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What moves households' expectations during a crisis? Evidence from a randomized information experiment

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Non-technical summary

Research question

This paper examines whether households pay attention to macroeconomic conditions and economic policy announcements at the height of the coronavirus crisis. Large cyclical fluctuations and economic policy changes could increase the benefits of obtaining new information and updating expectations in such a crisis. This issue is of central importance, as a functioning expectation channel is particularly relevant for the effectiveness of economic policy measures in times of crisis.

Contribution

We use a representative household survey conducted at the beginning of the pandemic. The survey includes a randomised information experiment to examine whether households are aware of the difficult economic conditions and major economic policy measures. We determine households' expectations before and after the provision of information in order to investigate the causal effects of the information provided. We collect additional information on how households are exposed to the economic consequences of the pandemic. This experimental design allows us to provide causal evidence of what affects households' expectations during a crisis.

Results

Our experimental evidence suggests that households do not fully know what is happening in the economy shortly after the pandemic outbreak. Households become more pessimistic and uncertain about the economic outlook and intend to cut their consumption spending if they receive information on experts' assessment of the economy. Surprisingly, this also applies for households that receive information on key monetary and fiscal stimulus measures announced at the onset of the coronavirus crisis. This suggests that economic policy announcements provide bad news about the current economic situation that overshadow the potential positive effects of the announced measures. Households that are less exposed to and less informed about the economic consequences of the pandemic drive the estimated effects. This underlines that personal experiences receive a large weight in household expectation formation.

Nichttechnische Zusammenfassung

Forschungsfrage

Im vorliegenden Beitrag wird untersucht, ob die privaten Haushalte auf dem Höhepunkt der Corona-Krise den gesamtwirtschaftlichen Bedingungen und wirtschaftspolitischen Ankündigungen Aufmerksamkeit schenken. Große Konjunkturschwankungen und wirtschaftspolitische Veränderungen könnten die Vorteile erhöhen, die sich aus der Beschaffung neuer Informationen und der Aktualisierung der Erwartungen in einer solchen Krise ergeben. Diese Frage ist von zentraler Bedeutung, da ein funktionierender Erwartungskanal für die Wirksamkeit wirtschaftspolitischer Maßnahmen in Krisenzeiten besonders relevant ist.

Beitrag

Wir nutzen eine repräsentative Haushaltsbefragung, die zu Beginn der Pandemie durchgeführt wurde. Die Umfrage enthält ein randomisiertes Informationsexperiment, mit dem untersucht werden kann, ob private Haushalte sich der schwierigen wirtschaftlichen Bedingungen und der großen wirtschaftspolitischen Maßnahmen bewusst sind. Wir ermitteln die Erwartungen der privaten Haushalte vor und nach der Informationsbereitstellung, um die kausalen Auswirkungen der bereitgestellten Informationen zu untersuchen. Wir sammeln zusätzliche Informationen darüber, wie die privaten Haushalte den wirtschaftlichen Folgen der Pandemie ausgesetzt sind. Dieses experimentelle Design ermöglicht es uns, kausale Belege dafür zu liefern, was die Erwartungen der privaten Haushalte während einer Krise beeinflusst.

Ergebnisse

Unsere experimentelle Evidenz deutet darauf hin, dass die privaten Haushalte nicht vollständig wissen, was kurz nach dem Pandemieausbruch in der Wirtschaft geschieht. Die privaten Haushalte werden pessimistischer und unsicherer über die Konjunkturaussichten und beabsichtigen ihre Konsumausgaben zu senken, wenn sie Informationen über die Einschätzung der Wirtschaft von Experten erhalten. Überraschenderweise gilt dies auch für private Haushalte, die Informationen über wichtige geldpolitische und fiskalische Konjunkturmaßnahmen erhalten, die als Reaktion auf die Corona-Krise angekündigt wurden. Dies deutet darauf hin, dass wirtschaftspolitische Ankündigungen schlechte Nachrichten über die aktuelle Lage der Wirtschaft vermitteln und potentielle positive Effekte der angekündigten Maßnahmen überschatten. Die geschätzten Effekte werden von privaten Haushalten getrieben, die gegenüber den wirtschaftlichen Folgen der Pandemie weniger exponiert und diesbezüglich weniger informiert sind. Dies unterstreicht, dass persönliche Erfahrungen eine wichtige Rolle bei der Bildung von Erwartungen spielen.

What moves households' expectations during a crisis? Evidence from a randomized information experiment *

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November 27, 2024

Abstract

Using a randomized information experiment embedded in a representative survey, we study households' economic expectations at onset of the COVID-19 crisis. Our experimental evidence indicates that households are not fully aware of what is happening in the economy shortly after the pandemic outbreak. Households that receive information on experts' views on the economy become more pessimistic and uncertain about the economic outlook and less willing to consume. Surprisingly, this also holds for households that receive information on major monetary and fiscal stimulus measures announced in response to the COVID-19 crisis, suggesting that policy announcements convey bad news about the economy that overshadow the good news about the measures announced. The effects are driven by households who are less exposed to and less informed about the economic consequences of the pandemic, underscoring that personal experiences receive a large weight in household expectation formation.

JEL classification: D12, D83, D91, E58, G11

Keywords: household expectations, beliefs, information, policy announcements, randomized information experiment, COVID-19

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1 Introduction

How households form expectations is one of the most fundamental questions in macroeconomics. There is overwhelming evidence that households' expectation formation is not consistent with full information rational expectations as assumed in structural macroeconomic models (see, e.g., [Dräger and Lamla, 2024](#)). While households must regularly make decisions for which their economic expectations matter, surveys reveal that they are usually unaware of general economic conditions and how policy actions by the government and the central bank affect the economy (e.g., [Carvalho and Nechio, 2014](#); [Cavallo et al., 2017](#); [Coibion et al., 2018, 2022b](#)). This is not surprising, as people have limited capacity for processing information in everyday life. Thus, it may be rational for households to only sporadically pay attention to the economy (e.g., [Sims, 2003](#); [Reis, 2006](#); [Mankiw and Reis, 2006](#)), and to revise their beliefs and actions infrequently (e.g., [Alvarez et al., 2012](#); [Gabaix, 2019](#)). This may particularly be true in times when economic fluctuations and policy changes are small. In times of crisis, by contrast, large economic disruptions and policy interventions stand to increase the gains from acquiring new information and updating expectations. However, as of yet, there is only limited evidence on how households form expectations during a crisis.

In this paper, we present new experimental evidence on how macroeconomic developments and policy announcements affect household expectations during the global outbreak of COVID-19. We conduct a randomized information experiment embedded in a representative survey of German households, fielded by the Deutsche Bundesbank at an early stage of the pandemic in April 2020. The pandemic outbreak in March 2020 provides a unique backdrop to study how households form expectations because of the drastic revisions in the economic outlook and significant policy changes. Financial markets worldwide went into turmoil and growth forecasts were revised sharply downwards amid high uncertainty. In Germany, the stock market lost around 40% of its value within a month. On March 16, the Federal Government announced a partial lockdown with restrictions on public life, such as the closure of restaurants, schools and shops, and also announced massive fiscal support measures to protect the economy. Two days later, the European Central Bank (ECB) announced a large-scale Pandemic Emergency Purchase Programme (PEPP). The timing of our experiment gives participants sufficient time to learn about the economic consequences of the pandemic and to incorporate them in their beliefs about the economy and their personal prospects.

The randomized information experiment proceeds in three stages. First, we elicit respondents' macroeconomic expectations, as well as their beliefs and experiences regarding the coronavirus pandemic. Next, randomized groups of respondents receive different pieces of information as a treatment. The treatments inform respondents about the economic outlook according to experts, the macroeconomic uncertainty perceived by experts, or announcements by monetary or fiscal policymakers on actions taken in response to the pandemic. Finally, after the treatment, we re-elicite respondents' expectations and their willingness to consume certain items.

We obtain three main findings. First, we find that information on experts' views on the economy significantly affects households' expectations. Even before receiving this information, households

express a high level of pessimism and uncertainty about future economic activity and their personal economic outlook. However, households that receive information on experts' views on the economy significantly update their economic expectations and consumption plans. In particular, survey respondents who receive the information that experts predict a deep recession revise their expectations about one-year-ahead GDP growth and personal income growth significantly downwards. Uncertainty about these variables increases significantly for the same group of respondents. In addition, respondents who receive the information that there is a high degree of uncertainty in experts' economic forecasts report significantly lower GDP growth expectations and willingness to purchase big-ticket items, such as cars and durable goods. At the same time, when survey participants have to make more complex inferences concerning the stock market, house prices, the unemployment rate, and the inflation rate, we obtain small and statistically insignificant treatment effects.

Second, our results show that information on major monetary and fiscal stimulus measures announced in response to the COVID-19 crisis significantly affects households' expectations. Upon receiving announcements regarding the ECB's PEPP, the German government's fiscal stimulus measures, or assurances of comprehensive support for employees and firms by the government, survey participants become significantly *more* pessimistic and *more* uncertain about one-year-ahead GDP growth and they reduce their propensity to buy durables in the next 12 months. At the same time, information on policy announcements exerts minimal and statistically insignificant effects on households' expectations regarding the stock market, house prices, and the unemployment rate. Nevertheless, survey respondents that receive information on monetary or fiscal policy stimulus measures report significantly higher one-year-ahead inflation expectations in the next wave of the survey, fielded one month after the experiment.

Third, we find that differences in households' exposure to the economic consequences of the pandemic shape differences in their information sets and their expectation formation. About one half of the respondents in our sample report direct exposure through financial or income losses suffered due to the pandemic. Respondents who report to have suffered such losses have a relatively more pessimistic economic outlook *a priori*. In addition, they do not significantly revise their expectations after receiving information regarding the impending recession or heightened economic uncertainty. In contrast, those without personal losses markedly adjust their GDP growth expectations downward and lower their propensity to consume. In addition, the pronounced negative treatment effects of information on policy announcements are predominantly observed among households less exposed to the pandemic. We find comparable differences in household expectation formation depending on indirect exposure through the consumption of economic news about the pandemic. Post-treatment, the disparity in GDP growth expectations between those with high and low exposure to the pandemic's economic impact diminishes.

Our experimental evidence is consistent with theories of rational inattention, which imply that it is rational for individuals to acquire, absorb, and process information at infrequent intervals because of the associated costs (e.g., [Sims, 2003](#); [Reis, 2006](#); [Mankiw and Reis, 2006](#)). The information provided via the treatments serves as a "wake-up call", especially for households with less direct

or indirect exposure to the pandemic’s economic fallout. This corroborates existing evidence that individuals put a large weight on personal experiences when they form economic expectations (e.g., [Malmendier and Nagel, 2016](#); [Cavallo et al., 2017](#); [Kuchler and Zafar, 2019](#); [Malmendier et al., 2021](#); [Cato and Schmidt, 2023](#)). Crucially, our findings indicate that households are not fully aware of what is happening in the economy in the midst of a once-in-a-lifetime crisis event. This is an important insight for policymakers who rely on a functioning expectations channel during a crisis.

Our paper contributes to a growing literature that studies the expectation formation of households using survey experiments. Existing evidence shows that households are inattentive to general economic conditions and policy announcements, and that policy announcements can be an effective tool to steer households’ expectations (e.g., [Armantier et al., 2016](#); [Binder and Rodrigue, 2018](#); [Coibion et al., 2020](#); [Roth and Wohlfart, 2020](#); [Beutel et al., 2021](#); [Coibion et al., 2021, 2022b](#); [Andre et al., 2022](#); [Coibion et al., 2023](#)). Yet the existing evidence has largely been collected in tranquil periods, when it may be rational for households to only sporadically update their beliefs about the economy. Only a few papers use survey experiments to study the expectation formation of households during a crisis, such as the coronavirus pandemic. For instance, [Fetzer et al. \(2021\)](#) find a large dispersion in beliefs about the pandemic risk factors and demonstrate that these beliefs causally affect individuals’ economic anxieties. In addition, [Hanspal et al. \(2021\)](#) show that beliefs about the duration of the stock market recovery after the COVID-19 crash shape households’ expectations about their own wealth and their planned investment decisions and labor market activity. Moreover, [Bui et al. \(2023\)](#) document how information on beliefs about the government’s and the public’s reaction to the COVID-19 pandemic affects consumers’ macroeconomic expectations and sentiment.

Research exploring the impact of policy communication during the early stages of the COVID-19 crisis has revealed a general inattentiveness among households to the unfolding pandemic. For instance, [Binder \(2020\)](#) finds in a survey conducted in early March 2020 that only a minority of U.S. consumers are aware of the Federal Reserve’s decision to reduce the federal funds rate in response to the COVID-19 outbreak. Additionally, reactions to announcements of policy stimuli are notably subdued. [Binder \(2020\)](#) shows that only a subset of the U.S. consumers surveyed become more optimistic about future unemployment rates upon learning of the Fed’s rate cut. In a similar vein, [Coibion et al. \(2022a\)](#) identify only minor and largely insignificant responses to U.S. monetary and fiscal policy announcements at the onset of the pandemic. An exception are inflation expectations, which decrease following announcements of expansionary monetary policy ([Binder, 2020](#); [Coibion et al., 2022a](#)). Furthermore, fiscal and monetary policy announcements also have a limited effect on expected household income during the pandemic ([D’Acunto et al., 2020](#); [Goldfayn et al., 2020](#)).

There is no conclusive evidence yet as to why economic policy measures announced at the onset of the pandemic have been found to have only muted effects, especially considering the major policy changes announced. [Coibion et al. \(2022a\)](#) discuss potential explanations. They argue that households’ beliefs do not respond to the treatments either because i) they do not understand the transmission channel, ii) they expect the policies to have only little effect, or iii) the announcement of policy measures may disclose information about bad economic fundamentals, since large expan-

sionary policy measures are usually only announced when economic conditions are weak. Such an “information effect” of policy announcements has also been documented in various studies on monetary and fiscal policy (e.g., [Nakamura and Steinsson, 2018](#); [Cieslak and Schrimpf, 2019](#); [Jarociński and Karádi, 2020](#); [Miranda-Agrippino and Ricco, 2021](#); [Melosi et al., 2022](#)). According to this potential explanation, the estimated treatment effects can be viewed as a combination of a negative signal about the state of the economy and a positive signal about the policy actions, which cancel each other out. Other studies find experimental evidence that is consistent with the presence of such information effects of policy announcements on households’ expectations ([Binder, 2020](#); [Candia et al., 2020](#)).

The fact that we find highly significant *negative* effects of policy announcements on GDP growth expectations is not consistent with the first two potential mechanisms but fully consistent with the presence of information effects. An advantage of our paper is that it does not exclusively focus on policy announcements. By additionally incorporating experts’ opinions about the economic consequences of the pandemic as treatments, we can demonstrate that households are not fully informed about the gravity of the economic consequences of the pandemic. Thus, the policy announcements can plausibly provide a relevant signal about the state of the economy. Indeed, in our case, the negative signal about the state of the economy seems to dominate the positive signal about the policy action. Moreover, respondents who receive information about policy announcements revise their GDP growth expectations less strongly downwards than respondents treated with information about the economic outlook according to experts. This suggests that, net of the information effect, policy announcements may have a positive impact on households’ beliefs about economic growth.

The zero treatment effects for other macro aggregates, such as stock prices, house prices, or the unemployment rate, are not inconsistent with information effects of policy announcements. However, they are also consistent with other explanations. For instance, households might not understand the transmission mechanism due to cognitive constraints (e.g., [D’Acunto et al., 2023](#)), or they might have very heterogeneous transmission channels in mind (e.g., [Andre et al., 2022](#)). The increase in households’ inflation expectations in response to information on expansionary policy announcements is in line with economic theory but contrasts with previous experimental findings showing that households reduce their inflation expectations after an expansionary monetary policy announcement or shock (e.g., [Binder, 2020](#); [Coibion et al., 2022a](#); [Andre et al., 2022](#)). An important difference to these studies is that we treat households with information on an unconventional monetary policy action (an asset purchase programme), whereas the aforementioned studies inform households on a conventional policy action (i.e., a change in the federal funds rate).

The rest of the paper is organized as follows. Section 2 presents our experimental design. Section 3 presents the results. We describe households’ pre-treatment beliefs in section 3.1. Then, we discuss the average effects of the treatments on households’ expectations about the macroeconomy, their personal economic situation, and their consumption plans in section 3.2, followed by a more detailed heterogeneity analysis in section 3.3. Section 4 concludes.

2 Experimental design

This section lays out our experimental design. The randomized information experiment is implemented in the 4th wave of the Bundesbank’s Survey on Consumer Expectations, fielded between April 14 and 21, 2020. The experiment is based on two trials that share a subset of information treatments. One trial is featured in Goldfayn et al. (2020) and uses announcements by monetary and fiscal policymakers as treatments. We design the second trial, which additionally to policy announcements also uses treatments that contain information about the economic outlook according to experts and the macroeconomic uncertainty perceived by experts. How the latter two treatments affect household expectations provide a sensible benchmark for the treatment effects of the policy announcements. In addition, they help us to assess whether households understand the implications of the health crisis for economic outcomes, and they give us an insight into how expert judgments on the economy shape the macroeconomic beliefs of households.

In what follows, we first describe the representative household survey and present key sample characteristics. We then move on to provide a discussion of the randomized information experiment and some features of the experimental design.

2.1 Survey

The survey is administered by Forsa Institute for Social Research and Statistical Analysis (Forsa), and is fielded on the "forsa.Omninet" online panel. Panelists are recruited via phone and e-mail. Forsa incentivizes participation in the survey with bonus points from the internal reward system. These points can be collected and redeemed for various small items. The sample is balanced along four dimensions: age, gender, region, and education. Demographic characteristics are broadly representative of the German population. Additionally, Forsa provides sampling weights. We use these weights in our regressions to account for potential imbalances in the sample composition.

The questionnaire consists of an initial set of questions on households’ macroeconomic expectations and experiences with regard to the pandemic, followed by a randomized information treatment, and it concludes with a final set of questions to assess the effect of the information treatment on expectations and planned behavior.¹ A total of 2,034 individuals complete the survey. Additionally, we include selected results from the follow-up wave of the survey conducted in the next month, which approximately half the respondents from the April 2020 wave participate in again. This allows us to assess the persistence of the treatment effects on household expectations and to investigate additional dimensions such as inflation expectations, which we can not elicit in the same wave of the survey due to space constraints.

Table 1 (top panel) displays key demographic characteristics for the overall sample (column 1), after adjusting for population weights. The share of females in the sample is 51%, and the mean age is

¹A detailed description of the methodology can be found in Beckmann and Schmidt (2020). The full questionnaire is available at: <https://www.bundesbank.de/resource/blob/850006/2c4bfbcce120c34889fff10879fa16fc9/mL/questionnaire-04-data.pdf>.

	(1) Full Sample	(2) Plac.	(3) T-Rec.	(4) T-Unc.	(5) T-MP	(6) T-FP	(7) T-Subj.	(8) P-val.
Demographics								
Female (%)	0.51	0.44	0.52	0.52	0.55	0.50	0.53	0.48
Age (years)	46.97	47.83	46.02	44.94	46.74	47.83	48.48	0.20
East German (%)	0.14	0.13	0.14	0.11	0.20	0.14	0.16	0.12
HH with children (%)	0.25	0.26	0.20	0.24	0.28	0.27	0.22	0.38
College education or higher (%)	0.24	0.22	0.23	0.27	0.29	0.25	0.21	0.23
<i>Profession (%)</i>								
White-Collar	0.45	0.46	0.48	0.42	0.50	0.42	0.39	0.09*
Civil servants	0.06	0.05	0.05	0.08	0.05	0.07	0.05	0.81
Other	0.13	0.12	0.12	0.12	0.12	0.16	0.12	0.97
Retiree	0.26	0.25	0.24	0.24	0.22	0.30	0.30	0.16
Homeowner (%)	0.60	0.63	0.57	0.59	0.61	0.57	0.59	0.47
High income (%)	0.20	0.20	0.23	0.21	0.21	0.18	0.20	0.99
Non-health exposure to COVID-19								
Corona-induced losses	0.42	0.38	0.44	0.41	0.49	0.40	0.40	0.16
Liquidity/credit constraints (%)	0.15	0.11	0.16	0.15	0.18	0.14	0.14	0.13
<i>Follows the news</i>								
daily life	1.51	1.44	1.48	1.58	1.44	1.56	1.54	0.06*
economic	1.98	1.94	1.94	2.07	1.97	1.95	1.99	0.56
financial	2.42	2.41	2.42	2.44	2.43	2.37	2.48	0.86
monetary policy	2.54	2.44	2.56	2.49	2.55	2.56	2.63	0.20
fiscal policy	1.96	1.89	1.97	2.02	1.97	1.93	1.99	0.20
N	2031	340	336	334	345	340	336	

Table 1: Sample characteristics

Note: This table reports socio-demographic sample characteristics and characteristics that reflect non-health exposure to the COVID-19 pandemic for the overall sample (column 1) and for the randomized sub-samples (columns 2-7) which will be introduced in section 2.2. Column 8 displays the p-values of a one-sided ANOVA test of equality across all subsamples. *East German* captures the share of respondents being born in East Germany before 1989. *High income* is defined as the share of respondents with a monthly net personal income $\geq \text{€}4000$ or monthly net total household income $\geq \text{€}5000$. *Corona-induced losses* indicate if respondents have already incurred financial or income losses due to the pandemic, *Liquidity/credit constraints* describe household who anticipate difficulties covering their current expenditure over the next 3 months. *Follows the news* is a series of measures on news attentiveness, where 1 represents a high level of attentiveness and 4 no attentiveness to news. Sample means are estimated using sample weights. * indicate significance at a 90%, ** at a 95% and *** at a 99% level of confidence.

47 years. 14% of respondents were born in former East Germany, 24% of them have at least one child, and 25% have a college degree. 45% of respondents report to be white-collar workers and roughly a quarter of the sample consists of retirees. 13% work in other professions, i.e., as blue-collar workers or government employees, or they are self-employed. Around a fifth of the surveyed households fall into the high-income group (monthly net personal income $\geq \text{€}4000$ or monthly net total household income $\geq \text{€}5000$).

Table 1 (bottom panel) reports household characteristics that reflect non-health exposure to the COVID-19 pandemic. 42% of the respondents report that they have incurred financial or income losses due to the pandemic. In addition, 15% of respondents anticipate pandemic-induced difficulties in covering their current expenditure over the next 3 months, indicating that a non-negligible share of households expects liquidity or credit constraints in the near future. Besides economic exposure, we also elicit attention to news on how the pandemic impacts everyday life, economic growth, and the

financial markets, as well as news on monetary policy measures of the ECB and fiscal policy measures of the German federal government. We elicit attention to news on an ordinal scale between 1-4 (1 = “very closely”; 2 = “closely”; 3 = “in passing”; and 4 = “not at all”). The highest degree of attention is overall put on general pandemic-related news, followed by news about the economic impact and fiscal measures in response to the pandemic. Households follow news on financial markets and the ECB’s policy measures relatively less closely.

2.2 Randomized information experiment

The experimental setup consists of three stages. At the beginning, we elicit respondents’ prior beliefs about pandemic-induced restrictions on daily life, as well as their expectations about GDP growth, inflation, house price growth, stock market returns, and personal income growth over the next 12 months. Then, randomized groups receive different pieces of information as a treatment, discussed in detail below. Finally, we elicit respondents’ post-treatment expectations about GDP growth, house price growth, stock market returns, and personal income growth. In addition, we ask respondents about their readiness to purchase big-ticket items, such as real estate, cars, or other durable goods (e.g., refrigerators or furniture), and we ask them about their employment status and their assessment of how likely they are to lose their job over the next 12 months. We winsorize the variables of interest at the top and bottom two percent of their distribution, mitigating the impact of potential outliers on the survey responses.

We assign survey respondents randomly to one of six groups. Each group receives an information treatment that contains publicly available information. All the provided information is factually correct, as required by professional standards. In particular, we provide respondents with information broadly covered in German media from mid-March 2020 onward.

The first two treatments contain information on the economic outlook according to experts. The first treatment (labelled as *T-Rec.*) contains the following information about the pandemic’s likely consequences for economic growth based on an assessment of experts:

“Now we would like to show you a summary of the possible economic consequences of the coronavirus pandemic. We are experiencing the first truly global economic crisis since the Great Depression of 1929. The financial crisis of 2008-09 also hit the industrialised countries in particular. Many emerging market economies collapsed for a short time, but recovered quickly. The coronavirus pandemic, however, is directly affecting the real economy. According to experts, there will be a deep recession.”²

The second treatment (labelled as *T-Unc.*) informs survey respondents that experts are highly uncertain about the economic consequences of the pandemic. It reads as follows:

²This treatment is based on the interview with Kenneth Rogoff in the German newspaper *Capital* on March 17, 2020.

“Now we would like to show you a summary of the possible economic consequences of the coronavirus pandemic. There is a high degree of uncertainty about the economic consequences of the coronavirus pandemic. The exact outcomes will depend on how the virus spreads and how quickly the implications for health and for the economy can be successfully contained. Expert opinions on this subject differ greatly.”³

Three treatment groups receive information on the announcements of policy measures taken in response to the COVID-19 pandemic. The third treatment (labelled as *T-MP*) contains the following piece of objective information about a monetary policy announcement on the introduction of the PEPP by the ECB in the wake of the pandemic:

“The European Central Bank (ECB) is responsible for monetary policy throughout the euro area, including Germany. Now we would like to show you a summary of the monetary policy measures initiated by the ECB with regard to the coronavirus pandemic. On 19 March 2020, the ECB launched the pandemic emergency purchase programme (PEPP) with a total volume of 750 billion euros, which is valid until the end of the year. It is available to all countries and will remain in force until the ECB considers the coronavirus pandemic to have ended.”⁴

The fourth treatment (labelled as *T-FP*) contains the following piece of information about the announcement of the German federal government’s fiscal policy program introduced at the beginning of the pandemic:

“Now we would like to show you a summary of the measures taken by the Federal Government to combat the economic impact of the coronavirus pandemic. The Federal Government has launched an assistance package for employees, self-employed persons and enterprises. The package totals 750 billion euros. 600 billion euros in assistance funds will be provided to enterprises. 400 billion euros of this is envisaged to take the form of guarantees.”

While the third and fourth groups receive information on actual policy measures that were designed to counter the pandemic, the fifth treatment (labelled as *T-Subj.*) contains an informal statement by a top German government official, stating that the federal government will do everything in its power to cushion the blow of COVID-19 on German businesses, which is, however, not linked to any objective change in policy:

³Based on the Special Report 2020 of the German Council of Economic Experts published on March 22, 2020: <https://www.sachverstaendigenrat-wirtschaft.de/en/special-report-2020.html>.

⁴See the ECB press release on March 18, 2020: https://www.ecb.europa.eu/press/pr/date/2020/html/ecb.pr200318_1~3949d6f266.en.html.

“Now we would like to show you a statement made by a member of the Federal Government on the measures taken to combat the economic impact of the coronavirus pandemic. ‘We have the financial strength to cope with this crisis. There is enough money available and we are putting it to good use. We will take all the measures necessary to protect employees and enterprises. Everyone can be sure of that.’ ”⁵

Finally, the sixth group acts as the control group. Respondents in this group receive a “placebo” treatment (labelled as *Placebo*), which contains the following excerpt from a press release by the European Commission concerning its new action plan on human rights and democracy:

“Now we would like to show you a summary of the measures the European Commission has implemented to promote human rights and democracy. The European Commission has set out priorities and next steps to be taken in the area of human rights and democracy, and has passed the EU Action Plan on Human Rights and Democracy for the period 2020-2024. The aim of this plan is to enable decisions on matters of human rights and democracy to be made more quickly and effectively.”⁶

Columns 2-7 of Table 1 display information on demographic characteristics and non-health exposure to COVID-19 for each randomized group. Overall, the sample characteristics are broadly similar across the groups. To formally check whether the randomization yields comparable sub-samples, we employ a one-sided ANOVA test and present the corresponding *p*-values in column 8. The *p*-values indicate mostly insignificant differences between subgroups. Marginal differences exist in the percentage of white-collar workers and in the extent to which COVID-related news are followed, which are significant at the 10 percent level. Table A.1 in the appendix shows that the expectations prior to the treatment are also comparable across subgroups. To account for any remaining imbalances in the sample composition, we include socio-demographic control variables and controls for differences in prior beliefs in our preferred regression specifications. Our main results remain robust to specifications without including additional covariates.

2.3 Discussion of experimental design

Randomized information experiments are generally prone to biases from “anchoring” (Tversky and Kahneman, 1974) and “experimenter demand effects” (Crowne and Marlowe, 1964; De Quidt et al., 2018). Providing a numerical anchor to respondents as an information treatment, such as a decrease in future GDP growth of a certain percentage, can significantly influence survey responses (see Furnham

⁵See the announcement by Olaf Scholz, Vice Chancellor and Minister of Finance of Germany, on March 13, 2020: https://www.bundesfinanzministerium.de/Content/DE/Pressemitteilungen/Finanzpolitik/2020/03/2020-03-13-Corona_1.html.

⁶See the European Commission’s press release on March 25, 2020: https://ec.europa.eu/commission/presscorner/detail/en/ip_20_492.

and Boo, 2011). To guard against anchoring, we instead rely on qualitative information treatments. In addition, experimenter demand effects – i.e., the tendency of survey participants to try to please the experimenter and behave in line with her hypothesis – are unlikely to drive our results for at least four reasons. First and foremost, we find small or significantly negative treatment effects of policy announcements on respondents’ beliefs, which runs counter to our research hypothesis. Second, the treatments have some persistent effects on the beliefs of survey participants even one month after the experiment, which is unlikely to be caused by experimenter demand. Third, respondents update their beliefs heterogeneously depending on personal experience and socio-demographic characteristics, which also speaks against experimenter demand. Finally, evidence shows that experimenter demand effects are generally small or absent (De Quidt et al., 2018; Mummolo and Peterson, 2019) and do not affect the qualitative conclusions from a study (De Quidt et al., 2019).

An important design feature of our study is the use of a placebo treatment. The placebo treatment serves as an additional guardrail against potential experimenter demand effects and spurious learning (e.g., Coibion et al., 2022b). The placebo treatment’s content is on purpose neutral and avoids any influence on participants’ expectations or consumption decisions. The necessity to maintain a large sample size in each treatment group precludes the inclusion of a pure control group that receives no information. Therefore, we compare the effects of our information treatments with those obtained for the placebo group, which is a standard comparison in clinical research (see, e.g., Hohenschurz-Schmidt et al., 2023).

In our information treatments, participants receive summaries of articles or official press releases. Our aim is to evaluate and contrast the efficacy of various policy interventions. We condense the news articles into brief summaries, ensuring that each is presented in a consistent text format of similar length and complexity for comparability. Hence, we abstract from other factors that have been shown to influence the effectiveness of policy communication, as discussed by, e.g., Coibion et al. (2022c).

To mitigate the risk of survey fatigue and its potential impact on the results, we employ varied question formats in the pre-treatment and post-treatment phases. For example, we ask respondents for their point estimate of the future level of the DAX before the treatment, while we ask them about the distribution of the expected return of a 10,000 euro investment in the stock market after the treatment. By obtaining answers to both questions from the placebo group, we can account for the fraction in the variation of outcome variables that are not caused by the information treatments. Thus, respondents in the placebo group may still revise their answers for reasons unrelated to the information provided. For instance, they may have thought about the question more carefully or may have made an error when filling out the survey the first time, which induces variation unrelated to the placebo treatment itself. We assume that such variations are random and, as such, they should not systematically skew the findings of our study.

3 Results

This section reports our empirical results. First, we describe households’ baseline beliefs prior to the treatment. Then, we investigate how the information treatments affect households’ expectations about the economy and their personal situation, as well as their consumption plans on average. We then explore if there exist systematic differences in households’ reactions to the treatments.

3.1 Baseline beliefs

Table 2 reports households’ baseline beliefs elicited before the treatment stage of the experiment. Survey respondents provide information on their baseline beliefs about pandemic-related restrictions; the economic outlook in terms of GDP growth, the unemployment rate, and the inflation rate; the housing and stock market; and their personal income growth over the next 12 months. Qualitative variables are elicited on an ordinal 5-point scale (1 = “decrease significantly”; 2 = “decrease somewhat”; 3 = “roughly stay the same”; 4 = “increase somewhat”; and 5 = “increase significantly”). Quantitative estimates are elicited as point estimates based on survey participants’ best guess, or as density estimates based on participants attributing probabilities to a set of mutually exclusive scenarios. We calculate the mean based on these probabilistic estimates by using the midpoint of each interval and weighting it with the assigned probabilities of each respondent. While more appealing from a theoretical standpoint, eliciting density estimates comes at the cost of lower item response rates.

Concerning the impact of the pandemic on people’s daily lives, we ask households how long they expect pandemic-related restrictions on public life to be in place. On average, the “lockdown” is expected to last nearly 200 days, with a relatively high standard deviation of around 125 days. This represents a high level of disagreement regarding the length of lockdown restrictions.

Concerning the macroeconomic outlook, the median household expects GDP to “decrease significantly” and the aggregate unemployment rate to “increase significantly”. To further qualify the severity of the expected decrease in GDP growth, we additionally take households’ density estimates for GDP growth in the post-treatment stage (placebo group only) into account. The mean (median) expected GDP growth over the next 12 months is -1.72 (-2.50) percent, which suggests that respondents expect a recession of moderate severity. The relatively large standard deviation of 5.47 percent reflects a substantial degree of disagreement about future GDP growth among households. Prior to receiving information about experts’ views on the economy, households are thus already pessimistic and uncertain about the economic outlook, which is consistent with existing evidence on the impact of the pandemic on households’ economic expectations (see, e.g. [Dietrich et al., 2022](#); [Goldfayn et al., 2020](#)). In addition, qualitatively, the median household expects the inflation rate to “increase somewhat”. Quantitatively, survey participants provide a point prediction of 5.16 percent for the expected inflation rate, with a relatively large standard deviation of nearly 7 percent. When eliciting the expected inflation density, the standard deviation almost halves to 3.60 percent, and the mean (median) forecast in this setting is 2.78 (2.50) percent. The differences likely reflect measurement errors in

	Mean	Median	SD	Answers	Response rate (%)
Pandemic related destrictions					
Duration (days)	193	180	125	2009	99.8
GDP					
Qualitative	1.71	1	1.01	2032	99.9
Quantitative (post)*	-1.72	-2.50	5.43	319	93.5
Unemployment					
Qualitative	4.28	5	1.00	2034	100
Inflation					
Qualitative	3.83	4	97.7	2027	99.7
Quantitative					
point estimate	5.26	3	7.10	1951	95.92
density estimate	2.79	2.5	3.63	1840	90.46
House price growth					
Qualitative	3.04	3	1.05	2030	99.8
Quantitative					
point estimate	2.36	0	9.38	1979	97.3
density estimate	3.33	3.8	5.32	1411	69.4
Stock market return					
Quantitative					
point estimate	3.84	3.91	17.48	1612	79.3
Income growth					
Quantitative (density)					
in EUR	-32.4	75.0	579	1925	94.6
% of household income	-0.44	1.79	25.1	1852	91.1

Table 2: Prior beliefs

Note: This table reports respondents' prior expectations about GDP growth, inflation, house price growth, stock market returns, personal income growth, and unemployment. An exemption is the quantitative estimate of GDP growth (indicated with a *), which represents the expected GDP growth in the Placebo group. Qualitative expectations are measured on an ordinal 5-point-scale. Mean, median, and standard deviations are estimated with the provided sampling weights.

beliefs.

We also elicit households beliefs about house price growth and stock market returns. The median household expects house prices to stay approximately the same. In the years before the pandemic, German house prices rose at a high pace of between around 5 to 8 percent, on average.⁷ Respondents expect this trend to slow down substantially. The stock market is expected to grow by around 4% over the next 12 months.⁸

At the personal level, we ask survey respondents by how much they expect their household income to change. On average, households expect a slight decrease in household income (37 €) over the next 12 months, which is approximately 0.68% of the monthly household income. The distribution in income growth is tilted to the right. A few households expect larger decreases while a larger share of households expects modest income growth.

Overall, there is substantial disagreement between households regarding their expectations about the economy and their personal income growth. One potential source of this disagreement could stem from differences in the information sets of households about the current state of the economy (e.g., Reis, 2006; Coibion and Gorodnichenko, 2012). Such differences may arise from different experiences that are collected either personally (first-hand experiences) or indirectly (second-hand experiences), for example, through conversations with friends and family or more generally through consumption of news media.

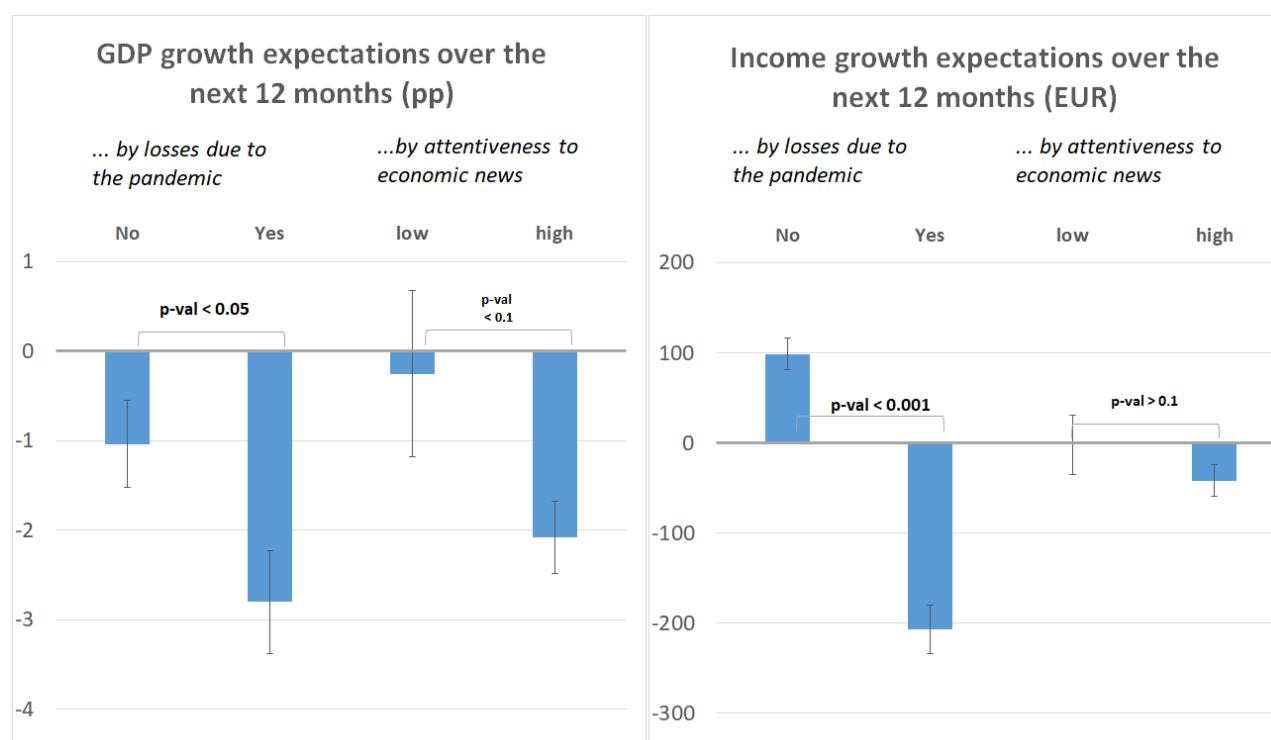
We derive three measures capturing households' personal experiences with the pandemic's economic consequences. First, households report whether they have already incurred financial losses, income losses, or no losses due to the pandemic. We construct a binary indicator, *Covid-induced losses*, which differentiates between households that have not incurred any losses and households that have incurred income or financial losses due to the pandemic. Second, households report whether they currently have or anticipate difficulties in covering their current expenditure within the next three months. We aggregate some categories and derive another binary indicator, *Credit constraint 3m*, which indicates whether households anticipate financial difficulties over the next three months. In addition, to measure second-hand experiences, we derive a binary indicator regarding respondents' attentiveness to pandemic-related news concerning the economy on an ordinal 4-point scale from "very closely" to "not at all", as discussed before (see Table 1), grouping categories 1 and 2 (=attentive) and 3 and 4 (=not attentive). We use these three indicators to split the sample into survey respondents relatively more vs. less exposed to the pandemic.

Figure 1 highlights that alternating experiences correlate with significant differences in the macro outlook (GDP growth) and personal outlook (income growth). Households with lower direct or indirect exposure to the economic consequences of the pandemic are more optimistic about the overall

⁷See: <https://www.bundesbank.de/resource/blob/848902/70ad436f0a1969ace8cc5a5c73b2611f/mL/2020-10-preisaufschwung-wohnmobililien-data.pdf>.

⁸We elicit respondents' expectations about the future stock market performance in a level frame. In the question, we provide households with the current level of the DAX and then ask them to state their expected future level of the DAX in 12 months. Besides their best guess, respondents provide additional estimates for a worst and best case stock market scenario.

Figure 1: Heterogeneity in expectations - Experiences



Note: Bars show the mean of GDP growth expectations on the left and income growth expectations on the right. Each chart shows expectations by two binary indicators, losses due to pandemic and attentiveness to economic news. The black error bars represent standard errors of the estimated means. p-values show the level of significance that means of the subgroups are significantly different from each other.

economy as well as their personal income. For instance, while respondents who have not incurred losses expect GDP growth to decline on average by around 1 pp, those who have incurred personal losses expect GDP growth to shrink by 2.8 pp. We find the differences between the two subgroups to be statistically different ($p < 0.05$). A similar picture emerges when we look at the sample split along attentiveness to economic news or when we look at differences regarding income growth.⁹ At the same time, we observe no substantial differences in their expectations about the inflation rate, the stock market or house prices (see Table A.2 in the Appendix).

This preliminary analysis provides a first indication that households' expectations respond to the pandemic and generally turn more pessimistic. This holds particularly for those households that have been more exposed to the economic consequences of the pandemic through first-hand or second-hand experiences. Yet on average, GDP expectations of households appear more optimistic than comparable forecasts of economic experts.¹⁰

⁹An exception is the split of income growth expectations by news attentiveness. While the qualitative pattern holds, we cannot find significant differences in income growth expectations between these two subgroups.

¹⁰GDP growth projections in the April 2020 IMF World Economic Outlook indicate a decline of around -7 percent in 2020, followed by a sharp recovery in the following year. Quarterly forecasts by Consensus Economics published in June 2020 average at a GDP growth decline of around -6.2 percent from 2020Q2 to 2021Q1.

3.2 Average treatment effects

In this section, we investigate how the information treatments affect households' beliefs. At the macroeconomic level, we study the causal effects of the treatments on households' expectations about future GDP growth, the unemployment rate, inflation, house price growth, and stock market returns. After that, we investigate the effects of information treatments on micro-level outcomes, including expectations about changes in personal income, beliefs about the probability of losing one's job, and household consumption plans.

3.2.1 Econometric approach

In general, we measure households' expectations at two points in time, prior to and after the treatment. We elicit the posterior expectations either immediately after the treatment (beliefs about stock market, house prices) or in the follow-up wave one month after (inflation, unemployment). We rely on the following difference-in-differences regression framework to estimate treatment effects, which is common in the literature (see, e.g., [Coibion et al., 2022a](#)):

$$E_i^{post}[X] - E_i^{prior}[X] = c + \sum_{s=1}^S \beta_s T_{s,i} + \theta' \mathbf{Z}_i + u_i, \quad (1)$$

where $E_i^{post}[X]$ denotes the post-treatment expectation X of respondent i , and $E_i^{prior}[X]$ the corresponding pre-treatment expectation. $T_{s,i}$ is an indicator variable that is equal to one if respondent i receives treatment s and zero otherwise. The vector $\mathbf{Z}_i$ contains a set of control variables capturing socio-demographic characteristics, non-health exposure to the COVID-19 pandemic, and a vector of qualitative and quantitative expectation measures elicited prior to the experiment. Finally, u_i is an i.i.d. error term ($u \sim N(0, \sigma^2)$). The coefficients β_s capture the average treatment effects (ATEs) as the difference between the conditional changes in expectation j in treatment group s relative to the changes in the placebo group.

Given space constraints in the survey, we obtain measurement of a few outcome variables after the treatment and thus do not elicit a corresponding measurement prior to the treatment. In these instances, we rely on the following regression framework, in which we identify treatment effects as the difference between the conditional mean expectation of measure X between the treatment group s and the placebo group:

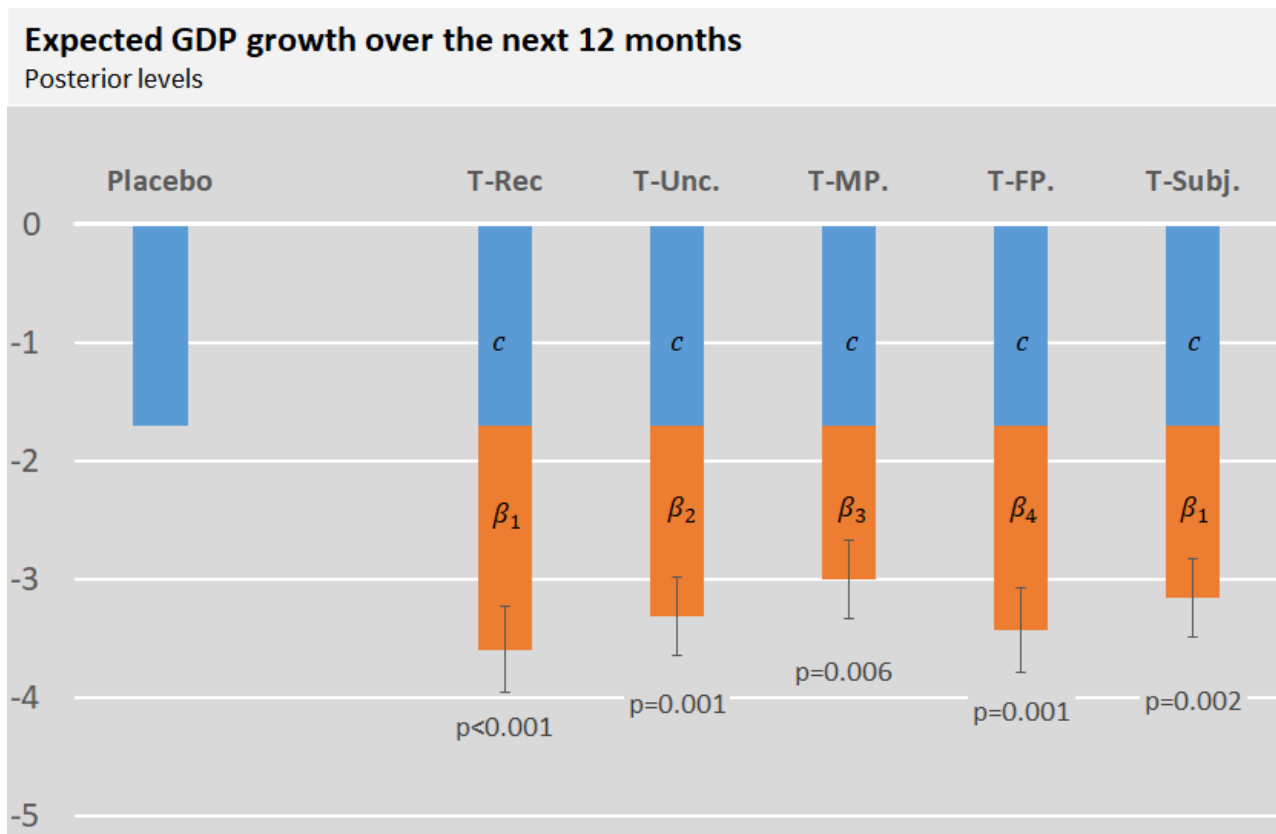
$$E_i^{post}[X] = c + \sum_{s=1}^S \beta_s T_{s,i} + \theta' \mathbf{Z}_i + u_i, \quad (2)$$

3.2.2 Effects on expectations at the macro level

GDP growth We first examine the treatment effects on expected GDP growth. The quantitative measure of GDP growth expectations is only elicited after the treatment, therefore, we estimate the treatment effects using Equation (2). Table 3 (column 1) shows the OLS estimates of the ATEs. In addition, Figure 2 graphically illustrates the estimation results by showing the posterior expectations

about future GDP growth in the placebo group and the five treatment groups (in the absence of controls). Let us first consider the impact of information about the economic outlook of experts on household expectations. Respondents who receive the information that according to experts there will be a deep recession (*T-Rec.*) expect GDP to grow over the subsequent year by 1.9 pp less, on average, than respondents in the placebo group, after controlling for socio-demographic characteristics, non-health exposure to the pandemic, and prior beliefs. The treatment effect is statistically significant at a 99% level of confidence, indicating that respondents are highly responsive to experts' assessment when forming their expectations (see also the orange bars in Figure 2). The estimated effect is also economically sizeable: Learning that experts expect a deep recession moves households' GDP growth expectations by around one-half of a standard deviation relative to the sample mean.

Figure 2: Average GDP growth expectations in different treatment arms



Note: Bars show the mean of GDP growth expectations for each treatment arm. The blue part represents the average expected GDP growth in the placebo group (c). The orange part highlights the difference of the other groups relative to the placebo group. The black error bars represent the standard error of the β coefficients (± 1 standard error). P-values show the level of significance that β coefficient is significantly different from zero.

To gain more insight into the impact of the *T-Rec.* treatment on households' GDP growth expectations, we consider respondents' beliefs about the likelihood of a recession, $P(Rec.)$, defined as the probability weight attributed to a decrease in GDP, and their beliefs about the likelihood of a severe recession, $P(sev. rec.)$, defined as a decrease in GDP of more than 10 percent. In addition, we consider tail outcomes associated with the 20th and 5th percentile in the upper and lower tail of the subjective GDP growth distribution. Table A.3 shows the results. Respondents in the *T-Rec.* group

	GDP		Unemployment	Inflation	House prices	Stock market return
	(1)	(2)	(3)	(4)	(5)	(6)
	Quant.	$\Delta Qual.(F)$	$\Delta Qual(F)$	$\Delta Quant.(F)$	$\Delta Quant.$	$\Delta Quant.$
T-Rec.	-1.88*** (0.50)	-0.23 (0.15)	0.04 (0.15)	0.06 (0.67)	0.61 (0.81)	-1.19 (1.14)
T-Unc.	-1.60*** (0.48)	-0.17 (0.15)	-0.10 (0.15)	0.95 (0.71)	0.64 (0.85)	0.99 (1.07)
T-MP.	-1.29*** (0.47)	-0.10 (0.15)	0.03 (0.13)	1.09* (0.66)	0.03 (0.72)	-0.05 (1.16)
T-FP.	-1.72*** (0.50)	-0.26* (0.15)	-0.02 (0.12)	1.67** (0.77)	0.70 (0.74)	-0.13 (1.10)
T-Subj.	-1.45*** (0.48)	-0.23 (0.14)	-0.03 (0.14)	0.20 (0.63)	-0.19 (0.68)	-0.33 (1.10)
Constant	3.96*** (1.52)			3.53 (2.25)	9.26*** (2.38)	7.33** (3.41)
<i>Socio-demographics</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Non-health Covid exposure</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Prior beliefs</i>	Yes	Yes	Yes	Yes	Yes	Yes
N	1790	928	929	902	1777	1464
R ²	0.19			0.31	0.37	0.65

Table 3: Treatment effects on household expectations about macrofinancial expectations

Note: This table reports the results of an OLS regression of equation (2) (column 1) and equation (1) (columns 2-6), including survey weights. Column 1 uses the mean expected GDP growth over the next 12 months as the dependent variable, columns 2-6 use the revision in households' qualitative GDP estimate (column 2), the qualitative assessment of the unemployment rate (column 3) as well as the quantitative assessment of the inflation rate (column 4), the house prices (column 5) and stock market returns (column 6). (F) indicates revisions relative to the follow-up survey (columns 2-4). Otherwise, revisions are measured immediately after the treatment. *Socio-demographics* and *Non-health Covid exposure* are a set of control variables summarized in table 1. *Prior beliefs* is a vector of variables on qualitative and quantitative assessments of respondents expectations prior to the treatment stage. Linearized standard errors are in parentheses. * indicate significance at a 90%, ** at a 95% and *** at a 99% level of confidence.

expect a recession with a 12 pp higher probability and a severe recession with a 9 pp higher probability (columns 1 and 2, respectively). The recession treatment has a significant impact on the entire distribution of GDP growth expectations beyond the central tendency. Columns 3-6 of Table A.3 show that the whole distribution shifts to the left, as the treatment affects both the lower tail (columns 3 and 4) and the upper tail (columns 5 and 6) of the subjective GDP distribution. Additionally, column 1 of Table A.4 shows that the subjective variance of GDP growth expectations increases significantly after receiving the *T-Rec.* treatment ($p < 0.01$), indicating that households become more uncertain about the macroeconomic outlook.¹¹

Households also update their beliefs when they receive information about macroeconomic uncertainty (see Table 3 and Figure 2). In particular, respondents who learn that there is a high uncertainty among experts about the economic consequences of the pandemic (*T-Unc.*) expect a 1.6 pp lower GDP growth rate, on average, over the subsequent year ($p\text{-val} < 0.01$), indicating that respondents incorporate the information on high perceived economic uncertainty in their GDP growth expectations. Table A.3 shows that the treatment significantly increases the probability of a recession by a highly significant 13 pp, though we find only a weak and statistically insignificant increase in the likelihood of a severe recession. While the treatment significantly shifts the lower tail of the subjective distribution downwards, we find only weak evidence for a downward shift of the upper tail. In addition, we find no evidence that the treatment influences the variance of subjective GDP expectations (c.f. Table A.4). Thus, the *T-Unc.* treatment significantly affects the first moment of GDP growth expectations, but not the second moment.¹²

To sum up, our results thus far show that respondents are ex-ante not fully informed about the economic environment but take experts' opinions into account and revise their GDP forecast accordingly. This first main finding matches existing evidence in Roth and Wohlfart (2020), who show that information treatments containing expert opinions also exert a significant influence on the GDP expectations of households during normal times and is also consistent with theories of rational inattention (e.g., Sims, 2003; Reis, 2006; Mankiw and Reis, 2006).

Next, we turn to the question of how policy announcements affect households' expectations about GDP growth. Table 3 (column 1) indicates that all three policy announcements cause households to become significantly *more pessimistic* and *more uncertain* about the GDP growth outlook (see also the orange bars in Figure 2). In particular, households who learn that the ECB just launched a new asset purchase program (*T-MP*) significantly reduce their GDP growth expectations by 1.3 pp ($p\text{-val} < 0.01$), those who receive information on the German government's aid package (*T-FP*) lower their expectations by 1.7 pp ($p\text{-val} < 0.01$), and those who are confronted with the government's claim that it is willing to do whatever it takes to protect workers and firms (*T-Subj.*) slash their expectations by

¹¹We measure the uncertainty of GDP growth expectations by the subjective variance of respondents' GDP density forecasts using the "mass-at-midpoint" approach (e.g., Glas, 2020).

¹²On the one hand, this contradicts existing survey evidence by Coibion et al. (2024), who find that providing information about disagreement among professional forecasters does not significantly impact the first moment but leads to large upward revisions in the second moment of households' GDP growth expectations. On the other hand, it aligns with the time series evidence that shocks to uncertainty have significant first-moment effects (e.g., Bloom, 2009).

1.5 pp (p-val<0.01), on average, relative to the placebo group. We observe no significant differences in treatment effects between policy branches ($T-MP$ vs. $T-FP$) or in the style of communication ($T-FP$ vs. $T-Subj.$).

The treatment effects remain highly robust to using the alternative measures $P(rec.)$ and $P(sev. rec.)$. The three policy treatments significantly raise the mass under the lower tail of their subjective GDP distribution in an economically meaningful manner, indicating higher perceived downside risks to GDP growth (see Table A.3). Interestingly, only the objective fiscal policy treatment, $T-FP$, causes a downward shift in the upper tail. For the other two policy treatments, we find no significant effects on the upper tail. In addition, the policy treatments increase respondents subjective uncertainty about future GDP growth significantly (c.f. Table A.4).

In sum, households are ex-ante not fully informed about major monetary and fiscal policy announcements. The information provided via the treatments is relevant for households' macroeconomic outlook, as they significantly and robustly update their macroeconomic expectations. Moreover, despite the significant *expansionary* measures that households are informed about, their GDP growth expectations turn even more negative. This result stands in contrast to standard benchmark models, in which policy announcements are generally found to have large benign effects on expectations of economic agents but aligns with other recent survey evidence (e.g. Binder, 2020; Coibion et al., 2022a) and supports the presence of information effects of policy announcements (Nakamura and Steinsson, 2018; Cieslak and Schrimpf, 2019; Jarociński and Karádi, 2020; Miranda-Agrippino and Ricco, 2021; Melosi et al., 2022). We discuss potential explanations in more detail below, after presenting the main results.

We exploit the panel structure of the survey to investigate whether the effects on households' GDP growth expectations are persistent. In the follow-up wave of the survey, we do not have a quantitative measure for GDP growth expectations and instead resort to a qualitative measure that we also elicit in the prior stage in the main wave of the survey. Column 2 of Table 3 reports the corresponding estimates of Equation (1), using an ordered probit model and revisions in the qualitative GDP assessment, $\Delta GDP_{qual}(F)$ ¹³, as dependent variable. The estimated effects are generally small and statistically insignificant. The only exception is the fiscal policy treatment $T-FP$, which continues to have a significant negative impact on households' expectations about GDP growth one month after the information experiment.

Unemployment We re-estimate the ordered probit model using the revision in beliefs about the unemployment rate, ($\Delta Unemployment_{qual}(F)$) as dependent variable. Column 3 of Table 3 reports the results. We find that the treatments cause no significant changes in households' beliefs about how unemployment will develop over the next 12 months. However, the explanatory power of both measures is small and biased. More than half of respondents expect GDP growth to decrease significantly and unemployment to increase significantly, representing the two most extreme categories on the qualitative scale. Thus, while survey participants might become even more pessimistic due to the

¹³(F) indicates that $E_i^{post}[GDP_{qual}]$ is elicited in the follow-up wave.

information provided in the treatment, as our previous results suggest, they are unable to express it appropriately.

Inflation Column 4 of Table 3 displays the ATEs on households’ revisions of one-year-ahead inflation expectations between the main and follow up wave ($\Delta Inflation(F)$). The estimates are again based on Equation (1). Households who receive the recession and uncertainty treatment revise their inflation expectations slightly upwards, although the effects are not statistically significant. The monetary and fiscal policy treatments cause a significant upward revision in inflation expectations. Households who receive information about the ECB’s announcement of the PEPP expect a 1.1 pp (p-val <0.1) higher future inflation rate, while those who learn that the government announced a large-scale fiscal aid package expect prices to increase at a 1.7 pp higher pace over the next year, relative to the placebo group (p-val<0.05). The results are economically meaningful, as they correspond to around a third of the standard deviation in households’ revision to one-year-ahead inflation expectations. The treatments do not significantly affect households’ subjective inflation uncertainty (c.f. Table A.4, column 2).

The direction in which households update their inflation expectations after an expansionary fiscal or monetary policy shock is consistent with experts’ forecasts as well as empirical and theoretical benchmarks (Andre et al., 2022). Our results differ from Coibion et al. (2022a), who find a negative effect of an expansionary monetary policy announcement and zero effects for an expansionary fiscal policy announcement. However, their information treatments differ with regard to the type of policy instrument. For instance, for the monetary policy announcement, Coibion et al. (2022a) inform households that the Fed has lowered the policy rate, i.e., a conventional instrument. In contrast, we inform households about the magnitude of the ECB’s quantitative easing program, an unconventional instrument. We are not aware of studies that explicitly compare the effects of conventional and unconventional monetary policy measures on household inflation expectations.

Asset price growth Column 5 of Table 3 shows the estimates of Equation (1), using revisions in expected stock market returns over the next 12 months, while column 6 uses revisions in expected house price growth over the next 12 months as dependent variable. The estimated ATEs are relatively small and none of the treatments have statistically significant effects on households’ expectations about housing and the stock market. Similarly, we find no support for the hypothesis that the treatments affect respondents’ subjective uncertainty in their estimates of house price growth and stock market returns (c.f. Table A.4, columns 3 and 4).

3.2.3 Effects on expectations at the micro-level

Income growth We estimate the impact of the treatments on income growth expectations by applying the regression model in Equation (1) and using revisions in expected income growth over the subsequent year, $\Delta Income$, as dependent variable. We note that $\Delta Income$ might depend strongly on respondents’ income levels. To account for this we introduce an alternative measure, $\Delta relative Income$,

which expresses expected income growth relative to households' current monthly income, and estimate the regression model similarly.

	$\Delta Income$				P(Unemployment)
	(1) <i>Income</i>	(2) <i>rel. income</i>	(3) <i>Income (F)</i>	(4) <i>Income</i>	(5) <i>P(jobloss)</i>
T-Rec.	-47.32** (18.83)	-1.32* (0.73)	-63.65 (55.79)	-27.21 (22.99)	-2.38 (2.50)
T-Unc.	-18.90 (21.54)	0.15 (0.80)	28.05 (53.38)	-15.57 (23.23)	-3.84 (2.55)
T-MP.	-7.04 (17.77)	-0.09 (0.70)	-21.57 (48.77)	-0.50 (21.73)	-1.65 (2.56)
T-FP.	1.73 (18.67)	0.62 (0.75)	-18.47 (55.86)	-9.04 (23.13)	-0.71 (2.60)
T-Subj.	-26.35 (20.07)	-0.69 (0.89)	41.83 (45.78)	2.54 (21.86)	0.74 (2.67)
Constant	9.09 (60.71)	2.30 (2.61)	517.41*** (162.91)	-150.60 (120.13)	21.03 (13.25)
<i>Socio-demographics</i>	Yes	Yes	Yes	Yes	Yes
<i>Non-health Covid exposure</i>	Yes	Yes	Yes	Yes	Yes
<i>Prior beliefs</i>	Yes	Yes	Yes	Yes	Yes
N	1807	1745	907	1092	1100
R ²	0.13	0.21	0.41	0.16	0.21

Table 4: ATE on expectations about household income and subjective probability of losing own job

Note: This table reports the results of an OLS regression of equation (1) on revisions in households' income growth expectations (columns 1-4) and of an regression of (2) with households' personal probability of losing their job $P(jobloss)$ as dependent variable (column 5). $\Delta Income$ describes revisions in all households' expected income growth over the subsequent 12 months immediately after the treatment (column 1), $\Delta rel. income$ expresses these revisions relative to their monthly household income (column 2). $\Delta Income(F)$ measures revisions using the follow-up survey (column 3) and column 4 shows the immediate revisions in expected income growth in the active workforce. *Socio-demographics* and *Non-health Covid exposure* are a set of control variables summarized in table 1. *Prior beliefs* is a vector of variables on qualitative and quantitative assessments of respondents expectations prior to the treatment stage. Linearized standard errors are in parentheses. * indicate significance at a 90%, ** at a 95% and *** at a 99% level of confidence.

The results are shown in Table 4. Respondents who learn that experts expect a deep recession (*T-Rec.*) revise their monthly household income growth expectations downward by around €47 (column 1). The effect is significant (p -value < 0.05) and robust to excluding control variables. While the estimated coefficient is small relative to the very high standard deviation of households' income growth expectations pre-treatment (579€), it is still economically meaningful. Using the alternative measure $\Delta rel. income$ as dependent variable, we find that the recession treatment causes an average decrease in household income of around 1.3%, relative to the placebo group (see column 2). While the *T-Unc.* treatment has a negative effect on income growth expectations, its coefficient is estimated imprecisely and the coefficient is not statistically significant. The policy announcement treatments do not have significant effects on mean income growth expectations (columns 1 and 2), which is in stark contrast to their strong effects on GDP growth expectations and GDP growth uncertainty.

To assess the persistence of treatment effects, we leverage the fact that households' income growth expectations have also been elicited in the follow-up wave. We calculate $\Delta Income(F)$ as revision in respondent's belief about income in the follow-up wave relative to their belief prior to the treatment.

Results are shown in column 3 of Table 4. While the ATE of the *T-Rec.* treatment further decreases, it is not statistically significant because the coefficient is estimated with much less precision.

We re-estimate the treatment effects on income for survey participants who are in the active workforce, i.e., those who are currently employed. We find qualitatively very similar results to those obtained for the entire sample (see column 4 of Table 4). One difference is the effect of the *T-Rec.* treatment, which turns insignificant.

Probability of losing the job Survey participants are asked to report their personal employment status and job market prospects in the post-treatment stage of our experiment. In particular, we ask respondents whether they are currently employed, unemployed, or inactive on the job market. We then continue to ask the employed (unemployed) about the perceived chance of losing (finding) their job within the next 12 months. Around 40% of the sample is not active in the job market, which mostly comprises retirees. This leaves us with 1216 observations. Of those, 56 respondents report being currently unemployed. Due to the small sample size, we limit our analysis on the perceived job-loss probability to the employed, active workforce. We use the regression model in Equation (2) with the job-loss probability $P(\text{jobloss})$ as the dependent variable. None of the treatments cause individuals to systematically revise their perceived chances of losing their job. This finding is consistent with Coibion et al. (2022a), who similarly find overall small and insignificant effects of policy announcements on individuals' job loss expectations.

Willingness to consume Finally, we study the ATEs on households' willingness to consume. We elicit households' propensity to purchase big-ticket items, such as a house, a car, or durable goods (furniture, fridge, electronic machines etc.), as well as their propensity to gather additional financial reserves over the next 12 months only after the treatment stage. Let $P(\text{spend}_j)$ denote the propensity to consume, where j is the respective spending category. We modify the regression model specification in Equation (2) by replacing the dependent variable with $P(\text{spend}_j)$ and then estimate the regression for each spending category.

Table 5 presents the results. Receiving the information that experts expect a deep recession (*T-Rec.*) tends to reduce the readiness to purchase a house (column 1), car (column 2), or durable goods (column 3), although the effects are only significant for real estate at the 10% level. The effects of *T-Unc.* are more pronounced. Households in this treatment group reduce their propensity of buying a car by 5.8 pp (p-val<0.05) and of buying durable goods by 7.9 pp (p-val<0.05). These effects are statistically significant and economically meaningful (around 20-25% of a standard deviation of the dependent variable in the placebo group). They highlight that macro-level uncertainty affects the economic decision-making of households. This aligns with recent experimental evidence by Coibion et al. (2024), who find that macroeconomic uncertainty can impact household decisions and have large negative effects on economic outcomes. Additionally, we find that expansionary policy announcements cause households to reduce their readiness to consume. The monetary policy announcement (*T-MP*) causes households to reduce their propensity to purchase a car by 4.4 pp (p-val<0.10)

	(1) Real Estate	(2) Car	(3) Durables	(4) Financial reserves
T-Rec.	-2.91* (1.68)	-2.79 (2.26)	-3.19 (3.03)	-2.79 (3.38)
T-Unc.	-2.04 (1.77)	-5.83** (2.28)	-7.85** (3.08)	2.77 (3.43)
T-MP.	-2.10 (1.76)	-4.37* (2.31)	-5.26* (2.98)	-3.28 (3.33)
T-FP.	-3.43** (1.63)	-1.99 (2.39)	-6.21** (3.07)	-2.97 (3.49)
T-Subj.	-1.63 (1.67)	-3.19 (2.28)	-4.01 (3.12)	-0.91 (3.31)
Constant	3.05 (4.48)	12.15* (6.42)	45.15*** (9.40)	59.89*** (10.57)
<i>Socio-demographics</i>	Yes	Yes	Yes	Yes
<i>Non-health Covid exposure</i>	Yes	Yes	Yes	Yes
<i>Prior beliefs</i>	Yes	Yes	Yes	Yes
N	1880	1893	1886	1918
R^2	0.08	0.06	0.07	0.10

Table 5: Likelihood of Consumption (posterior, in pp)

Note: This table reports the estimates of (2) on households propensity to purchase real estate (column 1), a car (column 2), durables (column 3) and to gather additional financial reserves (column 4). *Socio-demographics* and *Non-health Covid exposure* are a set of control variables summarized in table 1. *Prior beliefs* is a vector of variables on qualitative and quantitative assessments of respondents expectations prior to the treatment stage. Linearized standard errors are in parentheses. * indicate significance at a 90%, ** at a 95% and *** at a 99% level of confidence.

and durable goods by 5.3 pp (p-val<0.10). The fiscal aid package announcement (*T-FP*) similarly reduces households' propensity to buy real estate by 3.4 pp (p-val<0.05) and to purchase durables by 6.2 pp (p-val<0.05). While qualitatively similar, we find no significant effect of the *T-Subj.* treatment. At the same time, we find that households who receive any of the treatments are as likely to gather additional financial reserves as the placebo group (column 4). In other words, the treatments do not induce behavior that is consistent with a precautionary savings motive.

The OLS estimates may be biased because the dependent variable $P(spend_j)$ is censored at 0 and 100. In particular, a large share of respondents reports a zero percent probability of consumption. Thus, we re-estimate the regression using a Tobit model that incorporates the censoring information in the estimation. Table A.5 shows that after taking censoring into account, the estimated ATEs are larger, though the precision of the estimates diminishes. For instance, the Tobit estimates imply that the uncertainty treatment reduces the propensity to buy a car by 17.6 pp (p-val<0.01) and durable goods by 11.6 pp (p-val<0.05). The magnitude of the estimated effects of the policy announcements similarly increase, but they are only significant at a 10% level.

Additionally, we investigate the persistence of the ATEs on household consumption plans in the follow-up wave of the survey. We use a survey item that elicits households' intention of spending on a series of categories. In particular, households are asked to indicate whether they plan to spend less, about the same, or more on a list of consumption categories. Let $I(spend_j)$ denote the intention to consume, where j is the respective spending category. Note that we do not elicit this variable in the main wave of the survey. We therefore use Equation ((2)) and replace the dependent variable with $I(spend_j)$ and then estimate the regression for each spending category as an ordered probit model.

We find that the information treatments cause households to plan to spend less on transportation in the next 12 months compared to the placebo group (see Table A.6). The results are particularly strong and statistically highly significant (p-val<0.01) for the uncertainty treatment and the fiscal policy announcements. We find mostly negative but small and insignificant effects on other spending categories.

3.2.4 Discussion of the treatment effects of policy announcements

It might be surprising that policy announcements negatively affect households' expectations about GDP growth. There are at least three potential explanations for this outcome. First, households might think that the announced policy actions dampen economic growth because they do not understand the transmission mechanism. Earlier studies have found evidence for various impediments to the effectiveness of fiscal and monetary policy interventions targeting households, such as cognitive frictions or public ignorance of what the government and the central bank do (e.g., [Carvalho and Nechio, 2014](#); [Binder, 2017](#); [Coibion et al., 2020](#); [D'Acunto et al., 2021, 2023](#); [Coibion et al., 2022b](#)). However, these impediments would generally weaken the effects of the provided information rather than reversing them.

Another explanation is that households understand the mechanism of action but do not believe in the efficacy of the announced policy measures or more generally distrust the institutions imple-

menting them. However, a majority (61 percent) of German citizens expressed trust in their national government in a representative survey conducted by the European Commission in the Summer of 2020, while the proportion of Germans stating that they tend to trust the ECB was on a par with those who expressed a lack of trust (43 vs. 46 percent, respectively), which corresponds to the average level of trust in the ECB across all 27 EU member states.¹⁴ Hence, an overwhelming distrust of public institutions is not likely to drive our results.

A third, and in our view more plausible, explanation has been put forward by Binder (2020), Coibion et al. (2022a) and Goldfayn et al. (2020). It is based on evidence regarding the “information effect” of policy announcements. That is, the announcement of policy actions may disclose information about economic fundamentals, as shown by various studies on monetary and fiscal policy (e.g., Nakamura and Steinsson, 2018; Cieslak and Schrimpf, 2019; Jarociński and Karádi, 2020; Miranda-Agrippino and Ricco, 2021; Melosi et al., 2022). The estimated ATEs can then be seen as a combination of a negative signal about the state of the economy and a positive signal about the policy actions. In a similar setting, Coibion et al. (2022a) find insignificant effects of policy announcements on the economic expectations of households, which they attribute to the negative and the positive signals washing out on average. In our case, however, the effects of the negative information about the economy seem to outweigh the positive signal.

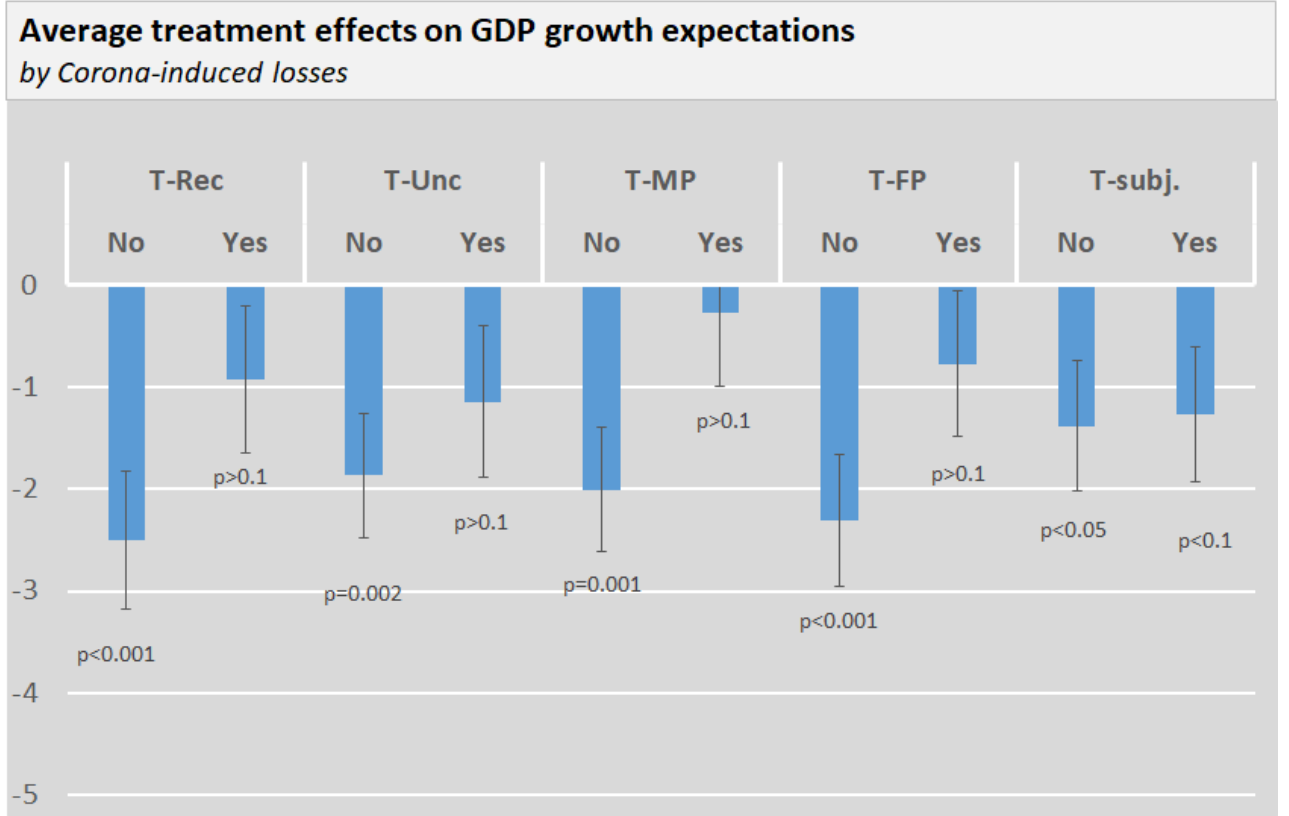
Net of the information effect, the announcement of policy measures by the government and the ECB may have had a positive impact on households’ beliefs about economic growth. Notice, that policy announcements cause smaller downward revisions in GDP growth expectations than the treatments that contain information on the economic outlook. A simple back-of-the-envelope comparison of the estimated ATEs suggests that policy announcements have a positive impact on GDP growth expectations when stripping out the information effects.¹⁵ For instance, the net effect of the ECB’s policy announcement on GDP growth expectations is equal to 0.59 pp, while the net effect of the government’s aid program announcement equals 0.16 pp, on average. However, the net effects are relatively small, given the sheer scope of the policy interventions. This is in line with the existing survey evidence that policy announcements have relatively small effects on household expectations compared to what standard economic models would predict (e.g., Carvalho and Nechio, 2014; Coibion et al., 2023).

In stark contrast to their strong effects on GDP growth expectations and GDP growth uncertainty, the policy announcement treatments do not have significant effects on households income growth expectations (Table 4) or income growth uncertainty (c.f Table A.4, column 5). However, this finding is not inconsistent with the presence of information effects. Specifically, it suggests that the negative information effect of the policy announcement balances out the positive effect of the policy itself so that the two cancel out on average. But why would households expect strong negative effects on the overall macroeconomy, yet not on their personal income? The announced monetary and fiscal policy

¹⁴See the Standard Eurobarometer 93 (Summer 2020) survey factsheet and its annex for Germany at: <https://europa.eu/eurobarometer/surveys/detail/2262>.

¹⁵Although more formal tests for the presence of information effects are attractive retrospectively, the experimental design does not permit this.

Figure 3: Treatment effects on household expectations about GDP growth - by COVID-induced losses



Note: This figure compares the effects of the information treatments between households that have incurred *Covid-induced losses* to those that have not. Blue bars show the average (mean) effects for these subgroups, the black error bars visualize the range of $\pm$ one linearized standard error. P-values indicate the significance of differences between placebo and treatment groups.

measures were designed to safeguard the corporate sector from a credit crunch and to shield the household and financial sector from the crisis. Consequently, it appears plausible that households would not expect significant decreases in their personal income (salary, pension payments, etc.) during the pandemic.

3.3 Cross-sectional heterogeneity

In this section, we examine whether the treatment effects vary systematically across households with differing levels of (direct or indirect) exposure to the pandemic's economic fallout. While we focus on heterogeneity concerning GDP growth expectations for the most part, we show that the observed pattern carries over to other outcome variables. Specifically, we estimate Equation (2) with $E_i^{post}[GDP]$ as dependent variable on mutually exclusive subsamples. As sample splits, we utilize binary indicators for respondents' direct experiences (*Covid-induced losses*), indirect experience through news consumption (*attentiveness to economic news about the pandemic*) as well as demographic characteristics that correlate with different experiences in the pandemic.

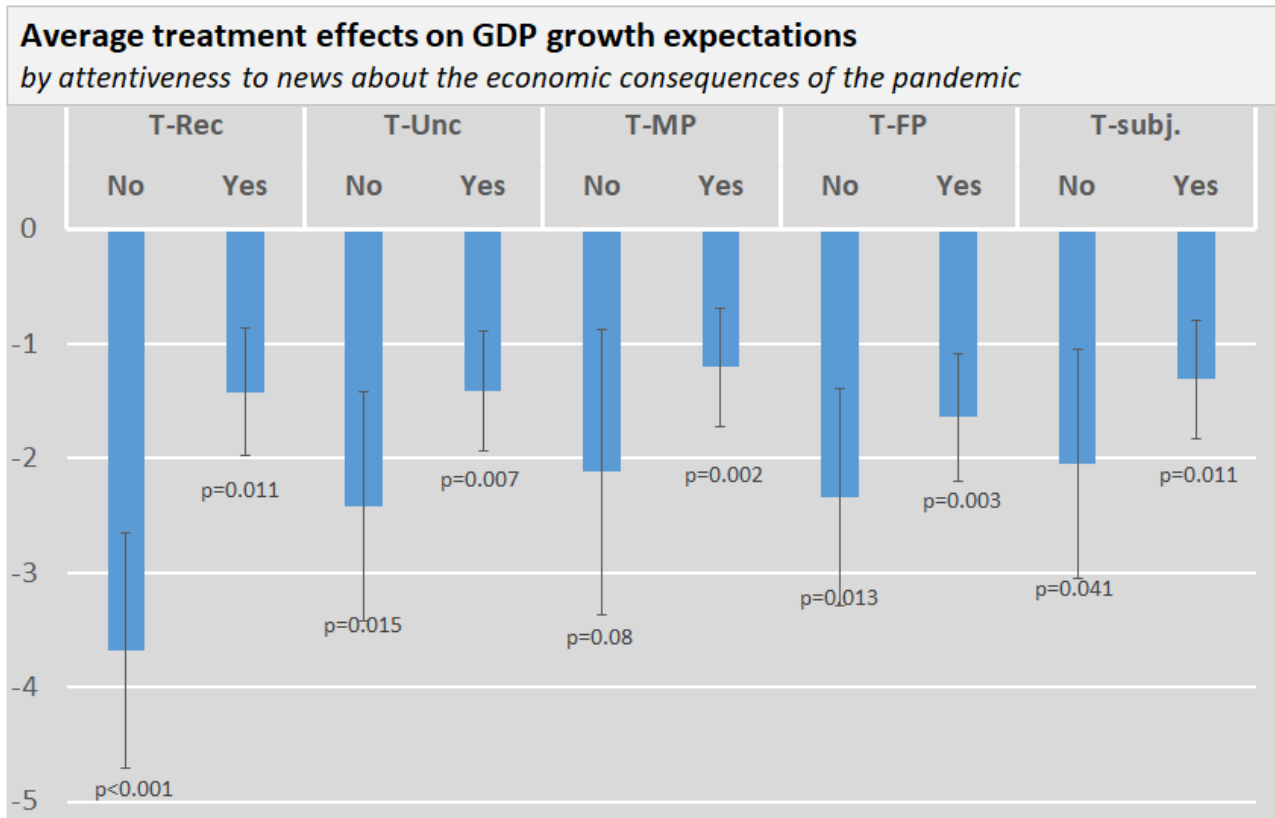
COVID-induced losses Figure 3 depicts the estimated ATEs for households' GDP growth expectations by financial or income losses induced by the pandemic (the coefficients correspond to columns 1 and 2 of Table 7). For all information treatments, the ATEs are almost entirely driven by households who have not yet incurred any losses. These households revise their expectations significantly downwards in an economically meaningful manner. Conversely, those who have already incurred COVID-related losses are largely unaffected by the treatments. For instance, households that receive the information that experts predict a deep recession (*T-Rec.*) revise their GDP growth expectations on average by 2.5 pp downwards if they have not incurred any pandemic-related losses ($p\text{-val} < 0.01$), whereas households with losses do not significantly update their GDP growth expectations after the treatment. Similar differences exist for the uncertainty treatment (*T-Unc.*), and the monetary and fiscal policy treatments, *T-MP* and *T-FP*. After receiving the treatments, the difference in GDP growth expectations between those who have incurred losses and those who have not vanishes. One exception is the *T-Subj.* treatment, where we find some evidence for belief updating ($p < 0.10$) of households who have already incurred losses. This suggests that the information provided in this treatment has been a new and relevant piece of information to at least some households that have already incurred losses.

News attentiveness Figure 4 depicts the estimated ATEs for households' GDP growth expectations by attentiveness to pandemic related news about the economy. Again, we find larger ATEs for households with less exposure to the pandemic through news consumption. Even though the precision of the estimates is limited, given that only around 20% of the sample is not attentive to economic news, we nevertheless obtain significant effects (the corresponding p-values are reported in the figure). However, in contrast to the split along COVID-induced losses, we also obtain significant, albeit smaller, effects of respondents that do follow the news about the economic consequences of the pandemic. Overall, we conclude that personal experiences receive a large weight in household expectation formation at the onset of the pandemic.

Demographic characteristics A potential concern with our direct and indirect measures for personal experiences could be that these measures are self-reported and subject to biases or reverse causality problems. As an additional robustness exercise, we therefore conduct a heterogeneity analysis using demographic characteristics. We argue that experiences may vary systematically across demographics, given the differential impact of the pandemic and the containment measures on various socio-demographic groups.

We include the following characteristics: gender, retirement status, profession, and housing tenure. For instance, female respondents are more likely to experience retail and grocery store closures first-hand due to differences in gender roles, which are known to produce divergent economic expectations (e.g., [D'Acunto et al., 2021](#)). Retirees might be particularly concerned about the health impact of COVID-19 and may, therefore, be more familiar with information about the pandemic. Those who rent their homes are similarly more likely to be more exposed to the economic impact of the pandemic.

Figure 4: Treatment effects on household expectations about GDP growth - by attentiveness to news about the economic consequences of the pandemic



Note: This figure compares the effects of the information treatments between households that have do follow the news about economic impacts of the pandemic only peripherically or not at all (*No*) to those that follow the news somewhat or closely (*Yes*). Blue bars show the average treatment effects for these subgroups, the black error bars visualize the range of $\pm$ one linearized standard error. P-values indicate the significance of differences between placebo and treatment groups.

	Gender		Profession			Tenure	
	(1) Male	(2) Female	(3) White-Collar	(4) Other	(5) Retiree	(6) Owner	(7) Renter
T-Rec.	-2.75*** (0.81)	-1.01* (0.56)	-1.99*** (0.70)	-1.93** (0.89)	-1.34 (1.05)	-2.02*** (0.61)	-1.80** (0.82)
T-Unc.	-2.54*** (0.74)	-0.86 (0.55)	-2.63*** (0.60)	0.05 (0.92)	-1.28 (0.94)	-2.17*** (0.59)	-0.99 (0.80)
T-MP.	-2.50*** (0.81)	-0.54 (0.51)	-2.05*** (0.63)	-0.70 (0.82)	-0.97 (1.03)	-1.26** (0.57)	-1.32* (0.75)
T-FP.	-2.53*** (0.81)	-0.88 (0.55)	-1.87*** (0.65)	-1.30 (0.90)	-1.82* (0.99)	-1.95*** (0.59)	-1.36 (0.86)
T-Subj.	-2.19*** (0.71)	-0.70 (0.59)	-1.61** (0.65)	-0.47 (0.96)	-1.30 (0.86)	-1.85*** (0.56)	-0.54 (0.82)
Constant	6.53*** (2.19)	2.91** (1.39)	4.70*** (1.78)	8.31*** (2.25)	3.43 (2.70)	3.57** (1.53)	5.71** (2.24)
<i>Non-health Covid exposure</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Prior beliefs</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	764	1026	778	409	603	1170	620
R ²	0.22	0.23	0.21	0.38	0.17	0.21	0.20

Table 6: Treatment effects on household expectations about GDP growth – Heterogeneity

Note: This table shows treatment effects on households' GDP growth expectations for demographic subgroups, as defined in the column headers, based on equation (2). *Non-health-covid-exposure* is a set of control variables summarized in table 1. *Prior beliefs* is a vector of variables on qualitative and quantitative assessments of respondents expectations prior to the treatment stage. Linearized standard errors are in parentheses. * indicate significance at a 90%, ** at a 95% and *** at a 99% level of confidence.

In addition, white-collar workers may find it relatively easy to work from home during the pandemic, in contrast to blue-collar workers. On top of that, civil servants in Germany are granted additional labor security which makes their jobs more secure in general. This limits white-collar workers' and civil servants' first-hand exposure compared to other professions that are potentially more affected by the pandemic and its containment measures.

Table 6 reports the estimated treatment effects on households' GDP growth expectations by gender, retirement status, profession, and housing tenure. The results strongly corroborate our previous findings. Demographic subgroups that are expected to be less personally exposed or less informed about the economic impact of the pandemic are the ones that revise their GDP expectations strongly downwards (males, non-retired, white-collar workers, renters). By contrast, the revision in expectations is smaller and in most cases not statistically significant for female respondents, for those who are retired, who have another profession besides white-collar work, and who rent their homes.

Additional results As a final exercise, we check whether the treatment effects that we have identified on other variables besides GDP growth expectations are also mainly driven by households with limited exposure to the pandemic. Table 7 shows treatments effects on macro-level (top panel) and micro-level (bottom-panel) expectations between households who have not incurred losses (indicated with a *No*) and those who have (indicated with a *Loss*), after controlling for demographics and prior beliefs. We find that, in general, the significant ATEs we have found in Section 3.2 are almost

entirely driven by respondents who have not incurred losses due to the pandemic. For instance, the effects of the *T-MP* and *T-FP* treatments on inflation expectations stem from respondents who have not incurred losses due to the pandemic (columns 7 and 8). The information provided in the monetary policy treatment causes this group of households to revise their inflation expectations by 1.8 pp upwards, even one month after they receive the information. The effect is statistically significant at the 95% level and economically large (around a third standard deviation of overall inflation revisions). In contrast, households with prior losses do not significantly revise their inflation expectations.

Households who have not yet incurred pandemic-induced losses also account for the negative and significant effect of the recession treatment on income growth expectations in the whole sample (columns 11 and 12). It is noteworthy that households who have already incurred losses tend to expect higher income growth after receiving the monetary and fiscal policy treatments. Notice that the same households do not significantly revise their GDP growth expectations. Higher expected income growth is thus consistent with the view that households expect some positive impact of the stimulus measures. Finally, we find that the negative effects on households' consumption plans that we report for the whole sample are again overwhelmingly driven by households that have not yet incurred COVID-related losses (columns 15-18).

Taken together, the results of our heterogeneity analysis are consistent with the view that, by the time of our experiment, households with exposure to the pandemic's economic fallout have already incorporated the information provided in the treatments into their macroeconomic expectations while households without personal exposure have not. Both treatment types – experts' assessment about the economic situation (*T-Rec.*, *T-Unc.*) and policy announcements (*T-FP*, *T-MP*, *T-Subj.*) – appear to convey important information for households' economic outlook and serve as a wake-up call to households that have not yet been exposed to the pandemic. These findings are in line with theories of rational inattention and, in particular, with infrequent updating of beliefs. Note that, while it appears plausible that personal experiences work as a trigger for households to revise their expectations, it is also possible that only households that have by chance already updated their beliefs realize that they have incurred losses.

	GDP		Δ House prices		Δ Stock market return		Δ Inflation (F)		Δ Unemployment (F)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	No	Loss	No	Loss	No	Loss	No	Loss	No	Loss
T-Rec.	-2.50*** (0.68)	-0.93 (0.72)	-0.29 (0.96)	1.70 (1.26)	3.53 (2.38)	-3.22 (2.64)	0.71 (0.81)	-0.75 (0.93)	-0.09 (0.20)	0.36 (0.25)
T-Unc.	-1.86*** (0.61)	-1.14 (0.74)	-0.16 (0.89)	0.79 (1.30)	2.16 (2.30)	0.73 (2.19)	2.07** (0.85)	-0.79 (0.93)	-0.41** (0.21)	0.34 (0.23)
T-MP.	-2.00*** (0.61)	-0.27 (0.72)	-1.77** (0.82)	1.36 (0.98)	1.23 (2.26)	0.51 (2.50)	1.80** (0.76)	-0.35 (0.92)	-0.31 (0.20)	0.44** (0.21)
T-FP.	-2.31*** (0.65)	-0.77 (0.72)	-0.23 (0.88)	1.43 (1.09)	2.21 (2.29)	-0.47 (2.32)	1.85** (0.93)	0.96 (0.98)	0.14 (0.20)	0.46** (0.20)
T-Subj.	-1.38** (0.64)	-1.26* (0.66)	-1.66* (0.85)	1.29 (1.01)	1.04 (2.31)	-2.16 (2.56)	0.55 (0.63)	-0.59 (0.88)	-0.12 (0.18)	0.31 (0.23)
Constant	2.97* (1.57)	2.40 (1.78)	7.11*** (2.18)	3.11 (2.70)	8.34 (6.03)	4.74 (7.36)	0.92 (2.07)	2.98 (2.61)		
N	1008	794	1012	776	789	684	510	396	525	407
R ²	0.21	0.20	0.48	0.30	0.18	0.17	0.35	0.48		
	Δ Income		P(jobloss)		P(car)		P(durable)		P(saving)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	No	Loss	No	Loss	No	Loss	No	Loss	No	Loss
T-Rec.	-74.77*** (23.29)	-32.69 (33.14)	-2.06 (3.13)	1.41 (3.79)	-0.64 (3.06)	-4.43 (3.04)	-5.71 (3.70)	2.44 (4.80)	-2.66 (4.43)	-6.13 (5.10)
T-Unc.	-8.76 (23.07)	-59.57* (33.47)	-5.94** (2.68)	4.20 (4.21)	-5.40* (2.88)	-3.82 (3.17)	-7.84** (3.92)	-3.52 (4.33)	1.16 (4.58)	1.52 (5.07)
T-MP.	-21.89 (23.05)	-7.83 (28.88)	-4.78 (2.98)	5.72 (3.75)	-4.00 (3.06)	-3.28 (3.17)	-8.59** (4.02)	1.82 (4.41)	-2.41 (4.54)	-5.20 (4.87)
T-FP.	-30.88 (20.27)	20.82 (32.95)	1.36 (3.43)	0.47 (4.11)	-0.64 (3.09)	-3.14 (3.41)	-5.88 (3.89)	-4.63 (4.68)	-5.09 (4.53)	-1.17 (5.41)
T-Subj.	-38.87 (24.29)	-0.29 (30.37)	-0.32 (3.16)	6.44 (4.39)	-1.68 (2.99)	-4.43 (3.27)	-5.82 (4.28)	1.07 (4.36)	-2.59 (4.46)	-3.05 (4.84)
Constant	-14.23 (60.16)	165.37** (67.89)	18.41 (18.15)	26.63* (15.47)	5.99 (7.15)	17.14** (6.68)	52.34*** (10.11)	42.06*** (10.17)	32.08*** (10.51)	52.10*** (11.58)
N	1021	797	606	555	1079	829	1080	821	1103	832
R ²	0.18	0.16	0.15	0.20	0.09	0.12	0.08	0.11	0.06	0.17

Table 7: Heterogeneity analysis - Losses due to COVID

Note: No refers to households with no losses, Loss to households with financial or income losses due to the pandemic. The column head defines the dependent variable of the regression. The regression model is chosen based on data availability. Additionally controls for *Socio-demographics* and *Prior beliefs*. *Socio-demographics* is a set of control variables summarized in table 1. *Prior beliefs* is a vector of variables on qualitative and quantitative assessments of respondents expectations prior to the treatment stage. Linearized standard errors are in parentheses. * indicate significance at a 90%, ** at a 95% and *** at a 99% level of confidence.

4 Conclusion

This paper has investigated whether households pay close attention to macroeconomic conditions and policy announcements at the height of the COVID-19 crisis when large economic fluctuations and policy changes potentially increase the gains from acquiring new information and updating beliefs. This question is of first-order importance, as a functioning expectations channel is especially relevant to policymakers in times of crisis.

We utilize a large representative household survey at the onset of the pandemic. The survey contains a randomized information experiment that allows us to investigate whether households are aware of the distressed economic conditions and major policy actions. We elicit households' beliefs before and after the treatment stage to detect the causal effects of the provided information, and we collect additional information on households' economic exposure to the pandemic. This experimental design allows us to provide causal evidence on what moves households' expectations during a crisis.

We find that, while households are somewhat pessimistic at the outbreak of the pandemic, they do not fully grasp the severity of the COVID-19 recession. Information about the looming recession makes households' GDP growth expectations significantly more negative and more dispersed, and it limits their willingness to consume. Households also become significantly more pessimistic and more uncertain about the economy and reduce their propensity to consume upon receiving information about monetary and fiscal stimulus measures announced by the ECB and the German federal government in order to contain the economic fallout of the pandemic. These announcements seem to convey bad news about the economy that overshadows the good news about the policy actions.

Our experimental evidence is consistent with theories of rational inattention, which imply that it is rational for individuals to acquire, absorb, and process information at infrequent intervals because of the associated costs. The information provided via the treatments serves as a wake-up call, especially for households with less exposure to the pandemic's economic fallout. This corroborates existing evidence that individuals put a large weight on personal experiences when they form expectations about the aggregate economy. What is remarkable about our findings is that households, by and large, seem to not be fully aware of economic developments and their implications even in the midst of a once-in-a-lifetime event. This is a sobering conclusion for policymakers who rely on a functioning expectations channel during a crisis.

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Appendix

Additional tables

	(1) Full Sample	(2) Control	(3) T-Rec.	(4) T-Unc.	(5) T-MP	(6) T-FP	(7) T-subj.	(8) p-val.
Restrictions to public life								
Duration (days)	192.54 (3.43)	186.62 (7.91)	193.13 (7.79)	182.07 (9.70)	193.55 (8.78)	204.25 (7.76)	196.09 (8.33)	0.16
GDP growth								
qualitative	1.71 (0.03)	1.83 (0.08)	1.59 (0.06)	1.80 (0.12)	1.71 (0.07)	1.63 (0.06)	1.70 (0.07)	0.46
Unemployment								
qualitative	4.28 (0.03)	4.25 (0.07)	4.23 (0.07)	4.26 (0.07)	4.35 (0.05)	4.32 (0.08)	4.26 (0.07)	0.55
Inflation								
qualitative	3.83 (0.03)	3.84 (0.06)	3.85 (0.06)	3.70 (0.11)	3.87 (0.06)	3.84 (0.07)	3.86 (0.06)	0.79
point estimate	5.26 (0.22)	5.55 (0.44)	5.04 (0.45)	5.67 (0.67)	5.27 (0.56)	5.71 (0.62)	4.32 (0.40)	0.68
density estimate	2.79 (0.10)	3.09 (0.23)	2.79 (0.23)	2.69 (0.30)	2.50 (0.25)	2.94 (0.28)	2.77 (0.23)	0.49
House price growth								
qualitative	3.04 (0.03)	3.09 (0.07)	3.01 (0.07)	3.08 (0.08)	2.93 (0.07)	3.05 (0.07)	3.06 (0.06)	0.58
point estimate	2.36 (0.28)	2.82 (0.68)	1.58 (0.59)	1.93 (0.86)	2.78 (0.61)	2.70 (0.76)	2.41 (0.60)	0.88
density estimate	3.33 (0.17)	3.46 (0.44)	3.14 (0.38)	3.29 (0.37)	3.43 (0.43)	3.54 (0.45)	3.14 (0.40)	0.90
Stock market return								
point estimate	3.84 (0.57)	4.53 (1.37)	2.14 (1.41)	4.67 (1.78)	3.11 (1.20)	3.77 (1.30)	4.84 (1.26)	0.30
Income growth								
in EUR, density	-32.44 (15.68)	-15.87 (35.03)	-22.67 (36.43)	-31.88 (34.63)	-73.90 (40.24)	-9.98 (43.74)	-40.60 (40.40)	0.70
in % HH income, density	-0.44 (0.74)	0.21 (1.51)	-0.62 (1.62)	0.04 (1.55)	-2.24 (1.62)	-0.00 (2.21)	-0.06 (2.31)	0.57

Table A.1: Prior beliefs and randomization of subgroups

Note: This table reports respondents' average prior beliefs about pandemic-induced restrictions on public life, as well as their expectations about GDP growth, inflation, house price growth, stock market returns, personal income growth, and unemployment. Standard deviation are in parantheses. Quantitative variables are winsorized at the top and bottom two percent of their distribution. Qualitative variables are elicited on a ordinal 5-point-scale (1 = "decrease significantly"; 2 = "decrease somewhat"; 3 = "roughly stay the same"; 4 = "increase somewhat"; and 5 = "increase significantly"). Estimated using sampling weights. Estimates for the overall sample (column 1) and for the randomized sub-samples (columns 2-7). Column 8 displays the p-values of a one-sided ANOVA test of equality for all subsamples.

	Full sample	corona losses		credit constraint 3m		news attentiveness	
	(1)	(2) None	(3) Losses	(4) Unconstr.	(5) Constr.	(6) low	(7) high
Restriction to public life (days)	192.54 (3.43)	191.08 (4.17)	194.50 (5.78)	193.55 (3.68)	186.77 (9.31)	182.01 (7.47)	195.91 (3.85)
GDP growth (qual.)	1.71 (0.03)	1.74 (0.04)	1.67 (0.05)	1.70 (0.03)	1.76 (0.09)	1.89 (0.07)	1.66 (0.04)
GDP growth (quant.)	-1.72 (0.38)	-1.04 (0.49)	-2.80 (0.57)	-1.52 (0.37)	-3.32 (1.61)	-0.25 (0.92)	-2.08 (0.41)
Unemployment rate (qual.)	4.28 (0.03)	4.26 (0.04)	4.31 (0.04)	4.27 (0.03)	4.33 (0.09)	4.17 (0.06)	4.31 (0.03)
Inflation (point estimate)	5.26 (0.22)	5.15 (0.25)	5.40 (0.38)	4.82 (0.23)	7.81 (0.65)	5.61 (0.50)	5.16 (0.24)
House price growth (point estimate)	2.36 (0.28)	2.34 (0.38)	2.40 (0.43)	2.03 (0.30)	4.31 (0.84)	3.39 (0.55)	2.04 (0.33)
Stock market return (point estimate)	3.84 (0.57)	3.67 (0.80)	4.05 (0.81)	5.06 (0.60)	-3.50 (1.56)	0.11 (1.08)	4.96 (0.66)
Income growth, EUR (density estimate)	-32.44 (15.68)	98.77 (17.36)	-206.55 (26.58)	37.00 (15.07)	-436.45 (50.96)	-1.87 (33.26)	-41.85 (17.75)

Table A.2: Heterogeneity in prior beliefs

Note: This table reports respondents' average prior beliefs about pandemic-induced restrictions on public life, as well as their expectations about GDP growth, inflation, house price growth, stock market returns, personal income growth, and unemployment. Standard errors are in parentheses. Quantitative variables are winsorized at the top and bottom two percent of their distribution. Qualitative variables are elicited on a ordinal 5-point-scale (1 = "decrease significantly"; 2 = "decrease somewhat"; 3 = "roughly stay the same"; 4 = "increase somewhat"; and 5 = "increase significantly"). Estimated using sampling weights. Estimates for the overall sample (column 1), by corona losses (columns 2-3) by credit constraint (column 4-5) and by attentiveness to economic news (column 6-7).

	P(recession)		lower tail		upper tail	
	(1)	(2)	(3)	(4)	(5)	(6)
	<0	<10%	20th pct.	5th pct.	80th pct.	95 pct.
T-Rec.	12.48*** (3.59)	9.28*** (2.35)	-0.41*** (0.10)	-0.36*** (0.10)	-0.25*** (0.10)	-0.20** (0.10)
T-Unc.	13.49*** (3.69)	3.34 (2.10)	-0.35*** (0.10)	-0.22** (0.10)	-0.17* (0.10)	-0.15 (0.10)
T-MP.	10.71*** (3.48)	6.18*** (2.24)	-0.28*** (0.10)	-0.25** (0.10)	-0.15 (0.09)	-0.13 (0.09)
T-FP.	12.31*** (3.57)	7.92*** (2.50)	-0.39*** (0.10)	-0.32*** (0.10)	-0.20** (0.10)	-0.22** (0.10)
T-Subj.	10.30*** (3.63)	4.55** (2.25)	-0.32*** (0.09)	-0.31*** (0.10)	-0.17* (0.09)	-0.12 (0.09)
Constant	16.60 (10.83)	-4.45 (6.95)				
<i>Socio-demographics</i>	Yes	Yes	Yes	Yes	Yes	No
<i>Non-health Covid exposure</i>	Yes	Yes	Yes	Yes	Yes	No
<i>Prior beliefs</i>	Yes	Yes	Yes	Yes	Yes	Yes
N	1833	1833	1833	1833	1833	1845
R ²	0.18	0.15				

Table A.3: Treatment effects on household expectations about GDP growth

Note: This table reports the results of an OLS regression (columns 1-2) and an ordered probit regression (columns 3-6) of equation (2). Column 1 uses the probability weight allocated to scenarios with a GDP decline as dependent variable, column 2 the probability weight of a sharp decline of <-10% or below. Columns 3-6 use the respective percentile of individuals' expected GDP growth distribution as dependent variable. *Socio-demographics* and *Non-health Covid exposure* are a set of control variables summarized in table 1. *Prior beliefs* is a vector of variables on qualitative and quantitative assessments of respondents expectations prior to the treatment stage. Linearized standard errors are in parentheses. * indicate significance at a 90%, ** at a 95% and *** at a 99% level of confidence.

	(1) GDP	(2) $\Delta Inflation(F)$	(3) $\Delta Houseprices$	(4) $\Delta Stock\ market\ return$	(5) $\Delta Income$
T-Rec.	5.36*** (1.78)	-4.00 (3.85)	-3.78 (5.24)	3.02 (34.03)	8559.84* (5129.10)
T-Unc.	3.36** (1.56)	-4.08 (4.33)	-0.45 (5.23)	30.45 (37.76)	2783.47 (4725.27)
T-MP.	4.18** (1.98)	0.77 (4.35)	2.18 (5.86)	34.58 (42.27)	2467.59 (5231.44)
T-FP.	4.37*** (1.64)	0.94 (5.13)	-5.30 (5.18)	31.74 (38.94)	6133.18 (5107.43)
T-Subj.	4.08** (1.84)	-3.63 (3.57)	0.61 (5.63)	-1.43 (35.74)	5973.61 (5026.84)
Constant	5.77 (3.78)	15.08 (10.12)	17.56 (11.40)	210.57** (106.50)	8458.44 (14768.06)
<i>Socio-demographics</i>	Yes	Yes	Yes	Yes	Yes
<i>Non-health Covid exposure</i>	Yes	Yes	Yes	Yes	Yes
<i>Prior uncertainty</i>	Yes	Yes	Yes	Yes	Yes
N	1314	853	993	1084	1321
R^2	0.40	0.06	0.06	0.09	0.13

Table A.4: Treatment effects on subjective uncertainty regarding macro expectations

Note: This table reports the results of an OLS regression of equation (2) (column 1) and equation (1) (columns 2-5), similar to table 3 but instead using the second moment of these variables as dependent variable. Column 1 uses the subjective variance in each respondents' GDP growth expectations as outcome variable and Columns 2-5 use revisions in subjective variance. (F) indicates revisions relative to the follow-up survey. *Socio-demographics* and *Non-health Covid exposure* are a set of control variables summarized in table 1. *Prior beliefs* is a vector of variables on qualitative and quantitative assessments of respondents expectations prior to the treatment stage. Linearized standard errors are in parentheses. * indicate significance at a 90%, ** at a 95% and *** at a 99% level of confidence.

	(1) Real Estate	(2) Car	(3) Durables	(4) Financial reserves
T-Rec.	-27.26** (11.16)	-7.19 (6.44)	-4.80 (4.65)	-3.49 (5.89)
T-Unc.	-9.46 (10.52)	-17.56*** (6.79)	-11.57** (4.77)	6.09 (6.09)
T-MP.	-6.73 (10.62)	-11.92* (6.60)	-7.95* (4.57)	-4.75 (5.79)
T-FP.	-17.86* (10.85)	-8.09 (6.72)	-9.51* (4.87)	-5.28 (6.17)
T-Subj.	-2.48 (10.37)	-6.33 (6.53)	-5.99 (4.83)	-0.79 (5.84)
Constant	-47.22 (33.31)	-25.06 (18.93)	46.90*** (14.29)	81.29*** (18.18)
<i>Socio-demographics</i>	Yes	Yes	Yes	Yes
<i>Non-health Covid exposure</i>	Yes	Yes	Yes	Yes
<i>Prior beliefs</i>	Yes	Yes	Yes	Yes
N	1880	1893	1886	1918
Uncensored	198	568	1175	1064
Left-censored	1660	1268	540	489
Right-censored	22	57	171	365

Table A.5: Likelihood of Consumption (posterior, in pp)

Note: This table reports the estimates of (2) on households propensity to purchase real estate (*RE*), a car (*Car*), durables (*Dur.*) and to gather additional financial reserves (*Sav.*). Regression is estimated using a tobit regression, taking into account censoring at 0 and 100 percentage points. *Socio-demographics* and *Non-health Covid exposure* are a set of control variables summarized in table 1. *Prior beliefs* is a vector of variables on qualitative and quantitative assessments of respondents expectations prior to the treatment stage. Linearized standard errors are in parentheses. * indicate significance at a 90%, ** at a 95% and *** at a 99% level of confidence.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Car/durable	Consumption	Clothing	Leisure	Transport	Services	Vacation	Housing	Fin. reserve
T-Rec.	0.09 (0.17)	-0.08 (0.21)	-0.06 (0.18)	-0.13 (0.15)	-0.19 (0.16)	-0.01 (0.16)	-0.18 (0.15)	0.19 (0.20)	0.13 (0.17)
T-Unc.	-0.12 (0.17)	0.06 (0.21)	0.07 (0.18)	-0.15 (0.15)	-0.48*** (0.15)	0.08 (0.16)	0.08 (0.15)	-0.15 (0.19)	-0.04 (0.17)
T-MP.	0.03 (0.15)	-0.09 (0.21)	-0.10 (0.19)	-0.25* (0.14)	-0.18 (0.16)	-0.02 (0.17)	-0.29** (0.15)	0.22 (0.17)	-0.03 (0.15)
T-FP.	-0.02 (0.16)	-0.03 (0.19)	-0.09 (0.18)	-0.09 (0.14)	-0.25* (0.14)	-0.02 (0.16)	0.02 (0.15)	0.20 (0.19)	0.10 (0.17)
T-Subj.	0.10 (0.15)	0.11 (0.17)	-0.17 (0.20)	-0.24 (0.15)	-0.39*** (0.15)	-0.19 (0.17)	-0.05 (0.15)	0.00 (0.17)	0.25 (0.15)
<i>Socio-demographics</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Non-health Covid exposure</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Prior beliefs</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	988	990	989	990	989	989	987	988	989

Table A.6: Effects on respondents' intention to spend, one month after initial treatment

Note: This table reports the results of regression model (2), using an ordered probit model. As dependent variable, respondents choose between spending less (-1) about the same (0) or more (1) than in the previous month, for each respective spending categories (columns 1-9). Variable is elicited in the follow-up wave. *Socio-demographics* and *Non-health Covid exposure* are a set of control variables summarized in table 1. *Prior beliefs* is a vector of variables on qualitative and quantitative assessments of respondents expectations prior to the treatment stage. Linearized standard errors are in parentheses. * indicate significance at a 90%, ** at a 95% and *** at a 99% level of confidence.