolios. Recall from Table 2 that households facing high inflation uncertainty report a greater willingness to reduce the riskiness of their financial portfolio than those facing low inflation uncertainty, without necessarily increasing their stock of cash. To what extent is this what we observe from the randomized control trial?

4.1 Hypothetical portfolio allocation of a financial windfall

From the survey, we have two independent ways to help us assess effects on financial portfolios. The first is the portfolio simulation experiment in which we asked households how they would allocate a windfall gain of €10,000 across different financial asset classes. Asking respondents about their choices over scenarios that involve wealth gains, positive and negative income shocks, and other real-life events has recently gained prominence in a number of surveys.[7] Beutel and Weber (2023), Christelis et al. (2024) and Coibion et al. (2024) use a very similar hypothetical scenario to evaluate desired portfolio allocations in response to information provision experiments. Given that

[7] For example, Colarieti et al. (2024) review related studies and discuss the benefits of asking scenario questions in household surveys. For applications see Shapiro and Slemrod (2003), Jappelli and Pistaferri (2014), and Christelis et al. (2020, 2024).

we ask the portfolio scenario question after the information treatment stage, we can assess whether and how inflation expectations and uncertainty affect portfolio allocation of a financial windfall.

To this end, we estimate a version of equation (1) where the dependent variable is the share invested (out of €10,000) in each asset class. Results are shown in Panel A of Table 7. According to the results, the main effect of increased inflation uncertainty (holding constant inflation expectations) is to reduce the share of portfolio allocated to retirement accounts and increase the share in checking and savings. The latter are among the most liquid assets, while the former is the most illiquid option provided in the scenario. The effect is relatively large: a doubling of inflation uncertainty leads to an increase in the desired share of assets held in checking/savings accounts of 17 percentage points. We therefore observe households significantly altering the liquidity of their desired portfolio in the face of higher inflation uncertainty.

With inflation expectations, we see a reversal of this pattern, albeit estimated with less precision. A higher level of inflation expectations leads to an increase in the share of the windfall being allocated to retirement funds, but it is fairly small. A one percentage point increase in inflation expectations raises the desired share of retirement accounts by only around 1 percentage point. We cannot identify with precision which other asset class would be reduced to compensate for this larger share of retirement funds.

4.2 Actual portfolio allocation

The hypothetical scenario question speaks to what households would do at the margin with their portfolio. Furthermore, as a hypothetical question, it may not necessarily reproduce what households would actually do. Finally, the hypothetical speaks to a new investment would be allocated whereas in practice investors tend to change their portfolios only infrequently (e.g., Giglio et al. 2021). For all these reasons, the response of actual portfolio allocations could be very different from what is suggested by the hypothetical scenario.

A unique feature of our analysis is that the CES fielded a household finance module in November asking respondents to provide details on the allocation of their actual financial portfolio two months after the information treatment. To the best of our knowledge, this is therefore among the first settings that combine survey data on expectations, a randomized information treatment, a hypothetical portfolio investment, and information on subsequent actual portfolio allocations. Previous research has typically had only one or at most two of these ingredients. Using this reported portfolio allocation as our dependent variable in equation (1), we can therefore examine the extent

to which our information experiment and the exogenously revised beliefs about first and second moments of inflation had an impact on, if at all, the actual portfolio composition that households choose to hold a few months after the information provision.

Results are presented in Panel B of Table 7. Consistent with answers to the hypothetical scenario, the clearest outcome is that in the face of higher inflation uncertainty, households subsequently reallocated their portfolio away from retirement funds and into checking/savings accounts. These effects are quite large: a doubling of inflation uncertainty leads to an increase in the share of households' portfolios held in checking and savings accounts by 24 percentage points. This increase in safe forms of savings supports a precautionary saving channel of inflation uncertainty and aligns with the considerable reduction in durable spending. We also observe some reallocation away from investments that households control themselves directly (stocks and bonds) and toward investments that are managed by professionals (mutual funds), which could be an indication that individuals recognize that a professional may be better suited to choosing individual investment choices in a high uncertainty environment. As with the hypothetical question, we do not see any change in cash holdings.

With the level of inflation expectations, we see what is, by and large, a reversal of these patterns. When households expect higher inflation in the future with no additional uncertainty, they move some of their resources out of their checking and savings and into retirement accounts, which should provide better protection against inflation. These effects are significantly larger than what was observed in the hypothetical. A one percentage point increase in inflation leads to an increase in the share of the portfolio held in retirement accounts of almost four percentage points. We also observe a reallocation away from mutual funds and into different assets like bonds and other financial assets (which include commodities like gold, etc.).

4.3 Recap

There are several important takeaways from these results. First, they are broadly aligned with the result suggested by the windfall gain scenario that with higher inflation uncertainty, households will seek to reduce the riskiness of their portfolio. Households report higher desired shares of safe assets when they have exogenously higher inflation uncertainty and they ultimately hold portfolios that are less risky. Thus, both approaches yield the same qualitative finding. Second, our results rely not just on hypothetical questions but also on *actual* portfolio decisions. Third, we find offsetting portfolio adjustments to higher inflation expectations and higher inflation uncertainty. Because the

two are positively correlated unconditionally, it is not possible to identify clearly how each one affects portfolios unless one explicitly controls for the other. For example, when we use only the implied mean of inflation expectations as the endogenous variable, we find (Appendix Table 5) that higher inflation expectations result in a higher portfolio share allocated to current/saving accounts. It is a unique feature of our analysis that we can generate exogenous variation in both the inflation expectations and uncertainty of respondents in a setting where we also observe the actual financial portfolios of those same individuals.

5. The effects of expected inflation and inflation uncertainty on labor supply

Along with spending and portfolio adjustments, the third margin that households report that higher inflation uncertainty would affect is their labor supply decision. In Table 2, households who are asked about higher uncertainty are more likely to say they would ask for a raise, look for a higher paying job, or find other ways (e.g., part time work) to raise their income. In this section, we test to what extent these margins are identifiable using our information treatments.

5.1 Job search activity and future income

In the CES, households are regularly asked about searching for work. Respondents are asked if they are currently searching for a job and, if so, how many job applications they have sent out over the last three months. Unemployed workers are also asked for their subjective probability of finding a job over the next three months. Employed workers are asked about their subjective probabilities of losing their job in the next three months as well as their probability that they will start looking for a job in the next three months. Finally, all respondents are asked about their expected income over the next year after the information treatment, using the Altig et al. (2022) scenario question with three possible outcomes (i.e., similar to the one used to measure posterior beliefs about inflation). Using these measures, we can therefore assess the extent to which changes in beliefs about future inflation, whether the level or their uncertainty about it, affect household search decisions as well as their expectations about their future income.

We report results in Table 8 from estimating equation (1) using these different job search activities and related beliefs as outcome variables, all from the month following the information treatment (October 2023),. First, across all respondents, we find that higher inflation uncertainty leads to an increase in the number of job applications households send out. A doubling of uncertainty leads them to an increase of 5-6 in the number of job applications they plan to make.

Since the average number of planned job applications for respondents is 6.8, this represents almost a doubling of job search activity. Also, for the unemployed, they expect this increased job search to pay off. We find that unemployed workers with higher inflation uncertainty expect a higher probability of landing a job, with a doubling of inflation uncertainty leading to an increase in their subjective probability of finding a job of over 35 percentage points. Among employed workers, higher inflation uncertainty does not lead to an increase in their perceived probability of job loss. However, following an increase in inflation uncertainty they do think that it is more likely they will be looking for a new job in the next three months (Column 4 of Table 8). Together with the question on the actual number of job applications, we can conclude that employed workers tend to search more actively for new work when they face higher inflation uncertainty. Thus, for both the employed and the unemployed, our results indicate that higher inflation uncertainty leads to a more active and intensive search for work.

Higher inflation expectations, on the other hand, have very different effects. Overall, we see that respondents plan to apply for fewer jobs when inflation is expected to be higher. The unemployed also perceive a lower probability that they will be hired in the near future. The estimated effects are again quite large. A one percentage point increase in inflation expectations leads unemployed workers to anticipate that they will be about ten percentage points less likely to be employed in the next three months. One possible reason why this might be the case is if workers think that the economic outlook will deteriorate with higher inflation, as suggested by e.g., Kamdar (2018), Hajdini et al. (2023), and Binetti et al. (2024). At odds with this interpretation though is that, at least among the employed, higher inflation expectations are not associated with a higher perceived probability of losing their jobs in the near future. When the level of expected inflation rises, the employed also view it as less likely that they will be looking for a job soon. Hence, both ways of measuring job search imply that they will search for new work less actively when they expect higher inflation. This result contrasts with a positive effect of the level of expected inflation on job search as found by Pilossoph and Ryngaert (2024). It highlights again the importance of controlling for second moments when seeking to identify the first moment effect of inflation expectations on economic behavior. Consistent with this, if we estimate our specification including only inflation expectations (Appendix Table 8), we find more ambiguous evidence on the first moment's effect on job search.

Finally, we consider respondents' expected household income growth over the next 12 months. The results for both the expected mean and uncertainty about the evolution of future income are shown in Table 9. As households become more uncertain about the inflation outlook, they also tend to become more uncertain about their expected future income. Since both the unemployed and the employed view it as more likely that they will, respectively, either find a job or transition jobs in the future, this could potentially be the source of the uncertainty about their income. For the employed, another potential explanation relates to uncertainty about wages in their current jobs. In terms of the level of expected income, we cannot reject the null of zero response to a change in inflation uncertainty.

Overall, we find that in the face of higher uncertainty about inflation, respondents report that they plan to search more aggressively for new work, consistent with what was reported in Table 2 from the hypothetical question. We view this as providing causal evidence of an "insurance" motive for labor supply.

5.2 Job market outcomes

While the previous section presented evidence about workers' planned job search, it would be ideal to know if this additional search in the face of high inflation uncertainty is fruitful and actually leads to greater employment in subsequent months among respondents. Fortunately, the ECB survey asks respondents every three months about their job status, essentially if they are employed, unemployed (interested in or searching for work) or out of the labor force (not searching). Among the employed, we can also decompose employment into full time work and part time work. This therefore provides us with actual labor market outcomes for our survey respondents who participated in the information treatment.

As a result, we can estimate equation (1) using employment status as an outcome variable. For each category, we use an indicator variable equal to one if an individual is in that category and zero otherwise. Results are presented in Table 10 for labor market outcomes one month and four months after the treatment. Consistent with the reported increased job search, we observe a progressive movement of the unemployed into employment and part-time workers into full-time employment when inflation uncertainty increases. This is particularly visible after 4 months (Panel B). An increase in inflation uncertainty does not change the probability of someone being out of the labor force, but it does lead to a decline in the probability of being unemployed as well as a decline in the probability of being in part-time work, which is compensated for by an increase in

the probability of being in full-time employment. Consistent with the reported desire in Table 2 of respondents to increase their income through new or additional jobs when inflation uncertainty is high, we can indeed observe a change in labor market outcomes in the survey which is consistent with these motives. Overall, the results for actual employment outcomes based on the RCT broadly confirm those elicited from the directly reported expected actions of respondents.

5.3 Recap

Together, these results provide clear evidence that, when households perceive high uncertainty about future inflation, they use their labor supply to provide insurance against this volatility. Higher inflation uncertainty leads to an increased in job search, an expectation of higher job turnover or acquisition, and ultimately movements out of unemployment and part-time work into more full-time work.

6. The effects of expected inflation and inflation uncertainty on other outcomes

Inflation uncertainty and expectations can of course affect other margins and beliefs as well. For example, Table 2 suggests that households would adjust their shopping behavior in the face of more uncertainty. One can imagine other decisions as well that could be sensitive to uncertainty about inflation, such as borrowing decisions. In this section, we consider a few additional dimensions along which households may be affected by their beliefs about inflation.

The first is precisely the type of shopping behavior emphasized by households in their response to the hypothetical question described in Table 2. While it is difficult to quantify consumer shopping behavior, the survey included one question, post-treatment, that asked about this margin. Specifically, respondents were posed the following question:

> "*In the next 12 months, how much time do you plan to spend searching and shopping for goods and services (e.g. visit shops, compare offers, search the internet)* ***compared to what you currently do****?"*

Answers are on a scale of 1 (plan to search much less) to 5 (plan to search much more). We use that scale as an outcome variable to measure desired shopping intensity over the next year. We then estimate equation (1) using this as the dependent variable and report results in column (1) of Table 11. As inflation uncertainty rises, households report a greater desired level of shopping intensity, consistent with responses shown in Table 2. In contrast, higher levels of inflation expectations are associated with a reduced plan for future shopping activity.

A second possible margin is in terms of borrowing decisions and the nature of loans that households would prefer to hold. An example of this regards mortgages, that represent the most important form of household debt. Different mortgage types are typically prevalent across European countries, where consumers often face a choice between fixed and adjustable rate mortgages. One might expect that, if there is more uncertainty about future inflation, households would tend to prefer fixed rate mortgages in which more of the associated interest-rate risk is borne by the lender. In the September 2023 survey, there was a hypothetical question posed after the information treatment that went after this decision. The question was:

> "*Suppose you have to take out a mortgage to finance the purchase of a house/apartment today. Which one of the following types would you choose?*"

Respondents were able to choose between an adjustable rate mortgage, a fixed rate mortgage, or a mixed one that typically features a fixed interest rate period initially before turning into variable. We create an indicator variable equal to one if respondents select either a fixed or mixed mortgage and zero otherwise and use it as the dependent variable in estimating equation (1). We find (column 2 of Table 11) that as inflation uncertainty rises, respondents' propensity to choose a fixed rate mortgage also rises, as the intuition above would suggest. The effect is non-trivial: a doubling of inflation uncertainty leads to an increase in the probability of someone picking a fixed rate mortgage by about 13 percentage points.

The third margin we investigate is confidence in monetary policy. We do so by utilizing two questions that speak to the central bank's ability to control inflation, both of which were posed in September 2023 after the information treatment. The first is:

> "*How long do you think will it take before inflation is close to 2% in the country you currently live in?*"

Respondents select from a set of pre-set time spans ranging from less than 6 months to 10 or more years. We quantify these time spans by assigning them each a quantitative value in months (the midpoint) and then taking logs. We use the resulting measure as the outcome variable and report results in Table 11. When respondents expect greater inflation uncertainty, they report that they think it will take longer for inflation get close to 2%.

A second measure is provided by the following question, also asked after the information treatment:

> "*How likely do you think it is that* ***the ECB will maintain price stability in the euro area economy over the next 3 years?*****"**

Respondents answered the question by picking a value ranging from 0 (not likely) to 100 (very likely), with an option to select "I don't know". We use the reported likelihood as the dependent variable for estimating equation (1) and again show results in Table 11. Neither changes in inflation expectations nor in inflation uncertainty seem to affect respondents' perceptions about the ECB's credibility in terms of achieving price stability over a three-year horizon.

These two results therefore present mixed evidence regarding how inflation uncertainty affects households' beliefs about the central bank. On the one hand, an increase in inflation uncertainty leads respondents to expect that it will take longer to bring inflation down to 2%. However, this does not seem to affect their overall perception about the central bank's ability to maintain price stability over a three-year horizon, thus suggesting that despite higher inflation uncertainty, the overall credibility of monetary policy remains unchanged.

7. Conclusion

We find large and persistent effects of inflation uncertainty on household durable goods purchases, their portfolio allocations, and their labor supply decisions, net of first moment effects. In doing so, we also provide new evidence on the net effect of inflation expectations on decisions, stripping out the indirect effect operating through inflation uncertainty. The two types of expectations generally have opposite effects on decisions but unconditionally are highly correlated with one another. For macroeconomists who aim to understand the different channels through which expectations affect economic decisions, the distinction between the effects of first and second moments of inflation expectations is therefore important and highly informative.

For policymakers who are interested in communication however, the implications are more nuanced. The overall effect of a given communication that affects inflation expectations can be summarized by the "total" effect estimated in e.g., Coibion et al. (2022), which will capture the combined net effect of first and second moments. In that sense, the total effects may be more immediately informative for policymakers. But to the extent that future communication could be

shaped to target the first or second moments of beliefs more cautiously and separately, then this suggests more scope for affecting consumer decisions in a desired direction. For example, a boost in durable goods spending can be achieved through either raising inflation expectations or reducing uncertainty about future inflation. Communication that does both would tend to be particularly effective. In this sense it is important to carefully assess how different communication strategies such as target versus instrument communication (Angelots and Sastry, 2021) or communication that emphasizing "data dependence of policy" versus clearer forward guidance on expected future policy rates might impact separately both the first and second moments of expected inflation. This more explicit consideration of both the first and second moment channels through which such messages and guidance may affect beliefs, holds out the prospect of more effective central bank communication.

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Table 1. Descriptive statistics for pre-treatment inflation expectations.

country	Implied mean					Implied uncertainty				
	mean	p10	p50	p90	s.d.	mean	p10	p50	p90	s.d.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Belgium	5.08	0.71	4.46	10.78	3.77	1.78	0.41	1.29	3.67	1.34
Germany	6.04	1.50	5.71	11.70	3.87	1.51	0.41	0.82	3.43	1.26
Spain	6.03	0.96	5.65	12.12	4.11	2.21	0.61	1.63	4.55	1.76
France	5.82	1.50	5.42	11.27	3.84	1.59	0.30	1.14	3.52	1.31
Italy	6.43	1.18	6.00	13.08	4.23	2.57	0.69	2.06	4.97	2.00
Netherlands	4.96	0.77	4.15	10.00	3.60	1.85	0.41	1.39	3.78	1.40
Austria	6.06	1.50	5.94	10.98	3.61	1.87	0.41	1.51	3.81	1.36
Finland	5.00	0.71	4.46	10.00	3.48	2.19	0.58	1.81	4.41	1.58
Greece	9.65	3.13	10.44	14.00	4.32	2.83	0.82	2.57	5.35	2.27
Ireland	6.25	1.24	6.00	12.79	3.98	2.42	0.82	2.10	4.66	1.71
Portugal	6.60	1.01	6.00	13.57	4.41	2.51	0.77	2.03	4.85	1.93
All	6.08	1.48	5.69	12.59	4.04	1.93	0.41	1.33	4.10	1.63

Notes: p10, p50, p90 stand for the 10^{th}, 50^{th}, and 90^{th} percentiles. Implied uncertainty is measured with the standard deviation implied by the reported subjective distribution.

Table 2. Responses to a hypothetical increase/decrease in inflation uncertainty.

#	Action	Difference in probability of using a strategy if would face higher vs. lower inflation uncertainty
		(1)
1	Bring forward major purchases of durable goods	0.008
		(0.007)
2	Reduce usual spending and put aside more money	0.113***
		(0.007)
3	Shop around more actively to find the best price for the same exact product or service	0.071***
		(0.006)
4	Substitute goods and services with cheaper alternatives	0.094***
		(0.007)
5	Switch stores	0.092***
		(0.007)
6	Shop more online	0.037***
		(0.007)
7	Save less than usual or liquidate (some or all) savings to finance spending	0.031***
		(0.007)
8	Use more credit than usual to finance spending (e.g. increased balance on credit cards or other consumer loans)	0.006
		(0.005)
9	Buy gold, real estate and other inflation-protected assets	-0.006
		(0.005)
10	Hold more savings in cash	-0.002
		(0.007)
11	Adopt a less risky portfolio strategy	0.019***
		(0.007)
12	Ask for a pay rise from my current employer or look for a higher paying job	0.026***
		(0.006)
13	Look to increase your income in other ways (e.g. take on a second job, work more hours with current employer)	0.057***
		(0.007)

Notes: The table reports estimated coefficients on the indictor variable equal to one if a respondent is presented with "increase uncertainty" scenario. The dependent variable is an indicator variable equal to one if a respondent would take a given strategy (action) in response to a change (increase or decrease) in inflation uncertainty. The regressions are estimated with OLS. Country fixed effects are included but not reported. Heteroskedasticity robust standard errors are reported in parentheses. ***, **, * denote statistical significance at 1, 5 and 10 percent levels.

Table 3. Purchases of durable goods, extensive margin.

	Dependent variable: indicator variable is a durable good is purchased.					
	Home	Durable	Car	Holiday package	Luxury items	Other
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A. One month after treatment, IV.						
Posterior mean	0.421	4.812***	0.483	1.934	0.539*	0.451
	(0.268)	(1.369)	(0.315)	(1.578)	(0.283)	(0.863)
100×log(Posterior uncertainty)	-0.025**	-0.230***	-0.024*	-0.091	-0.021**	-0.055*
	(0.010)	(0.057)	(0.013)	(0.065)	(0.011)	(0.034)
Observations	11,514	11,506	11,502	11,512	11,519	11,483
R-squared	0.002	-0.041	-0.001	0.100	0.022	0.036
1st stage F-stat (mean)	118.4	113.8	117.6	114.8	118	112.7
1st stage F-stat (uncert)	100.5	99.29	99.10	100.7	101.9	101.2
KP Wald test	10.63	9.532	10.34	10.51	10.48	10.19
Panel B. One month after treatment, IV.						
Posterior mean	-0.305***	-1.695***	-0.325***	-1.158**	-0.208***	-1.452***
	(0.066)	(0.400)	(0.078)	(0.501)	(0.071)	(0.267)
Observations	8,658	8,652	8,645	8,653	8,662	8,646
R-squared	0.01	0.04	0.01	0.11	0.03	0.02
1st stage F-stat (mean)	208.3	200.1	206.6	212.8	207.3	202.6
Panel C. One month after treatment, OLS						
Posterior mean	0.077	-0.014	0.120	0.246	0.217***	0.685***
	(0.081)	(0.332)	(0.083)	(0.273)	(0.082)	(0.215)
100×log(Posterior uncertainty)	-0.131	3.383**	0.140	0.086	-0.465	-0.790
	(0.430)	(1.645)	(0.312)	(1.351)	(0.339)	(1.074)
Observations	2,654	2,638	2,644	2,629	2,647	2,634
R-squared	0.011	0.080	0.012	0.105	0.100	0.085

Notes: The table reports estimated coefficients on posterior beliefs about inflation in specification (1). The first stage is given by specification (2). For Panel B specifications (1) and (2) exclude beliefs for uncertainty and treatment 2. Panel C includes the control group and the specification does not include pre-treatment beliefs. The dependent variables takes values 0 (no purchase) and 100 (a purchase is made). Heteroskedasticity robust standard errors are reported in parentheses. ***, **, * denote statistical significance at 1, 5 and 10 percent levels. Results for 2,3, and 4 months after the treatment are in Appendix Table 4.

Table 4. Subsample analysis for purchases of a durable good one month after the treatment.

subsample	Posterior mean		100×log(Posterior uncertainty)		N obs.
	coef.	s.e.	coef.	s.e.	
	(1)	(2)	(3)	(4)	(5)
Liquidity constrained	4.097*	(2.200)	-0.217**	(0.101)	3025
Liquidity unconstrained	4.389***	(1.563)	-0.208***	(0.063)	8481
p-value (equality)	0.914		0.936		
South	4.843**	(2.011)	-0.253***	(0.091)	4687
North	4.198**	(1.704)	-0.185***	(0.065)	6819
p-value (equality)	0.807		0.547		
Income quartile Q1	0.113	(1.910)	-0.009	(0.097)	2511
Income quartile Q2	6.417*	(3.451)	-0.323**	(0.132)	2251
Income quartile Q3	4.974**	(2.058)	-0.219***	(0.080)	3605
Income quartile Q4 (top)	5.463	(3.518)	-0.229*	(0.134)	3139
p-value (equality)	0.200		0.198		
Low financial literacy	2.964	(2.012)	-0.204**	(0.089)	4405
High financial literacy	4.506***	(1.591)	-0.191***	(0.065)	7020
p-value (equality)	0.548		0.910		

Notes: The table reports estimated coefficients on posterior beliefs about inflation in specification (1) for various subsamples. The first stage is given by specification (2). The dependent variables takes values 0 (no purchase) and 100 (a purchase is made). Liquidity constrained respondents are defined as those who respond that they do not have sufficient financial resources to meet an unexpected payment equal to one month of household income. North covers Belgium, Germany, France, Netherlands, Austria, Finland, and Ireland. South covers Spain, Italy, Greece and Portugal. Low financial literacy covers households who give 3 or fewer correct answers on the "big-5" financial literacy questions. p-value (equality) report p-value of equality of estimated coefficients across subsamples. Heteroskedasticity robust standard errors are reported in parentheses. ***, **, * denote statistical significance at 1, 5 and 10 percent levels.

Table 5. Purchases of non-durable goods and services.

	Dependent variable: 100 × log monthly purchases of non-durable goods and services			
	One month after treatment	One month after treatment	Four months after treatment	Four months after treatment
	(1)	(2)	(3)	(4)
Posterior mean	-3.194	0.454	0.297	1.035
	(2.502)	(0.772)	(2.576)	(0.834)
100×log(Posterior uncertainty)	0.163		0.011	
	(0.100)		(0.104)	
Observations	11,250	8,445	8,641	6,519
R-squared	0.24	0.26	0.29	0.28
1st stage F-stat (mean)	114	210.3	96.73	189.3
1st stage F-stat (uncert)	101.4		86.99	
KP Wald test	10.61		9.498	

Notes: The table reports estimated coefficients on posterior beliefs about inflation in specification (1). The first stage is given by specification (2). Heteroskedasticity robust standard errors are reported in parentheses. ***, **, * denote statistical significance at 1, 5 and 10 percent levels.

Table 6. Reallocation of non-durable goods and services spending.

	Food at home	Food out	Utilities	Home equipment	Clothing	Healthcare and beauty products	Trans-portation	Recreation	Education and other
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A. One month after treatment									
Posterior mean	-0.339	-0.313	1.288***	-0.458	-0.180	0.264	-0.066	-0.082	-0.222
	(0.730)	(0.282)	(0.460)	(0.945)	(0.229)	(0.331)	(0.333)	(0.475)	(0.424)
100×log(Posterior uncertainty)	0.010	0.013	-0.052***	0.039	0.006	-0.010	0.005	-0.004	-0.002
	(0.029)	(0.011)	(0.018)	(0.038)	(0.009)	(0.014)	(0.013)	(0.020)	(0.018)
Observations	10,937	10,937	10,937	10,937	10,937	10,937	10,937	10,937	10,937
R-squared	0.09	0.10	0.02	0.14	0.04	0.08	0.03	0.06	0.05
1st stage F-stat (mean)	107.2	107.2	107.2	107.2	107.2	107.2	107.2	107.2	107.2
1st stage F-stat (uncertainty)	99.26	99.26	99.26	99.26	99.26	99.26	99.26	99.26	99.26
KP Wald	9.293	9.293	9.293	9.293	9.293	9.293	9.293	9.293	9.293
Panel B. Four months after treatment									
Posterior mean	-1.461**	-0.474	0.447	0.875	-0.080	0.528*	0.570*	0.122	-0.725*
	(0.697)	(0.332)	(0.491)	(0.870)	(0.263)	(0.300)	(0.325)	(0.380)	(0.439)
100×log(Posterior uncertainty)	0.064**	0.020	-0.020	-0.035	0.004	-0.019	-0.027**	-0.000	0.022
	(0.029)	(0.014)	(0.020)	(0.036)	(0.011)	(0.013)	(0.013)	(0.016)	(0.019)
Observations	8,354	8,354	8,354	8,354	8,354	8,354	8,354	8,354	8,354
R-squared	0.06	0.11	0.06	0.14	0.08	0.11	-0.01	0.06	0.02
1st stage F-stat (mean)	93.82	93.82	93.82	93.82	93.82	93.82	93.82	93.82	93.82
1st stage F-stat (uncertainty)	84.20	84.20	84.20	84.20	84.20	84.20	84.20	84.20	84.20
KP Wald	8.682	8.682	8.682	8.682	8.682	8.682	8.682	8.682	8.682

Notes: The table reports estimated coefficients on posterior beliefs about inflation in specification (1). The first stage is given by specification (2). The dependent variable is measured in percent. Heteroskedasticity robust standard errors are reported in parentheses. ***, **, * denote statistical significance at 1, 5 and 10 percent levels.

Table 7. Portfolio allocations across asset classes.

	Portfolio shares							
	Cash	Curr./Saving account	Stocks	Mutual funds	Retirement account	Bonds	Crypto assets	Other
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A. Scenario-based, immediately after treatment								
Posterior mean	0.525	-2.346	-0.876	1.144	1.039*	-0.233	0.157	0.442
	(1.068)	(1.642)	(0.665)	(0.712)	(0.595)	(0.548)	(0.195)	(0.518)
100×log(Posterior uncertainty)	-0.045	0.173***	0.025	-0.049	-0.065***	0.001	-0.009	-0.025
	(0.042)	(0.066)	(0.029)	(0.030)	(0.025)	(0.023)	(0.009)	(0.021)
Observations	13,601	13,601	13,601	13,601	13,601	13,601	13,601	13,601
R-squared	0.10	0.05	0.05	0.08	0.02	0.11	0.02	0.05
1st stage F-stat (mean)	143.9	143.9	143.9	143.9	143.9	143.9	143.9	143.9
1st stage F-stat (uncertainty)	122.5	122.5	122.5	122.5	122.5	122.5	122.5	122.5
KP Wald	12.78	12.78	12.78	12.78	12.78	12.78	12.78	12.78
Panel B. Actual, two months after treatment								
Posterior mean	-0.325	-4.894***	1.026*	0.589	1.833*	0.678**	0.016	1.612**
	(0.398)	(1.723)	(0.526)	(0.537)	(1.073)	(0.330)	(0.063)	(0.741)
100×log(Posterior uncertainty)	0.010	0.233***	-0.053**	-0.025	-0.076*	-0.036***	-0.003	-0.065**
	(0.015)	(0.071)	(0.022)	(0.023)	(0.044)	(0.013)	(0.003)	(0.030)
Observations	9,121	9,121	9,121	9,121	9,121	9,121	9,121	9,121
R-squared	0.07	0.02	0.05	-0.04	-0.05	-0.11	0.01	0.06
1st stage F-stat (mean)	101.1	101.1	101.1	101.1	101.1	101.1	101.1	101.1
1st stage F-stat (uncertainty)	91.79	91.79	91.79	91.79	91.79	91.79	91.79	91.79
KP Wald	11.30	11.30	11.30	11.30	11.30	11.30	11.30	11.30

Notes: The table reports estimated coefficients on posterior beliefs about inflation in specification (1). The first stage is given by specification (2). The dependent variable is measured in percent. Heteroskedasticity robust standard errors are reported in parentheses. ***, **, * denote statistical significance at 1, 5 and 10 percent levels.

Table 8. Job Search and Related Expectations.

	Job search intensity (# of job application)	Subj. prob. of finding a job in 3 months	Subj. prob. of losing a job in 3 months	Subj. prob. of looking for a job in 3 months
	(1)	(2)	(3)	(4)
Panel A. One month after treatment				
Posterior mean	-1.149***	-10.240**	-0.274	-1.808**
	(0.415)	(4.892)	(0.931)	(0.744)
100×log(Posterior uncertainty)	0.056***	0.365**	0.016	0.053*
	(0.017)	(0.171)	(0.034)	(0.030)
Observations	1,411	461	7,597	7,251
R-squared	-0.07	-0.07	0.03	0.03
1st stage F-stat (mean)	11.03	2.383	70.18	75.18
1st stage F-stat (uncertainty)	10.14	3.878	65.76	69.30
KP Wald	1.887	1.232	5.896	9.996
Panel B. Four months after treatment				
Posterior mean	-0.268	38.871**	0.246	-0.225
	(0.272)	(19.038)	(0.716)	(0.686)
100×log(Posterior uncertainty)	-0.007	-1.702*	-0.014	-0.007
	(0.013)	(0.915)	(0.027)	(0.027)
Observations	848	274	5,810	5,632
R-squared	0.07	-4.99	0.05	0.05
1st stage F-stat (mean)	12.54	3.101	58.56	59.61
1st stage F-stat (uncertainty)	11.52	3.184	55.05	51.87
KP Wald	3.379	0.238	6.412	7.460

Notes: The table reports estimated coefficients on posterior beliefs about inflation in specification (1). The first stage is given by specification (2). Heteroskedasticity robust standard errors are reported in parentheses. ***, **, * denote statistical significance at 1, 5 and 10 percent levels.

Table 9. Expectations about household income growth (next 12 months).

	Household income growth	
	Implied mean	100×log(implied uncertainty)
	(1)	(2)
Posterior mean	-0.13	-3.07
	(0.22)	(3.25)
100×log(Posterior uncertainty)	1.07	0.35**
	(0.88)	(0.13)
Observations	13,448	13,418
R-squared	0.05	0.19
1st stage F-stat (mean)	138.6	138.2
1st stage F-stat (uncertainty)	119.7	116.3
KP Wald	12.58	11.24

Notes: The table reports estimated coefficients on posterior beliefs about inflation in specification (1). The first stage is given by specification (2). Heteroskedasticity robust standard errors are reported in parentheses. ***, **, * denote statistical significance at 1, 5 and 10 percent levels.

Table 10. Employment Status.

	Employed (any)	Employed (full-time)	Employed (part-time)	Unemployed	Other (out of labor force, laid-off, etc.)
	(1)	(2)	(3)	(4)	(5)
Panel A. One month after treatment					
Posterior mean	0.649	-0.981	1.402	0.503	-1.175
	(1.873)	(1.967)	(1.098)	(0.693)	(1.826)
100×log(Posterior uncertainty)	0.031	0.116	-0.076*	-0.065**	0.032
	(0.073)	(0.077)	(0.044)	(0.026)	(0.071)
Observations	11,426	11,426	11,426	11,426	11,426
R-squared	0.37	0.32	0.04	0.03	0.40
1st stage F-stat (mean)	112.4	112.4	112.4	112.4	112.4
1st stage F-stat (uncertainty)	101.5	101.5	101.5	101.5	101.5
KP Wald	11.43	11.43	11.43	11.43	11.43
Panel B. Four months after treatment					
Posterior mean	-0.259	-2.327	2.173*	0.822	-0.716
	(1.886)	(2.026)	(1.201)	(0.565)	(1.854)
100×log(Posterior uncertainty)	0.044	0.161**	-0.121**	-0.071***	0.026
	(0.076)	(0.082)	(0.049)	(0.022)	(0.075)
Observations	8,666	8,666	8,666	8,666	8,666
R-squared	0.41	0.35	0.01	0.02	0.43
1st stage F-stat (mean)	96.75	96.75	96.75	96.75	96.75
1st stage F-stat (uncertainty)	85.54	85.54	85.54	85.54	85.54
KP Wald	8.570	8.570	8.570	8.570	8.570

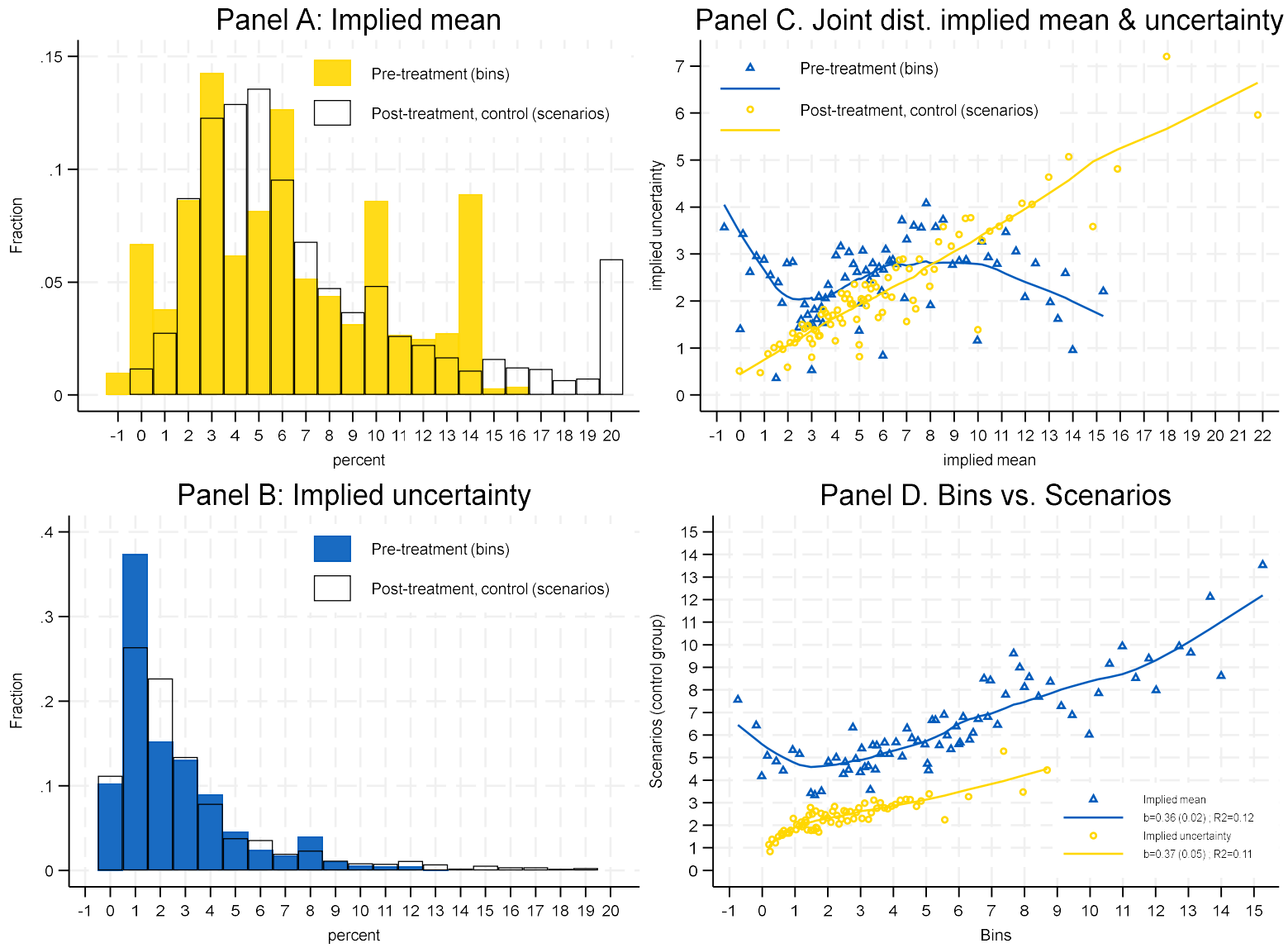
Notes: The table reports estimated coefficients on posterior beliefs about inflation in specification (1). Employment status is measures as an indicator variable equal to one if in a given status and zero otherwise. Category "other" includes laid-off workers. The first stage is given by specification (2). Heteroskedasticity robust standard errors are reported in parentheses. ***, **, * denote statistical significance at 1, 5 and 10 percent levels.

Table 11. Additional margins of adjustment.

	Outcome			
	Shopping intentions	Mortgage choice: FRM	Time expected for inflation to return to 2%, 100×log(months)	ECB credibility
	(1)	(4)	(6)	(7)
Posterior mean	-0.092***	-1.744*	0.737	-0.351
	(0.036)	(1.034)	(3.278)	(0.997)
100×log(Posterior uncertainty)	0.004***	0.131***	0.320**	0.001
	(0.001)	(0.045)	(0.131)	(0.039)
Control for pre-treatment level of the dependent variable	Yes	No	No	Yes
Observations	14,227	14,192	14,236	11,551
R-squared	0.08	-0.01	0.07	0.43
1st stage F-stat (mean)	145.9	148.8	145.9	116.4
1st stage F-stat (uncertainty)	124.9	123.8	124.9	104
KP Wald	12.42	12.26	12.56	11.04

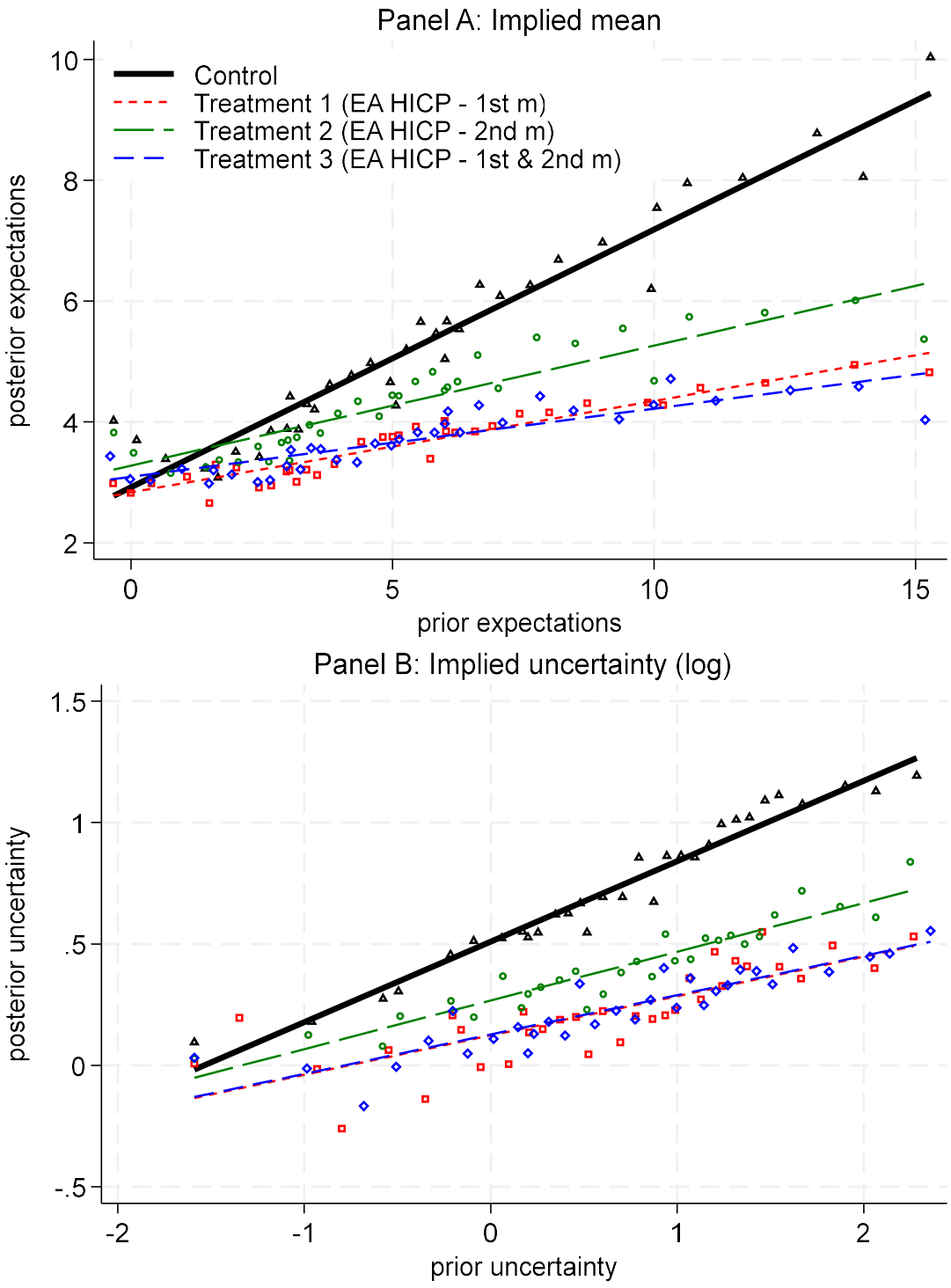
Notes: The table reports estimated coefficients on posterior beliefs about inflation in specification (1). Shopping intentions are measured on 1 (much less) to 5 (much more) scale. Mortgage choice is coded as 100 (fixed-rate mortgage) or 0 (adjustable-rate mortgage). Credibility of the European Central Bank (ECB) is measured on 0-100 scale. Outcome in column (3) is a choice from the following options: less than 6 months; 6 months or more but less than 1 year; 1 year or more but less than 1.5 years; 1.5 years or more but less than 2 years; 2 years or more but less than 3 years; 3 years or more but less than 5 years; 5 years or more but less than 10 years; 10 years or more. We use the midpoint for each option. Outcomes in columns (1)-(3) are measured immediately after information treatments. Outcome in column (4) is measured one month after treatment. The first stage is given by specification (2). Heteroskedasticity robust standard errors are reported in parentheses. ***, **, * denote statistical significance at 1, 5 and 10 percent levels.

Figure 1. Distribution of inflation expectations.



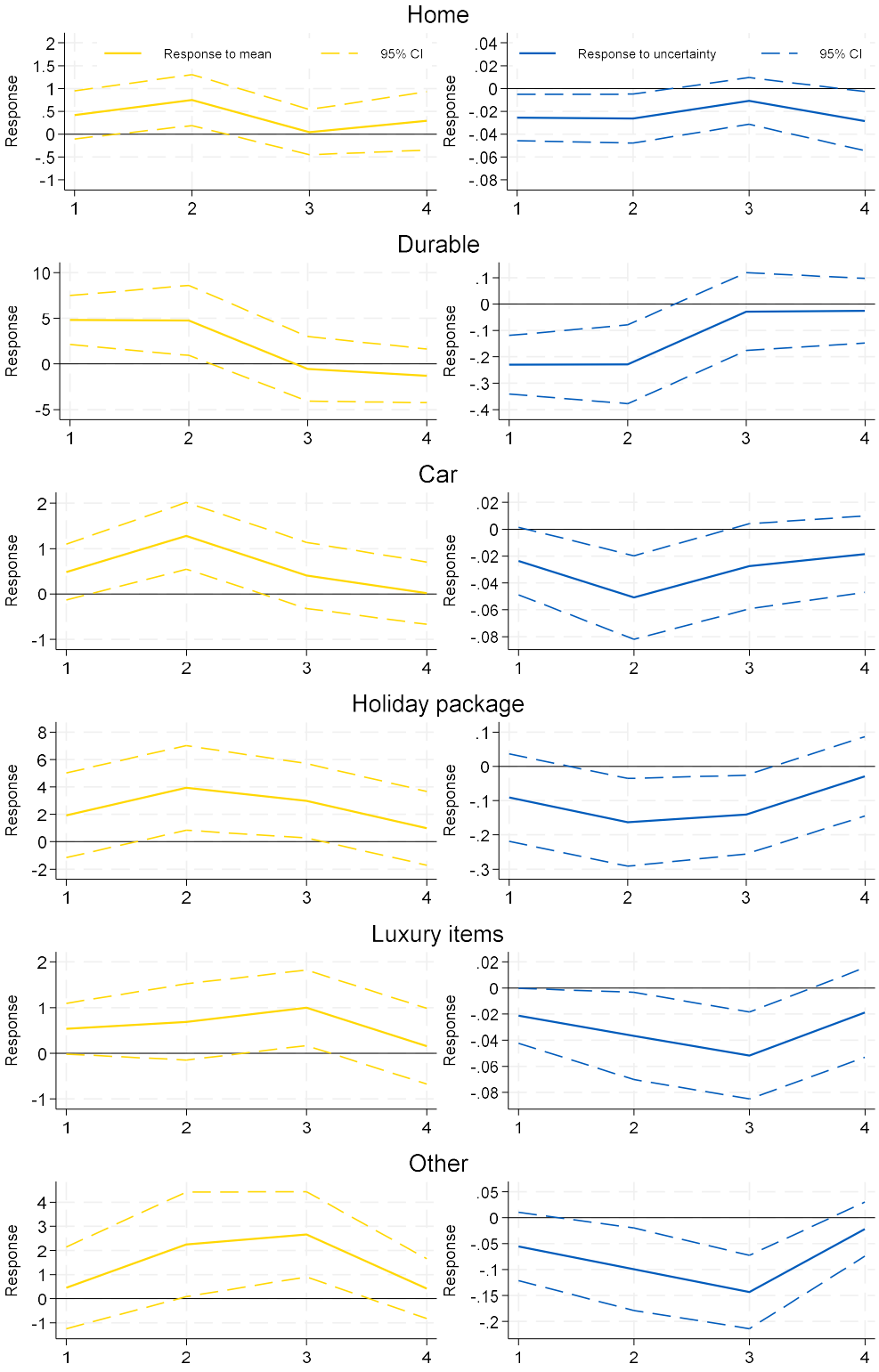
Notes: Panels A and B plot the distribution for beliefs elicited with different surveys questions. Panel C shows binscatters for first vs. second moments of inflation expectations by survey method. Panel D shows binscatters of responses for bins-based vs scenario-based questions by moment of inflation expectations. Huber robust weights are used in Panels C and D. Scenario-based questions are based on Altig et al. (2022). Responses for the scenario-based responses are winsorized at 25% in Panel A, C, and D.

Figure 2. Treatment effect on inflation expectations.



Notes: Uncertainty is measured with the standard deviation implied by the reported subjective probability distribution. Prior are elicited using bin-based questions. Posterior are elicited using scenario-based questions suggested by Altig et al (2022).

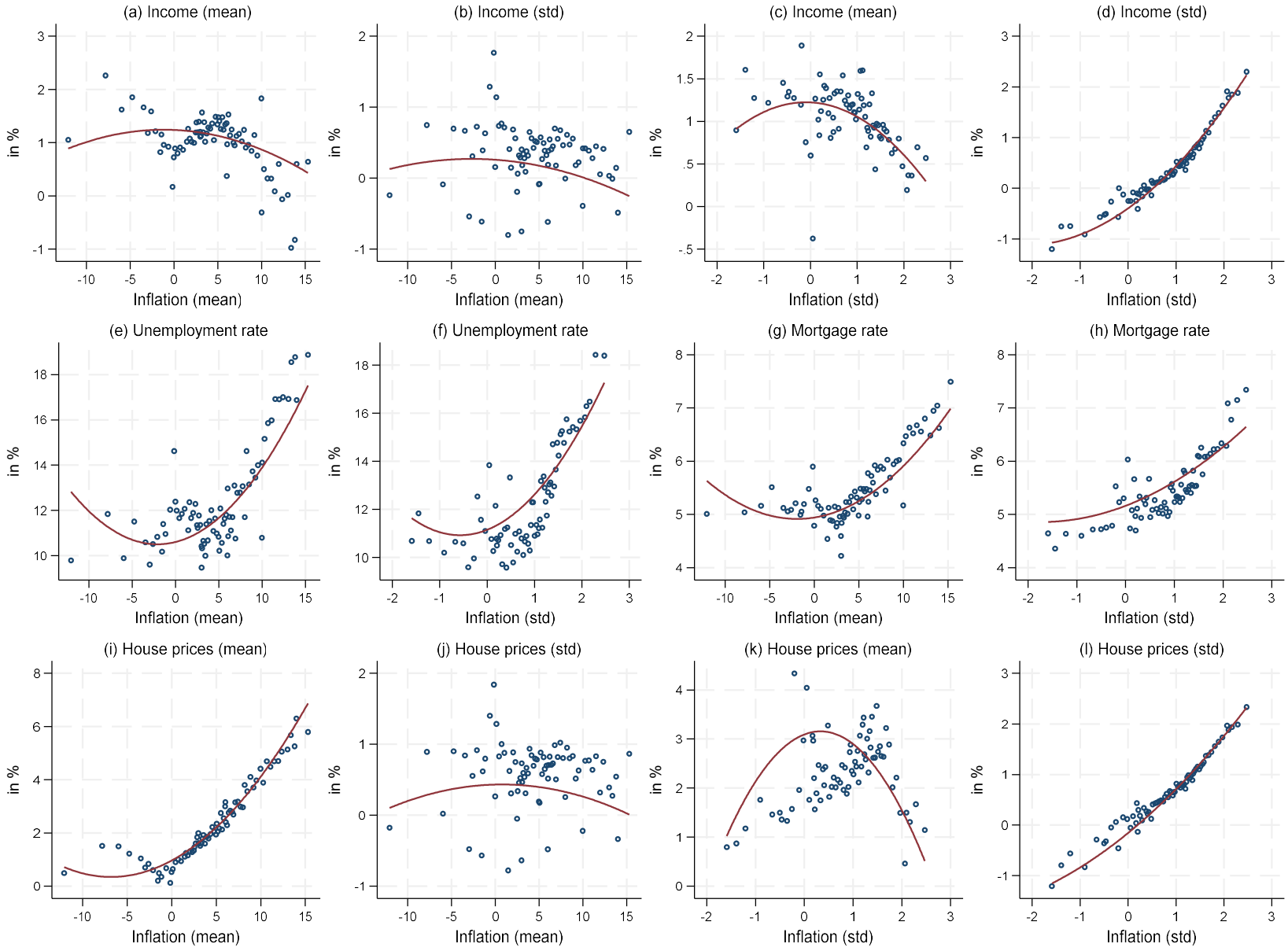
Figure 3. Dynamic effect of inflation expectations and uncertainty on durable goods purchases.



Notes: The figure reports results for purchases of durable goods (extensive margin) by month after information treatments.

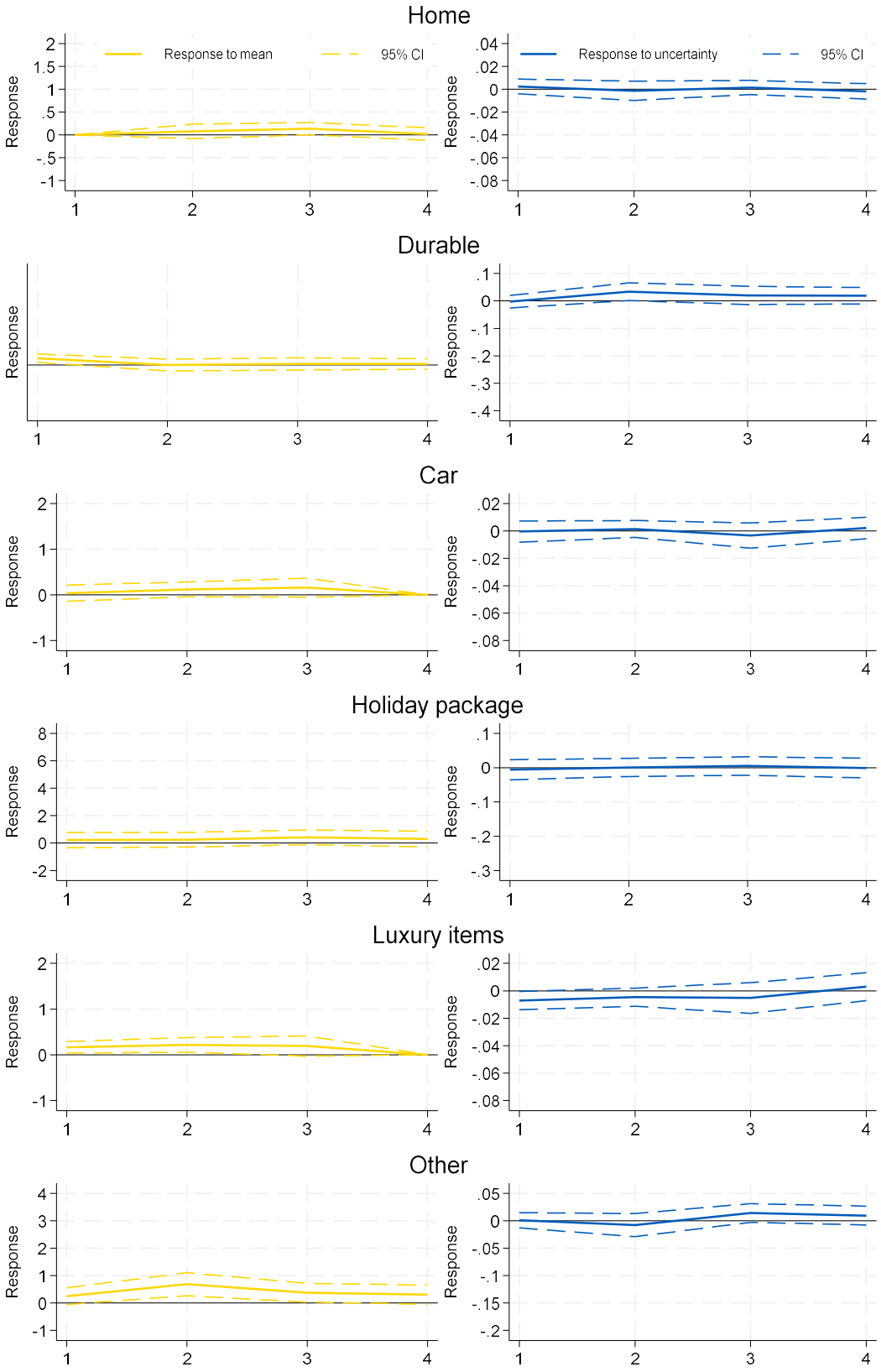
Appendix Tables and Figures

Appendix Figure 1. Expectations for inflation and other variables.



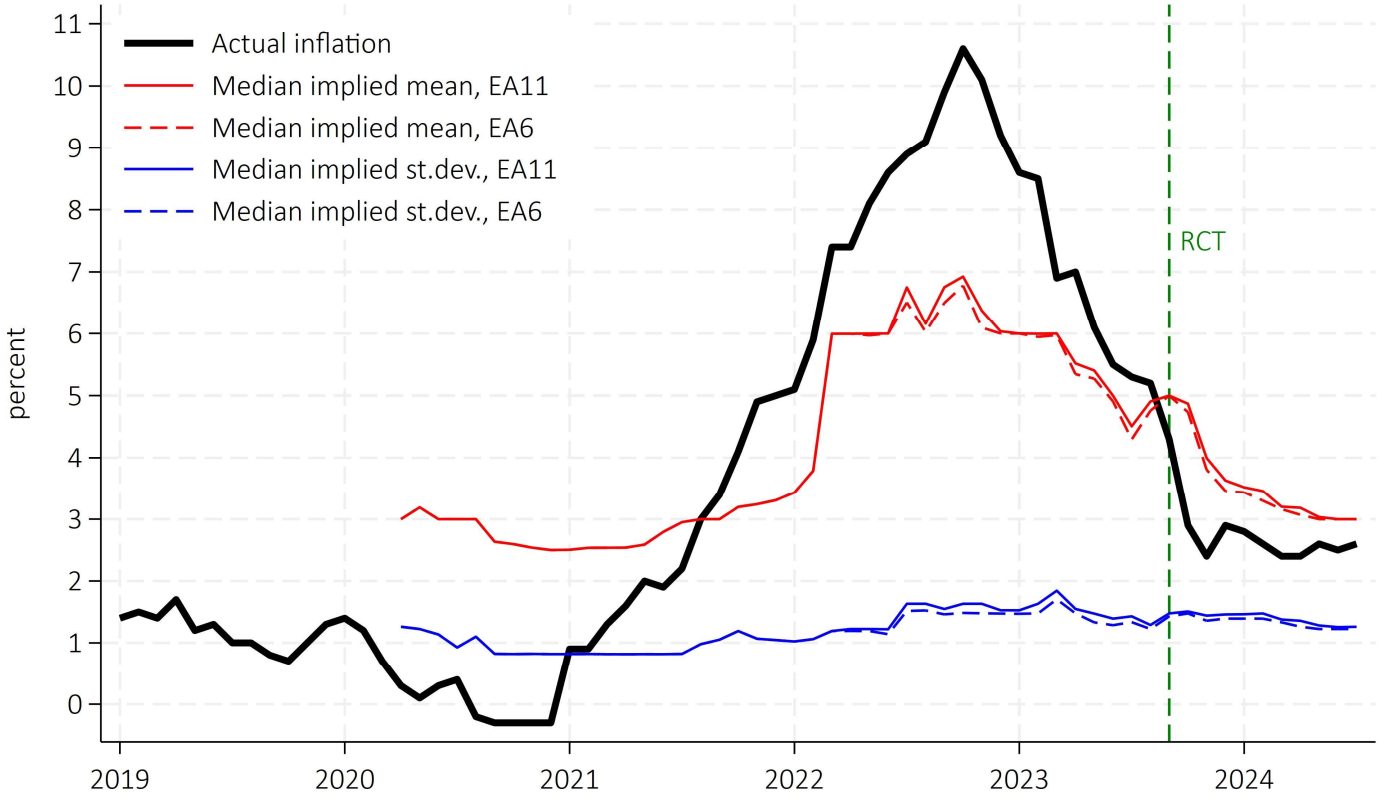
Notes: the figures show binscatter plots for inflation vs. other macroeconomic expectations.

Appendix Figure 2. The effects of expectations on durable goods purchases across months, OLS.



Notes: see notes for Figure 2 and Table 3. The scales of the vertical axes match the corresponding panels in Figure 2.

Appendix Figure 3. Time series of actual inflation and inflation expectations in the CES.



Source: https://www.ecb.europa.eu/stats/ecb_surveys/consumer_exp_survey/html/data_methodological.en.html. EA11 covers 11 countries in the euro area: Belgium, France, Germany, Italy, the Netherlands, Spain, Austria, Greece, Finland, Ireland, Portugal. EA6 covers 6 countries in the euro area: Belgium, France, Germany, Italy, the Netherlands, Spain.

Appendix Table 1. Descriptive statistics for post-treatment (scenarios) inflation expectations for the control group.

country	Implied mean					Implied uncertainty				
	mean	p10	p50	p90	s.d.	mean	p10	p50	p90	s.d.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Belgium	5.41	1.90	4.50	10.00	3.39	1.94	0.00	1.66	3.74	1.48
Germany	5.32	2.45	5.00	9.25	2.75	1.78	0.00	1.55	3.49	1.36
Spain	5.85	2.20	5.00	11.00	3.58	2.20	0.64	1.73	4.62	1.66
France	5.20	2.00	4.70	10.00	3.17	1.75	0.00	1.47	3.63	1.46
Italy	7.35	2.25	6.10	14.50	4.61	2.60	0.64	2.04	5.36	2.18
Netherlands	5.18	2.10	4.80	9.40	3.00	1.98	0.66	1.68	3.31	1.31
Austria	6.21	2.50	6.00	10.00	3.24	2.17	0.67	1.80	3.98	1.60
Finland	5.76	2.25	4.80	10.80	3.46	2.45	0.71	2.22	4.74	1.69
Greece	10.31	3.50	9.90	19.50	6.02	3.89	0.78	3.35	7.35	2.56
Ireland	6.14	2.50	5.30	11.05	3.29	2.67	0.80	2.37	5.31	1.78
Portugal	6.75	2.30	5.20	12.00	5.06	2.81	0.77	2.01	5.55	2.26
All	5.87	2.10	5.00	10.50	3.67	2.09	0.00	1.66	4.15	1.72

Notes: the sample covers only respondents in the control group. See notes to Table 1.

Appendix Table 2. Predictors of inflation expectations.

	Dependent variable:			
	Implied mean		log(Implied uncertainty)	
	(1)	(2)	(3)	(4)
High-school diploma	0.011	-0.054	0.018	0.037
	(0.108)	(0.082)	(0.022)	(0.022)
College+	-0.125	-0.018	0.091***	0.100***
	(0.103)	(0.078)	(0.021)	(0.022)
Age	0.135***	0.035***	-0.003	-0.007***
	(0.012)	(0.009)	(0.002)	(0.002)
$Age^2/100$	-0.116***	-0.030***	-0.003	0.000
	(0.012)	(0.009)	(0.002)	(0.002)
Household size	0.051*	0.009	0.012**	0.008
	(0.027)	(0.021)	(0.006)	(0.006)
Log(household income)	-0.339***	-0.100**	-0.032***	-0.020
	(0.058)	(0.044)	(0.012)	(0.012)
Sufficient liquidity	-0.969***	-0.321***	-0.064***	-0.069***
	(0.074)	(0.058)	(0.015)	(0.015)
Male	-0.491***	-0.082*	-0.035***	-0.005
	(0.059)	(0.045)	(0.012)	(0.013)
Non-probabilistic sample	-0.580***	-0.510***	0.290***	0.254***
	(0.069)	(0.053)	(0.014)	(0.015)
Perceived inflation		0.307***		0.024***
		(0.004)		(0.001)
Trust in ECB		-0.095***		0.003
		(0.009)		(0.002)
Country fixed effects (omitted: Germany)				
Belgium	-0.455***	-0.592***	0.082**	0.077**
	(0.142)	(0.108)	(0.032)	(0.033)
Spain	-0.104	-0.735***	0.355***	0.275***
	(0.100)	(0.077)	(0.021)	(0.021)
France	-0.178*	-0.376***	0.023	0.028
	(0.093)	(0.071)	(0.019)	(0.020)
Italy	0.274***	-1.019***	0.537***	0.400***
	(0.098)	(0.076)	(0.020)	(0.021)
Netherlands	-0.660***	-0.859***	0.088***	0.097***
	(0.131)	(0.100)	(0.030)	(0.030)
Austria	0.600***	-0.128	0.117***	0.060**
	(0.139)	(0.112)	(0.030)	(0.031)
Finland	-0.494***	-0.926***	0.215***	0.182***
	(0.145)	(0.116)	(0.033)	(0.034)
Greece	3.651***	0.486***	0.411***	0.317***
	(0.173)	(0.147)	(0.036)	(0.040)
Ireland	0.849***	-0.294**	0.360***	0.274***
	(0.162)	(0.134)	(0.034)	(0.036)
Portugal	0.610***	-0.529***	0.276***	0.202***
	(0.173)	(0.125)	(0.032)	(0.034)
Observations	16,811	14,853	18,744	16,516
R-squared	0.086	0.407	0.125	0.159

Notes: Huber robust regression. Heteroskedasticity robust standard errors are reported in parentheses. ***, **, * denote statistical significance at 1, 5 and 10 percent levels.

Appendix Table 3. The effect of treatments on posterior beliefs.

	Dependent variable: Posterior belief	
	Implied mean	Log Implied uncertainty
	(1)	(2)
$Prior$	0.384***	0.306***
	(0.010)	(0.009)
$\{Treat\ 1\} \times \{Prior\}$	-0.238***	-0.181***
	(0.013)	(0.013)
$\{Treat\ 2\} \times \{Prior\}$	-0.193***	-0.137***
	(0.014)	(0.013)
$\{Treat\ 3\} \times \{Prior\}$	-0.270***	-0.189***
	(0.013)	(0.013)
$Treat\ 1$	-0.156**	-0.363***
	(0.077)	(0.013)
$Treat\ 2$	0.262***	-0.235***
	(0.082)	(0.013)
$Treat\ 3$	0.051	-0.351***
	(0.076)	(0.013)
Observations	14,317	17,630
R-squared	0.286	0.210
F-stat	529.2	449.1

Notes: The table reports results for regressing posterior beliefs on prior beliefs, treatment status and interactions. The specification is estimated with Huber robust regression. Heteroskedasticity robust standard errors are reported in parentheses. ***, **, * denote statistical significance at 1, 5 and 10 percent levels.

Appendix Table 4. The effects of expectations on durable goods purchases across months.

	Dependent variable: indicator variable is a durable good is purchased.					
	Home	Durable	Car	Holiday package	Luxury items	Other
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A. Two months after treatment						
Posterior mean	0.747***	4.768**	1.283***	3.934**	0.686	2.254**
	(0.285)	(1.956)	(0.375)	(1.578)	(0.426)	(1.106)
Posterior uncertainty (log)	-0.026**	-0.228***	-0.051***	-0.163**	-0.037**	-0.099**
	(0.011)	(0.076)	(0.016)	(0.065)	(0.017)	(0.041)
Observations	10,825	10,818	10,809	10,815	10,812	10,804
R-squared	-0.00	-0.04	-0.02	0.06	0.05	0.05
1st stage F-stat (mean)	112.9	110.5	112	111.2	112.5	109.9
1st stage F-stat (uncert)	99.76	100.5	100.1	98.98	100.7	100.6
KP Wald test	9.678	9.329	9.257	9.199	9.052	9.462
Panel B. Three months after treatment						
Posterior mean	0.045	-0.538	0.409	2.997**	0.997**	2.669***
	(0.253)	(1.803)	(0.371)	(1.383)	(0.422)	(0.900)
Posterior uncertainty (log)	-0.011	-0.029	-0.028*	-0.141**	-0.052***	-0.143***
	(0.010)	(0.075)	(0.016)	(0.059)	(0.017)	(0.036)
Observations	9,855	9,864	9,846	9,841	9,847	9,842
R-squared	0.011	0.073	0.017	0.059	0.044	0.011
1st stage F-stat (mean)	105.2	101.3	103.6	100.2	104.6	103.1
1st stage F-stat (uncert)	90.28	90.51	89.96	88.28	90.89	89.27
KP Wald test	10.06	9.185	9.006	10.23	10.72	10.22
Panel C. Four months after treatment						
Posterior mean	0.290	-1.301	0.018	0.986	0.154	0.416
	(0.327)	(1.502)	(0.350)	(1.376)	(0.424)	(0.631)
Posterior uncertainty (log)	-0.029**	-0.025	-0.019	-0.029	-0.019	-0.022
	(0.013)	(0.062)	(0.015)	(0.059)	(0.018)	(0.027)
Observations	8,810	8,809	8,808	8,795	8,797	8,793
R-squared	0.013	0.044	0.011	0.096	0.035	0.066
1st stage F-stat (mean)	95.64	94.25	96.21	92.68	95.30	96.95
1st stage F-stat (uncert)	85.64	83.38	85.32	82.62	85.82	85.71
KP Wald test	9.609	8.463	9.217	9.213	9.973	9.742

Notes: The table reports estimated coefficients on posterior beliefs about inflation in specification (1). The first stage is given by specification (2). The coefficients are multiplied by 100. Heteroskedasticity robust standard errors are reported in parentheses. ***, **, * denote statistical significance at 1, 5 and 10 percent levels.

Appendix Table 5. Portfolio allocations across asset classes.

	Portfolio shares							
	Cash	Curr./Sav. account	Stocks	Mutual funds	Retirement account	Bonds	Crypto assets	Other
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A. Hypothetical, immediately after treatment								
Posterior mean	-0.70**	3.70***	-0.66***	-0.33	-0.82***	-0.37**	0.01	-0.64***
	(0.33)	(0.54)	(0.24)	(0.24)	(0.19)	(0.18)	(0.07)	(0.16)
Observations	10,128	10,128	10,128	10,128	10,128	10,128	10,128	10,128
R-squared	0.10	0.07	0.04	0.10	0.04	0.11	0.02	0.06
1st stage F-stat (mean)	256.7	256.7	256.7	256.7	256.7	256.7	256.7	256.7
Panel B. Actual, two months after treatment								
Posterior mean	-0.33***	1.94***	-0.27*	-0.22	-0.37	-0.25***	-0.04**	-0.36
	(0.11)	(0.49)	(0.15)	(0.17)	(0.33)	(0.09)	(0.02)	(0.24)
Observations	6,936	6,936	6,936	6,936	6,936	6,936	6,936	6,936
R-squared	0.07	0.09	0.06	0.09	0.04	0.06	0.02	0.09
1st stage F-stat (mean)	196.2	196.2	196.2	196.2	196.2	196.2	196.2	196.2

Notes: The table reports estimated coefficients on posterior beliefs about inflation in specification (1). The first stage is given by specification (2). For this table, specifications (1) and (2) exclude beliefs for uncertainty and treatment 2. The dependent variable is measured in percent. Heteroskedasticity robust standard errors are reported in parentheses. ***, **, * denote statistical significance at 1, 5 and 10 percent levels.

Appendix Table 6. Budget shares for spending on non-durables.

	Budget shares								
	Food at home	Food out	Utilities	Home equipment	Clothing	Healthcare and beauty products	Trans-portation	Recreation	Education and other
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
Panel A. One month after treatment									
Posterior mean	-0.44**	0.01	0.16	0.69**	0.02	0.07	0.18*	-0.28*	-0.37***
	(0.22)	(0.08)	(0.12)	(0.28)	(0.07)	(0.10)	(0.10)	(0.14)	(0.13)
Observations	8,143	8,143	8,143	8,143	8,143	8,143	8,143	8,143	8,143
R-squared	0.09	0.12	0.08	0.14	0.05	0.08	0.04	0.07	0.05
1st stage F-stat (mean)	200	200	200	200	200	200	200	200	200
Panel B. Four months after treatment									
Posterior mean	-0.05	-0.05	0.06	0.41	0.01	-0.09	-0.08	0.00	-0.18
	(0.21)	(0.10)	(0.14)	(0.28)	(0.08)	(0.10)	(0.10)	(0.12)	(0.13)
Observations	6,172	6,172	6,172	6,172	6,172	6,172	6,172	6,172	6,172
R-squared	0.10	0.12	0.08	0.15	0.09	0.13	0.03	0.06	0.03
1st stage F-stat (mean)	167.2	167.2	167.2	167.2	167.2	167.2	167.2	167.2	167.2

Notes: The table reports estimated coefficients on posterior beliefs about inflation in specification (1). The first stage is given by specification (2). For this table, specifications (1) and (2) exclude beliefs for uncertainty and treatment 2. The dependent variable is measured in percent. Heteroskedasticity robust standard errors are reported in parentheses. ***, **, * denote statistical significance at 1, 5 and 10 percent levels.

Appendix Table 7. Employment status.

	Portfolio shares				
	Employed (any)	Employed (full-time)	Employed (part-time)	Unemployed	Other (out of labor force, laid-off, etc.)
	(1)	(2)	(3)	(4)	(5)
Panel A. One month after treatment					
Posterior mean	0.98	3.04***	-2.11***	-1.14***	0.25
	(0.64)	(0.68)	(0.36)	(0.17)	(0.63)
Observations	8,541	8,541	8,541	8,541	8,541
R-squared	0.39	0.32	0.04	0.03	0.42
1st stage F-stat (mean)	198.8	198.8	198.8	198.8	198.8
Panel B. Four months after treatment					
Posterior mean	0.17	1.89***	-1.74***	-0.72***	0.60
	(0.62)	(0.65)	(0.36)	(0.16)	(0.61)
Observations	6,507	6,507	6,507	6,507	6,507
R-squared	0.42	0.38	0.04	0.03	0.45
1st stage F-stat (mean)	174.1	174.1	174.1	174.1	174.1

Notes: The table reports estimated coefficients on posterior beliefs about inflation in specification (1). The first stage is given by specification (2). For this table, specifications (1) and (2) exclude beliefs for uncertainty and treatment 2. The coefficients are multiplied by 100. Heteroskedasticity robust standard errors are reported in parentheses. ***, **, * denote statistical significance at 1, 5 and 10 percent levels.

Appendix Table 8. Subjective beliefs about labor market outcomes.

	Employment outcomes			
	Job search intensity (# of job application)	Subj. prob. of finding a job in 3 months	Subj. prob. of losing a job in 3 months	Subj. prob. of looking for a job in 3 months
	(1)	(2)	(3)	(4)
Panel A. One month after treatment				
Posterior mean	0.27*	0.87	-0.71**	-1.04***
	(0.16)	(1.53)	(0.29)	(0.27)
Observations	1,039	338	5,738	5,468
R-squared	0.12	0.42	0.04	0.04
1st stage F-stat (mean)	16.26	3.754	113.7	136.3
Panel B. Four months after treatment				
Posterior mean	-0.37***	0.72	-0.66**	-0.80***
	(0.08)	(0.95)	(0.26)	(0.28)
Observations	636	243	4,399	4,293
R-squared	0.10	0.36	0.04	0.04
1st stage F-stat (mean)	30.20	4.156	108.3	112.3

Notes: The table reports estimated coefficients on posterior beliefs about inflation in specification (1). The first stage is given by specification (2). For this table, specifications (1) and (2) exclude beliefs for uncertainty and treatment 2. Heteroskedasticity robust standard errors are reported in parentheses. ***, **, * denote statistical significance at 1, 5 and 10 percent levels.

Appendix Table 9. Dynamics of the first stage.

	Dep.var.: Beliefs h months after treatment							
	Point prediction.				Point prediction (and use point-prediction as a prior).			
	h=1	h=2	h=3	h=4	h=1	h=2	h=3	h=4
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Prior$	0.629***	0.588***	0.544***	0.493***	0.829***	0.815***	0.660***	0.617***
	(0.014)	(0.014)	(0.014)	(0.015)	(0.008)	(0.010)	(0.010)	(0.011)
$\{Treat\ 1\} \times \{Prior\}$	-0.050**	-0.073***	-0.044**	-0.073***	0.025**	-0.130***	-0.072***	-0.102***
	(0.020)	(0.020)	(0.021)	(0.021)	(0.011)	(0.013)	(0.012)	(0.015)
$\{Treat\ 2\} \times \{Prior\}$	-0.040**	-0.038*	-0.025	-0.001	-0.032***	-0.069***	-0.029**	-0.107***
	(0.020)	(0.020)	(0.021)	(0.021)	(0.012)	(0.013)	(0.013)	(0.016)
$\{Treat\ 3\} \times \{Prior\}$	0.009	0.017	-0.007	-0.009	-0.031***	-0.030**	0.005	0.012
	(0.020)	(0.020)	(0.021)	(0.022)	(0.012)	(0.013)	(0.013)	(0.015)
$Treat\ 1$	-0.023	0.145	-0.080	0.277**	-0.219***	0.345***	0.056	0.368***
	(0.109)	(0.105)	(0.112)	(0.114)	(0.062)	(0.068)	(0.071)	(0.080)
$Treat\ 2$	-0.019	-0.008	-0.066	0.002	0.008	0.181***	-0.016	0.347***
	(0.111)	(0.108)	(0.114)	(0.116)	(0.064)	(0.067)	(0.072)	(0.083)
$Treat\ 3$	-0.079	-0.174	-0.026	0.057	0.028	0.018	-0.057	0.013
	(0.112)	(0.107)	(0.114)	(0.116)	(0.063)	(0.068)	(0.073)	(0.081)
Observations	12,089	11,251	10,346	9,322	12,121	11,341	10,450	9,441
R-squared	0.467	0.443	0.419	0.389	0.830	0.798	0.735	0.657
F-statistic	1078	885.7	714.8	530.8	5349	4071	2830	1589

Notes: The table reports results for regressing posterior beliefs on prior beliefs, treatment status and interactions. Posterior beliefs are taken from subsequent waves. In columns (1)-(4), priors are measures with the implied mean in the reported pre-treatment subjective distributions. In columns (5)-(8), the priors are measured with pre-treatment point predictions. In all columns, posterior beliefs are measured with point predictions. The specification is estimated with Huber robust regression. Heteroskedasticity robust standard errors are reported in parentheses. ***, **, * denote statistical significance at 1, 5 and 10 percent levels.

Appendix Table 10. Sample attrition cross waves.

	Months after treatment							
	h=1	h=2	h=3	h=4	h=1	h=2	h=3	h=4
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Treat\ 1$	-0.002	0.007	0.017*	0.010	-0.004	0.005	0.015	0.008
	(0.008)	(0.009)	(0.010)	(0.010)	(0.008)	(0.009)	(0.009)	(0.010)
$Treat\ 2$	-0.000	0.011	0.016*	0.018*	0.002	0.014	0.017*	0.017*
	(0.008)	(0.009)	(0.010)	(0.010)	(0.008)	(0.009)	(0.009)	(0.010)
$Treat\ 3$	-0.010	-0.003	0.011	-0.003	-0.010	-0.003	0.011	-0.004
	(0.008)	(0.009)	(0.010)	(0.010)	(0.008)	(0.009)	(0.009)	(0.010)
Controls	No	No	No	No	Yes	Yes	Yes	Yes
Observations	18,805	18,805	18,805	18,805	18,786	18,786	18,786	18,786
R-squared	0.000	0.000	0.000	0.000	0.030	0.035	0.056	0.047
p-value(F-test treatment vars.)	0.539	0.371	0.277	0.156	0.430	0.247	0.259	0.148

Notes: the table reports results for the linear probability model where the dependent variable is equal to one if a respondent in wave t is missing in wave $t + h$. In columns (5)-(8) respondent controls (gender, education, income, etc.) are included but not reported. F test is the F-test for the joint significance on indicator variables for the treatment groups. Heteroskedasticity robust standard errors are reported in parentheses. ***, **, * denote statistical significance at 1, 5 and 10 percent levels.

Appendix Table 11. Predictors of treatment status.

	Dependent variable: indicator variable for treatment status			
	Control	Treatment 1	Treatment 2	Treatment 3
	(1)	(2)	(3)	(4)
High-school diploma	-0.006	-0.008	0.008	0.006
	(0.011)	(0.011)	(0.011)	(0.011)
College+	-0.014	0.008	0.004	0.002
	(0.011)	(0.011)	(0.011)	(0.011)
Age	-0.000	0.001	-0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)
$Age^2/100$	0.000	-0.001	0.001	0.000
	(0.001)	(0.001)	(0.001)	(0.001)
Household size	-0.000	0.001	-0.001	0.001
	(0.003)	(0.003)	(0.003)	(0.003)
Log(household income)	-0.001	-0.001	0.009	-0.006
	(0.006)	(0.006)	(0.006)	(0.006)
Sufficient liquidity	-0.007	-0.007	0.006	0.008
	(0.007)	(0.007)	(0.007)	(0.007)
Male	0.004	0.003	-0.002	-0.005
	(0.006)	(0.006)	(0.006)	(0.006)
Non-probabilistic sample	0.009	-0.003	-0.007	0.000
	(0.008)	(0.008)	(0.008)	(0.008)
Country fixed effects (omitted: Germany)				
Belgium	0.019	0.002	-0.015	-0.006
	(0.017)	(0.017)	(0.016)	(0.016)
Spain	-0.004	-0.008	-0.010	0.023*
	(0.012)	(0.012)	(0.012)	(0.012)
France	0.004	-0.004	-0.018	0.018
	(0.011)	(0.011)	(0.011)	(0.011)
Italy	0.011	-0.008	-0.012	0.009
	(0.011)	(0.011)	(0.011)	(0.011)
Netherlands	0.010	0.005	0.001	-0.016
	(0.017)	(0.016)	(0.017)	(0.016)
Austria	0.002	-0.009	0.009	-0.001
	(0.016)	(0.016)	(0.016)	(0.016)
Finland	0.018	-0.014	-0.013	0.010
	(0.016)	(0.016)	(0.016)	(0.016)
Greece	-0.010	-0.003	0.022	-0.010
	(0.017)	(0.018)	(0.018)	(0.017)
Ireland	-0.018	0.006	-0.006	0.018
	(0.016)	(0.017)	(0.017)	(0.017)
Portugal	-0.028*	-0.001	0.013	0.016
	(0.016)	(0.016)	(0.016)	(0.017)
p-value(F-stat)	0.387	0.769	0.316	0.615
Observations	18,874	18,874	18,874	18,874
R-squared	0.001	0.001	0.001	0.001

Notes: Huber robust regression. Heteroskedasticity robust standard errors are reported in parentheses. ***, **, * denote statistical significance at 1, 5 and 10 percent levels.

Appendix Table 12. Subsample results for durable goods, one month after the treatment.

Good	Subsample	Posterior mean		100×log(Posterior uncertainty)		N obs.
		coef.	s.e.	coef.	s.e.	
		(1)	(2)	(3)	(4)	(5)
Home	Liquidity constrained	0.680	(0.718)	-0.041	(0.031)	3020
	Liquidity unconstrained	0.479	(0.310)	-0.025**	(0.012)	8494
	p-value (equality)	0.797		0.634		
	South	0.210	(0.296)	-0.021	(0.014)	4688
	North	0.793*	(0.427)	-0.032**	(0.014)	6826
	p-value (equality)	0.262		0.580		
	Income quartile Q1	0.272	(0.482)	-0.027	(0.026)	2502
	Income quartile Q2	0.385	(0.568)	-0.005	(0.023)	2253
	Income quartile Q3	0.686	(0.492)	-0.036**	(0.018)	3603
	Income quartile Q4 (top)	0.517	(0.672)	-0.033	(0.024)	3156
	p-value (equality)	0.943		0.746		
	Low financial literacy	0.030	(0.456)	-0.003	(0.021)	4401
	High financial literacy	0.474	(0.303)	-0.029***	(0.011)	7031
	p-value (equality)	0.418		0.261		
Durable	Liquidity constrained	4.097*	(2.200)	-0.217**	(0.101)	3025
	Liquidity unconstrained	4.389***	(1.563)	-0.208***	(0.063)	8481
	p-value (equality)	0.914		0.936		
	South	4.843**	(2.011)	-0.253***	(0.091)	4687
	North	4.198**	(1.704)	-0.185***	(0.065)	6819
	p-value (equality)	0.807		0.547		
	Income quartile Q1	0.113	(1.910)	-0.009	(0.097)	2511
	Income quartile Q2	6.417*	(3.451)	-0.323**	(0.132)	2251
	Income quartile Q3	4.974**	(2.058)	-0.219***	(0.080)	3605
	Income quartile Q4 (top)	5.463	(3.518)	-0.229*	(0.134)	3139
	p-value (equality)	0.200		0.198		
	Low financial literacy	2.964	(2.012)	-0.204**	(0.089)	4405
	High financial literacy	4.506***	(1.591)	-0.191***	(0.065)	7020
	p-value (equality)	0.548		0.910		
Car	Liquidity constrained	0.565	(0.690)	-0.030	(0.032)	3024
	Liquidity unconstrained	0.573	(0.384)	-0.026*	(0.014)	8478
	p-value (equality)	0.992		0.913		
	South	-0.032	(0.307)	-0.004	(0.015)	4686
	North	0.798	(0.491)	-0.033*	(0.017)	6816
	p-value (equality)	0.152		0.202		
	Income quartile Q1	0.117	(0.558)	-0.019	(0.029)	2510
	Income quartile Q2	0.124	(0.546)	-0.016	(0.024)	2250
	Income quartile Q3	0.884	(0.567)	-0.033*	(0.019)	3601
	Income quartile Q4 (top)	0.301	(0.902)	-0.002	(0.032)	3141
	p-value (equality)	0.744		0.853		
	Low financial literacy	0.012	(0.568)	-0.001	(0.025)	4401
	High financial literacy	0.732**	(0.368)	-0.034**	(0.014)	7020
	p-value (equality)	0.288		0.248		

(continued on next page)

Good	Subsample	Posterior mean		100×log(Posterior uncertainty)		N obs.
		coef.	s.e.	coef.	s.e.	
		(1)	(2)	(3)	(4)	(5)
Holiday packages	Liquidity constrained	3.122	(2.493)	-0.108	(0.111)	3028
	Liquidity unconstrained	1.726	(1.889)	-0.093	(0.076)	8484
	p-value (equality)	0.655		0.912		
	South	2.136	(2.257)	-0.123	(0.100)	4691
	North	2.312	(2.155)	-0.086	(0.082)	6821
	p-value (equality)	0.955		0.779		
	Income quartile Q1	-2.014	(2.235)	0.121	(0.115)	2516
	Income quartile Q2	5.693	(3.714)	-0.205	(0.140)	2250
	Income quartile Q3	4.420*	(2.515)	-0.206**	(0.096)	3600
	Income quartile Q4 (top)	-8.396	(5.186)	0.256	(0.190)	3146
	p-value (equality)	0.036		0.035		
	Low financial literacy	3.943	(2.475)	-0.183*	(0.105)	4414
	High financial literacy	1.524	(1.939)	-0.074	(0.078)	7019
	p-value (equality)	0.442		0.403		
Luxury item	Liquidity constrained	-0.264	(0.348)	0.011	(0.015)	3031
	Liquidity unconstrained	0.649*	(0.355)	-0.025**	(0.012)	8488
	p-value (equality)	0.066		0.062		
	South	0.283	(0.329)	-0.016	(0.016)	4693
	North	0.444	(0.401)	-0.018	(0.014)	6826
	p-value (equality)	0.756		0.896		
	Income quartile Q1	0.323	(0.447)	-0.025	(0.017)	2509
	Income quartile Q2	0.651	(0.662)	-0.040	(0.028)	2255
	Income quartile Q3	0.290	(0.385)	-0.008	(0.013)	3605
	Income quartile Q4 (top)	0.564	(0.761)	-0.003	(0.026)	3150
	p-value (equality)	0.961		0.676		
	Low financial literacy	-0.483	(0.502)	0.018	(0.022)	4413
	High financial literacy	0.878**	(0.344)	-0.032***	(0.012)	7025
	p-value (equality)	0.025		0.046		
Other	Liquidity constrained	1.149	(1.444)	-0.060	(0.062)	3016
	Liquidity unconstrained	0.088	(1.031)	-0.049	(0.039)	8467
	p-value (equality)	0.550		0.890		
	South	-0.277	(1.111)	-0.002	(0.051)	4674
	North	1.258	(1.318)	-0.096**	(0.046)	6809
	p-value (equality)	0.374		0.173		
	Income quartile Q1	-0.490	(1.514)	-0.039	(0.072)	2504
	Income quartile Q2	1.653	(2.272)	-0.073	(0.086)	2240
	Income quartile Q3	-1.401	(1.232)	0.007	(0.043)	3589
	Income quartile Q4 (top)	3.488	(2.114)	-0.133*	(0.080)	3150
	p-value (equality)	0.200		0.446		
	Low financial literacy	-1.806	(1.605)	0.024	(0.064)	4390
	High financial literacy	0.778	(0.922)	-0.064*	(0.035)	7012
	p-value (equality)	0.163		0.232		

Notes: See notes to Table 4 and Table 3. Heteroskedasticity robust standard errors are reported in parentheses. ***, **, * denote statistical significance at 1, 5 and 10 percent levels.

Appendix Table 13. Subsample results for spending on non-durable goods&services, one month after the treatment.

subsample	Posterior mean		100×log(Posterior uncertainty)		N obs.
	coef.	s.e.	coef.	s.e.	
	(1)	(2)	(3)	(4)	(5)
Liquidity constrained	0.495	(4.204)	0.055	(0.191)	2908
Liquidity unconstrained	-5.280*	(2.954)	0.232**	(0.114)	8342
p-value (equality)	0.261		0.425		
South	-7.606**	(3.690)	0.269*	(0.158)	4623
North	2.336	(3.262)	0.039	(0.123)	6627
p-value (equality)	0.044		0.251		
Income quartile Q1	-5.303	(4.683)	0.307	(0.216)	2431
Income quartile Q2	-5.245	(5.874)	0.199	(0.235)	2180
Income quartile Q3	2.498	(3.689)	-0.030	(0.142)	3552
Income quartile Q4 (top)	-9.964	(6.267)	0.383*	(0.229)	3087
p-value (equality)	0.281		0.360		
Low financial literacy	-2.777	(4.057)	0.135	(0.176)	4230
High financial literacy	-1.572	(2.902)	0.103	(0.111)	6942
p-value (equality)	0.809		0.878		

Notes: See notes to Table 4 and Table 5. Heteroskedasticity robust standard errors are reported in parentheses. ***, **, * denote statistical significance at 1, 5 and 10 percent levels.

Appendix Table 14. Subsample results for employment status, four months after the treatment.

Empl. status	subsample	Posterior mean		100×log(Posterior uncertainty)		N obs.
		coef.	s.e.	coef.	s.e.	
		(1)	(2)	(3)	(4)	(5)
Employed (any)	Liquidity constrained	-1.987	(3.512)	0.121	(0.163)	2256
	Liquidity unconstrained	0.124	(2.226)	0.026	(0.086)	6410
	p-value (equality)	0.612		0.603		
	South	-4.193	(3.008)	0.211*	(0.126)	3623
	North	3.184	(2.473)	-0.095	(0.095)	5043
	p-value (equality)	0.058		0.053		
	Income quartile Q1	-0.601	(3.770)	0.089	(0.180)	1829
	Income quartile Q2	-1.095	(4.583)	0.162	(0.184)	1688
	Income quartile Q3	2.546	(2.525)	-0.101	(0.094)	2707
	Income quartile Q4 (top)	-5.422	(3.978)	0.191	(0.148)	2442
	p-value (equality)	0.399		0.290		
	Low financial literacy	-1.079	(3.372)	0.019	(0.148)	3126
	High financial literacy	-0.563	(2.131)	0.096	(0.082)	5486
	p-value (equality)	0.897		0.646		
Employed (full-time)	Liquidity constrained	-4.289	(3.946)	0.321*	(0.182)	2256
	Liquidity unconstrained	-2.018	(2.362)	0.123	(0.092)	6410
	p-value (equality)	0.621		0.331		
	South	-5.877*	(3.328)	0.315**	(0.141)	3623
	North	0.370	(2.560)	0.047	(0.098)	5043
	p-value (equality)	0.137		0.120		
	Income quartile Q1	-4.567	(3.814)	0.299*	(0.181)	1829
	Income quartile Q2	-3.040	(5.018)	0.232	(0.199)	1688
	Income quartile Q3	0.486	(2.711)	0.014	(0.101)	2707
	Income quartile Q4 (top)	-6.138	(4.391)	0.276*	(0.166)	2442
	p-value (equality)	0.533		0.358		
	Low financial literacy	-3.295	(3.641)	0.215	(0.161)	3126
	High financial literacy	-2.480	(2.326)	0.169*	(0.090)	5486
	p-value (equality)	0.851		0.800		
Employed (part-time)	Liquidity constrained	2.452	(2.452)	-0.204*	(0.109)	2256
	Liquidity unconstrained	2.238	(1.364)	-0.100*	(0.054)	6410
	p-value (equality)	0.939		0.390		
	South	2.124	(1.770)	-0.117	(0.078)	3623
	North	2.562	(1.698)	-0.132**	(0.063)	5043
	p-value (equality)	0.858		0.877		
	Income quartile Q1	4.679	(2.865)	-0.234*	(0.138)	1829
	Income quartile Q2	1.643	(2.496)	-0.050	(0.103)	1688
	Income quartile Q3	2.106	(1.685)	-0.107*	(0.062)	2707
	Income quartile Q4 (top)	0.956	(2.613)	-0.098	(0.098)	2442
	p-value (equality)	0.794		0.764		
	Low financial literacy	2.855	(2.196)	-0.226**	(0.100)	3126
	High financial literacy	1.849	(1.405)	-0.069	(0.054)	5486
	p-value (equality)	0.700		0.167		

Empl. status	subsample	Posterior mean		100×log(Posterior uncertainty)		N obs.
		coef.	s.e.	coef.	s.e.	
		(1)	(2)	(3)	(4)	(5)
Unemployed	Liquidity constrained	2.778	(1.700)	-0.176**	(0.079)	2256
	Liquidity unconstrained	0.401	(0.540)	-0.047**	(0.019)	6410
	p-value (equality)	0.183		0.113		
	South	0.874	(1.114)	-0.078	(0.048)	3623
	North	0.573	(0.536)	-0.053***	(0.019)	5043
	p-value (equality)	0.808		0.632		
	Income quartile Q1	2.493	(2.054)	-0.255***	(0.097)	1829
	Income quartile Q2	1.552	(1.162)	-0.093**	(0.044)	1688
	Income quartile Q3	0.381	(0.537)	0.003	(0.019)	2707
	Income quartile Q4 (top)	0.117	(0.495)	-0.018	(0.019)	2442
	p-value (equality)	0.504		0.017		
	Low financial literacy	1.160	(1.124)	-0.118**	(0.054)	3126
	High financial literacy	0.571	(0.615)	-0.044**	(0.021)	5486
	p-value (equality)	0.646		0.198		
Other	Liquidity constrained	-1.270	(3.410)	0.063	(0.156)	2256
	Liquidity unconstrained	-0.641	(2.196)	0.022	(0.085)	6410
	p-value (equality)	0.877		0.817		
	South	3.645	(2.883)	-0.161	(0.120)	3623
	North	-4.283*	(2.498)	0.166*	(0.096)	5043
	p-value (equality)	0.038		0.034		
	Income quartile Q1	-2.456	(3.863)	0.178	(0.186)	1829
	Income quartile Q2	-0.006	(4.425)	-0.077	(0.179)	1688
	Income quartile Q3	-2.984	(2.468)	0.098	(0.092)	2707
	Income quartile Q4 (top)	5.174	(3.911)	-0.168	(0.146)	2442
	p-value (equality)	0.344		0.337		
	Low financial literacy	-0.165	(3.332)	0.098	(0.145)	3126
	High financial literacy	-0.251	(2.070)	-0.046	(0.080)	5486
	p-value (equality)	0.983		0.382		

Notes: See notes to Table 4 and Table 10. Heteroskedasticity robust standard errors are reported in parentheses. ***, **, * denote statistical significance at 1, 5 and 10 percent levels.

Appendix Table 15. Subsample results for hypothetical portfolio allocations.

Asset class	Subsample	Posterior mean		100×log(Posterior		N obs.
		coef.	s.e.	coef.	s.e.	
		(1)	(2)	(3)	(4)	(5)
cash	Liquidity constrained	0.651	(2.104)	-0.144	(0.092)	3733
	Liquidity unconstrained	1.262	(1.202)	-0.042	(0.045)	9868
	p-value (equality)	0.801	(1.202)	0.323	(0.045)	
	South	0.013	(1.679)	-0.018	(0.071)	5407
	North	1.872	(1.383)	-0.091*	(0.051)	8194
	p-value (equality)	0.393	(1.383)	0.398	(0.051)	
	Income quartile Q1	-1.339	(2.173)	-0.046	(0.099)	3020
	Income quartile Q2	1.476	(2.736)	-0.045	(0.104)	2690
	Income quartile Q3	1.594	(1.559)	-0.069	(0.058)	4223
	Income quartile Q4 (top)	2.716	(1.748)	-0.104	(0.065)	3668
	p-value (equality)	0.538	(1.748)	0.945	(0.065)	
	Low financial literacy	0.232	(1.892)	-0.014	(0.078)	5347
	High financial literacy	0.032	(1.102)	-0.034	(0.041)	8157
	p-value (equality)	0.927	(1.102)	0.815	(0.041)	
Current/Saving account	Liquidity constrained	-5.023*	(2.809)	0.443***	(0.128)	3733
	Liquidity unconstrained	-1.746	(2.037)	0.104	(0.078)	9868
	p-value (equality)	0.345	(2.037)	0.024	(0.078)	
	South	-0.509	(2.204)	0.050	(0.098)	5407
	North	-3.019	(2.311)	0.228***	(0.087)	8194
	p-value (equality)	0.432	(2.311)	0.172	(0.087)	
	Income quartile Q1	-2.223	(2.634)	0.185	(0.120)	3020
	Income quartile Q2	-2.362	(3.915)	0.168	(0.151)	2690
	Income quartile Q3	-1.993	(2.561)	0.129	(0.100)	4223
	Income quartile Q4 (top)	-1.319	(3.725)	0.143	(0.141)	3668
	p-value (equality)	0.997	(3.725)	0.986	(0.141)	
	Low financial literacy	-2.505	(2.683)	0.174	(0.112)	5347
	High financial literacy	-1.113	(1.903)	0.138*	(0.076)	8157
	p-value (equality)	0.672	(1.903)	0.791	(0.076)	
Stocks	Liquidity constrained	-0.827	(0.784)	0.033	(0.042)	3733
	Liquidity unconstrained	-1.192	(0.921)	0.034	(0.037)	9868
	p-value (equality)	0.763	(0.921)	0.975	(0.037)	
	South	-1.497	(0.984)	0.087**	(0.044)	5407
	North	-1.707*	(0.948)	0.022	(0.038)	8194
	p-value (equality)	0.877	(0.948)	0.269	(0.038)	
	Income quartile Q1	-0.676	(0.860)	0.024	(0.043)	3020
	Income quartile Q2	-1.088	(1.625)	0.057	(0.065)	2690
	Income quartile Q3	-1.714	(1.057)	0.056	(0.043)	4223
	Income quartile Q4 (top)	-1.848	(1.933)	0.052	(0.076)	3668
	p-value (equality)	0.869	(1.933)	0.951	(0.076)	
	Low financial literacy	-2.003*	(1.056)	0.066	(0.044)	5347
	High financial literacy	-0.184	(0.837)	-0.000	(0.037)	8157
	p-value (equality)	0.177	(0.837)	0.246	(0.037)	
Mutual funds	Liquidity constrained	0.839	(0.753)	-0.053	(0.037)	3733
	Liquidity unconstrained	1.254	(1.016)	-0.052	(0.041)	9868
	p-value (equality)	0.743	(1.016)	0.984	(0.041)	
	South	1.497	(1.012)	-0.067	(0.047)	5407
	North	0.887	(1.001)	-0.036	(0.039)	8194
	p-value (equality)	0.668	(1.001)	0.609	(0.039)	
	Income quartile Q1	1.291	(0.883)	-0.011	(0.043)	3020
	Income quartile Q2	0.690	(1.510)	-0.023	(0.062)	2690
	Income quartile Q3	1.123	(1.113)	-0.049	(0.045)	4223
	Income quartile Q4 (top)	0.457	(2.120)	-0.056	(0.082)	3668
	p-value (equality)	0.976	(2.120)	0.917	(0.082)	
	Low financial literacy	0.705	(0.748)	-0.039	(0.032)	5347
	High financial literacy	1.149	(1.017)	-0.047	(0.042)	8157
	p-value (equality)	0.725	(1.017)	0.876	(0.042)	

Asset class	Subsample	Posterior mean		100×log(Posterior		N obs.
		coef.	s.e.	coef.	s.e.	
		(1)	(2)	(3)	(4)	(5)
Retirement account	Liquidity constrained	2.332**	(0.957)	-0.128***	(0.046)	3733
	Liquidity unconstrained	0.544	(0.762)	-0.043	(0.030)	9868
	p-value (equality)	0.144	(0.762)	0.124	(0.030)	
	South	0.654	(0.933)	-0.027	(0.041)	5407
	North	1.138	(0.797)	-0.085***	(0.031)	8194
	p-value (equality)	0.693	(0.797)	0.261	(0.031)	
	Income quartile Q1	2.174**	(0.976)	-0.083*	(0.047)	3020
	Income quartile Q2	-0.924	(1.513)	-0.001	(0.061)	2690
	Income quartile Q3	0.961	(0.820)	-0.052	(0.034)	4223
	Income quartile Q4 (top)	1.598	(1.736)	-0.097	(0.066)	3668
	p-value (equality)	0.377	(1.736)	0.677	(0.066)	
	Low financial literacy	2.053**	(0.976)	-0.112***	(0.040)	5347
	High financial literacy	0.135	(0.732)	-0.029	(0.031)	8157
	p-value (equality)	0.116	(0.732)	0.101	(0.031)	
Bonds	Liquidity constrained	0.773	(0.646)	-0.058*	(0.032)	3733
	Liquidity unconstrained	-0.681	(0.769)	0.022	(0.031)	9868
	p-value (equality)	0.148	(0.769)	0.070	(0.031)	
	South	-0.140	(1.088)	-0.023	(0.049)	5407
	North	-0.518	(0.533)	0.022	(0.021)	8194
	p-value (equality)	0.755	(0.533)	0.409	(0.021)	
	Income quartile Q1	0.679	(0.862)	-0.034	(0.042)	3020
	Income quartile Q2	-0.260	(1.343)	-0.025	(0.053)	2690
	Income quartile Q3	-0.337	(0.904)	0.016	(0.037)	4223
	Income quartile Q4 (top)	-1.944	(1.203)	0.069	(0.048)	3668
	p-value (equality)	0.369	(1.203)	0.384	(0.048)	
	Low financial literacy	0.010	(0.714)	-0.016	(0.031)	5347
	High financial literacy	-0.951	(0.748)	0.029	(0.031)	8157
	p-value (equality)	0.353	(0.748)	0.304	(0.031)	
crypto	Liquidity constrained	0.529	(0.385)	-0.033*	(0.019)	3733
	Liquidity unconstrained	0.089	(0.215)	-0.004	(0.009)	9868
	p-value (equality)	0.319	(0.215)	0.163	(0.009)	
	South	0.322	(0.317)	-0.016	(0.014)	5407
	North	0.188	(0.248)	-0.010	(0.010)	8194
	p-value (equality)	0.739	(0.248)	0.699	(0.010)	
	Income quartile Q1	-0.001	(0.336)	-0.003	(0.017)	3020
	Income quartile Q2	0.357	(0.477)	-0.017	(0.019)	2690
	Income quartile Q3	0.156	(0.249)	-0.003	(0.011)	4223
	Income quartile Q4 (top)	0.057	(0.443)	-0.003	(0.017)	3668
	p-value (equality)	0.937	(0.443)	0.929	(0.017)	
	Low financial literacy	0.256	(0.338)	-0.012	(0.015)	5347
	High financial literacy	0.040	(0.213)	-0.006	(0.009)	8157
	p-value (equality)	0.590	(0.213)	0.736	(0.009)	
Other	Liquidity constrained	0.640	(0.848)	-0.045	(0.040)	3733
	Liquidity unconstrained	0.456	(0.657)	-0.017	(0.025)	9868
	p-value (equality)	0.864	(0.657)	0.556	(0.025)	
	South	-0.247	(0.847)	0.005	(0.037)	5407
	North	0.823	(0.672)	-0.038	(0.025)	8194
	p-value (equality)	0.322	(0.672)	0.338	(0.025)	
	Income quartile Q1	-0.070	(0.891)	-0.018	(0.043)	3020
	Income quartile Q2	1.781	(1.332)	-0.081	(0.050)	2690
	Income quartile Q3	-0.469	(0.768)	0.009	(0.030)	4223
	Income quartile Q4 (top)	0.659	(1.313)	-0.019	(0.049)	3668
	p-value (equality)	0.501	(1.313)	0.505	(0.049)	
	Low financial literacy	0.487	(0.815)	-0.011	(0.034)	5347
	High financial literacy	0.472	(0.638)	-0.034	(0.026)	8157
	p-value (equality)	0.989	(0.638)	0.585	(0.026)	

Notes: See notes to Table 4 and Table 7. Heteroskedasticity robust standard errors are reported in parentheses. ***, **, * denote statistical significance at 1, 5 and 10 percent levels.

Appendix Table 16. Subsample results for actual portfolio allocations.

Asset class	Subsample	Posterior mean		100×log(Posterior		N obs.
		coef.	s.e.	coef.	s.e.	
		(1)	(2)	(3)	(4)	(5)
cash	Liquidity constrained	-0.944	(1.078)	0.034	(0.050)	2297
	Liquidity unconstrained	0.041	(0.366)	-0.003	(0.013)	6990
	p-value (equality)	0.387	(0.366)	0.474	(0.013)	
	South	-0.180	(0.710)	-0.000	(0.030)	3919
	North	-0.301	(0.433)	0.016	(0.016)	5368
	p-value (equality)	0.884	(0.433)	0.639	(0.016)	
	Income quartile Q1	-0.948	(0.935)	0.010	(0.045)	1978
	Income quartile Q2	0.531	(0.871)	-0.007	(0.033)	1785
	Income quartile Q3	-0.396	(0.496)	0.015	(0.018)	2886
	Income quartile Q4 (top)	0.182	(0.576)	-0.007	(0.021)	2638
	p-value (equality)	0.590	(0.576)	0.849	(0.021)	
	Low financial literacy	-1.656*	(0.900)	0.068*	(0.038)	3297
	High financial literacy	0.248	(0.394)	-0.013	(0.014)	5931
	p-value (equality)	0.053	(0.394)	0.044	(0.014)	
Current/Saving account	Liquidity constrained	-8.250**	(3.757)	0.464***	(0.170)	2297
	Liquidity unconstrained	-4.128**	(1.914)	0.181**	(0.077)	6990
	p-value (equality)	0.328	(1.914)	0.129	(0.077)	
	South	-3.889	(2.669)	0.219*	(0.115)	3919
	North	-4.165**	(2.027)	0.183**	(0.079)	5368
	p-value (equality)	0.934	(2.027)	0.793	(0.079)	
	Income quartile Q1	-4.007	(2.513)	0.219*	(0.119)	1978
	Income quartile Q2	-5.559	(3.452)	0.189	(0.143)	1785
	Income quartile Q3	-3.445	(2.633)	0.176*	(0.104)	2886
	Income quartile Q4 (top)	-0.711	(3.754)	0.104	(0.138)	2638
	p-value (equality)	0.815	(3.754)	0.938	(0.138)	
	Low financial literacy	-3.356	(2.895)	0.139	(0.126)	3297
	High financial literacy	-4.604**	(1.989)	0.240***	(0.079)	5931
	p-value (equality)	0.722	(1.989)	0.494	(0.079)	
Stocks	Liquidity constrained	0.846	(0.811)	-0.050	(0.037)	2297
	Liquidity unconstrained	1.158*	(0.643)	-0.058**	(0.025)	6990
	p-value (equality)	0.764	(0.643)	0.853	(0.025)	
	South	0.720	(0.665)	-0.045	(0.030)	3919
	North	1.094	(0.719)	-0.055**	(0.027)	5368
	p-value (equality)	0.702	(0.719)	0.807	(0.027)	
	Income quartile Q1	0.000	(0.612)	-0.010	(0.035)	1978
	Income quartile Q2	-0.359	(0.963)	0.018	(0.041)	1785
	Income quartile Q3	1.981**	(0.873)	-0.089***	(0.034)	2886
	Income quartile Q4 (top)	1.265	(1.660)	-0.067	(0.059)	2638
	p-value (equality)	0.207	(1.660)	0.166	(0.059)	
	Low financial literacy	2.257**	(0.897)	-0.086**	(0.038)	3297
	High financial literacy	0.070	(0.650)	-0.026	(0.026)	5931
	p-value (equality)	0.048	(0.650)	0.194	(0.026)	
Mutual funds	Liquidity constrained	-0.157	(0.609)	0.008	(0.028)	2297
	Liquidity unconstrained	0.929	(0.686)	-0.038	(0.028)	6990
	p-value (equality)	0.236	(0.686)	0.249	(0.028)	
	South	0.817	(0.834)	-0.031	(0.037)	3919
	North	0.170	(0.663)	-0.013	(0.026)	5368
	p-value (equality)	0.544	(0.663)	0.680	(0.026)	
	Income quartile Q1	1.132*	(0.629)	-0.025	(0.033)	1978
	Income quartile Q2	-0.289	(0.890)	0.022	(0.039)	1785
	Income quartile Q3	1.271	(0.931)	-0.057	(0.037)	2886
	Income quartile Q4 (top)	0.367	(1.650)	-0.034	(0.059)	2638
	p-value (equality)	0.553	(1.650)	0.528	(0.059)	
	Low financial literacy	0.024	(0.744)	-0.001	(0.032)	3297
	High financial literacy	0.648	(0.686)	-0.030	(0.028)	5931
	p-value (equality)	0.537	(0.686)	0.497	(0.028)	

Asset class	Subsample	Posterior mean		100×log(Posterior		N obs.
		coef.	s.e.	coef.	s.e.	
		(1)	(2)	(3)	(4)	(5)
Retirement account	Liquidity constrained	6.132**	(2.634)	-0.285**	(0.120)	2297
	Liquidity unconstrained	0.332	(1.184)	-0.008	(0.047)	6990
	p-value (equality)	0.045	(1.184)	0.031	(0.047)	
	South	2.018	(1.771)	-0.099	(0.076)	3919
	North	2.307*	(1.306)	-0.078	(0.050)	5368
	p-value (equality)	0.896	(1.306)	0.821	(0.050)	
	Income quartile Q1	3.263**	(1.568)	-0.148**	(0.069)	1978
	Income quartile Q2	3.424	(2.248)	-0.142	(0.093)	1785
	Income quartile Q3	-1.205	(1.662)	0.054	(0.067)	2886
	Income quartile Q4 (top)	1.093	(2.815)	-0.056	(0.102)	2638
	p-value (equality)	0.198	(2.815)	0.153	(0.102)	
	Low financial literacy	1.540	(1.875)	-0.039	(0.082)	3297
	High financial literacy	1.806	(1.258)	-0.083*	(0.050)	5931
	p-value (equality)	0.906	(1.258)	0.647	(0.050)	
Bonds	Liquidity constrained	0.277	(0.487)	-0.021	(0.023)	2297
	Liquidity unconstrained	0.764*	(0.409)	-0.038**	(0.015)	6990
	p-value (equality)	0.444	(0.409)	0.539	(0.015)	
	South	0.908	(0.662)	-0.057**	(0.029)	3919
	North	0.498*	(0.271)	-0.016	(0.010)	5368
	p-value (equality)	0.566	(0.271)	0.170	(0.010)	
	Income quartile Q1	-0.380	(0.412)	0.003	(0.022)	1978
	Income quartile Q2	0.384	(0.665)	-0.017	(0.028)	1785
	Income quartile Q3	1.517**	(0.592)	-0.068***	(0.022)	2886
	Income quartile Q4 (top)	-0.198	(0.810)	0.004	(0.028)	2638
	p-value (equality)	0.064	(0.810)	0.092	(0.028)	
	Low financial literacy	0.645	(0.482)	-0.038*	(0.019)	3297
	High financial literacy	0.545	(0.413)	-0.031*	(0.016)	5931
	p-value (equality)	0.875	(0.413)	0.773	(0.016)	
crypto	Liquidity constrained	-0.064	(0.083)	0.000	(0.004)	2297
	Liquidity unconstrained	0.066	(0.072)	-0.005*	(0.003)	6990
	p-value (equality)	0.235	(0.072)	0.264	(0.003)	
	South	0.066	(0.105)	-0.002	(0.005)	3919
	North	-0.092	(0.080)	-0.001	(0.003)	5368
	p-value (equality)	0.231	(0.080)	0.811	(0.003)	
	Income quartile Q1	0.150*	(0.083)	-0.009*	(0.005)	1978
	Income quartile Q2	0.027	(0.124)	-0.001	(0.005)	1785
	Income quartile Q3	-0.058	(0.088)	0.001	(0.004)	2886
	Income quartile Q4 (top)	-0.146	(0.200)	0.003	(0.007)	2638
	p-value (equality)	0.279	(0.200)	0.360	(0.007)	
	Low financial literacy	-0.015	(0.109)	0.000	(0.005)	3297
	High financial literacy	0.021	(0.078)	-0.004	(0.003)	5931
	p-value (equality)	0.791	(0.078)	0.441	(0.003)	
Other	Liquidity constrained	1.363	(1.371)	-0.089	(0.062)	2297
	Liquidity unconstrained	1.666*	(0.862)	-0.055	(0.034)	6990
	p-value (equality)	0.852	(0.862)	0.631	(0.034)	
	South	1.001	(0.963)	-0.039	(0.040)	3919
	North	1.245	(0.975)	-0.052	(0.038)	5368
	p-value (equality)	0.859	(0.975)	0.816	(0.038)	
	Income quartile Q1	0.803	(0.906)	-0.019	(0.041)	1978
	Income quartile Q2	1.412	(1.351)	-0.045	(0.057)	1785
	Income quartile Q3	0.579	(1.187)	-0.031	(0.046)	2886
	Income quartile Q4 (top)	-0.452	(2.000)	0.016	(0.072)	2638
	p-value (equality)	0.891	(2.000)	0.923	(0.072)	
	Low financial literacy	1.823	(1.153)	-0.082*	(0.049)	3297
	High financial literacy	1.331	(0.908)	-0.052	(0.036)	5931
	p-value (equality)	0.738	(0.908)	0.620	(0.036)	

Notes: See notes to Table 4 and Table 7. Heteroskedasticity robust standard errors are reported in parentheses. ***, **, * denote statistical significance at 1, 5 and 10 percent levels.

Appendix Table 17. Purchases of durable goods, extensive margin, control for GDP growth expectations

	Dependent variable: indicator variable is a durable good is purchased.					
	Home	Durable	Car	Holiday package	Luxury items	Other
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A. One month after treatment, IV.						
Posterior mean	0.413	4.867***	0.453	2.008	0.539*	0.426
	(0.268)	(1.385)	(0.314)	(1.591)	(0.285)	(0.880)
100×log(Posterior uncertainty)	-0.025**	-0.233***	-0.022*	-0.094	-0.021*	-0.055
	(0.010)	(0.058)	(0.013)	(0.066)	(0.011)	(0.034)
Prior mean: GDP growth	0.014	0.052	0.017	-0.020	-0.011	0.105*
	(0.018)	(0.071)	(0.020)	(0.077)	(0.020)	(0.058)
Posterior mean: GDP growth	-0.024	-0.094*	-0.014	-0.055	-0.006	-0.001
	(0.015)	(0.052)	(0.017)	(0.061)	(0.015)	(0.036)
Observations	11,514	11,506	11,502	11,512	11,519	11,483
R-squared	0.003	-0.043	0.000	0.100	0.022	0.036
1st stage F-stat (mean)	119.8	115.3	119	116.1	119.5	113.9
1st stage F-stat (uncert)	100.4	98.87	98.95	100	101.6	101.3
KP Wald test	10.52	9.436	10.19	10.34	10.35	10.10

Notes: The table reports estimated coefficients on posterior beliefs about inflation in specification (1). The first stage is given by specification (2). The specification includes prior and posterior expectations for the growth rate of GDP in the euro area. The dependent variables takes values 0 (no purchase) and 100 (a purchase is made). Heteroskedasticity robust standard errors are reported in parentheses. ***, **, * denote statistical significance at 1, 5 and 10 percent levels.