LENA DRÄGER, MICHAEL J. LAMLA, DAMJAN PFAIJFAR

How to Limit the Spillover from an Inflation Surge to Inflation Expectations

Institute for Monetary and Financial Stability

How to Limit the Spillover from an Inflation Surge to Inflation Expectations?[*]

Lena Dräger[‡]
Michael J. Lamla[†]
Damjan Pfajfar[§]

July 4, 2022

Abstract

We study the effects of forward looking communication in an environment of rising inflation rates on German consumers' inflation expectations using a randomized control trial. We show that information about rising inflation increases short- and long-term inflation expectations. This initial increase in expectations can be mitigated using forward looking information about inflation. Among these information treatments, professional forecasters' projections seems to reduce inflation expectations by more than policymaker's characterization of inflation as a temporary phenomenon.

Keywords: Short-run and long-run inflation expectations, inflation surge, randomized control trial, survey experiment, persistent or transitory inflation shock.

JEL classification: E31, E52, E58, D84.

I

1   Introduction

"We need to prevent high inflation from becoming entrenched in expectations."

Isabel Schnabel, member of the ECB's Executive Board, in an interview with Handelsblatt in May 2022

After a decade of inflation rates mostly below 2 percent, many developed countries experienced an inflation surge starting in 2021. Inflation started to climb in developed countries at the beginning of 2021, after supply bottlenecks and capacity constraints severely limited the supply of goods, while demand was strong, as the economies recovered from the COVID-19 recession. Already in November 2021, the year-on-year inflation rate in Germany rose above 5 percent.[1]

While at the onset of the inflation surge, many central banks characterized increasing inflation as temporary, concerns over more persistent inflation grew in the last months of 2021, when price increases started to spill over to sectors that have not been impacted by supply-chain disruptions and worries increased that this might lead to higher wage demands.[2] The European Central Bank (ECB) intially argued that the inflation hike would be temporary (Lagarde, 2021). However, there is considerable uncertainty and disagreement about the persistence of the inflation surge, and to what degree supply and demand factors feed into it.[3] Given this high level of uncertainty, one of the main fears of central banks is that the surge in inflation would spillover to inflation expectations resulting in a de-anchoring of (long-run) expectations.[4]

In such an environment it is imperative to understand two aspects: First, how consumers adjust their short- and long-run expectations in this high inflation environment and, second, how policymakers can use communication to steer inflation expectations of the general public to mitigate the spillover to expectations. This is where we contribute in this paper. We investigate how information about the current surge in inflation impacts both short- and long-run inflation expectations of consumers and which type of communication about future inflation developments may mitigate the spillover from observed current inflation dynamics onto short- and long-term expectations.

---

[1]CPI inflation in Germany was 5.2 percent year-on-year in November 2021, see https://www.destatis.de/EN/Press/2021/12/PE21_564_611.html. In Germany, policy responses to the COVID-19 crisis such as the temporary VAT reduction in the second half of 2020 led to lower prices in 2020 and, consequently, additionally pushed inflation up by about 1.2 percentage points in the second half of 2021 when tax rates were adjusted back to previous levels (Bundesbank, 2020). A surge in energy prices pushed the current inflation rate further upwards.

[2]Even the ECB's staff union demanded more pay to guard against inflation (Look, 2021).

[3]The Bank of England raised the policy rate in their December meeting, citing inflation as the main factor in this decision. In the December statement, the FOMC in the US acknowledges that "[s]upply and demand imbalances related to the pandemic and the reopening of the economy have continued to contribute to elevated levels of inflation." (Federal Reserve, 2021). The FOMC has announced a faster tapering of asset purchases at the same meeting. In contrast, the ECB official have continued to claim that the inflation surge is temporary, expecting that inflation will return in 2023 to levels below 2 percent. Lagarde (2021), for example, emphasized that "[e]ven after the expected end of the pandemic emergency, it will still be important that monetary policy—including the appropriate calibration of asset purchases—supports the recovery throughout the euro area and the sustainable return of inflation to our target."

[4]In fact, mean short-run inflation expectations by German consumers, measured in the Bundesbank Online Panel of Households, rose by about 1 percentage point in the second half of 2021, while long-run inflation expectations increased by about 0.5 percentage points. See https://www.bundesbank.de/en/bundesbank/research/survey-on-consumer-expectations/inflation-expectations-848334.

While there is broad consensus that central bank communication is effective in steering expectations of financial market participants, the influence central bank communication has on the general public is much less clear (Lamla and Vinogradov, 2019; Coibion et al., 2020b, 2022). Hence it is crucial to improve our understanding, for instance, on which type of communication is most effective in preventing a spillover from the current high levels of inflation to short- and long-run inflation expectations. The studies mentioned above show that the effects of communication on expectations of consumers are muted and argue that this might be due to the low inflation environment these studies were conducted in. When inflation is low, consumers perceive inflation as not a major concern and consequently devote little attention to it. There exists further evidence that the formation of inflation expectations depends on the environment (see, e.g., Pfajfar and Žakelj, 2014), and that in periods of heightened uncertainty the dispersion of inflation expectations increases.[5]

We test the influence of different information treatments about the future inflation development in light of the inflation surge on consumers' inflation expectations using a randomized control trial (RCT). The RCT was incorporated in the September 2021 wave of the Survey on Consumer Expectations in the Bundesbank Online Panel of Households (BOP-HH), which is representative of the German population. The survey and core questionnaire were designed and developed by Deutsche Bundesbank's Research Center in cooperation with the survey institute Forsa. Germany seems to us very suited for our analysis as Germany is among the most inflation-averse countries inside the Euro area and the public discussion includes many inflation hawks, the current inflation surge is an important topic both in the policy world and among the general public. We randomly allocate respondents to five different information treatments. The main motivation is, first, to observe the reaction of inflation expectations to the information about the current inflation rate (and past inflation from one year ago). Second, we assess whether complementary information about inflation projections can offset the reaction of the short- and long-run inflation expectations to the information about currently observed inflation dynamics.

Respondents in all treatment arms are informed about the inflation rate in August 2021 (3.9 percent) and last year's inflation rate in August 2020 (0 percent). Thus, all respondents have the same information on the current inflation rate, and they are aware that inflation in 2021 is significantly higher than a year ago. Coibion et al. (2020c) and Coibion et al. (2022) show that informing consumers or firm managers of the current inflation rate has significant effects on expectations.[6] As we intend to analyze whether information about inflation projections affects the transmission of current inflation dynamics on expectations, we deem it important to inform all respondents about current inflation. Hence, the *basic* treatment, which serves as our control group, does not offer any additional information. This allow us to separately identify the effect of just providing information about the current inflation surge. The other treatments couple the information about the current inflation dynamic with additional information about the inflation outlook. With this additional information we test whether there is a difference in the reaction in comparison to observing price

---

[5]The cross-sectional variance of inflation expectations is countercyclical in the Michigan survey (see Pfajfar and Santoro, 2010). Thus, it is quite possible that in a high inflation environment communication about monetary policy and inflation matters more than in periods with low and stable inflation.

[6]Notably, they do not inform them of the *change* in inflation.

increases alone. Particularly, we want to check the effect along three different dimensions: providing a forecast, stating that the inflation surge is transitory and that it is persistent / long-lasting. To make sure that the results are not driven by just providing more text, we add another treatment providing information that is not relevant for future price developments. The *long-lasting* treatment additionally cites Prof. Dr. Volker Wieland from the German Council of Economic Advisers ('Sachverständigenrat') who states that in his view inflation is likely to remain elevated between 2-3 percent in the next years. The *temporary* treatment additionally cites ECB president Christine Lagarde's view that the inflation increase will be temporary. The *SPF* treatment additionally provides the average forecasts of the Survey of Professional Forecasters (SPF) conducted by the ECB for the Euro area inflation for 2022-2025, i.e., inflation is expected to be between 1.5-1.8 percent over the next years. Finally, in line with Coibion et al. (2022), we add a *placebo* treatment that provides expected population growth as an additional information. The population growth should be viewed as irrelevant—at least to the first order—for forecasting inflation. Another feature of our RCT design is that we are able to study the effects of the information treatments on *changes* in respondents' short- and long-run inflation expectations as we elicit expectations before and after the information treatment. Hence, we can observe if an information treatment leads to an adjustment in expectations and by how much for each survey participant.

We observe that on average 25 percent of all consumers adjust their expectations after receiving an information treatment. Information about current inflation dynamics only (*basic* treatment) raises inflation expectations, both for the next 12 months as well as 5-10 years ahead. We hypothesize that in such environment observing higher inflation increases inflation expectations. Remarkably though, even longer-term expectations are adjusted as well. In our case, the unconditional increase in short-run inflation expectations is relatively small, while long-run inflation expectations rise by about 1 percentage point.[7] In all other treatments, except the placebo treatment, expectations decrease compared to the *basic* treatment, which indicates that providing inflation projections is effective in limiting the spillover from observing rising inflation to expectations. Conditional on an update, the strongest effect on both short- and long-run expectations is measured for the *SPF* treatment. This information reduces short-run expectations by 1.5 percentage points and long-run expectations by 1.2 percentage points relative to the *basic* treatment. Both the *long-lasting* and the *temporary* treatment also mitigate the spillover from observing currently high inflation to expectations, albeit with a smaller effect between 0.5-0.7 percentage points relative to the *basic* treatment. Hence, our results highlight the relevance of forward looking communication to stabilize inflation expectations, particularly in times of rising prices.

Our paper is closely related to RCT studies on inflation expectations and central bank communication, in particular Coibion et al. (2022). Similarly to Coibion et al. (2022), we test how different forms of communication affect expectations, but focus specifically on how communication can reduce spillover effects from inflation spells on short- and long-run inflation expectations. Coibion et al. (2022) show that information about the current level of inflation decreases inflation expectations, and thus makes them more accurate. However, one has to keep in mind that in this study

---

[7]See Table A.2 in the appendix.

the level of inflation was inferred in an environment where inflation was subdued and a positive bias in inflation expectation among consumers was reported. By contrast, we study the behavior of expectations in a rising inflation environment. Coibion et al. (2020c) use an information treatment showing current inflation, which leads to an increase in inflation expectations for firms in Italy, that consequently feed into firm decisions. In addition, Coibion et al. (2020a) also utilize a RCT design to study the effect of different forms of forward guidance on several macroeconomic forecasts. Haldane and McMahon (2018) use randomized information treatments to test the relevance of layered communication adopted at the Bank of England. Using the Survey on Consumer Expectations at the Bundesbank, Hoffmann et al. (2021) run a RCT with information treatments to analyze the effects of a hypothetical move to flexible average inflation targeting on inflation expectations in Germany. Furthermore, our work relates to the paper by Andre et al. (2021), who study the inflation narratives that experts, households and managers have in mind to explain the recent inflation surge. They show that narratives differ strongly between experts, on the one hand, and households or managers, on the other hand.

The remainder of the paper is organized as follows: Section 2 explains the data we use and the survey experiment, while Section 3 discusses our empirical results. Section 4 concludes.

2 Data and RCT Experiment

The randomized control trial in this study was conducted on respondents in the September 2021 wave of the Bundesbank Online Panel of Households (BOP-HH). The BOP-HH core questionnaire elicits a large range of both qualitative and quantitative macroeconomic expectations.[8] For our study, we focus on point estimates of expected inflation 12 months ahead (short-run expectations) and expectations either 5 or 10 years ahead (long-run expectations).[9] We elicit expectations before and after the information treatment. Before the RCT questions inflation expectations are captured by the following questions measuring inflation point forecasts:

> What do you think the rate of inflation will roughly be over the next twelve months?

> What value do you think the rate of inflation or deflation will take on average over the next [insert five or ten] years?[10]

The September 2021 wave consisted of 3,724 participants who were randomly selected into our five treatment arms, each consisting of about 650 respondents. Conditional on providing a point forecast of short- and long-run expectations, we provided the following information treatments. In the *basic* treatment, participants were given the following information about current inflation:

---

[8]The full questionnaire is available at https://www.bundesbank.de/en/bundesbank/research/survey-on-consumer-expectations.

[9]Respondents are randomly selected to give long-run estimates with either a 5 or 10 year horizon in the core questionnaire. For our analysis, we make sure that the horizon for post-treatment forecasts matches that of pre-treatment forecasts, but otherwise regard both 5 or 10 year forecasts as long-run expectations.

[10]Note that in the core questionnaire, respondents are randomly asked either about their point forecasts for the next 5 or the next 10 years. We make sure that in our follow-up question after the treatment the forecast horizon matches with that of prior long-run expectations.

> "We now show you some information on the inflation rate. The inflation rate in Germany was measured by the Federal Statistical Office at 3.9% in August 2021, one year ago in August 2020 the inflation rate was 0%."

This treatment serves as our control group. In all other treatments, respondents were provided with some information in addition to the basic information about current inflation. The *long-lasting* treatment cites a member of the German Council of Economic Advisers ('Sachverständigenrat') who thinks that inflation will be elevated beyond 2022:

> "We now show you some information on the inflation rate. The inflation rate in Germany was measured by the Federal Statistical Office at 3.9% in August 2021, one year ago in August 2020 the inflation rate was 0%.
>
> Volker Wieland, member of the German Council of Economic Experts, was quoted in "Wirtschaftswoche" on 12 March 2021 as saying [*a weekly German newspaper focusing on economics and business topics*] saying: "I, too, expect that inflation rates may reach an average annual level of two percent, and may even reach three per cent in some individual months by the end of the year. [...] I also anticipate that 2022 and the following years may see similar rates of inflation – that is, annual rates of between two and three percent."

The *temporary* treatment cites a different view by ECB president Christine Lagarde, stressing that the inflation increase will be temporary:

> "We now show you some information on the inflation rate. The inflation rate in Germany was measured by the Federal Statistical Office at 3.9% in August 2021, one year ago in August 2020 the inflation rate was 0%.
>
> On 31 May 2021, "Handelsblatt" wrote: "The ECB president has always made it clear that she sees this year's higher inflation rate as a temporary phenomenon. In her view, the increased inflation is down to one-off factors arising from the pandemic, which are now also making themselves known in the German figures for May.""

Next, the *SPF* treatment gives the adjustment in the most recent short- and long-run inflation forecasts for the Euro area by professional forecasters surveyed in the ECB Survey of Professional Forecasters (SPF):

> "We now show you some information on the inflation rate. The inflation rate in Germany was measured by the Federal Statistical Office at 3.9% in August 2021, one year ago in August 2020 the inflation rate was 0%.
>
> According to a survey by the European Central Bank (ECB) among experts in the Euro area, these increased their inflation expectations for the Euro area as a whole (including Germany) for 2021 to 1.9% from their previous forecast of 1.6%. They adjusted their inflation expectations for both 2022 and 2023 to 1.5% and their expectations for 2025 to 1.8%.

Finally, our last treatment provides a *placebo* test by adding information that is not relevant for forecasting neither short- nor long-run inflation:

> "We now show you some information on the inflation rate. The inflation rate in Germany was measured by the Federal Statistical Office at 3.9% in August 2021, one year ago in August 2020 the inflation rate was 0%.
>
> The Federal Statistical Office also predicts that Germany's population, which was measured at 83 million in 2018, will continue to grow until at least 2024 and will have started to decline by 2040 at the latest."

After each treatment, we ask respondents whether they would like to adjust their short- and/or their long-run inflation forecasts. In order to make sure that individual updates are not due to inaccurate recall of previously given forecasts, we remind all respondents about their prior estimates. The post-treatment questions and answer categories are phrased as follows:

> **Q1:** On the basis of this information, would you adjust the inflation expectations for the next twelve months you gave in the earlier part of the questionnaire? If so, to what extent?
>
> - Yes, from X [*inserted prior expectation*] percent to . . . percent
> - No
>
> **Q2:** On the basis of this information, would you adjust the inflation expectations for the next **for the next 5/10 years** you gave in the earlier part of the questionnaire? If so, to what extent?
>
> - Yes, from X [*inserted prior expectation*] percent to . . . percent
> - No

To design this survey experiment, we made several choices we would like to rationalize in this section. First, we opted to explicitly ask respondents whether they want to change their previously voiced expectations after the information treatment, and reminded them about their previous forecast. We did this to identify conscious updates of expectations and avoid situations where respondents could not exactly recall their expectations before the treatment and state a different number than before by accident. If respondents say that they want to change expectations we ask them for the new point forecast.

Since the core questionnaire of the BOP-HH asks for both point forecasts and probabilistic forecasts on inflation before our RCT, we could not elicit posterior expectations after the treatment with either of those forecast questions as previously practiced in Coibion et al. (2022). Moreover, there is evidence that asking a probabilistic questions leads to lower reported inflation expectations due to the more narrow range of the provided bins and that, furthermore, some individuals allocate 100% to a specific bin, which might require cleaning or at least additional consideration (D'Acunto

et al., 2022). We thus chose to ask respondents whether they would like to update their expectations in a transparent manner.

In addition, our design is also different from previous RCT experiments in the sense that we provided them in the *basic* treatment with both the inflation in the previous year and the current (last observed) inflation. This is a feature of the design, because the goal of this paper is to see whether the "induced" change in expectations facing data on the current change in inflation can be limited by providing information about future inflation developments.

Finally, there is a time delay between the news we used for the information treatment and the day where the survey was conducted. This is due to the application procedures to submit proposals for the BOPHH. However, the attitude regarding inflation in Germany started to change only in the fall, thus the information that we provided in the quotes was still timely. Furthermore, the advantage of having a real world quote is that its impact on survey respondents, to our understanding, might be superior to hypothetically framed information treatments.

In order to check for any potential heterogeneity across demographic groups, we additionally show results adding controls for gender, age and three income groups (*inc_low*–monthly net income below or equal 1.000 €, *inc_middle*–monthly net income between 1.000 € and 3.000 €, and *inc_high*–monthly net income above 3.000 €).
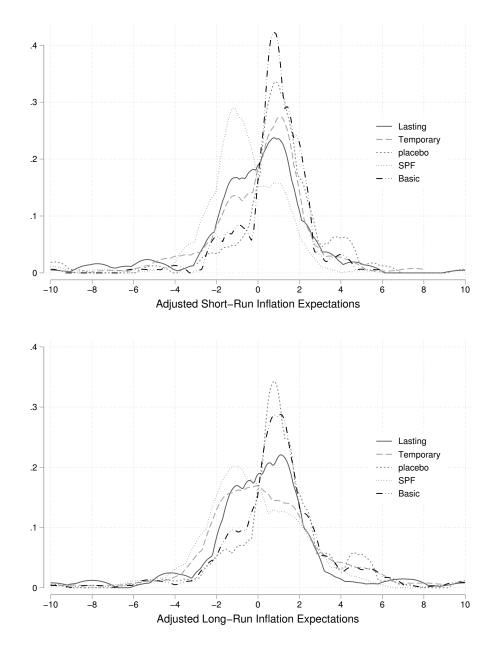
3 Results

3.1 Distributions of Information Treatment Effects

In this subsection, we explore the effect of our treatments graphically. Specifically, we compare, for each information treatment, the distribution of changes in short- and long-term inflation expectations. Afterwards, in the next subsection, we employ regression analysis to measure the causal effect of our inflation treatments. Sample means for short- and long-run expectations, pre- and post-treatment for all treatment arms are provided in the appendix in table A.2.[11] Across all treatments, 25% or 26% of respondents opted to update their short- and long-run inflation expectations, respectively (see Table A.2).

In Figure 1, we plot the densities of changes in short- and long-term expectations for each treatment. The upper panel of the figure shows the short-run expectations, while the lower panel depicts the long-run expectations. The following observations can be drawn from the figures. The current inflation surge (i.e., *basic* treatment) is reflected by a density distribution where most of the mass is at positive changes, implying that observing current high inflation rates alone, leads to an upwards adjustment for both short- and long-run expectations for survey participants. If we compare this distribution to the distributions where we add forward looking information, we can see that, except for the placebo treatment, the distributions have less mass in the positive territory. This indicates that providing additional forward-looking information mitigates the upward movement in expectations. Particularly, the numerical forecast from the *SPF* has the strongest effect on both

---

[11]In the core questionnaire, about 3% of respondents chose not to answer or gave don't know answers to the short- and long-run inflation point forecast questions.

Figure 1: Treatment Effects on the Overall Distribution of Inflation Expectations

Notes: Kernel densities plotted. Upper Panel shows the distribution of changes of short-run expectations for each treatment arm while the lower panel shows changes in long-run expectations for each treatment arm.

short- and long-run expectations in comparison to the distribution under the *basic* treatment: The increase of expectations of the *basic* treatment is reversed, leading to a mean reduction in both short- and long-run expectations. Reassuringly, the distribution of expectations of the *placebo* treatment group is very similar to the distribution of the basic treatment.

To test whether the densities are significantly different across treatments, we conduct Kolmogorov-Smirnov tests: We check whether the density of the *basic* treatment is statistically different (pairwise) from all other treatment densities. For changes in short- and long-term expectations, the Kolmogorov-Smirnov test shows that all treatment densities—except the density of the *placebo*

treatment group—are statistically different from the density of the *basic* treatment.[12] Thus, *long-lasting*, *temporary*, and *SPF* treatments affect expectations beyond the way the basic treatment does: The additional information about projected inflation importantly shapes inflation expectations, demonstrating that there is room for targeted communication about the current inflation outlook that could mitigate the spill-over from current inflation to consumers' inflation expectations.

3.2   Treatment Effects on Short- and Long-Run Inflation Expectations

In this subsection, we evaluate the treatment effects on changes in individual short- and long-run inflation expectations in a regression framework.

We start by evaluating the overall treatment on short- and long-run inflation expectations controlling for prior expectations before the treatment:

$$\pi_{i,posterior}^{e,h} = a_0 + a_1 \cdot \pi_{i,prior}^{e,h} + b_1 \cdot d\_longlasting_i + b_2 \cdot d\_temporary_i + b_3 \cdot d\_spf_i + b_4 \cdot d\_placebo_i + (c' \cdot X_i^{controls}) + u_i,$$

(1)

where $\pi_{i,posterior}^{e,h}$ denotes the consumer i's posterior inflation expectations at horizon h (short- or long-run expectations) after the treatment. We condition posterior inflation expectations on consumer i's prior expectations $\pi_{i,prior}^{e,h}$. The coefficients b_1-b_4 measure the treatment effects in relation to the control group, the *basic* information treatment (the constant represents the estimated average effect of the *basic* treatment). Some estimations additionally control for demographic characteristics $X_i^{controls}$, namely gender, age, and income groups. u_i represents the i.i.d. error term. All estimations use population weights and robust standard errors and truncate expectations in the range from -5 to +25 to avoid an effect of large outliers.

Table 1 shows the estimated average treatment effect on posterior short-run inflation expectations in the first two columns, and on long-run inflation expectations in the last two columns.[13] Prior and posterior expectations are strongly positively correlated, but the persistence is surprisingly low considering that all respondents were informed about their prior expectations after the treatment and that many chose not to update their expectations. This suggests that updates in expectations that did occur where often substantial.

All treatment effects measure the effect of providing additional information relative to the *basic* treatment. While the sample mean of both short- and long-run expectations is adjusted upward in response to the basic treatment informing respondents about the rise in current inflation, we find that providing additional information reduces posterior expectations, thereby mitigating the spillover from observed high current inflation to expectations. The strongest treatment effect is

---

[12]The Kolmogorov-Smirnov test reports p-values of 0.000, 0.032, and 0.000 for the *long-lasting*, *temporary* and *SPF* treatment when comparing the densities to the *basic* treatment, respectively, and 0.348 for the comparison of the *placebo* treatment and *basic* treatment for short-run expectations and 0.002, 0.000, 0.000 and 0.991 analogously for long-run expectations.

[13]We report estimates on the update in inflation expectations after the treatment (assuming $b_1 = 1$) in Table A.3 in the appendix. In this set-up, the *SPF* treatment also has the strongest effect on reducing both short- and long-run expectations after treatment. The constants in Table A.3 measure the average effect of the *basic* treatment (information on the current increase in inflation) on updates in expectations. We find that long-run expectations are raised by 0.37 percentage points on average, while the effect on short-run expectations is not significant.

reported for the *SPF* treatment, which causes posterior short- and long-run expectations to be lower by 0.4-0.5 percentage points compared to the *basic* treatment. The *SPF* treatment is most naturally compared to the *temporary* treatment–as both suggest that the rise in inflation is temporary and inflation will return to pre-pandemic levels (below 2 percent) and they are both "affiliated" to the ECB–and the only difference between them is that the *SPF* treatment provides a numerical forecast. We find a much stronger effect of the *SPF* treatment on expectations, since the *temporary* treatment reduces only long-run expectations and the effect is smaller. This indicates that providing numerical forecasts, that lie significantly below the current inflation rate, has a stronger impact on households' expectations than just characterizing the inflation surge as temporary, and is therefore efficient in taming fears of persistently higher inflation in this context.

In the case of long-run inflation expectations, reported in columns (3) and (4), we find additional negative treatment effects from both the *long-lasting* and the *temporary* treatments. This implies that both texts, emphasizing that the current inflation increase will either be temporary or could be persistent in the next few years, caused respondents to lower their long-run inflation expectations relative to those just informed about the current inflation rate.[14] Finally, treatment effects are not qualitatively different in models with or without demographic control variables.

After evaluating the overall treatment effect, we distinguish between the extensive and the intensive margin of treatment effects. The extensive margin is estimated as the likelihood of updating short- or long-run expectations after an information treatment using a probit model:

$$P(d\_\pi_i^{e,h} = 1|X) = \Phi\left(a_0 + b' \cdot Treatments_i + (c' \cdot X_i^{controls})\right), \qquad (2)$$

where $d\_\pi_i^{e,h}$ are dummy variables taking the value of 1 if consumer i updated her inflation expectations at horizon h (short- or long-run expectations) after the information treatment and $Treatments_i$ denotes the vector of treatment dummies excluding the basic treatment. Table 2 reports the marginal effects evaluated at the mean in columns (1)-(4).

The results are presented in Table 2. Regarding the extensive margin, it shows that none of the additional information provided leads consumers to update their inflation expectations with a higher probability. In fact, except for the *SPF* treatment, all the other treatments lead to a *lower* likelihood of adjusting short-run inflation expectations compared to the *basic* treatment. Interestingly, the *long-lasting* treatment reduces the likelihood of an update in short-run expectations, while the *temporary* treatment leads to a lower updating probability of both short- and long-run expectations. Overall, it seems that providing additional information about the expected future path of inflation can help to anchor expectations by mitigating the tendency to adjust and raise inflation expectations as compared to the *basic* treatment.

---

[14]Given that most information treatments–with the exception of the *basic* treatment–provide average yearly inflation and not forecasts for inflation in the next 12 months, it is likely that our results in the current environment may be subject to a small downward bias. All information treatments suggest that inflation will decrease from the level observed in August 2020. Taking into account that the survey was conducted in the second half of the year 2021 and that the process for inflation is persistent, it is likely that the forecasts for 12-months ahead inflation in September 2021 would be somewhat lower than the yearly averages reported for 2022. Thus, the effect may be larger (and potentially more significant) if in our treatments such inflation forecasts were reported. The availability of relevant quotes guided our decisions on various information treatments.

Table 1: Overall Treatment Effects on Inflation Expectations Post-Treatment

	$\pi_{post}^{e,short}$		$\pi_{post}^{e,long}$	
$\pi_{prior}^{e,short}$	0.6907***	0.6794***		
	(0.0583)	(0.0596)		
$\pi_{prior}^{e,long}$			0.8745***	0.8669***
			(0.0312)	(0.0309)
$d\_longlasting$	-0.1267	-0.0682	-0.3658	-0.3719*
	(0.2033)	(0.2098)	(0.2265)	(0.2250)
$d\_temporary$	-0.3014	-0.2931	-0.2792*	-0.2914*
	(0.2187)	(0.2203)	(0.1583)	(0.1604)
d_spf	-0.4598***	-0.4243**	-0.5382***	-0.5623***
	(0.1772)	(0.1830)	(0.1736)	(0.1760)
$d\_placebo$	0.1998	0.2330	-0.0331	-0.0913
	(0.1507)	(0.1536)	(0.1775)	(0.1644)
$constant$	1.3931***	1.3869***	0.9545***	1.0353***
	(0.2480)	(0.3936)	(0.1765)	(0.2741)
Demographic Controls	No	Yes	No	Yes
N	3136	3033	3078	2982
Adj. R^2	0.635	0.628	0.793	0.804

Note: Bundesbank Survey on Consumer Expectations, September 2021 wave. Inflation expectations prior to and post treatment are truncated to lie in the range $-5 \leq \pi^e \leq 25$. The current inflation rate for August 2021 was given as 3.9% in all treatment groups and the control group (basic treatment). OLS estimations with population weights with robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

The intensive margin is estimated on the sample of respondents that updated their short- and/or long-run expectations after the treatment, i.e., the intensive margin of the treatments is calculated as the change in short- and long-run expectations $\Delta\pi^{e,h}$ conditional on updating expectations after the treatment, shown in columns (5)-(8). To avoid any bias from very large revisions on the estimated treatment effects, we estimate Huber robust regressions. The results in columns (5)-(8) show that all treatments, except the *placebo* treatment, cause a significant reduction in short- and long-run expectations conditional on an update compared to the *basic* treatment. As in Table 1, the *SPF* treatment has the strongest effect on lowering expectations relative to the *basic* treatment: Presented with additional evidence from experts' forecasts, respondents that update their expectations lower their short-run expectations by 1.5 percentage points and their long-run expectations by 1.2 percentage points. Moreover, both the *long-lasting* and the *temporary* treatments significantly reduce short- and long-run expectations relative to the *basic* treatment, albeit with smaller reductions in the range from 0.5-0.7 percentage points.

Overall, we find that all forward-looking information regarding inflation can mitigate the increase in expectations after informing respondents that inflation is currently high. Specifically, numerical information about inflation projections mitigates the effect of recent elevated inflation rates, while the effect of policymakers' characterization of the inflation surge as a "temporary phenomenon"

is considerably smaller. Interestingly, the *long-lasting* treatment–warning that inflation may be elevated for several years–has a similar effect than the *temporary* treatment. This may be due to the mentioned quantitative inflation forecasts in the *long-lasting* treatment, which were considerably below current inflation in August 2021.[15]

4 Conclusion

In this paper, we study the effects of different forward looking communication in relation to a inflation surge on consumers' inflation expectations. We show that, in such an environment, the information about rising inflation feeds into short- and long-term inflation expectations of German consumers raising concerns regarding their degree of anchoring.

This observed dynamic in inflation expectations raises the question how central banks can tame the spillover from observed inflation on inflation expectations. Our results from the survey experiment demonstrate that targeted forward looking communication can reduce the spillover from observing current inflation rates on short and long-run expectations. Using different information treatments we show that particularly explicit numerical inflation projections are able to limit the spillover effects from the current inflation to inflation expectations. Notably, also more text-based forward looking communication characterizing the inflation surge either as temporary or more long-lasting is capable of reducing the spillovers from current inflation short- and long-run inflation expectations, but to a lesser extent compared to an alternative with numerical inflation projections. With that we can conclude that in an environment of rising inflation rates forward-looking information on inflation has the ability to tame the spillovers short- and long-run inflation expectations.

---

[15]To test for a potential asymmetric response to the information treatments, we split the sample of respondents into those who have prior inflation expectations below or above the current inflation rate of 3.9% in August 2021, which was given as an information in all treatments. These results are reported in Online Appendix Table A.4. Respondents who experience a negative inflation surprise via the information that current inflation lies above their short- or long-run forecast (first and third column) increase their expectations. By contrast, those with prior expectations above 3.9% on average reduce their short-run expectations.

Table 2: Treatment Effects: Extensive and Intensive Margin

| | Extensive Margin | | | | Intensive Margin | | | |
	Prob. $\Delta\pi^{e,short} \neq 0$		Prob. $\Delta\pi^{e,long} \neq 0$		$\Delta\pi^{e,short}$		$\Delta\pi^{e,long}$	
$d\_longlasting$	-0.0724*	-0.0796*	0.0004	-0.0048	-0.6103***	-0.6525***	-0.6754***	-0.6672***
	(0.0408)	(0.0417)	(0.0448)	(0.0440)	(0.1853)	(0.1861)	(0.2231)	(0.2247)
$d\_temporary$	-0.0704*	-0.0744*	-0.0854**	-0.0980**	-0.5102***	-0.5202***	-0.7419***	-0.6896***
	(0.0420)	(0.0418)	(0.0435)	(0.0427)	(0.1881)	(0.1902)	(0.2344)	(0.2378)
d_spf	0.0017	-0.0108	0.0281	0.0088	-1.4951***	-1.5163***	-1.2412***	-1.2394***
	(0.0408)	(0.0415)	(0.0423)	(0.0418)	(0.1730)	(0.1746)	(0.2172)	(0.2199)
$d\_placebo$	-0.0908**	-0.0949**	-0.0264	-0.0455	0.2608	0.1661	0.1342	0.1697
	(0.0389)	(0.0397)	(0.0397)	(0.0382)	(0.1896)	(0.1930)	(0.2210)	(0.2254)
$constant$					0.8780***	1.4379***	0.9468***	1.5903***
					(0.1246)	(0.5208)	(0.1527)	(0.5894)
Demographic Controls	No	Yes	No	Yes	No	Yes	No	Yes
N	3162	3053	3112	3012	813	792	844	822
χ^2	9.648	16.923	7.221	23.269				
Pseudo R^2	0.007	0.014	0.006	0.017				
Adj. R^2					0.119	0.117	0.054	0.053

Note: Bundesbank Survey on Consumer Expectations, September 2021 wave. Marginal effects on the likelihood of updating expectations from probit estimation in columns (1)-(4) are evaluated at the mean and estimated with population weights and Huber/White robust standard errors. Estimates of the intensive margin in columns (5)-(8) are from Huber robust regressions on the untruncated data. *** p<0.01, ** p<0.05, * p<0.1

References

Andre, P., Haaland, I., Roth, C., and Wohlfahrt, J. (2021). Inflation narratives. *ECONtribute Discussion Papers Series*, 127.

Bundesbank, D. (2020). The German Economy. *Monthly Report*, 72(11).

Coibion, O., Georgarakos, D., Gorodnichenko, Y., and Weber, M. (2020a). Forward guidance and household expectations. Working Paper 26778, National Bureau of Economic Research.

Coibion, O., Gorodnichenko, Y., Kumar, S., and Pedemonte, M. (2020b). Inflation expectations as a policy tool? *Journal of International Economics*, 124:103297.

Coibion, O., Gorodnichenko, Y., and Ropele, T. (2020c). Inflation expectations and firm decisions: New causal evidence. *The Quarterly Journal of Economics*, 135(1):165–219.

Coibion, O., Gorodnichenko, Y., and Weber, M. (2022). Monetary policy communications and their effects on household inflation expectations. *Journal of Political Economy*. forthcoming.

D'Acunto, F., Malmendier, U., and Weber, M. (2022). What Do the Data Tell Us about Inflation Expectations? *CESifo Working Papers*, 9602.

Federal Reserve (2021). FOMC Statement, December 15, 2021.

Haldane, A. and McMahon, M. (2018). Central bank communications and the general public. *AEA Papers and Proceedings*, 108:578–583.

Hoffmann, M., Moench, E., Schultefrankenfeld, G., and Pavlova, L. (2021). Would households understand average inflation targeting? *CEPR Discussion Paper*, DP16786.

Lagarde, C. (2021). Commitment and persistence: monetary policy in the economic recovery. Keynote speech at the 31st Frankfurt European Banking Congress 2021 "From Recovery to Strength", November 19, 2021, European Central Bank.

Lamla, M. J. and Vinogradov, D. V. (2019). Central bank announcements: Big news for little people? *Journal of Monetary Economics*, 108:21–38.

Look, C. (2021). ECB staff union demands more pay to guard against inflation. *Bloomberg News, November 24, 2021*.

Pfajfar, D. and Žakelj, B. (2014). Experimental evidence on inflation expectation formation. *Journal of Economic Dynamics and Control*, 44:147–168.

Pfajfar, D. and Santoro, E. (2010). Heterogeneity, learning and information stickiness in inflation expectations. *Journal of Economic Behavior & Organization*, 75(3):426–444.

5 Appendix

Table A.1: Short and Long-Run Inflation Expectations Pre- and Post-Treatment

Treatment	Short-run Pre	Short-run Post	Long-run Pre	Long-run Post
Basic	4.50	4.64	4.40	5.41
Lasting	5.10	4.49	4.78	4.86
Temporary	4.25	4.18	4.52	4.91
SPF	4.30	3.31	4.85	4.24
Placebo	4.36	5.21	4.25	5.23
Average	4.50	4.31	4.52	4.93
Average share of revisions	0.25		0.26	
Observations	775		801	

Notes: Sample means reported, truncated data,
only consumers that adjusted expectations.

Table A.2: Short and Long-Run Inflation Expectations Pre- and Post-Treatment

Treatment	Short-run Pre	Short-run Post	Long-run Pre	Long-run Post
Basic	4.23	4.27	4.19	4.48
Lasting	4.29	4.14	4.33	4.35
Temporary	4.06	4.04	4.33	4.41
SPF	4.08	3.79	4.21	4.10
Placebo	4.32	4.50	4.18	4.43
Average	4.20	4.15	4.25	4.35
Observations	3155		3081	

Notes: Sample means reported, truncated data.

Table A.3: Overall Treatment Effects on Changes in Inflation Expectations

	$\Delta\pi^{e,short}$		$\Delta\pi^{e,long}$	
d_longlasting	-0.2372	-0.2195	-0.4301*	-0.4478*
	(0.2210)	(0.2262)	(0.2427)	(0.2406)
d_temporary	-0.3382	-0.3441	-0.3127*	-0.3175*
	(0.2981)	(0.3078)	(0.1650)	(0.1718)
d_spf	-0.4477**	-0.4447**	-0.5851***	-0.6150***
	(0.1989)	(0.2072)	(0.1787)	(0.1818)
d_placebo	0.2538	0.2297	-0.0173	-0.0920
	(0.1640)	(0.1693)	(0.1780)	(0.1686)
constant	0.0138	-0.2493	0.3714***	0.3283
	(0.1440)	(0.4288)	(0.1195)	(0.2886)
Demographic Controls	No	Yes	No	Yes
N	3158	3054	3116	3018
Adj. R^2	0.011	0.015	0.012	0.012

Note: Bundesbank Survey on Consumer Expectations, September 2021 wave. Inflation expectations prior to and post treatment are truncated to lie in the range $-5 \leq \pi^e \leq 25$. OLS estimations with population weights with robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table A.4: Overall Treatment Effects: Inflation Surprise

	$\Delta\pi^{e,short}$		$\Delta\pi^{e,long}$	
	prior $\pi^{e,short}$ < 3.9%	prior $\pi^{e,short}$ > 3.9%	prior $\pi^{e,long}$ < 3.9%	prior $\pi^{e,long}$ > 3.9%
d_infl_longlasting	-0.3000**	0.0224	-0.2304	-0.5178
	(0.1197)	(0.4292)	(0.1526)	(0.4012)
d_infl_temporary	-0.2227	-0.2356	-0.2004	-0.3954
	(0.1369)	(0.5294)	(0.1784)	(0.2990)
d_infl_spf	-0.5263***	-0.3307	-0.3386**	-0.8939***
	(0.1204)	(0.3906)	(0.1461)	(0.3378)
d_infl_placebo	-0.0448	0.6367**	-0.0592	-0.0441
	(0.1650)	(0.2990)	(0.1581)	(0.3057)
constant	0.8278*	-1.5671**	0.6559***	-0.3209
	(0.4640)	(0.7680)	(0.2151)	(0.6724)
Demographic Controls	Yes	Yes	Yes	Yes
N	1538	1516	1693	1322
Adj. R^2	0.050	0.031	0.035	0.019

Note: Bundesbank Survey on Consumer Expectations, September 2021 wave. Inflation expectations prior to and post treatment are truncated to lie in the range $-5 \leq \pi^e \leq 25$. The current inflation rate for August 2021 was given as 3.9% in all treatment groups and the control group (basic treatment). OLS estimations with population weights with robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

IMFS WORKING PAPER SERIES

Recent Issues

167 / 2022	Gerhard Rösl Franz Seitz	On the Stabilizing Role of Cash for Societies
166 / 2022	Eva Berger Sylwia Bialek Niklas Garnadt Veronika Grimm Lars Other Leonard Salzmann Monika Schnitzer Achim Truger Volker Wieland	A potential sudden stop of energy imports from Russia: Effects on energy security and economic output in Germany and the EU
165 / 2022	Michael D. Bauer Eric T. Swansson	A Reassessment of Monetary Policy Surprises and High-Frequency Identification
164 / 2021	Thomas Jost Karl-Heinz Tödter	Reducing sovereign debt levels in the post-Covid Eurozone with a simple deficit rule
163 / 2021	Michael D. Bauer Mikhail Chernov	Interest Rate Skewness and Biased Beliefs
162 / 2021	Magnus Reif Mewael F. Tesfaselassie Maik Wolters	Technological Growth and Hours in the Long Run: Theory and Evidence
161 / 2021	Michael Haliassos Thomas Jansson Yigitcan Karabulut	Wealth Inequality: Opportunity or Unfairness?
160 / 2021	Natascha Hinterlang Josef Hollmayr	Classification of Monetary and Fiscal Dominance Regimes using Machine Learning Techniques
159 / 2021	Volker Wieland	The decline in euro area inflation and the choice of policy strategy
158 / 2021	Matthew Agarwala Matt Burke Patrycja Klusak Moritz Kraemer Kamiar Mohaddes	Rising Temperatures, Falling Ratings: The Effect of Climate Change on Sovereign Creditworthiness
157 / 2021	Yvan Lengwiler Athanasios Orphanides	Collateral Framework:Liquidity Premia and Multiple Equilibria
156 / 2021	Gregor Boehl Cars Hommes	Rational vs. Irrational Beliefs in a Complex World

155 / 2021	Michael D. Bauer Eric T. Swanson	The Fed's Response to Economic News Explains the "Fed Information Effect"
154 / 2021	Alexander Meyer-Gohde	On the Accuracy of Linear DSGE Solution Methods and the Consequences for Log-Normal Asset Pricing
153 / 2021	Gregor Boehl Philipp Lieberknecht	The Hockey Stick Phillips Curve and the Zero Lower Bound
152 / 2021	Lazar Milivojevic Balint Tatar	Fixed exchange rate - a friend or foe of labor cost adjustments?
151 / 2021	Thomas Jost Franz Seitz	Designing a European Monetary Fund: What role for the IMF?
150 / 2021	Gerhard Rösl Franz Seitz	Cash and Crises: No surprises by the virus
149 / 2021	Wolfgang Lechthaler Mewael F. Tesfaselassie	Endogenous Growth, Skill Obsolescence and Output Hysteresis in a New Keynesian Model with Unemployment
148 / 2021	Gregor Boehl	Efficient Solution and Computation of Models with Occasionally Binding Constraints
147 / 2021	Brian Fabo Martina Jančoková Elisabeth Kempf Luboš Pástor	Fifty Shades of QE: Conflicts of Interest in Economic Research
146 / 2021	Robert C.M. Beyer Lazar Milivojevic	Dynamics and Synchronization of Global Equilibrium Interest Rates
145 / 2020	Lars P. Feld Volker Wieland	The German Federal Constitutional Court Ruling and the European Central Bank's Strategy
144 / 2020	Mátyás Farkas Balint Tatar	Bayesian Estimation of DSGE Models with Hamiltonian Monte Carlo
143 / 2020	Gregor Boehl Felix Strobel	U.S. Business Cycle Dynamics at the Zero Lower Bound
142 / 2020	Gregor Boehl Gavin Goy Felix Strobel	A Structural Investigation of Quantitative Easing
141 / 2020	Karl-Heinz Tödter	Ein SIRD-Modell zur Infektionsdynamik mit endogener Behandlungskapazität und Lehren für Corona-Statistiken