The Effects of Interest Rate Increases on Consumers' Inflation Expectations: The Roles of Informedness and Compliance

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Abstract

We study how monetary policy communications associated with increasing the federal funds rate causally affect consumers' inflation expectations in real time. In a large-scale, multi-wave randomized controlled trial (RCT), we find weak evidence that communicating these policy changes lowers consumers' medium-term inflation expectations on average. However, information differs systematically across demographic groups, in terms of ex ante informedness about monetary policy and ex post compliance with the information treatment. Monetary policy communications have a much stronger effect on the subset of consumers who had not previously heard news about monetary policy and who take sufficient time to read the treatment. Our findings show that, in an inflationary environment, these consumers expect that raising interest rates will lower inflation. More generally, our results emphasize the importance of measuring both respondents' information sets and their compliance with treatment when using RCTs in empirical macroeconomics to better understand the real-world implications of monetary policy communications.

Keywords: Expectations formation; Policy communication; Monetary policy; Inflation; Surveys

JEL Codes: E31, E52, E58

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1. Introduction

Monetary policymakers on the Federal Open Market Committee (FOMC) raised the federal funds rate at a relatively rapid pace during 2022 via a sequence of rate increases that began on March 16, 2022. The primary reason for this rapid tightening of policy was mounting concern that inflation was proving long-lived, with the risk of inflation expectations becoming unanchored. This led FOMC participants to talk openly and in advance of FOMC meetings about the pivot to a tighter monetary policy stance and the need for higher interest rates. While these communications were reflected in rising market-based expectations of the future federal funds rate, it is not clear whether the consumers comprising the "general public" were paying attention or, if they were, how they were reacting to these communications.[1]

This paper estimates the causal effects of communicating interest rate increases on consumers' inflation expectations using five waves of a randomized controlled trial (RCT) conducted via an online survey. We focus on communicating to consumers in very simple terms the federal funds rate increases of 2022 and assessing the impact on their inflation expectations. We do so by conducting in real time a specially designed set of RCTs immediately following the March, May, June, July, and September 2022 FOMC meetings. Each of these meetings resulted in increases to the federal funds rate target. Our RCT-based estimates of the *average* causal effect of communicating these hikes on households' inflation expectations have a wide range. We find that providing consumers with information about the latest interest rate hike reduced their expectations for inflation over the next five years, on average, between 0.17 and 2.18 percentage points, depending on the precise information transmitted.

While these treatment effects are statistically significant on average, we raise two difficulties about their interpretation that, as explained below, much of the wider RCT-based literature in empirical macroeconomics also faces. First, our RCTs treat consumers with information that is already publicly available and, moreover, they do so in an environment where monetary policy news was salient given high inflation readings. We provide novel evidence that consumers were indeed more informed about monetary policy in 2022 than they had been in prior years.[2] As a result, some treated individuals likely already had the treatment in their ex ante

[1] See https://www.cmegroup.com/insights/economic-research/2022/fed-rate-hikes-expectations-and-reality.html.
[2] This finding that consumers were more aware of monetary policy in 2022 than in prior years complements other work that has documented rising awareness of and attention paid to inflation in particular during this episode, such as Pfäuti (2024) and Bracha and Tang (2024).

information sets, a phenomenon also described in Weber et al. (2024) and Mackowiak and Wiederholt (2024). Second, while our RCTs explicitly communicate information to the treatment groups, it is hard to know how much of this information is really read and/or absorbed by respondents within the survey. We make the analogy to medicine and a physician prescribing a pill to a patient: the patient is only truly treated after swallowing the pill, not by having been prescribed or even given the pill.[3] Voluntary compliance with the treatment can only be confirmed ex post.[4]

Methodologically, we introduce to empirical macroeconomic studies that use RCTs the importance of ex ante informedness and ex post compliance. We propose a novel, easy, and accessible way to control for both the ex ante information set of respondents and how compliant they are with the information treatment ex post in a manner that is feasible in most online surveys. In our application, we capture informedness by asking households whether they had recently heard monetary news, and we measure voluntary compliance—rather than attempting to enforce compliance—through the time that respondents choose to spend reading the information treatment in the online survey. In this way, we proverbially do not force patients to take the pill, but we observe through a two-way mirror whether they choose to take the pill.

Using econometric methods familiar to microeconomists when undertaking causal inference with non-experimental data, we obtain complier average treatment effects by upweighting (downweighting) control group respondents based on their predicted probability of complying (not complying) with the treatment and excluding treatment group non-compliers. After accounting for compliance with the treatment and controlling for consumers' ex ante informedness in our regressions, we find that monetary policy communications about increases in interest rates have a statistically significant and economically meaningful negative impact on medium-term inflation expectations for the consumers who were previously uninformed about recent policy actions and compliant with the treatments. To the extent that the informed individuals proverbially swallowed the real-world monetary policy pill upon hearing monetary policy news prior to taking our survey, then they too may have reduced their inflation expectations at that time. However,

[3] In the 1999 movie "The Matrix," when Morpheus gives Neo the choice between taking the blue pill and staying blissfully unaware, or taking the red pill and joining the movement to undermine the matrix, he watches as Neo takes the red pill and washes it down with a glass of water.

[4] An alternative interpretation is that there is a key intensive margin to treatments that can vary across respondents and may not be completely random. Fuster et al. (2022) find that people with less uncertain prior beliefs are more likely to spend time reading the information treatment.

RCTs are unable to adequately capture their behaviors, because the information treatments are already part of their information set, as noted in Weber et al. (2024).[5]

Our empirical results contrast with the findings in Andre et al. (2022), who reported strong disagreement among consumers' responses to hypothetical situations involving monetary policy communications based on survey responses from a low-inflation period in 2019. Our findings, coming from a high-inflation period when consumers may respond differently to information shocks, suggest that consumers had a better understanding of the objectives of monetary policy when given the right information—they understood the basic mechanism that higher interest rates would reduce inflation. In a theoretical rational inattention model, Mackowiak and Wiederholt (2024) show that individuals have more incentive to pay attention to the macroeconomy and to comply with information treatments when inflation is high. We explicitly measure both margins and show empirically that the treatment effect, consistent with their model, is higher for the uninformed and for those consumers who pay attention during the survey.

By observing rather than enforcing compliance, we can analyze consumers' choice to comply with the treatment. We document systematic demographic differences across individuals who are both less informed about monetary policy and more compliant with the treatment, and we show that these differences are relevant when interpreting average and heterogeneous effects of information treatments in the macroeconomics RCT literature. For example, Coibion, Gorodnichenko, and Weber (2022) find that communication directly by the FOMC is more effective in moving household expectations than indirect communication via the media. They also find considerable heterogeneity across respondents, with female respondents' inflation expectations reacting more strongly to monetary policy information treatments. In our RCT, we find that women are more likely to spend a longer time reading the information treatments than men and to thus be considered as having complied with the treatment. This finding means that the gender differential in Coibion, Gorodnichenko, and Weber (2022) may simply reflect women paying more attention to the RCT treatment than men. We find support for this conjecture in our

[5] At the same time, we do not believe that an event study around the FOMC meetings in our sample is appropriate. Increases in the federal funds rate during our sample were telegraphed in advance of the meetings—subject to some uncertainty about their size—and hence it is unclear when the "events" transpired. Furthermore, we provide ample evidence that there are systematic differences across individuals who are and who are not informed about monetary policy. Thus, comparing individuals who had not heard about monetary policy before an FOMC meeting and those who had heard about monetary policy after the meeting likely confounds a number of factors beyond the actual information provided by the meeting—i.e., selection into informedness is not random.

study: after controlling for informedness and compliance, the gender gap is no longer statistically significant.

Our analysis also allows us to consider issues related to monetary policy awareness more broadly. Our findings suggest that central bank communications could be augmented to reach consumers who typically do not hear much monetary policy news. At the same time, our compliance results show that even when portions of the public are presented directly with monetary policy information, there is no guarantee that the information will be processed. Our focus on monetary policy awareness and compliance thus dovetails with the work of D'Acunto, Fuster, and Weber (2021), who find that the salience of female and minority representation on the FOMC affects how Fed information influences consumers' expectations, particularly for selected demographic groups, potentially offering a pathway to enhance real-world compliance to engage with monetary policy news.

Related Literature

RCTs have gained prominence in empirical macroeconomics to understand expectations formation; e.g., see Armantier et al. (2016), Binder and Rodrigue (2018), and Coibion, Gorodnichenko, and Weber (2022). Using RCTs, Haldane and McMahon (2018) and Bholat et al. (2019) find simple relatable communications by the central bank to be more effective in influencing households' expectations, thus motivating our focus on information treatments that are "short and sweet." To test whether the information treatment has additional power to affect expectations if the rationale for the policy change is also communicated, additional treatment groups in our survey are given some narrative or "vignette" (see Andre et al. (2022)) around the rate increase; e.g., by explaining that the FOMC is raising rates to reduce inflation. Our paper thus revisits the question of whether it is best to communicate targets or instruments, but it does so for the US, orienting the information treatments around the actual federal funds rate decisions made by the FOMC through 2022 rather than hypotheticals. In our case, we provide simple treatments and compare that treatment to others that provide additional information.

Our results build on a body of literature that studies communication as a central policy or lever of modern central banking. Much of this work has focused on whether and how central banks can communicate to consumers and firms (e.g., Blinder et al. (2008), Blinder et al. (2024), and Binder (2017)). Effective communication is important when central banks want to shape the

expectations of firms and consumers (Coibion et al. (2020)). This RCT-based literature has found that presenting consumers with simple statistics about current and past inflation, the FOMC's inflation target, and inflation forecasts can affect inflation expectations. In turn, Coibion et al. (2023a) show that forward guidance about policy rates can have strong effects on household expectations. It is also well documented from this literature that inflation expectations, and their determinants, vary across demographic groups. Recent studies have focused on the type of instrument for communicating (D'Acunto et al. (2020)) or the type of communication method used (Gorodnichenko, Pham, and Talavera (2023) and Pedemonte (2023)). In this paper, we emphasize the importance of measuring a respondent's information set, as stressed in Weber et al. (2024), which can have important implications for the subjective model(s) of the economy that consumers use to process information treatments, as studied in Andre et al. (2022). In addition, especially in online survey settings, measuring compliance is key, as has been stressed in other fields, notably medicine. Understanding whether there is compliance is particularly important given growing evidence that the public does not pay much attention to central bank communications; see Coibion et al. (2023b). Our paper thus contributes to the literature on the effectiveness of monetary policy communication by identifying those people most likely to be both informed and compliant if not initially informed.

While we find some evidence of stronger treatment effects when consumers are informed about not just the change in the interest rate (instrument) but also the intent of the policy change (to reduce inflation), we nevertheless find strong evidence that communicating the policy change itself is effective in lowering medium-run inflation expectations, especially for those who were previously unaware of but willing to pay attention to the communications. Our results therefore suggest that consumers did have some common understanding of the monetary policy transmission mechanism and of the source and intent of the FOMC's policy actions in 2022. Absent this specific context, the "information effect" (see Nakamura and Steinsson (2018) and Coibion, Gorodnichenko, and Weber (2022)) could in principle dominate a priori: consumers could interpret FOMC announcements of increases in the federal funds rate as signaling a stronger economy. Under this interpretation, inflation could be expected to increase, and it is that anticipated increase that is driving the funds rate higher. This finding contrasts with Andre et al. (2022), where both increases and decreases in inflation are predicted by substantial numbers of consumers in response to a *hypothetical* rise in the federal funds rate. Our paper shows that in the specific and real-world

context of the *actual* 2022 rate hikes in the US, on average consumers saw the demand-side effects as dominating, and accordingly they lowered their medium-term inflation expectations.

Our paper is also broadly related to the literature on inattention. Using a New Zealand survey, Coibion, Kumar, and Gorodnichenko (2018) found that firm managers have dispersed expectations of inflation. This is attributed to their inattention to inflation, opening the door for information treatments in RCTs to be effective in causing firms to update their heterogenous inflation expectations. But Weber et al. (2024) show that, in higher inflation environments, this need not be true, as households and firms are more informed about inflation and so adjust less to the exogenously provided inflation treatment. Our results suggest that the real-world effects of monetary policy communications on inflation expectations are likely stronger than what one would estimate based on naïve average treatment effects, because these would omit the change in expectations that had already happened prior to the RCT. Since the information in our treatments is publicly available, and moreover because the federal funds rate increases that commenced in March 2022 were largely telegraphed in the media ahead of FOMC meetings, our finding that some consumers do update their inflation expectations when treated with information about monetary policy actions is consistent with models of imperfect information (see Maćkowiak, Matějka, and Wiederholt (2023) for a review) in which agents do not fully update their information sets or incorporate all available information into their expectations. Indeed, our surveys provide direct empirical evidence that not everyone pays attention to monetary policy news, even during a period of high inflation. But, consistent with models of rational inattention (Sims, 2003), another novel feature of our survey is that it finds that a growing proportion of consumers did follow monetary policy news amid high and rising inflation in 2021 and 2022. Peaks in attentiveness coincide with FOMC meetings. Lamla and Vinogradov (2019) reach similar conclusions on an earlier lower inflation sample, when conducting surveys shortly before and after FOMC meetings.

The structure of the paper is as follows. Section 2 sets out the design of our RCTs. Section 3 presents tests showing that the information treatments were effective in reducing inflation expectations for the *average* consumer. Because the information treatments are conveying public information, in Section 4 we distinguish between consumers who were previously informed or uninformed about monetary policy actions. Section 5 uses propensity score weighted regressions to produce estimates of the treatment effect that adjust for less-than-perfect compliance in the treatment groups, thereby acknowledging the reality that respondents in RCTs need not always

comply with the treatment. Section 6 discusses the implications of our results and shows evidence that even uninformed and compliant consumers, who do expect inflation to fall because of the rate hikes, do not consistently expect this disinflation to be accompanied by a worsening real economy. Section 7 concludes. Online appendices contain supplementary tables, figures, and results.

2. Data and Design of the Randomized Controlled Trials

2.1 Survey Background

Our sample was collected as part of a daily online survey of consumer expectations conducted by the Federal Reserve Bank of Cleveland and administered by Qualtrics Research Services (see Knotek et al. (2020); Dietrich et al. (2022); Coibion et al. (2023b)). Respondents are representatively drawn from several actively managed, double-opt-in market research panels, complemented using social media (Qualtrics 2019). The survey has been conducted daily since the onset of the COVID-19 pandemic in March 2020. While our focus will be on the survey data during 2022, given the informational treatments we embedded into the survey the day after the FOMC raised interest rates in March, May, June, July, and September 2022, we will also make use of the historical data. In the survey, consumers are asked a variety of questions about their demographic characteristics, economic expectations, and their exposure to news about monetary policy and the economy.[6] In total, our main sample consists of 33,728 responses collected across the five treatment waves in 2022, with roughly 100 responses per day and over 5,000 consumers per wave. The five waves began in March, May, June, July, and September on the day after the respective month's FOMC press statement was issued and ran through the Wednesday before the next month's meeting. Each wave contains a repeated cross-section of observations; respondents are not followed over time. As described below, we reweight our respondents to ensure that our sample is representative of the US population.[7]

Appendix A shows the full statements from the FOMC issued immediately after each of the five meetings. In summary, the policy actions, which form the basis of our informational treatments, were that after the March 2022 meeting the FOMC raised the federal funds rate by ¼

[6] A list of the main survey questions is available in Appendix H.

[7] Haaland, Roth, and Wohlfart (2023) discuss online surveys and their consistency with surveys conducted using more traditional modes. As suggested in that work, our survey respondents receive monetary compensation for their time (the amount received is proprietary); we use ReCAPTCHA scores to reduce the incidence of bots; and we exclude respondents who spent extremely short (<1st percentile) or long (>99th percentile) times on the survey.

percentage point to a range of ¼ to ½ percent. In May, they raised the funds rate by ½ percentage point, to a range of ¾ to 1 percent and they also implemented the plan to start reducing the size of the Fed's balance sheet. In June, the funds rate was raised by ¾ percentage point, to a range of 1½ to 1¾ percent; in July, the funds rate was raised by ¾ percentage point, to a range of 2¼ to 2½ percent; and at the September meeting, the FOMC raised the funds rate by ¾ percentage point, to a range of 3 to 3¼ percent.

To enable a post-treatment versus pre-treatment comparison, we first directly measure inflation expectations for the next 12 months. To this end, we ask "Over the next 12 months, do you think that there will be inflation or deflation? Please give your best guess." Depending on the answer, the respondent proceeds to a follow-up question asking for a numerical estimate: "What do you expect the rate of inflation (deflation) to be over the next 12 months?" Answers to this question are adjusted to be negative for those who selected deflation in the first part of the question.

Then, before those who were assigned to a treatment group receive their information treatment, respondents are asked about their knowledge of interest rates and monetary policy. In particular, we asked whether they thought that interest rates in general had changed recently and whether they heard any news related to monetary policy in the last week. As we discuss in detail in Section 3, we find that most respondents were aware that broad interest rates had gone up recently, but they had not heard news about monetary policy.

At this stage, respondents are randomly assigned to a control group or one of the treatment groups. The control group does not receive any additional information. The treatment groups are provided with an informational treatment. For the majority of respondents who reported that they had not heard news about monetary policy, the treatment is presumably news to them; Coibion et al. (2023b) show that, within this same survey, their respondents were generally inattentive to recent monetary policy decisions. The total number of treatments in each wave varied from four (in March) to two (in May, June, July, and September). A placebo was also included in the September wave. The exact content of the information treatment varied with each wave, as the information—specifically, recent monetary policy news—changed between waves. Nonetheless, the objective for each treatment is to provide information about recent FOMC policy decisions.

Treatment 1, in each wave, provides a description of the action taken at the last FOMC meeting:

Treatment 1: "*On [date of most recent FOMC press release], the Federal Open Market Committee (FOMC) raised its primary policy interest rate (the federal funds rate) by [fraction] of a percentage point, to a target range of [lower bound] to [upper bound] percent. The FOMC also said that it would [begin/continue] to reduce the size of its balance sheet.*"

The numbers provided in Treatment 1 were updated each wave in accordance with policy decisions. The wording and length of this treatment, and of those that follow, are deliberately chosen to be to-the-point and factual and use FOMC language to mimic the sort of statement that might be communicated via a social media "tweet." Importantly, this treatment only contains information about the policy action. It does not provide any suggestive information about either the effect of the action on inflation or the motivation for the action. Andre et al. (2020) showed that, in a period of low inflation, consumers disagree about the inflationary effects of monetary policy. As this finding might change in higher inflation environments, we add additional treatments to see whether either explaining the reasons for the policy change or the policy objective itself delivers stronger effects on consumers' expectations.

Specifically, Treatment 2a provides the same information about *what* the most recent monetary policy action was, but also provides information (a narrative or "vignette") about the *intent* of the action. This treatment was included in the March through July waves:

Treatment 2a: Treatment 1 plus:

"*These actions were part of an effort to help bring inflation back down toward its objective.*"

Additionally, in September we added information about the longer-term policy objective:

Treatment 2b: Treatment 1 plus:

"*Federal Reserve Chair Jerome Powell said, 'The FOMC is strongly resolved to bring inflation down to 2 percent and we will keep at it until the job is done.*'"

The first wave—in March— also included two additional treatments that further expanded on the intent of the policy action as provided in Treatment 2:

Treatment 3: Treatment 1 + *"The FOMC said that, 'with appropriate firming in the stance of monetary policy, the Committee expects inflation to return to its 2 percent objective and the labor market to remain strong.'"*

Treatment 4: Treatment 2 + *"[The FOMC] anticipated that ongoing increases in the target range will be appropriate."*

Finally, a "placebo" treatment was added in September. This involved giving consumers information that had identical numerical content to the treatments above, but should be information that is irrelevant to consumers forming inflation expectations. The objective is to control for whether the provision of this information is changing consumers' answers, or if giving a numerical anchor is changing them as well. The placebo describes population growth:

Placebo: *"From 2015 to 2021, the population in the United States grew in a range of 3 to 3-1/4 percent.*"

After randomly receiving one of the information treatments (or being allocated to the control group that did not receive any information treatment), respondents were once again asked for their (posterior) inflation expectations. To avoid possible attrition (survey fatigue) from asking consumers the same question twice, this time we asked for their expectations over the next five years, as in Coibion et al. (2023b). As with the first question on inflation expectations, we first asked whether the respondent expected inflation or deflation: "Over the next 5 years, do you think there will be inflation or deflation on average?" This was followed up with a question asking for numerical input: "What do you expect the rate of inflation (deflation) to be over the next 12 months? Please give your best guess." We again obtained a continuous answer that can be positive or negative.

2.2. Weighting, Randomization, and Data Quality

Our survey sample comprises a large, representative, and reasonably high-quality sample of the US adult population. As in other survey research, including the Federal Reserve Bank of New York's Survey of Consumer Expectations (SCE) and Roth and Wohlfart (2020), our sample is somewhat over-educated relative to the adult population, and, unlike these other studies, our sample is also somewhat younger. These caveats aside, our sample is generally representative of the over-18 US population (see Appendix Table B1). Nevertheless, we use raking to calculate survey weights to bring our sample in line with target population proportions sourced from the 2019 American Community Survey across gender, income, age, education, race, ethnicity, and region. These weights are calculated separately for each treatment period, so that each treatment period's sample is a representative sample. While we make use of these weights in much of our

analysis, omitting them has little impact on our results.[8] We do not use demographic controls in any of our regression models unless otherwise specified.

Our sample is well-randomized and balanced, with only minor differences between the demographic make-up of any of the treatment groups and the control groups (see Appendix Table B2). A daily quota is used to ensure that the appropriate quantity of responses is collected even if respondents drop out of the survey before completing it. Respondents who fail the survey's ReCAPTCHA check or who are otherwise flagged by Qualtrics as likely bots or spammers do not count toward the quota, nor are they included in our data set.

We drop or otherwise alter as few responses from our sample as possible. The only respondents who are outright removed from our sample are those whose total survey completion times are either too short or too long. We drop respondents who took less than 6 minutes (N=574 consumers), approximately the 1st percentile, as well as those who took more than an hour to complete the survey (N=220), since the quality of responses from these respondents is typically poor, owing to rushing through the survey or simply forgetting about it. The median respondent took 14.4 minutes to complete the survey, and just under 90 percent completed it in less than 25 minutes. For the July and September survey waves, a timer was enabled to capture the time that respondents spent reading the screen with an information treatment, if relevant. Importantly, respondents choose how long to spend on the information treatment page in our survey; we do not force them to spend a specific amount of time on this page.

To deal with outliers, we winsorize responses at the 2nd and 98th percentiles for all point expectations and use Huber-robust regressions. Twelve percent of our sample reported that they were expecting deflation over the next year; among these respondents, 60 percent anticipated deflation between zero and 10 percent.

The raw median (across consumers and over time) response to the question on prior (that is, pre-treatment) year-ahead inflation expectations was 8 percent, with the 25th percentile at 4 percent and 75th percentile at 20 percent. The median posterior (that is, post-treatment) five-year average inflation expectation was 5 percent, with the 25th percentile at 2 percent and 75th percentile at 15 percent. After applying Huber weights, the median, 25th percentile, and 75th percentile prior

[8] These weights are not used in the propensity score weighted regressions in Section 5. Rather than reweighting to match population distributions, these regressions reweight the control group to match distributions within the treatment group compliers/non-compliers.

expectation are 7 percent, 4 percent, and 10 percent, respectively, and 5 percent, 2 percent, and 8 percent for the posterior.

3. Treatment Effects of Different Communication Tools

To estimate the average treatment effect, β_j, for treatments *j=1,2,3,4*, we run the following regression:

$$\pi_{i,t}^{5y} - \pi_{i,t}^{1y} = \alpha + \sum_{j=1}^{4} \beta_j \times I\left(1\ if\ treatment_j = 1\right) + \varepsilon_{it}, \qquad (1)$$

where $\pi_{i,t}^{5y}$ is the posterior, five-year inflation expectation for individual i in wave t, $\pi_{i,t}^{1y}$ is the prior, 12-month inflation expectation, and $I\left(1\ if\ treatment_j = 1\right)$ is a 0-1 dummy that takes a value of 1 if respondent i received treatment j. If treatment j is effective in changing the posterior inflation expectation relative to the prior inflation expectation, then β_j will be different from zero, implying that the treatment induces a different response on average for individuals who receive the treatment relative to the control group. Note that β_j measures the average treatment effect; changes to the distribution of responses that do not affect the average will not be captured in our regression. So a value of $\beta_j < 0$ signifies that treatment j lowers respondents' inflation expectations relative to their prior on average. To help filter outlier responses, we apply Huber weights obtained from a similar regression of five-year inflation expectations on one-year expectations, treatment indicators, and their interactions.

Table 1 shows the estimation results for each wave separately, as well as a pooled version that includes a wave fixed effect. The time fixed effects are important, since they control for the common information that the treated and control groups had at the time. Thanks to the different waves, in that specification we can control and talk about a general effect over the full-sample period.

Table 1 reports a negative average treatment effect for each treatment, implying that the *average* respondent reacts to the information treatment by reducing their inflation expectations. This negative effect is present even when consumers only receive information about the new federal funds rate (Treatment 1). This suggests that consumers may have some understanding of the mechanism behind monetary policy actions. This is particularly relevant for Treatment 1, as it does not include information about either the policy objective or inflation. The effect for Treatment 2, however, seems to be smaller in magnitude. This could be explained by an "information effect"

(see Nakamura and Steinsson (2018)) that can confound communications about interest rates: when consumers are told that the FOMC wants to reduce inflation with their actions, there is implicitly an acknowledgment of an inflationary problem, which might reduce the size of the treatment effect.[9]

Table 1: Posterior Minus Prior on Treatments

	(1) March	(2) May	(3) June	(4) July	(5) Sept	(6) Pooled
Treatment 1	-1.90***	-0.13	-0.38*	-1.18***	-0.35	-1.55***
	(0.33)	(0.19)	(0.21)	(0.28)	(0.32)	(0.13)
Treatment 2	-0.25	-0.17	-0.45**	-0.84***	-1.59***	-0.35***
	(0.21)	(0.18)	(0.21)	(0.29)	(0.36)	(0.09)
Treatment 3	-0.50**					-2.08***
	(0.21)					(0.30)
Treatment 4	-0.68***					-0.61***
	(0.21)					(0.19)
Placebo					1.09***	0.36**
					(0.27)	(0.18)
Observations	7961	5212	4899	5996	5876	29884

Columns 1-5 contain no controls or fixed effects. Column 6 shows a pooled regression with treatment period fixed effects. Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

There are some effects in Table 1 that are hard to rationalize. For example, the placebo seems to increase inflation expectations, depending on the specification. We re-evaluate these results below, once we have accounted for consumers' ex ante informedness about monetary policy and their ex post compliance with the information treatment.

4. Informed and Uninformed Respondents: Expanding the Reach of Monetary Policy

Table 1 showed that the information treatment was effective in reducing the inflation expectations of the *average* respondent. But since this information treatment is conveying public information at the time of the experiment, in principle our treatment should only affect respondents who are uninformed about recent monetary policy decisions. Informed respondents should already know the information communicated in the treatment and hence should be unaffected by it. In this section, we explore whether there are differences between the respondents who receive the

[9] In Appendix C, we complement Table 1 by showing that the treatment effects are larger for those consumers with higher prior expectations for inflation.

treatment and are likely uninformed (the "local average treatment effect") relative to the effect on all of the treated (the average treatment effect).

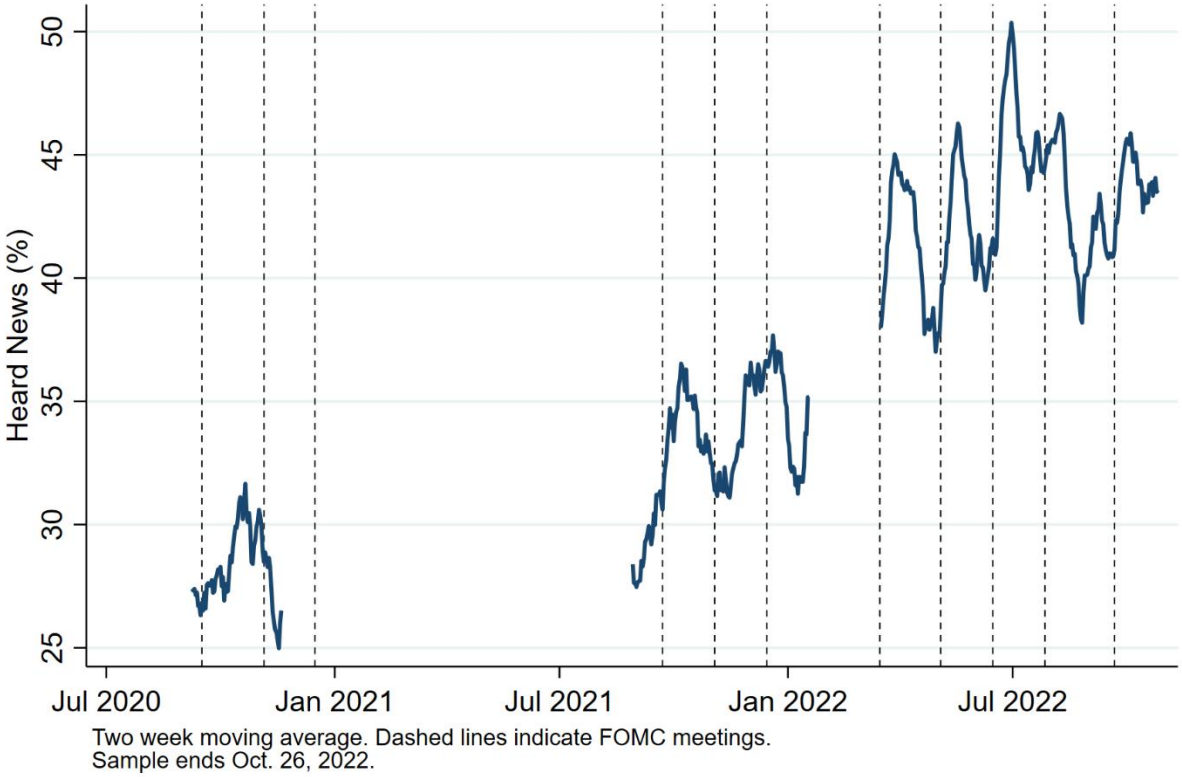
We start by identifying the uninformed group and exploring its demographic, behavioral, and socio-economic characteristics. We do so by exploiting the fact that our survey includes a pre-treatment question that asks respondents if mortgage rates had changed recently (and, if so, how) and whether they had heard news about monetary policy. As our treatments provide information about monetary policy decisions and changes in interest rates, these questions help identify which respondents were likely to have already known the information in the treatment. We find that 82.4% of respondents who had heard news about monetary policy were also aware that interest rates had changed recently, while only 47.25% of respondents who had not heard monetary policy news were aware of such an increase, and only 30.2% correctly described the change, less than half of the share among those who had heard monetary policy news. Since the question on monetary policy news is indeed correlated with informedness about interest rates, we use whether respondents had heard news as our indicator of informedness.[10] Figure 1 shows the evolution of the answers to this question over time.

Figure 1 reveals that the share of respondents who indicate that they have heard news about monetary policy has been rising since 2020. While only between 25 and 30 percent of respondents heard news about monetary policy in October 2020, around 45 percent of respondents had heard news of monetary policy in October 2022. This is consistent with the rise in inflation and the consequent increased public discussion of monetary policy through 2022. In addition, we also see from Figure 1 that respondents are more likely to have heard news about monetary policy immediately after FOMC meetings, as represented by the vertical dashed lines in Figure 1.[11]

[10] Using the question on interest rates also introduces additional complications. For example, since the possible initial responses were "No", "Not Sure", and "Yes", we would need to consider the cases of truly uninformed (i.e., "No" respondents) and little-informed (i.e., "Not sure" respondents), under the tenuous assumption that these labels are accurate. Using these as alternative indicators of informedness does not significantly change our results, however.

[11] Using a stratified random sample of the US public two days before and two days after the FOMC press conference, Lamla and Vinogradov (2019) also find that monetary policy announcements lead to an increase in the proportion of people who have heard monetary policy news.

Figure 1: Percentage of Respondents Hearing News about Monetary Policy



We should expect smaller treatment effects for respondents who have already heard news about monetary policy. To test this hypothesis, we re-run the regressions in Table 1 but only on that subset of respondents who reported that they had not heard news about monetary policy. Note that by design (random) assignment to a treatment group is not correlated with having heard news about monetary policy (see Appendix Table B2).[12]

Table 2 confirms that the estimated treatment effects for respondents who have *not* heard news are indeed often larger than those reported in Table 1, likely because for these respondents the information contained in the treatment is more informative than it is for those who have already heard some monetary policy news. In particular, in July and September we observe stronger treatment effects in Table 2 than in Table 1.

[12] Appendix Table E2 presents estimates showing how the probability that respondents had heard news about monetary policy varies with demographic factors and as a function of the time since the most recent FOMC meeting.

Table 2: Posterior Minus Prior on Treatments, Heard News = No

	(1) March	(2) May	(3) June	(4) July	(5) Sept	(6) Pooled
Treatment 1	-1.29**	-0.19	-1.34*	-2.03***	-0.93**	-1.36***
	(0.62)	(0.59)	(0.70)	(0.45)	(0.47)	(0.26)
Treatment 2	0.21	-0.01	0.73	-1.30***	-2.83***	-0.72***
	(0.46)	(0.56)	(0.58)	(0.43)	(0.61)	(0.23)
Treatment 3	-1.25**					-1.37***
	(0.55)					(0.50)
Treatment 4	-0.70					-0.84*
	(0.49)					(0.44)
Placebo					-0.62	0.01
					(0.45)	(0.41)
Observations	4522	3075	2669	3503	3339	17110

Columns 1-5 contain no controls or fixed effects. Column 6 shows a pooled regression with treatment period fixed effects. Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This differential effect speaks to a general limitation of this type of RCT. The treatment effect of communicating information depends on how "informative" the information provided actually is. Respondents who are already fully informed have no need to update their priors post-treatment. In the next section, we propose a way of distinguishing between the informational content of the (specific) treatment using a measure of whether the respondent complied with the treatment.

5. Who Reads the Treatment? Measuring Compliance

Assigning a respondent to a treatment group does not guarantee that the respondent complies with—and thus actually receives—the full extent of the information contained within the treatment. A parallel can be made with medical RCTs, in which patients may be randomly assigned the treatment, but they may not comply, for example, by not swallowing the pill prescribed by the physician. In the context of our survey of consumers, there could be many reasons for non-compliance. Consumers might be inattentive within the survey itself: they could be distracted, for example, and continue to the next question without having processed the treatment. Alternatively, they might not be willing to pay attention to the treatment at all, and they simply skip to the next question as fast as possible without digesting the information. While demographic characteristics and question-based assessments of reading and/or numerical literacy can help control for varying levels of attentiveness and understanding of the treatment, they cannot assess who reads—and

hence complies with—the treatment and who does not. Because non-compliance may be self-selected, it is "nonignorable," since it undermines the random allocation into the treatment group required for unbiased estimation of the local average treatment effect (the complier average causal effect); see Imbens and Angrist (1994) and Angrist, Imbens, and Rubin (1996). Therefore, the estimates in Tables 1 and 2 offer unbiased estimates of the effect of assignment, the so-called "intention-to-treat," not of the treatment itself. They reflect the efficacy of both the treatment and the compliance.

In this section, we propose a novel tool to measure whether respondents read (that is, comply with) the treatment, which we then use to estimate the average treatment effect free from any confounding effects of non-compliance. This is facilitated by the fact that in the July and September waves we measured how much time respondents chose to spend on the treatment page.[13] We use this measure as a proxy for whether respondents read and processed the treatment; we then separate the sample into attentive and inattentive respondents. Because the treatments vary in length, content, and across waves, separate rules are calculated for each treatment in each wave. We use a rule whereby a respondent is considered to have "read the treatment" if they took at least half of the average amount of time spent by respondents assigned to their treatment in their wave to read the treatment. This cutoff is 4.1 and 5.4 seconds for Treatments 1 and 2 in July, respectively, and 4.3, 5.9, and 2.5 seconds for Treatment 1, Treatment 2, and the placebo in September, respectively.[14] Table 3 shows how demographic and other characteristics predict attentiveness to the treatment.

While we cannot know from reading time alone whether a respondent truly read, processed, and correctly understood the information in the treatment, we can make reasonable assumptions that those with treatment reading times below these cutoffs are not likely to have done so. Even though our treatments provide succinct, "tweet-style" snippets of information, it is unreasonable to imagine that a respondent could read the entirety of the treatment in fewer than 4 or 5 seconds. Our measure of compliance, therefore, is a conservative one. There may very well be respondents

[13] This type of information is easy to implement in online surveys. Fuster et al. (2022) use a similar counter to track the relevance of information. They measure time spent reporting the posterior. They find a positive relationship between uncertain priors and the time spent reporting the posterior.

[14] Our results are not sensitive to using different cutoffs. Using an alternative standard of the 25th, 50th, or 75th percentile reading time produces similar results, with stronger treatment effects associated with longer reading time requirements. In general, our "half-the-average" rule requires a treatment reading time slightly below the median. For a plot of the empirical distribution of reading times, see Appendix Figure D1. For treatment effects by the reading time percentile used as the cutoff point, see Appendix Figure D3.

we consider compliant who in fact were not compliant, but there could only be very few respondents who we could be incorrectly considering non-compliant, given our reading cutoff times.

Table 3: Likelihood of Reading the Treatment

	Full Sample				No News Only			
	(1) Logit Odds Ratio		(2) OLS		(3) Logit Odds Ratio		(4) OLS	
Male	0.81***	(0.05)	-0.04***	(0.01)	0.81**	(0.07)	-0.04**	(0.02)
Nonwhite	0.64***	(0.05)	-0.09***	(0.02)	0.62***	(0.07)	-0.10***	(0.02)
Hispanic	0.64***	(0.07)	-0.09***	(0.02)	0.65***	(0.09)	-0.09***	(0.03)
Primary Shopper	0.90	(0.10)	-0.02	(0.02)	1.10	(0.13)	0.02	(0.02)
Numerical Literacy	1.77***	(0.16)	0.11***	(0.02)	1.43***	(0.17)	0.07***	(0.02)
Heard News	0.93	(0.06)	-0.02	(0.01)				
Age:								
36-50	2.11***	(0.16)	0.17***	(0.02)	2.22***	(0.21)	0.18***	(0.02)
51-65	5.24***	(0.46)	0.38***	(0.02)	4.79***	(0.53)	0.36***	(0.02)
66+	11.96***	(1.26)	0.51***	(0.02)	9.19***	(1.37)	0.47***	(0.02)
Income:								
$35,000-$49,999	1.17*	(0.11)	0.03*	(0.02)	1.22*	(0.13)	0.04*	(0.02)
$50,000-$99,999	0.91	(0.07)	-0.02	(0.02)	0.93	(0.09)	-0.02	(0.02)
$100,000 or more	0.75***	(0.08)	-0.05***	(0.02)	0.62***	(0.09)	-0.09***	(0.03)
Education:								
Some College	1.62***	(0.13)	0.09***	(0.02)	1.44***	(0.14)	0.07***	(0.02)
Bachelor's Degree	1.64***	(0.15)	0.10***	(0.02)	1.83***	(0.21)	0.12***	(0.02)
Advanced Degree	1.57***	(0.18)	0.09***	(0.02)	1.94***	(0.32)	0.13***	(0.03)
Political Party:								
Democrat	0.93	(0.07)	-0.02	(0.01)	0.87	(0.08)	-0.03	(0.02)
Republican	1.08	(0.09)	0.02	(0.02)	1.03	(0.11)	0.01	(0.02)
Constant	0.46***	(0.06)	0.32***	(0.02)	0.42***	(0.06)	0.31***	(0.03)
Observations	9427		9427		5350		5350	

Columns 1 and 3 report results from a logit model predicting compliance as a function of the listed variables as odds ratios, while columns 2 and 4 report results from OLS regressions of an otherwise identical model. All columns include a treatment wave fixed effect. Robust standard errors are reported in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

We see from Table 3 that women tend to pay more attention to the treatment, even conditional on not having already heard news. In addition, white, non-Hispanic respondents are more likely to read the treatment. Older and more educated respondents tend to pay more attention, but income plays a negative role, if anything. Political affiliation does not seem to affect compliance. In total, we can explain a good proportion of compliance that does not come from

idiosyncratic characteristics (for example, how tired the respondents are). This result is useful because it will allow us to characterize potential candidates who are likely to be attentive in the control group, and therefore to see if the effect of the treatment is stronger for consumers who pay attention.

We find a close relationship between the predicted probabilities of compliance and the Huber weights used in Tables 1 and 2: respondents with Huber weights close to 1 are predicted to be much more likely to read the treatment than those downweighted in the Huber-robust regressions (see Appendix Figure D2). In other words, those who are predicted to be more likely to comply with their assigned treatment are far less likely to provide outlier responses, and vice-versa. Accounting for compliance therefore has an added benefit in that doing so downweights outlier responses on the basis of the respondents' behavior instead of using measures derived from the statistical properties of all (or a subset of) responses, as in the case of Huber weights.

While having heard news does not predict assignment to a treatment group, reading the treatment does; respondents could only pass the reading time cutoff if they had a treatment to read in the first place. This problem is compounded by the predictability of compliance demonstrated in Table 3: selection into compliance or non-compliance is predictable by respondent demographics. Therefore, simply excluding non-compliers from the sample and rerunning the regressions in Tables 1 and 2 would no longer leave us with a randomly assigned treatment group. This implies that the average treatment effect estimates provided in Tables 1 and 2 are likely to understate the local average treatment effect (for compliers), because those estimates do not account for the partial endogeneity of treatment selection; that is, respondents must be randomly assigned a treatment group to be treated, but they may or may not comply with being treated in a non-random fashion. This underestimation is understood by noting (see Imbens and Angrist (1994) and Angrist, Imbens, and Rubin (1996)) that, under the "exclusion restriction" that treatment does not affect compliance, the local average treatment effect is the ratio of the estimated intent-to-treat effect (as shown in Tables 1 and 2) and the estimated proportion of compliers (as modeled in Table 3).

Given the evidence from Table 3 that we have covariates that explain compliance, we use these to calculate propensity scores that, in turn, are used to re-estimate the treatment effect. Following Jo and Stuart (2009), we use a two-step process to estimate complier and non-complier treatment effects. In the first step, similar to Follmann (2000), we estimate propensity scores ($\hat{p}$)

for respondents in the control group of a (given) treatment period by fitting a logit model of compliance within the treatment group using the covariates seen in Table 3. In the case of additional sample restrictions (that is, excluding respondents who heard news about monetary policy), the logit model is estimated on a subsample with the same restrictions, and fitted values are only calculated for respondents in the control group belonging to the same group (that is, who also did not hear news about monetary policy). Because of randomization, the covariates used in the treatment group should also explain compliance in the control group, for whom we cannot measure compliance directly, of course, as they did not receive a treatment and thus were not timed.

In the second step, we return to the regression model in Tables 1 and 2, but now use the estimated propensity scores to reweight respondents. To estimate the average causal effect among compliers (CACE), respondents in the control group are assigned weights $\hat{p}_i/(1-\hat{p}_i)$, while treatment group compliers and non-compliers are assigned weights equal to one and zero, respectively (thus equivalently excluding treatment group non-compliers). To estimate the average causal effect among non-compliers (NACE), respondents in the control group are assigned weights $(1-\hat{p}_i)/\hat{p}_i$, while treatment group compliers and non-compliers are assigned weights of zero and one, respectively (the inverse of the CACE weighting regime).[15] Intuitively, these regressions estimate complier (non-complier) treatment effects by giving the most likely and least likely compliers (non-compliers) within the control group the largest and smallest weights, respectively, effectively reweighting the control group as a whole to match the characteristics of the treatment group compliers (non-compliers).

Table 4 reports CACE and NACE estimates obtained via the two-step procedure outlined above, for the July and September waves and broken down by prior news exposure. To account for the estimation uncertainty from using estimated propensity scores in the second-stage weighted regression, we bootstrap each step of the two-step process. Table 4 reports the means and standard deviations of the distribution of each coefficient's draws, with p-scores calculated using these means and standard deviations.

[15] The reason that treatment group compliers and non-compliers get weights of 1 and 0, respectively (and vice-versa when estimating the NACE), rather than predicted scores, is that we know with certainty whether they passed the reading cutoff time or not. Using predicted scores over the observed compliance would discard this information.

Table 4 reveals large differences between compliers and non-compliers in both the size and statistical significance of the treatment effects. Among compliers, we find considerably larger treatment effects for both the sample as a whole and compliers without prior knowledge of recent monetary policy news. We also see that compliers who had already heard news about monetary policy had no significant treatment effects. For non-compliers, on the other hand, we find no significant treatment effects except for the placebo—which, given their non-compliance, might not be surprising. Comparing the size of the treatment effects on the compliers who have not heard news across the different treatments, it is noteworthy that Treatment 1 is more powerful than Treatment 2 in July, but the reverse is true in September. This may be because the September version of Treatment 2, which supplements the policy action with some discussion of its intent, includes a direct quote from Chair Powell. Previous research has also found that monetary policy communications resonate more when reinforced with a direct quote (for example, see Hoffmann, Moench, and Schultefrankenfeld (2023)). However, as discussed for Table 1, it is not clear that monetary policy communications are more effective when the reasons for the policy action are explained, since Treatment 3 (seen in Table 1) is ineffective in reducing consumers' inflation expectations. Certainly, the words used to communicate the rationale for the policy seem to matter.

Table 4: Treatment Effects Via Propensity Score Weighted Regressions

	Compliers			Non-compliers		
	(1)	(2)	(3)	(4)	(5)	(6)
Heard News =	All	Yes	No	All	Yes	No
July						
Treatment 1	-1.76***	0.20	-3.20***	-0.92	-1.12	-0.93
	(0.67)	(0.88)	(0.98)	(1.22)	(2.09)	(1.49)
Treatment 2	-2.00***	-1.20	-2.68***	-0.07	0.50	-0.69
	(0.69)	(0.86)	(1.03)	(1.24)	(2.16)	(1.47)
Observations	4674	1994	2680	4284	1833	2451
September						
Treatment 1	-1.79**	0.04	-3.24***	0.64	0.31	2.13
	(0.79)	(1.16)	(1.07)	(1.39)	(2.25)	(1.65)
Treatment 2	-2.57***	-1.17	-3.57***	-0.68	-2.11	1.72
	(0.81)	(1.20)	(1.10)	(1.41)	(2.21)	(1.80)
Placebo	-0.04	0.35	-0.42	-0.99	-4.48*	3.22*
	(0.78)	(1.02)	(1.17)	(1.46)	(2.39)	(1.71)
Observations	4339	1900	2439	3982	1834	2148

One hundred sets of fitted propensity scores are generated by bootstrapping a logit regression predicting compliance among the pooled treatment groups within each treatment period 100 times for each combination of prior information and compliance type (i.e., for each column within each panel). Then, each of the 100 sets of propensity scores from the first stage is used in a bootstrapped weighted OLS regression with another 100 repetitions. Reported above are the means and (in parentheses) standard deviations of the distribution of the resulting 10,000 "draws" of each coefficient. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

These results are robust to alternative cutoff parameters. Figure D3 in the Appendix shows that as we increase the reading time cutoff threshold used to classify compliance, the resulting treatment effects for the uninformed and compliant (the analog to the coefficients in Table 4) grow steadily larger in absolute terms to a point, consistent with our interpretation that these individuals are, indeed, spending more time reading the treatment.[16]

In summary, our results confirm that identifying compliant and uninformed consumers is important when understanding the heterogeneity that lies beneath average treatment effects, as initially reported in Table 1. Moreover, after accounting for compliance, the placebo treatment has the hoped-for zero effect on inflation expectations relative to the control.

[16] Table G5 in the Appendix shows that these differences in the estimated coefficients in Table 4 between consumers that heard and did not hear news are statistically significant. The effect on the informed is close to zero, especially for Treatment 1. In addition, Table G6 shows that consumers that spend more time reading the treatment tend to have stronger treatment effects than consumers that spend less time reading the treatment, even conditional on compliance.

We can go further in understanding the importance of distinguishing compliant and uninformed consumers from the noncompliant and informed by drawing on our results that compliant and uninformed consumers can be systematically characterized by their demographic characteristics. Coibion et al. (2022) find that gender differences are important; their RCTs suggest that female respondents are more responsive to information treatments in terms of updating their inflation expectations. However, we find (see Appendix Table E2) that women are both more likely to have read (and hence comply with) the treatment and to report being less informed about monetary policy news, on average, and so their stronger reaction to informational treatments could simply follow from the fact that compliant and less informed respondents have higher average effects, and have nothing to do with gender per se. To explore this further, Table 5 reports treatment effects by gender *before* (denoted "base") and *after* stratifying the sample into respondents who heard, or did not hear, monetary policy news and who are classified as complying with the treatment. For simplicity, in this final exercise we pool all the informational treatments into one, to focus on the differential effects by gender.

Table 5 shows that, depending on the wave, men have different reactions compared with women. In particular, in the September wave, men reacted less than women to the information treatment, as seen in columns (1) and (3). We also see that when we focus on the compliant, these gender differences disappear. In fact, comparing columns (3) and (4) in Table 5, we observe that the differences stem from the non-compliant respondents who are included in column (3); when we compare *compliant* male and female respondents in column (4), the treatment effects are not statistically different and, if anything, are greater for men.

In summary, our results highlight that in order to meaningfully compare information treatment effects across demographic groups it is important to measure who is paying attention, in order to capture the underlying treatment effect. Much attention has been paid in the now considerable RCT literature in empirical macroeconomics to the effectiveness of treatments (for example, see Coibion, Gorodnichenko, and Weber (2022), D'Acunto et al. (2020), and Weber et al. (2024)). However, there has been little discussion given to whether the treatments under consideration are, in fact, effective *simply* because respondents are paying attention to the information provided and/or because the information provided is news to them, because they were previously uninformed. Differences in average treatment effects across demographic groups can reflect differences in information sets rather than responses to the treatments per se. One of this

paper's contributions, therefore, is to propose a simple way to measure informedness and compliance and to show that, in certain contexts, apparent demographic differences can be explained by the degree of informedness and compliance.

Table 5: Gender Differences in Treatment Effects

Heard News =	All		No	
	(1)	(2)	(3)	(4)
Model =	Base	Compliers	Base	Compliers
July				
Treated	-0.95***	-2.63***	-1.72***	-3.44***
	(0.35)	(0.97)	(0.47)	(1.23)
Treated x Male	0.03	1.63	0.42	1.21
	(0.47)	(1.15)	(0.72)	(1.59)
Male	1.14***	1.15	0.93*	0.64
	(0.35)	(0.92)	(0.54)	(1.27)
Observations	5995	4674	3498	2680
September				
Treated	-1.55***	-1.76*	-2.97***	-2.72**
	(0.46)	(0.93)	(0.68)	(1.17)
Treated x Male	1.04*	-0.89	2.16**	-1.98
	(0.58)	(1.24)	(0.95)	(1.70)
Placebo	1.08**	-0.16	-0.94	-0.03
	(0.42)	(1.26)	(0.67)	(1.59)
Placebo x Male	-0.01	-0.07	0.70	-1.38
	(0.53)	(1.55)	(0.88)	(2.22)
Male	0.68	2.57***	0.70	2.32**
	(0.45)	(0.72)	(0.64)	(1.08)
Observations	5882	4339	3343	2439

Treatments are pooled within each wave, with the placebo in September kept separate. "Base" columns are a variation of equation (1), the model used in Tables 1 and 2, while "Compliance" columns are a variation of the propensity score procedure outlined in Section 5 and implemented in Table 4. "Compliance" columns show the results for compliers. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

6. Discussion

Our results highlight the importance of controlling for respondents' information sets when running and interpreting RCTs in empirical macro settings, especially when considering differences in responses across demographic groups that could be proxies for informedness and compliance.

Taken at face value, our results find that monetary policy communications can have a large impact on consumers' inflation expectations. The RCTs find large negative treatment effects for consumers who had not previously heard news about monetary policy and who read the treatment. But the RCTs have little to say about consumers who "swallowed the real-world monetary policy pill"—that is, for consumers who were paying close attention to monetary policy news—because the information provided to them was presumably uninformative. To the extent that those consumers responded in a similar fashion when they first heard the news that policymakers would be raising interest rates to combat inflation, FOMC policy actions in 2022 should have worked to directly reduce their inflation expectations as well.[17] Consistent with this belief, we find that informed respondents on average had lower inflation expectations during our sample period than uninformed respondents, as shown in Figure E1 in the Appendix.[18]

Our results also serve as a check on the external validity of Andre et al. (2022). Using hypothetical "vignettes," Andre et al.'s surveys reveal considerable disagreement across consumers in terms of how they update their expectations after an unexpected monetary policy shock. The authors attribute this to people having different subjective models of the economy, rather than to people having different information sets about the state of the economy. In contrast, having differentiated people's information sets, we find that uninformed and compliant consumers do understand the policy objective, as communicating the—for them, unanticipated or unknown—policy change directly reduces their inflation expectations. In the real-life context of the high inflation of 2022, these consumers appear to use a common subjective model of the economy, at least to the extent that they reduce their medium-term inflation expectations once informed that the FOMC has recently increased interest rates. Adding the narrative or vignette for why rates are rising, as administered in our RCTs by comparing Treatment 2 with Treatment 1, does not reduce consumers' inflation expectations further. Consumers appear to already know why the FOMC is raising the federal funds rate. As Weber et al. (2024) discuss, consumers may well react differently to information shocks when the level of inflation is lower. This may help explain why our results differ from those in Andre et al. (2022), who ran their experiments in 2019, a period when inflation was low and stable. Because of the rising inflation through 2022, consumers may well have learned

[17] Because many of the interest rate increases in 2022 were telegraphed in advance, the realization of some of this news could have occurred prior to our study.

[18] Of course, outside of the laboratory of an RCT, many different information shocks could have been buffeting the informed and uninformed respondents that could explain the time-varying relationship between the series.

or had a general sense that the intent of the increases in the federal funds rate was to lower inflation, so that even absent communication of the intent of the policy action, consumers still understood the FOMC's intended monetary policy transmission mechanism.

To probe more deeply at the mechanism(s)—that is, the underlying subjective model(s)—through which consumers thought that increases in the policy rate would reduce inflation, we summarize results testing whether consumers update their prior expectations for GDP growth and personal income in light of the information treatments as they do their inflation expectations. This additional exercise is possible given that our survey asks consumers questions about these two variables similar to those it asks about inflation.[19] In summary, as shown in the tables in Appendix F, we find that even when focusing on the previously uninformed and compliant respondents, consumers' posterior expectations for GDP growth and their personal income on average are unaffected by the treatments. In other words, even uninformed and compliant consumers do not consistently associate the fall in inflation, which they do expect given the rate hikes, with either a worsening real macroeconomy or deteriorating personal economic prospects. This implies that, if consumers think the slope of the Phillips curve is flat, they do not expect the increases in the federal funds rate to move the economy along a flat Phillips curve. Instead, monetary policy shifts inflation expectations directly, similar to the shifts seen in Hazell et al. (2022), who estimate a flat Phillips curve slope using state-level data. However, our results admittedly cannot rule out the possibility that consumers alternatively believe that there is a very steep Phillips curve, and hence there is little cost to disinflation, or that there is some mixture of these types of consumers among whom our analysis cannot differentiate. While future work should aim to disentangle these two possibilities, our results suggest that consumers think the Fed's disinflationary efforts will have little cost in terms of lost output.

While our treatments and analysis focus on the communication of monetary policy decisions, consumers may be more aware of other, longer-term interest rates—which potentially incorporate forward-looking expectations of monetary policy—because these rates are more relevant for the real-world monetary transmission mechanism for borrowers and savers. In Appendix G, we re-estimate the treatment effects in Table 4 while controlling for two additional

[19] These questions were asked in exactly the same manner as the questions eliciting inflation expectations: a question prior to the treatment first asked whether the respondent expected GDP/personal income to increase or decrease over the next year, and a follow-up posterior question after the treatment asked for the expected percent change (see Section 2 or Appendix H).

measures of broader awareness about interest rates that our survey asks about pre-treatment: whether the respondent reported that the interest rates that people pay to borrow money in general had changed recently; and whether the respondent indicated that borrowing rates in general had gone up by more than 1 percentage point recently.[20] As in Table 4, we continue to find negative and statistically significant treatment effects for all respondents who complied with the treatment and for those respondents who complied and were uninformed about monetary policy. We find no evidence that prior awareness about borrowing rates attenuates the treatment effects, as seen by the statistically insignificant interaction terms. Thus, our results are not dependent on providing information to consumers who were completely inattentive to the economic environment; the monetary policy treatments also moved the inflation expectations of those who already had some sense of what was happening to interest rates. These results provide suggestive evidence that it is the combination of communicating the *actor* (that is, the FOMC) and the *action* (that is, the decision to raise the policy rate) in our treatments that has delivered the large negative impact on inflation expectations, and not a change in interest rates alone. Future work can refine the role of these two margins further.

Our results highlight the importance of controlling for both informedness and compliance so that RCTs have a higher degree of external validity and can better help economists understand the real-world effects of monetary policy communications. Informedness is not the same for everybody (see Appendix Table E2), with some agents accruing information about policy ahead of others in the "real-world" rather than in the "laboratory" of the RCT. Informed consumers update their inflation expectations outside of the RCT. This means that the small and statistically insignificant treatments effects we find for them (Table 4, Columns (2) and (5)) do not mean that the monetary policy communication has been ineffective, just that this group of consumers may have already updated their expectations. The uninformed do have an understanding of the main mechanism of monetary policy; and so new, targeted communications to reach this group in the real-world should also be expected to weaken their responsiveness to treatments within the RCT.

[20] Appendix G documents that there is a high correlation between informedness about monetary policy and awareness of increases in borrowing rates more generally, but not a perfect correlation between the two different concepts, which forms the basis for these regression results.

7. Conclusion

This paper reports and analyzes results from a specially designed multi-wave RCT to test whether and how communications about actual increases in the federal funds rate in 2022 causally affected consumers' inflation expectations. We find that simple communications about increases in the federal funds rate reduced consumers' medium-term inflation expectations, but most notably only for those who were previously unaware of but willing to pay attention to (that is, in our language, "compliant" with) the information communicated in the RCT. Our results thus highlight the importance of measuring the ex ante informedness and the ex post compliance of respondents in applied macroeconomics RCTs.

Our results therefore suggest that the FOMC's policy actions of 2022 likely helped to directly (re)anchor medium-term inflation expectations and contribute to the disinflation process for some consumers. In turn, the fact that real-time and real-life monetary policy communications of the policy action alone (even absent any information on its intent) are found to lower longer-term inflation expectations suggests that consumers did have some common understanding of the monetary policy transmission mechanism and of the FOMC's intention that the rate hikes should drive inflation down.

Our finding that communicating the monetary policy changes of 2022 had small effects on inflation expectations on average, but larger effects on the previously uninformed and compliant, reinforces the growing consensus in the literature (for example, Coibion and Gorodnichenko (2015) and Andre et al. (2022)) that there is considerable heterogeneity across consumers in terms of how they form and update their inflation expectations. During the high inflation of 2022, we find that not everyone was paying attention to monetary policy nor was everyone equally attentive to the information treatment administered in our five RCTs, even when presented with very short, tweet-like monetary policy communications designed to be easy to read. By identifying groups of consumers who tend to report being less informed about monetary policy news and to be more likely to pay attention to news when it is shared with them, and by controlling for those groups in our regressions, we find evidence that there is scope to increase the impact of monetary policy communications by targeting specific groups of the general public, notably women. More generally, our results suggest that it is important when interpreting the heterogeneous treatment effects commonly found in RCTs in macroeconomics to unpack both the compliant from the non-

compliant and those for whom the informational treatment is news from those for whom the information is already known. Otherwise, as we illustrate, it is possible to misclassify the drivers of the heterogeneity and misdiagnose the best ways of increasing the effectiveness of monetary policy communications.

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Online Appendix A: The 5 FOMC Statements

Exhibit A1: March 16, 2022, FOMC Statement

March 16, 2022

Federal Reserve issues FOMC statement

For release at 2:00 p.m. EDT

Share

Indicators of economic activity and employment have continued to strengthen. Job gains have been strong in recent months, and the unemployment rate has declined substantially. Inflation remains elevated, reflecting supply and demand imbalances related to the pandemic, higher energy prices, and broader price pressures.

The invasion of Ukraine by Russia is causing tremendous human and economic hardship. The implications for the U.S. economy are highly uncertain, but in the near term the invasion and related events are likely to create additional upward pressure on inflation and weigh on economic activity.

The Committee seeks to achieve maximum employment and inflation at the rate of 2 percent over the longer run. With appropriate firming in the stance of monetary policy, the Committee expects inflation to return to its 2 percent objective and the labor market to remain strong. In support of these goals, the Committee decided to raise the target range for the federal funds rate to 1/4 to 1/2 percent and anticipates that ongoing increases in the target range will be appropriate. In addition, the Committee expects to begin reducing its holdings of Treasury securities and agency debt and agency mortgage-backed securities at a coming meeting.

In assessing the appropriate stance of monetary policy, the Committee will continue to monitor the implications of incoming information for the economic outlook. The Committee would be prepared to adjust the stance of monetary policy as appropriate if risks emerge that could impede the attainment of the Committee's goals. The Committee's assessments will take into account a wide range of information, including readings on public health, labor market conditions, inflation pressures and inflation expectations, and financial and international developments.

Exhibit A2: May 4, 2022, FOMC statement

May 04, 2022

Federal Reserve issues FOMC statement

For release at 2:00 p.m. EDT

Share

Although overall economic activity edged down in the first quarter, household spending and business fixed investment remained strong. Job gains have been robust in recent months, and the unemployment rate has declined substantially. Inflation remains elevated, reflecting supply and demand imbalances related to the pandemic, higher energy prices, and broader price pressures.

The invasion of Ukraine by Russia is causing tremendous human and economic hardship. The implications for the U.S. economy are highly uncertain. The invasion and related events are creating additional upward pressure on inflation and are likely to weigh on economic activity. In addition, COVID-related lockdowns in China are likely to exacerbate supply chain disruptions. The Committee is highly attentive to inflation risks.

The Committee seeks to achieve maximum employment and inflation at the rate of 2 percent over the longer run. With appropriate firming in the stance of monetary policy, the Committee expects inflation to return to its 2 percent objective and the labor market to remain strong. In support of these goals, the Committee decided to raise the target range for the federal funds rate to 3/4 to 1 percent and anticipates that ongoing increases in the target range will be appropriate. In addition, the Committee decided to begin reducing its holdings of Treasury securities and agency debt and agency mortgage-backed securities on June 1, as described in the Plans for Reducing the Size of the Federal Reserve's Balance Sheet that were issued in conjunction with this statement.

In assessing the appropriate stance of monetary policy, the Committee will continue to monitor the implications of incoming information for the economic outlook. The Committee would be prepared to adjust the stance of monetary policy as appropriate if risks emerge that could impede the attainment of the Committee's goals. The Committee's assessments will take into account a wide range of information, including readings on public health, labor market conditions, inflation pressures and inflation expectations, and financial and international developments.

Exhibit A3: June 15, 2022, FOMC statement

June 15, 2022

Federal Reserve issues FOMC statement

For release at 2:00 p.m. EDT

Share

Overall economic activity appears to have picked up after edging down in the first quarter. Job gains have been robust in recent months, and the unemployment rate has remained low. Inflation remains elevated, reflecting supply and demand imbalances related to the pandemic, higher energy prices, and broader price pressures.

The invasion of Ukraine by Russia is causing tremendous human and economic hardship. The invasion and related events are creating additional upward pressure on inflation and are weighing on global economic activity. In addition, COVID-related lockdowns in China are likely to exacerbate supply chain disruptions. The Committee is highly attentive to inflation risks.

The Committee seeks to achieve maximum employment and inflation at the rate of 2 percent over the longer run. In support of these goals, the Committee decided to raise the target range for the federal funds rate to 1-1/2 to 1-3/4 percent and anticipates that ongoing increases in the target range will be appropriate. In addition, the Committee will continue reducing its holdings of Treasury securities and agency debt and agency mortgage-backed securities, as described in the Plans for Reducing the Size of the Federal Reserve's Balance Sheet that were issued in May. The Committee is strongly committed to returning inflation to its 2 percent objective.

In assessing the appropriate stance of monetary policy, the Committee will continue to monitor the implications of incoming information for the economic outlook. The Committee would be prepared to adjust the stance of monetary policy as appropriate if risks emerge that could impede the attainment of the Committee's goals. The Committee's assessments will take into account a wide range of information, including readings on public health, labor market conditions, inflation pressures and inflation expectations, and financial and international developments.

Exhibit A4: July 27, 2022, FOMC statement

July 27, 2022

Federal Reserve issues FOMC statement

For release at 2:00 p.m. EDT

Share

Recent indicators of spending and production have softened. Nonetheless, job gains have been robust in recent months, and the unemployment rate has remained low. Inflation remains elevated, reflecting supply and demand imbalances related to the pandemic, higher food and energy prices, and broader price pressures.

Russia's war against Ukraine is causing tremendous human and economic hardship. The war and related events are creating additional upward pressure on inflation and are weighing on global economic activity. The Committee is highly attentive to inflation risks.

The Committee seeks to achieve maximum employment and inflation at the rate of 2 percent over the longer run. In support of these goals, the Committee decided to raise the target range for the federal funds rate to 2-1/4 to 2-1/2 percent and anticipates that ongoing increases in the target range will be appropriate. In addition, the Committee will continue reducing its holdings of Treasury securities and agency debt and agency mortgage-backed securities, as described in the Plans for Reducing the Size of the Federal Reserve's Balance Sheet that were issued in May. The Committee is strongly committed to returning inflation to its 2 percent objective.

In assessing the appropriate stance of monetary policy, the Committee will continue to monitor the implications of incoming information for the economic outlook. The Committee would be prepared to adjust the stance of monetary policy as appropriate if risks emerge that could impede the attainment of the Committee's goals. The Committee's assessments will take into account a wide range of information, including readings on public health, labor market conditions, inflation pressures and inflation expectations, and financial and international developments.

Exhibit A5: September 21, 2022, FOMC statement

September 21, 2022

Federal Reserve issues FOMC statement

For release at 2:00 p.m. EDT

Share

Recent indicators point to modest growth in spending and production. Job gains have been robust in recent months, and the unemployment rate has remained low. Inflation remains elevated, reflecting supply and demand imbalances related to the pandemic, higher food and energy prices, and broader price pressures.

Russia's war against Ukraine is causing tremendous human and economic hardship. The war and related events are creating additional upward pressure on inflation and are weighing on global economic activity. The Committee is highly attentive to inflation risks.

The Committee seeks to achieve maximum employment and inflation at the rate of 2 percent over the longer run. In support of these goals, the Committee decided to raise the target range for the federal funds rate to 3 to 3-1/4 percent and anticipates that ongoing increases in the target range will be appropriate. In addition, the Committee will continue reducing its holdings of Treasury securities and agency debt and agency mortgage-backed securities, as described in the Plans for Reducing the Size of the Federal Reserve's Balance Sheet that were issued in May. The Committee is strongly committed to returning inflation to its 2 percent objective.

In assessing the appropriate stance of monetary policy, the Committee will continue to monitor the implications of incoming information for the economic outlook. The Committee would be prepared to adjust the stance of monetary policy as appropriate if risks emerge that could impede the attainment of the Committee's goals. The Committee's assessments will take into account a wide range of information, including readings on public health, labor market conditions, inflation pressures and inflation expectations, and financial and international developments.

Online Appendix B: Survey Statistics

Table B1: Survey Sample Demographics, Pre- and Post-Weighting

	Raw	Weighted	Reference
Male	49.9	49	49
Income:			
Less than $10,000	11.0	6	6
$10,000-$34,999	25.7	22	22
$35,000-$49,999	14.9	12	12
$50,000-$99,999	28.3	30	30
$100,000-$199,999	16.1	22	22
More than $200,000	4.0	8	8
Age:			
18-29	16.7	21	21
30-44	36.9	24	24
45-64	24.8	33	33
65+	21.6	22	22
Education:			
High School or Less	25.5	36	36
Some College, No Degree	25.0	33	33
College Degree or More	49.6	31	31
Race:			
White	78.5	76	76
Asian	3.7	5	5
Black	13.3	13	13
Other	2.8	4	4
Two or More	1.7	2	2
Hispanic	10.1	13	13
Region:			
Northeast	21.2	16	16
Midwest	41.4	33	33
South	20.9	33	33
West	16.5	18	18

Numbers are the relative frequency across the whole sample within each variable.

Table B2: Treatment Randomization: Means of Each Variable by Wave

	March	May	June	July	Sept
Control Group					
Age	47.5	46.7	47.9	46.7	47.9
Male	0.47	0.50	0.48	0.50	0.48
# of Children	1.41	1.37	1.53	1.41	1.37
Married	0.48	0.49	0.48	0.46	0.51
Single	0.26	0.27	0.26	0.29	0.26
Nonwhite	0.23	0.22	0.22	0.24	0.23
Hispanic	0.12	0.15	0.11	0.13	0.12
Numerical Literacy	0.15	0.15	0.16	0.16	0.16
Primary Shopper	0.88	0.90	0.86	0.89	0.90
Heard News	0.42	0.42	0.43	0.42	0.46
Gets News Daily/Hourly	0.47	0.50	0.50	0.49	0.51
Treatment 1					
Age	46.8	47.6	47.9	47.7	47.3
Male	0.50	0.49	0.50	0.49	0.48
# of Children	1.36	1.40	1.59	1.37	1.35
Married	0.47	0.50	0.55	0.48	0.48
Single	0.28	0.26	0.23	0.28	0.28
Nonwhite	0.22	0.21	0.21	0.23	0.23
Hispanic	0.12	0.12	0.14	0.15	0.14
Numerical Literacy	0.15	0.15	0.18	0.18	0.15
Primary Shopper	0.87	0.89	0.86	0.89	0.90
Heard News	0.45	0.42	0.45	0.39	0.42
Gets News Daily/Hourly	0.52	0.51	0.52	0.49	0.50
Treatment 2					
Age	47.0	47.6	46.1	47.5	47.7
Male	0.50	0.48	0.49	0.48	0.49
# of Children	1.42	1.50	1.45	1.35	1.44
Married	0.49	0.49	0.48	0.49	0.50
Single	0.26	0.26	0.28	0.27	0.26
Nonwhite	0.23	0.23	0.23	0.21	0.21
Hispanic	0.13	0.12	0.14	0.12	0.13
Numerical Literacy	0.13	0.15	0.16	0.17	0.15
Primary Shopper	0.85	0.90	0.83	0.89	0.87
Heard News	0.44	0.43	0.42	0.43	0.42
Gets News Daily/Hourly	0.47	0.49	0.48	0.50	0.51
Treatment 3/Placebo (in Sept)					
Age	47.7				47.7
Male	0.49				0.51
# of Children	1.46				1.43
Married	0.51				0.52
Single	0.27				0.26
Nonwhite	0.20				0.23
Hispanic	0.14				0.14
Numerical Literacy	0.13				0.17
Primary Shopper	0.90				0.91
Heard News	0.43				0.46
Gets News Daily/Hourly	0.49				0.54
Treatment 4					
Age	47.4				
Male	0.49				
# of Children	1.34				
Married	0.51				
Single	0.27				
Nonwhite	0.22				
Hispanic	0.14				
Numerical Literacy	0.15				
Primary Shopper	0.88				
Heard News	0.45				
Gets News Daily/Hourly	0.49				

Online Appendix C: Treatment Effects Conditional on the Prior

Here we test for the presence of a significant treatment effect on the posterior conditional on the prior. Intuitively, we want to measure whether respondents who received the treatment put less weight on their priors after receiving the information treatment. This is not equivalent to the average treatment effect that we estimate in the main paper; in fact, the treatment might not have any effect on the average respondent while still affecting respondents with prior expectations away from the average. Specifically, we run the following regression:

$$\pi_{i,t}^{5y} = \alpha + \beta_j \times I\left(1\ if\ treatment_j = 1\right) + \theta \times \pi_{i,t}^{1y} + \gamma_j \times \pi_{i,t}^{1y} \times I\left(1\ if\ treatment_j = 1\right) + \varepsilon_{it}, \quad \text{(C1)}$$

where $\pi_{i,t}^{5y}$ is the five-year inflation expectation or the posterior for individual i in wave t, $\pi_{i,t}^{1y}$ is the 12-month inflation expectation or the prior, $I\left(1\ if\ treatment_j = 1\right)$ is a 0-1 dummy that takes a value of 1 if the respondent i received the treatment j, and θ indicates how much the prior influences the posterior for the control group. In this case, γ_j will indicate how individuals who received treatment j weight the prior relative to the control group. If the treatment is effective and contains useful information, the coefficient should be negative, as respondents should put less weight on their prior in favor of using the information learned from the treatment.

Table C1 shows the results for each wave separately, as well as a pooled version that includes a wave fixed effect. The time fixed effects are important, as they control for the common information that the treated and control groups had at the time. Thanks to the different waves, in that specification we can control and talk about a general effect over the full-sample period.

Table C1: Posterior on Prior-x-Treatment

	(1) March	(2) May	(3) June	(4) July	(5) Sept	(6) Pooled
Prior	0.96***	0.91***	0.93***	0.65***	0.69***	0.91***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Treatment 1	3.18***	-0.61***	-0.30	0.49**	0.28	2.04***
	(0.24)	(0.22)	(0.23)	(0.20)	(0.25)	(0.10)
Treatment 2	0.14	-0.62***	-0.50**	0.55***	0.45*	-0.46***
	(0.24)	(0.22)	(0.23)	(0.20)	(0.25)	(0.10)
Treatment 3	0.05					2.57***
	(0.23)					(0.20)
Treatment 4	0.01					-0.55***
	(0.24)					(0.20)
Placebo					-1.38***	0.08
					(0.24)	(0.19)
Treatment 1 x Prior	-0.53***	0.05***	-0.01	-0.18***	-0.10***	-0.39***
	(0.02)	(0.01)	(0.01)	(0.02)	(0.02)	(0.01)
Treatment 2 x Prior	-0.04**	0.04**	0.01	-0.11***	-0.20***	0.01
	(0.01)	(0.02)	(0.01)	(0.02)	(0.02)	(0.01)
Treatment 3 x Prior	-0.05***					-0.50***
	(0.01)					(0.02)
Treatment 4 x Prior	-0.07***					-0.02
	(0.02)					(0.01)
Placebo x Prior					0.25***	0.03**
					(0.02)	(0.01)
Observations	7961	5212	4899	5996	5876	29884
Adjusted R^2	0.86	0.89	0.89	0.64	0.77	0.83

Columns 1-5 contain no controls or fixed effects. Column 6 shows a pooled (over waves) regression with treatment period fixed effects. Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The abundance of statistically significant coefficients in Table C1 suggests that the treatments did affect respondents' posterior beliefs. We find that the coefficient on the prior (θ in Eq. C1, the weight that respondents in the control group assigns to their prior in forming their posterior expectations) is generally high, suggesting a high correlation between those two variables for the control group. This suggests that one-year inflation expectations are a good measure for a hypothetical prior five-year inflation expectation, which we do not directly observe. Table C1 also shows that, in general, consumers put a lower weight on their prior after the treatment, evidence that they are learning from the information treatment. We observe bigger updates for those with higher ex ante inflation expectations. In the case of the pooled regression (column 6), Treatment 1

has a significant effect when interacted with the prior. There is heterogeneity in the different waves, but, in general, we find negative coefficients, indicating that the treatment did cause respondents to revise down their prior.

Online Appendix D: Treatment Reading Times and Compliance

Figure D1: Treatment Reading Times (Pooled Across the July and September Surveys)

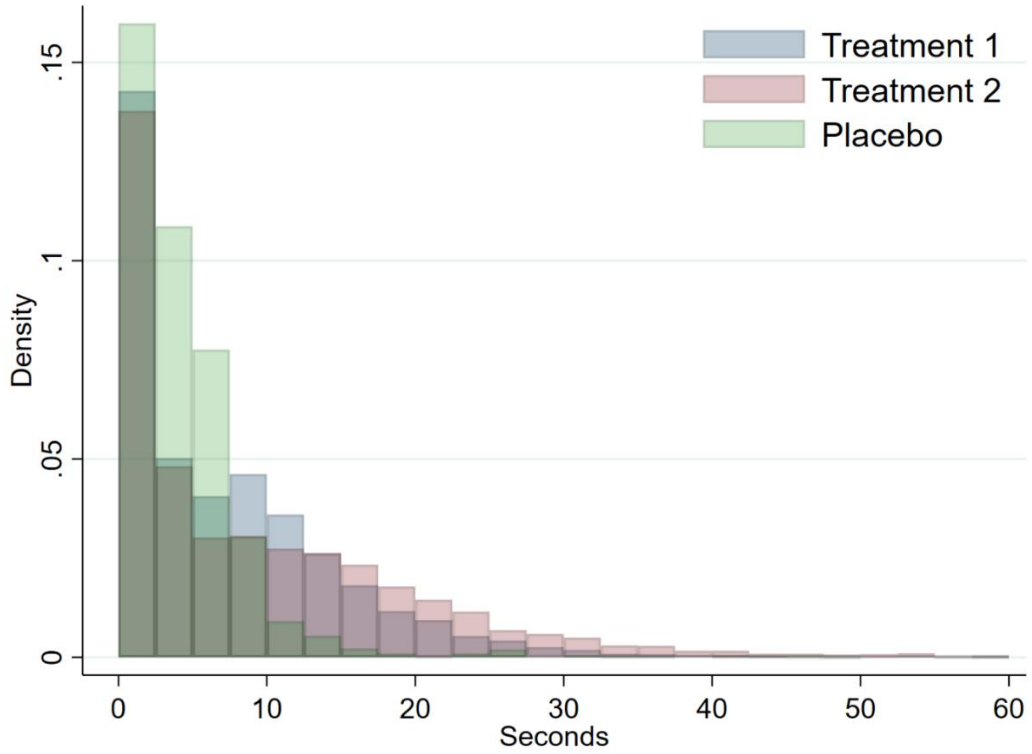
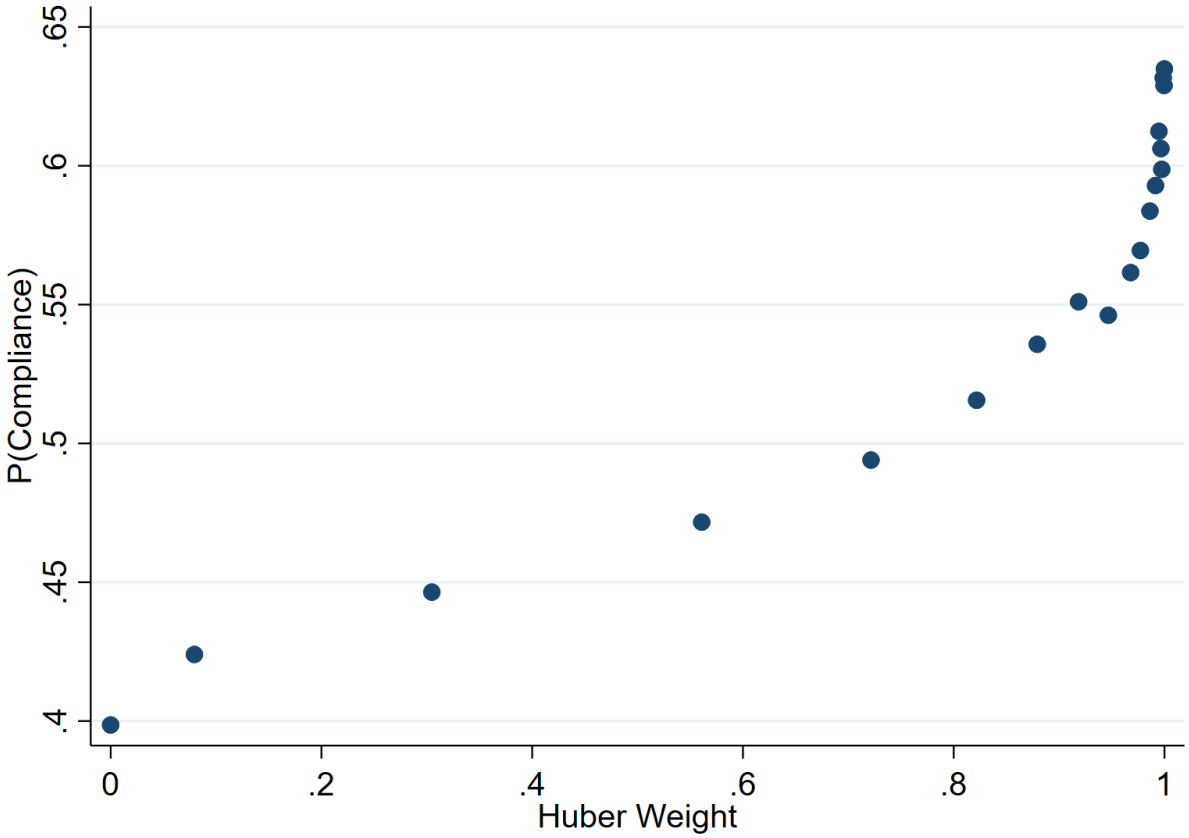
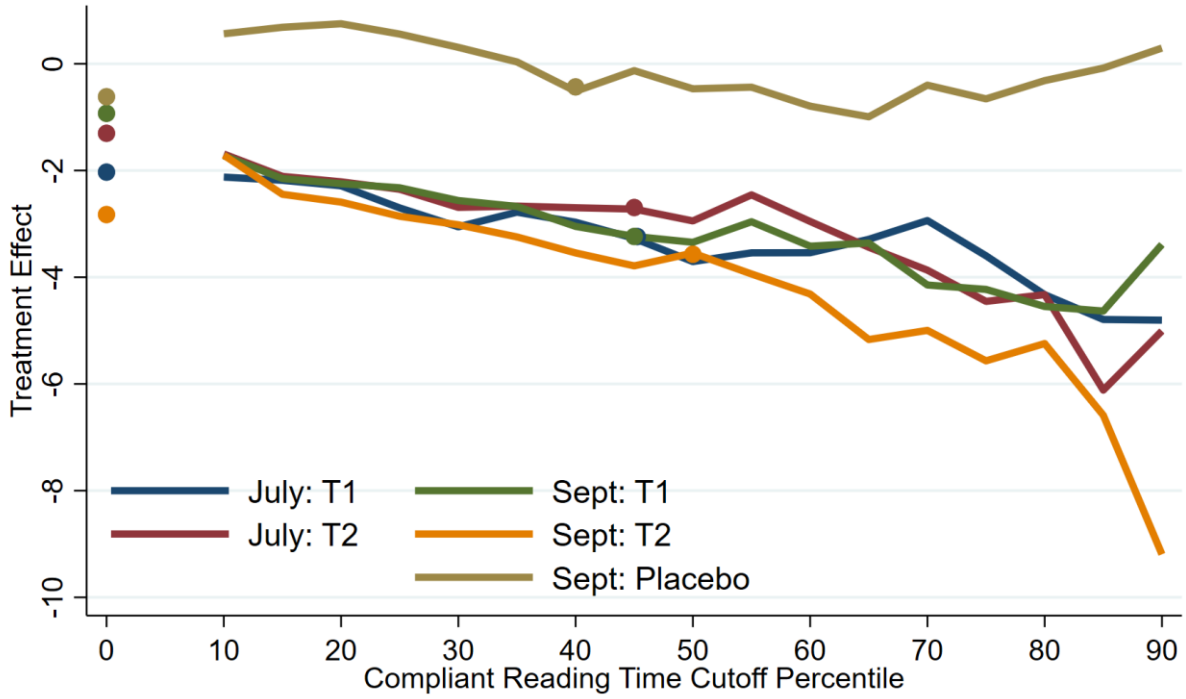


Figure D2: Compliance Probabilities vs. Huber Weights



Propensity scores and Huber weights estimated over the pooled July and September waves.

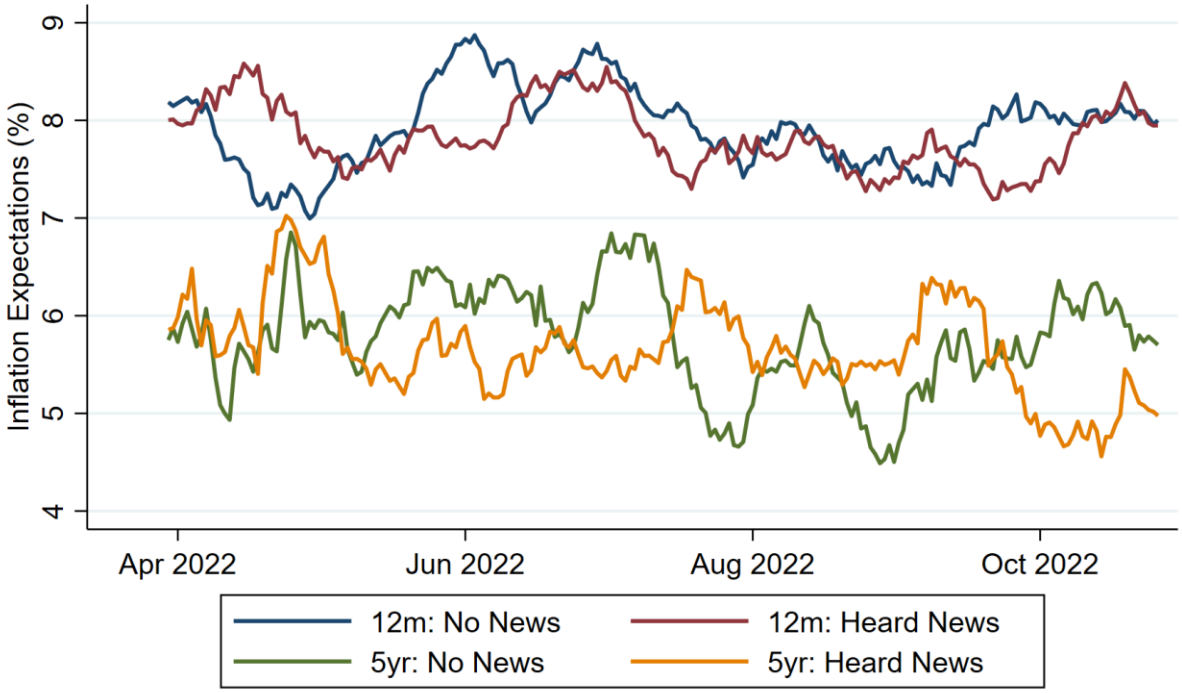
Figure D3: Treatment Effects on Compliant and Uninformed Respondents by Reading Time Percentile



Treatment effects on uninformed compliers estimated with propensity score weighted regressions.
Dots at zero on the x-axis are the compliance-unadjusted ATEs on the uninformed in Table 2.
Dots on the lines show the ATEs in Table 4 at their approximate cutoff point.

Online Appendix E: Inflation Expectations by Informedness and Informedness by Demographics

Figure E1: Inflation Expectations Based on Whether Consumers Had Heard News About Monetary Policy



Two week Huber-weighted moving average, winsorized at the top and bottom 2%.
Five-year expectations are for the control group only.
Sample ranges from March 17, 2022 to October 26, 2022.

Table E2: Probability of Having Heard News about Monetary Policy: Logit & Linear Probability Models

	(1)	(2)	(3)	(4)	(5)	(6)
Male	2.21***	2.21***	2.21***	0.17***	0.17***	0.17***
	(0.08)	(0.08)	(0.08)	(0.01)	(0.01)	(0.01)
Nonwhite	0.97	0.97	0.97	-0.01	-0.01	-0.01
	(0.05)	(0.05)	(0.05)	(0.01)	(0.01)	(0.01)
Hispanic	1.54***	1.55***	1.54***	0.09***	0.09***	0.09***
	(0.10)	(0.10)	(0.10)	(0.01)	(0.01)	(0.01)
Primary Shopper	1.71***	1.72***	1.75***	0.11***	0.11***	0.11***
	(0.11)	(0.11)	(0.11)	(0.01)	(0.01)	(0.01)
Numerical Literacy	1.09*	1.09*	1.09*	0.02*	0.02*	0.02*
	(0.05)	(0.05)	(0.05)	(0.01)	(0.01)	(0.01)
Age:						
36-50	0.66***	0.66***	0.66***	-0.08***	-0.08***	-0.08***
	(0.03)	(0.03)	(0.03)	(0.01)	(0.01)	(0.01)
51-65	0.84***	0.84***	0.84***	-0.04***	-0.04***	-0.04***
	(0.04)	(0.04)	(0.04)	(0.01)	(0.01)	(0.01)
66+	1.72***	1.72***	1.72***	0.12***	0.12***	0.12***
	(0.09)	(0.09)	(0.09)	(0.01)	(0.01)	(0.01)
Income:						
$35,000-$49,999	1.27***	1.27***	1.27***	0.05***	0.05***	0.05***
	(0.06)	(0.06)	(0.06)	(0.01)	(0.01)	(0.01)
$50,000-$99,999	1.42***	1.42***	1.43***	0.07***	0.07***	0.07***
	(0.06)	(0.06)	(0.06)	(0.01)	(0.01)	(0.01)
$100,000 or more	1.91***	1.91***	1.93***	0.14***	0.14***	0.14***
	(0.12)	(0.12)	(0.12)	(0.01)	(0.01)	(0.01)
Education:						
Some College	1.26***	1.26***	1.26***	0.05***	0.05***	0.05***
	(0.06)	(0.06)	(0.06)	(0.01)	(0.01)	(0.01)
Bachelor's Degree	2.14***	2.14***	2.16***	0.17***	0.17***	0.17***
	(0.11)	(0.11)	(0.11)	(0.01)	(0.01)	(0.01)
Advanced Degree	3.28***	3.27***	3.28***	0.26***	0.26***	0.26***
	(0.21)	(0.21)	(0.22)	(0.01)	(0.01)	(0.01)
Political Party:						
Democrat	1.34***	1.34***	1.34***	0.06***	0.06***	0.06***
	(0.06)	(0.06)	(0.06)	(0.01)	(0.01)	(0.01)
Republican	1.25***	1.25***	1.25***	0.04***	0.04***	0.04***
	(0.06)	(0.06)	(0.06)	(0.01)	(0.01)	(0.01)
Days Since FOMC			0.97***			-0.01***
			(0.01)			(0.00)
Days Since FOMC, Sq.			1.00***			0.00***
			(0.00)			(0.00)
Wave Fixed Effect	No	Yes	Yes	No	Yes	Yes
Observations	33780	33780	33780	33780	33780	33780

Columns 1-3 show results as odds ratios from a logit model, while columns 4-6 show results from OLS regression. Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Online Appendix F: Treatment Effects on Additional Variables

Table F1: Treatment Effects on GDP Expectations Via Propensity Score Weighted Regressions

	Compliers			Non-compliers		
	(1)	(2)	(3)	(4)	(5)	(6)
Heard News =	All	Yes	No	All	Yes	No
July						
Treatment 1	-0.04	0.82	-1.02	2.49*	0.44	3.65**
	(0.82)	(1.14)	(1.19)	(1.38)	(2.31)	(1.68)
Treatment 2	0.02	-0.92	0.45	3.50**	5.64**	1.71
	(0.84)	(1.14)	(1.24)	(1.40)	(2.30)	(1.76)
Observations	4674	1994	2680	4284	1833	2451
September						
Treatment 1	0.82	-0.40	1.44	1.24	-0.86	3.43
	(1.07)	(1.45)	(1.52)	(1.57)	(2.40)	(2.21)
Treatment 2	0.46	-2.79*	2.34	1.74	-0.27	3.84*
	(1.09)	(1.52)	(1.53)	(1.51)	(2.33)	(2.04)
Placebo	0.38	-2.11	1.95	0.68	-2.26	3.74
	(1.04)	(1.37)	(1.46)	(1.68)	(2.47)	(2.28)
Observations	4339	1900	2439	3982	1834	2148

The first-stage logit regressions are exactly as in Table 3. The dependent variable in the second-stage regressions is the post-treatment five-year average GDP growth expectation minus the pre-treatment year-ahead expectation, each winsorized at the 2nd and 98th percentiles. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table F2: Treatment Effects on Average Income Growth Via Propensity Score Weighted Regressions

	Compliers			Non-compliers		
	(1)	(2)	(3)	(4)	(5)	(6)
Heard News =	All	Yes	No	All	Yes	No
July						
Treatment 1	0.60	0.95	-0.29	2.20*	1.09	3.00*
	(0.78)	(1.11)	(1.12)	(1.29)	(2.19)	(1.62)
Treatment 2	-0.08	0.10	-0.75	3.06**	3.42	2.87*
	(0.76)	(1.01)	(1.17)	(1.34)	(2.23)	(1.70)
Observations	4674	1994	2680	4283	1833	2450
September						
Treatment 1	-0.70	-0.18	-1.52	-0.68	-0.44	-0.77
	(0.84)	(1.16)	(1.20)	(1.58)	(2.42)	(2.07)
Treatment 2	0.08	-1.73	0.79	-0.01	0.42	-0.30
	(0.99)	(1.50)	(1.29)	(1.54)	(2.30)	(2.10)
Placebo	-0.15	-2.05	0.93	-1.09	-2.10	0.08
	(0.90)	(1.30)	(1.24)	(1.70)	(2.58)	(2.24)
Observations	4339	1900	2439	3982	1834	2148

The first-stage logit regressions are exactly as in Table 3. The dependent variable in the second-stage regressions is the post-treatment five-year average income growth expectation minus the pre-treatment year-ahead expectation, each winsorized at the 2nd and 98th percentiles. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Online Appendix G: Treatment Effects Conditional on Interest Rate Priors

Table G1: Treatment Effects with Qualitative Prior Interest Rate Change Interaction

	Compliers			Non-compliers		
	(1)	(2)	(3)	(4)	(5)	(6)
Heard News =	All	Yes	No	All	Yes	No
Treatment 1	-2.84**	-2.27	-2.74**	0.69	-1.84	1.50
	(1.14)	(3.02)	(1.19)	(1.33)	(2.98)	(1.49)
Treatment 2	-3.63***	-4.36*	-3.28**	0.20	-3.69	1.38
	(1.22)	(2.56)	(1.37)	(1.38)	(3.35)	(1.52)
Placebo	0.82	1.05	1.02	-0.34	-11.27*	3.03
	(1.62)	(3.63)	(1.78)	(2.03)	(5.75)	(1.99)
Rates Changed	-1.78**	-3.47**	-0.88	2.67**	1.01	1.71
	(0.80)	(1.68)	(0.97)	(1.34)	(2.49)	(1.50)
Changed x Treatment 1	1.32	2.49	-0.77	-1.52	1.36	-2.69
	(1.26)	(3.10)	(1.47)	(1.82)	(3.43)	(2.19)
Changed x Treatment 2	1.75	3.35	0.35	-0.79	3.44	-2.52
	(1.34)	(2.66)	(1.60)	(1.83)	(3.73)	(2.26)
Changed x Placebo	-1.39	-0.73	-2.85	-0.88	9.55	-3.52
	(1.80)	(3.76)	(2.23)	(2.52)	(6.10)	(2.79)
Observations	9013	3894	5119	8266	3667	4599

Pooled across the July and September waves. Treatment effects estimated using the propensity score methodology described in Section 5. The "Rates changed" dummy =1 if respondents answered "Yes" to the question, "Thinking about the interest rates that people pay to borrow money, such as mortgage rates, would you say that those interest rates in general have changed recently?" and =0 if they answered "No" or "Not sure."
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table G2: Treatment Effects with Quantitative Prior Interest Rate Change Interaction

	Compliers			Non-compliers		
	(1)	(2)	(3)	(4)	(5)	(6)
Heard News =	All	Yes	No	All	Yes	No
Treatment 1	-2.42**	0.68	-3.08***	-0.25	-3.29	1.31
	(0.99)	(2.09)	(1.12)	(1.28)	(2.56)	(1.43)
Treatment 2	-3.09***	-1.73	-3.29***	-0.65	-4.14	1.09
	(1.05)	(1.87)	(1.23)	(1.32)	(2.82)	(1.43)
Placebo	1.02	3.59	0.51	-1.50	-9.86**	2.51
	(1.47)	(2.82)	(1.69)	(1.83)	(4.08)	(1.86)
Rates Up ≥ 1pp	-1.47**	-1.61	-0.93	0.92	-1.32	0.86
	(0.70)	(1.14)	(0.94)	(1.36)	(2.41)	(1.50)
Rates Up x Treatment 1	0.83	-0.76	-0.21	-0.09	3.68	-2.62
	(1.14)	(2.20)	(1.44)	(1.82)	(3.16)	(2.15)
Rates Up x Treatment 2	1.13	0.52	0.44	0.58	4.66	-2.06
	(1.19)	(2.00)	(1.53)	(1.86)	(3.32)	(2.24)
Rates Up x Placebo	-1.71	-3.73	-2.00	1.18	9.30**	-2.56
	(1.71)	(3.00)	(2.19)	(2.46)	(4.67)	(2.82)
Observations	9013	3894	5119	8266	3667	4599

Pooled across the July and September waves. Treatment effects estimated using the propensity score methodology described in Section 5. The "Rates Up ≥1 pp" dummy =1 if respondents said that general borrowing rates had recently increased by more than 1 percentage point for the question, "Thinking about the interest rates that people pay to borrow money, such as mortgage rates, how much would you say that interest rates in general have changed recently?" and =0 otherwise. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table G3: Qualitative Interest Rate Awareness by Heard Monetary Policy News

		Interest Rates Changed Recently			
		No	Not Sure	Yes	*Total*
Heard	No	23.3	29.5	47.2	100
News about	Yes	12.1	5.5	82.4	100
Monetary Policy	*Total*	18.5	19.2	62.3	100

Relative frequencies within each row. Values may not add to 100 due to rounding. The "Rates changed" variable ="Yes" if respondents answered "Yes" to the question, "Thinking about the interest rates that people pay to borrow money, such as mortgage rates, would you say that those interest rates in general have changed recently?" and reported a non-zero change in the follow-up question.

Table G4: Quantitative Interest Rate Awareness by Heard Monetary Policy News

		Rates Up ≥ 1 Percentage Point		
		No	Yes	*Total*
Heard	No	58.4	41.6	100
News about	Yes	30.2	69.8	100
Monetary Policy	*Total*	46.3	53.7	100

Relative frequencies within each row. Values may not add to 100 due to rounding. The "Rates Up ≥1 pp" dummy =1 if respondents said that general borrowing rates had recently increased by more than 1 percentage point for the question, "Thinking about the interest rates that people pay to borrow money, such as mortgage rates, how much would you say that interest rates in general have changed recently?" and =0 otherwise.

Table G5: Treatment Effect on Inflation Expectations

	Compliers			Non-compliers		
	July	Sept	Pooled	July	Sept	Pooled
Treatment 1	-3.35***	-3.16***	-3.28***	-0.53	1.95	0.50
	(0.98)	(1.08)	(0.72)	(1.54)	(1.66)	(1.10)
Treatment 2	-2.84***	-3.50***	-3.12***	-0.25	1.51	0.46
	(1.04)	(1.08)	(0.75)	(1.50)	(1.77)	(1.13)
Placebo		-0.37	-0.68		3.04*	1.72
		(1.15)	(1.10)		(1.68)	(1.45)
Heard News	-1.10	-0.13	-0.70	1.66	6.02***	3.77***
	(0.91)	(0.76)	(0.60)	(1.92)	(2.00)	(1.36)
Heard News x Treatment 1	3.62***	3.19**	3.46***	-0.76	-1.81	-1.33
	(1.31)	(1.58)	(0.99)	(2.50)	(2.75)	(1.85)
Heard News x Treatment 2	1.71	2.33	1.94*	0.59	-3.74	-1.53
	(1.32)	(1.63)	(1.02)	(2.55)	(2.84)	(1.84)
Heard News x Placebo		0.71	1.25		-7.70***	-5.41**
		(1.53)	(1.46)		(2.87)	(2.50)
Observations	4674	4339	9013	4284	3982	8266

Treatment effects estimated using the propensity score methodology described in Section 5. Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table G6: Treatment Effect on Inflation Expectations: Reading Time Interaction, Pooled

	All	Heard News	No News
Treatment 1	-1.21	0.23	-2.47**
	(0.93)	(1.54)	(1.12)
Treatment 2	0.30	0.16	0.57
	(0.93)	(1.36)	(1.26)
Treatment 3	-1.12	-0.92	-1.21
	(1.02)	(1.46)	(1.49)
Time x Treatment 1	-0.05	-0.01	-0.06
	(0.06)	(0.12)	(0.07)
Time x Treatment 2	-0.15***	-0.08	-0.22***
	(0.05)	(0.08)	(0.07)
Time x Treatment 3	0.16*	0.22*	0.09
	(0.08)	(0.12)	(0.13)
Observations	9013	3894	5119

Treatment effects estimated using the propensity score methodology described in Section 5. Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Online Appendix H: Main Survey Questions

Q1 Please enter your age: ____

Q3 Please indicate your gender.

- Male
- Female
- Other

Q48 What is the highest level of school you have completed, or the highest degree you have achieved?

- Less than high school
- High school diploma or equivalent
- Some college, no degree
- Bachelor's degree
- Master's degree
- Doctorate or professional degree

Q49 Please indicate the range of your yearly net disposable income.

- Less than $10,000
- $10,000 - $19,999
- $20,000 - $34,999
- $35,000 - $49,999
- $50,000 - $99,999
- $100,000 - $199,999
- More than $200,000

Q51 How would you identify your ethnicity? Please select all that apply.

- Asian/Asian American
- Black/African American
- White/Caucasian
- Other
- Prefer not to say

Q52 Do you consider yourself of Hispanic, Latino, or Spanish origin?

- Yes
- No

Q134.1 The next few questions are about economic output. Over the next 12 months, do you think that there will be an increase or decrease in GDP?

- Increase
- Decrease

Q134.2I *[If Q134.1 = Increase]* What do you expect the rate of increase in GDP to be over the next 12 months? Please give your best guess.

I expect the rate of increase to be ___ percent over the next 12 months.

Q134.2D *[If Q134.1 = Decrease]* What do you expect the rate of decrease to be over the next 12 months? Please give your best guess.

I expect the rate of decrease to be ___ percent over the next 12 months.

QA1.1 In your view, will the total income of all members of your household (including you), after taxes and deductions, increase or decrease over the next 12 months?

- Increase
- Decrease

QA1.2I *[If QA1.1 = Increase]* By how much do you expect total income for all members of your household to increase over the next 12 months? Please give your best guess.

Over the next 12 months, I expect total income of all members of my household to increase by ___ percent.

QA1.2D *[If QA1.1 = Decrease]* By how much do you expect total income for all members of your household to decrease over the next 12 months? Please give your best guess.

Over the next 12 months, I expect total income of all members of my household to decrease by ___ percent.

Q11.1 The next few questions are about inflation. Over the next 12 months, do you think that there will be inflation or deflation?

- Inflation
- Deflation (opposite of inflation)

Q11.2I *[If Q11.1 = Inflation]* What do you expect the rate of inflation to be over the next 12 months? Please give your best guess.

I expect the rate of inflation to be ___ percent over the next 12 months.

Q11.2D *[If Q11.1 = Deflation (opposite of inflation)]* What do you expect the rate of deflation to be over the next 12 months? Please give your best guess.

I expect the rate of deflation to be ___ percent over the next 12 months.

Q13 Now we would like you to think about what may happen to inflation over the next 12 months. We realize that this question may take a little more effort. In your view, what would you say is the percent change that, over the next 12 months…

the rate of inflation will be 12% or higher: __
the rate of inflation will be between 8% and 12% : __
the rate of inflation will be between 4% and 8% : __
the rate of inflation will be between 2% and 4% : __
the rate of inflation will be between 0% and 2% : __
the rate of deflation (opposite of inflation) will be between 0% and 2% : __
the rate of deflation (opposite of inflation) will be between 2% and 4% : __
the rate of deflation (opposite of inflation) will be between 4% and 8% __
the rate of deflation (opposite of inflation) will be between 8% and 12% : __
the rate of deflation (opposite of inflation) will be 12% or higher : __
Total : ___
[Respondent cannot continue until the displayed total = 100]

QI5 Are you the primary grocery shopper in your household?

- Yes
- No

QLO1a Thinking about the interest rates that people pay to borrow money, such as mortgage rates, would you say that those interest rates in general have changed recently?

- Yes
- No
- Not sure

QLO1b *[If QLO1a = Yes]* Thinking about the interest rates that people pay to borrow money, such as mortgage rates, how much would you say that interest rates in general have changed recently?

- Increased by more than 2 percentage points
- Increased between 1 and 2 percentage points
- Increased between 0 and 1 percentage points
- They are about the same
- Decreased between 0 and 1 percentage points
- Decreased between 1 and 2 percentage points
- Decreased by more than 2 percentage points

QJH3 Have you heard any news about monetary policy or the Federal Reserve in the last week?

- Yes
- No

Treatments

March Wave

TLO1 *[Control Group]* Please continue to the next page.

TLO2 *[Treatment 1]* On March 16, 2022, the Federal Open Market Committee (FOMC) raised its primary policy interest rate (the federal funds rate) by one-quarter percentage point, to a target range of 1/4 to 1/2 percent.

TLO3 *[Treatment 2]* On March 16, 2022, the Federal Open Market Committee (FOMC) raised its primary policy interest rate (the federal funds rate) by one-quarter percentage point, to a target range of 1/4 to 1/2 percent, as part of an effort to help bring inflation back down toward its objective.

TLO4 *[Treatment 3]* On March 16, 2022, the Federal Open Market Committee (FOMC) raised its primary policy interest rate (the federal funds rate) by one-quarter percentage point, to a target range of 1/4 to 1/2 percent. The FOMC said that, "with appropriate firming in the stance of monetary policy, the Committee expects inflation to return to its 2 percent objective and the labor market to remain strong."

TLO5 *[Treatment 4]* On March 16, 2022, the Federal Open Market Committee (FOMC) raised its primary policy interest rate (the federal funds rate) by one-quarter percentage point, to a target range of 1/4 to 1/2 percent, as part of an effort to help bring inflation back down toward its objective, and anticipated that ongoing increases in the target range will be appropriate.

May Wave

TLOv2.1 *[Control Group]* Please proceed to the next question.

TLOv2.2 *[Treatment 1]* On May 4, 2022, the Federal Open Market Committee (FOMC) raised its primary policy interest rate (the federal funds rate) by one-half percentage point, to a target range of 3/4 to 1 percent. The FOMC also said that it would begin to reduce the size of its balance sheet.

TLOv2.3 *[Treatment 2]* On May 4, 2022, the Federal Open Market Committee (FOMC) raised its primary policy interest rate (the federal funds rate) by one-half percentage point, to a target range of 3/4 to 1 percent, and anticipated that ongoing increases in the target range will be appropriate. The FOMC also said that it would begin to reduce the size of its balance sheet. These actions were part of an effort to help bring inflation back down toward its objective.

June Wave

TLOv2.1 *[Control Group]* Please proceed to the next question.

TLOv2.2 *[Treatment 1]* On June 15, 2022, the Federal Open Market Committee (FOMC) raised its primary policy interest rate (the federal funds rate) by three-quarters of a percentage point, to a target range of 1-1/2 to 1-3/4 percent. The FOMC also said that it would continue to reduce the size of its balance sheet.

TLOv2.3 *[Treatment 2]* On June 15, 2022, the Federal Open Market Committee (FOMC) raised its primary policy interest rate (the federal funds rate) by three-quarters of a percentage point, to a target range of 1-1/2 to 1-3/4 percent, and anticipated that ongoing increases in the target range will be appropriate. The FOMC also said that it would continue to reduce the size of its balance sheet. These actions were part of an effort to help bring inflation back down toward its objective.

July Wave

TLOv2.1 *[Control Group]* Please proceed to the next question.

TLOv2.2 *[Treatment 1]* On July 27, 2022, the Federal Open Market Committee (FOMC) raised its primary policy interest rate (the federal funds rate) by three-quarters of a percentage point, to a target range of 2-1/4 to 2-1/2 percent. The FOMC also said that it would continue to reduce the size of its balance sheet.

TLOv2.3 *[Treatment 2]* On July 27, 2022, the Federal Open Market Committee (FOMC) raised its primary policy interest rate (the federal funds rate) by three-quarters of a percentage point, to a target range of 2-1/4 to 2-1/2 percent, and anticipated that ongoing increases in the target range will be appropriate. The FOMC also said that it would continue to reduce the size of its balance sheet. These actions were part of an effort to help bring inflation back down toward its objective.

September Wave

TLOv4.1 *[Control Group]* Please proceed to the next question.

TLOv4.2 *[Treatment 1]* On September 21, 2022, the Federal Open Market Committee (FOMC) raised its primary policy interest rate (the federal funds rate) by three-quarters of a percentage point, to a target range of 3 to 3-1/4 percent. The FOMC also said that it would continue to reduce the size of its balance sheet.

TLOv4.3 *[Treatment 2]* On September 21, 2022, the Federal Open Market Committee (FOMC) raised its primary policy interest rate (the federal funds rate) by three-quarters of a percentage point, to a target range of 3 to 3-1/4 percent, and anticipated that ongoing increases in the target range will be appropriate. The FOMC also said that it would

continue to reduce the size of its balance sheet. Federal Reserve Chair Jerome Powell said, "The FOMC is strongly resolved to bring inflation down to 2 percent and we will keep at it until the job is done."

TLOv4.4 *[Placebo]* From 2015 to 2021, the population in the United States grew in a range of 3 to 3-1/4 percent.

QJH13 Over the next 5 years, do you think that there will be inflation or deflation on average?

- Inflation
- Deflation (opposite of inflation)

QJH13a *[If QJH13 = Inflation]* What do you expect the average annual rate of inflation to be over the next 5 years? Please give your best guess.

I expect the average annual rate of inflation to be __ percent per year over the next 5 years.

QJH13b *[If QJH13 = Deflation (opposite of inflation)]* What do you expect the average annual rate of deflation to be over the next 5 years? Please give your best guess.

I expect the average annual rate of deflation to be __ percent per year over the next 5 years.

QJH14 Over the next 5 years, do you think that there will be an increase or decrease in GDP on average?

- Increase
- Decrease

QJH14a *[If QJH14 = Increase]* What do you expect the average annual rate of increase in GDP will be over the next 5 years? Please give your best guess.

I expect the average annual rate of increase to be __ percent per year over the next 5 years.

QJH14b *[If QJH14 = Decrease]* What do you expect the average annual rate of decrease in GDP will be over the next 5 years? Please give your best guess.

I expect the average annual rate of decrease to be __ percent per year over the next 5 years.

QJH15 In your view, will the total income of all members of your household (including you), after taxes and deductions, increase or decrease over the next 5 years on average?

- Increase
- Decrease

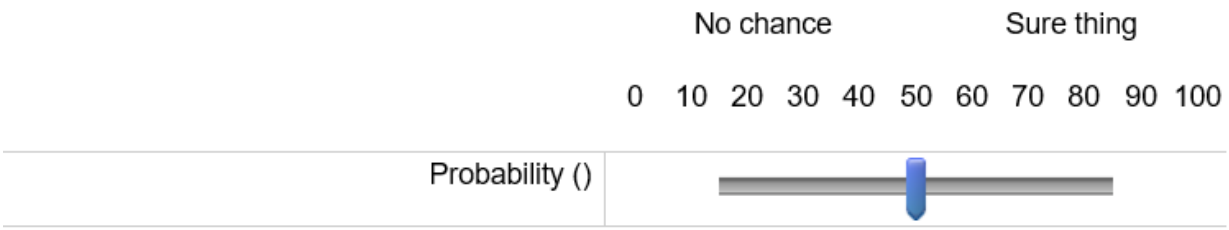
QJH15a *[If QJH15 = Increase]* What do you expect the average annual rate of increase in the total income of all members of your household will be over the next 5 years? Please give your best guess.

I expect the average annual rate of increase in the total income of all members of my household to be __ percent per year over the next 5 years.

QJH15b *[If QJH15 = Decrease]* What do you expect the average annual rate of decrease in GDP will be over the next 5 years? Please give your best guess.

I expect the average annual rate of decrease in the total income of all members of my household to be __ percent per year over the next 5 years.

QJH18a What do you think is the chance that inflation will be more than 4% in the next 12 months?



Q53. What is your civil status?

- Single
- Partner (not co-habiting)
- Partner (co-habiting)
- Married
- Divorced
- Widowed

Q121 What would you say is your political affiliation?

- Democrat
- Independent
- Republican
- Other

Q54 How many children do you have? ___

QX2 Imagine there are white and black balls in a ballot box. You draw a ball 70 times. 56 times, you have drawn a white ball, 14 times a black ball. Given this record, what would you say is the probability of drawing a black ball the next time?

The probability is ___ percent.