

Central Bank Communication as Public Opinion? Experimental Evidence *

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Abstract

A single supranational organization, the European Central Bank (ECB), has a particularly challenging job as it must communicate complex policy information to over 300 million citizens living across 19 member states in the Eurozone. Embedding a vignette experiment into two waves of a panel survey of German households, we examine ways in which communications by the ECB affect individuals' information uptake as well as their inflation expectations. We also test whether approval (or not) of the ECB's policies, news media consumption, and an individual's policy congruence affect how panelists respond to central bank communications. Our main empirical findings suggest that short and clear snippets of ECB information are most effective in shaping respondents' inflation expectations. We also find that respondents more skeptical of the ECB are less likely to incorporate ECB information and that policy congruence with the ECB's target has little to no effect.

1 Introduction

A single supranational central bank, the European Central Bank (ECB), regularly communicates complex monetary policy information to Eurozone citizens. These citizens are distributed across 19 different countries, with nationally distinct economies and heterogeneous populations. Monetary policy – or actions taken by a monetary authority that determine the size and rate of growth of the money supply – is generally thought to be particularly difficult for citizens to understand. The complexity of monetary policy has been blamed for why we rarely see societal cleavages over monetary policy preferences as well as a lack of political mobilization of those interests.¹ Yet, despite their lack of knowledge, citizens' expectations of the economy are crucial in determining economic outcomes.² This leads to a conundrum such that on the one hand, successful monetary policy depends on the central bank's ability to inform the mass public and yet, on the other hand, the public shows limited confidence in their financial literacy and limited interest in understanding what central banks do or say.

One way that central banks can influence the public and increase financial literacy is through the supply of central bank communications, but what type of communication works best? Previous studies have shown that the clarity of central bank communications matters.³ Jansen (2011) finds that even if a central bank communicates regularly, if it does so opaquely, the impact of its communications is lesser than if it were to communicate more clearly. Thus communications that are clear and comprehensible are also those statements most likely to be effective. In addition to the supply of information, however, recipients must also be receptive to the information sent by the central bank as well. That is, given a new piece of information, an individual must trust that the information is credible and be willing to incorporate the information into his or her beliefs.⁴ Political biases that individuals have therefore may also play a role in the up-take of central bank information.

One significant problem in teasing apart these effects is that in the real world, we observe both the central bank disseminating information and citizens taking up the information (or not) simultaneously. Previous studies therefore have a difficult time isolating the causal effects of central bank clarity while also investigating the political mechanisms and/or moderators that may influence receptivity to central bank information. To improve upon this, we embed two

¹Bearce 2003.

²Bernanke 2007; Bodea and Hicks 2015; Bachmann, Berg, and Sims 2015.

³Jansen 2011.

⁴Ehrmann, Soudan, and Stracca 2013.

different vignette experiments into a panel survey of German households. We then directly manipulate central bank statements that panel respondents receive. We test both whether central bank clarity and statement brevity matters for respondents' inflation expectations. In a second step, we also test for political mechanisms and moderators that the literature suggests might shape inflation expectations as well.

We find evidence that shorter and more precise central bank statements move respondents closer to the central bank's announced inflation target. We also find at the aggregate level that more (less) positive opinions of the ECB are associated with more (less) information updating, which is important as it suggests that economic expectations are entangled with public opinion. We also find that the more a respondent is exposed to the news, the more difficult it is to influence his or her inflation expectations. This is likely because they are more informed in the first place. Finally, we find little evidence showing that policy congruence matters for the susceptibility of ECB communications.

Our findings contribute a new understanding of the causal effects of central bank clarity and brevity as well as evidence on the role that political biases can play in shaping information receptivity. As mentioned above, our findings are important because how citizens learn about monetary policy has implications for the success of monetary policy. For example, if financial stability depends on everyday citizens making calculated market adjustments based on economic information, and if only a sub-section of citizens up-take information from the central bank, financial recovery might be longer and more painful than the case when central bank information informs a broader spectrum of people. Interestingly we find that, as the public worsens their opinions of the central bank, the central bank's ability to use central bank communications to shape their expectations goes down. Methodologically, our paper contributes to the literature that examines the origins of households' inflation expectations using survey experiments.⁵

1.1 Literature Review and Theoretical Expectations

Financial knowledge – or the ability to understand how money works – is necessary for undertaking many daily activities, such as following news about the economy, managing debt, and buying a home. A basic understanding of financial concepts and the ability to apply numeracy skills can ensure that citizens manage their own financial affairs and react to news and events in ways that benefit households' own financial well-being. Previous studies find that those with

⁵Armantier et al. 2016; Cavallo, Cruces, and Perez-Truglia 2017; Roos and Schmidt 2012.

higher levels of financial knowledge make better investment and retirement decisions and are also less likely to accumulate debt.⁶ Central banks have recently tried to capitalize on the links between central bank communications and financial literacy by paying closer attention to how they provide information to the mass public. According to Cavallo, “All these efforts may help central banks increase the speed which which individuals react to monetary policy”.⁷

Given that financial knowledge is important for understanding how the economy works as well as forecasting where the economy is going, it is imperative that we understand the sources of citizens’ economic views. Our particular focus in this paper is on the origins of inflation expectations and the causal role that information and political biases may play in shaping inflation expectations. Many if not most individuals have an information deficit when it comes to understanding how monetary policy works. One recent study surveyed Dutch households about their degree of knowledge about what the ECB does. These authors find that the public has very limited knowledge about the ECB, such that, in asking a number of questions about its role, respondents incorrectly guessed more than half of the eleven questions on average.⁸ Furthermore, not only are people relatively uninformed about monetary policy but also individuals have very little desire to become more informed.⁹ Thus the backdrop to our study is that individuals are both relatively uninformed and also relatively uninterested in learning about monetary policy. These factors might make central bank communications particularly challenging for policymakers and so understanding how much and through what channels communications work in shaping economic beliefs is paramount.

How do people form their beliefs about inflation? To what extent does the information clarity and brevity matter for households’ inflation expectations? To tackle these question, we examine both the supply of information by central banks as well as the receptivity to messages across treatment groups and within treatment subgroups. New to this study is that we bring together these research components in a way that can account for possible co-determination. We examine firstly, whether clarity and brevity in central bank communications influences citizens’ expectations of future inflation and secondly, examine whether citizens’ political predispositions and beliefs influence their willingness to take-up central bank information in the first place.

Studies on central bank communication argue that clarity represents a crucial dimension of central banks’ communication. Previously, researchers measure clarity by examining either the

⁶Hastings, Madrian, and Skimmyhorn 2013; Clark, Lusardi, and Mitchell 2017.

⁷Cavallo, Cruces, and Perez-Truglia 2017, p.4.

⁸Cruijnsen, Jansen, and De Haan 2015.

⁹Ibid.

readability of central bank communications¹⁰ or the expressed level of uncertainty in central bank statements.¹¹ Rather than focus on readability or uncertainty, in this paper we focus on the level of precision contained in central bank information by focusing on numerical anchors as well as on the length of central bank information. We say a statement is more clear when it includes numerical anchors and targets and when the information presented is relatively short. Building on the literature reviewed above, our first main set of hypotheses is that:

H1 Central bank statements that use numerical anchors affect individuals' inflation expectations more than statements that do not use numerical anchors.

H2 Central bank statements that are short are more influencing than longer statements.

In addition to the supply side, individuals must also be willing to incorporate information into their beliefs. Previous literature, mainly from economics, usually depicts citizens as optimally combining prior beliefs with information using Bayes' rule. Applied to inflation expectations, Bayesian learning assumes that citizens have prior beliefs about monetary policy outcomes and that citizens update their knowledge by taking new information into account and then revising their prior beliefs, forming posterior inflation expectations. For example, if someone thinks that inflation will be 1% and then is given information that it will actually be 2%, using Bayes' rule, the individual's posterior will be some weighted average of the two, with both the prior and the data contributing to the individual's posterior belief. To date, the empirical evidence in favour of Bayesian learning is mixed. Some authors find that individuals fail to incorporate all the available information provided,¹² yet others interpret the evidence in favour of rational inattention. Still other research suggests that individuals use inaccurate sources when forming their inflation expectations¹³ which some authors interpret as evidence of cognitive limitations.

Citizens may also incorporate economic information in ways that depend on political traits such as their policy preferences or evaluations that they make about institutions sending the information. Rather than be solely calculated inputs, inflation expectations might follow something more akin to Zaller's Receive-Accept-Sample model of opinion formation.¹⁴ According to this model, an individual's inflation expectations might depend on what they have heard or read about and whether and to what extent they accept this information because it is consistent

¹⁰Jansen 2011; Bulíř, Čihák, and Jansen 2013; Montes et al. 2016.

¹¹Baerg Forthcoming.

¹²Mankiw, Reis, and Wolfers 2003; Armantier et al. 2016.

¹³De Bruin et al. 2011; D'Acunto et al. 2019.

¹⁴Zaller 1992.

with their political biases. Inflation expectations, therefore, might reflect public opinion, making them more similar to other kinds of public opinion rather than or in addition to computed statistical quantities. Furthermore, inflation expectations may also depend on political support for policy decisions¹⁵ or on the level of congruence individuals have for the central bank's policy.¹⁶ Finally, expectations may depend on perceptions of performance. Indeed, if the public does not think the central bank is doing a good job, individuals may discount any information sent to them by the institution. This would mean that inflation expectations co-vary with political biases rather than (or in addition to) economic fundamentals. Thus our other set of hypotheses are that:

H3 Central bank information is more likely to attenuate expectations for those individuals who hold favorable opinions of the central bank.

H4 Central Bank information is more effective in affecting individuals with higher financial literacy.

H5 Central bank information is more persuasive for those individuals with policy preferences closer to the central bank's target.

As mentioned above, in the real world, citizens' inflation expectations are simultaneously determined by the information they receive as well as the particular model that they use to incorporate that information, whether Bayesian or politically biased. This means that what we observe in the real world is a combination of the supply side factors and individual level determinants of inflation expectations. To get at the causal effects of information clarity, we implement two waves of survey experiments and directly manipulate the communicated clarity by varying the use of numerical anchors and the length of the texts. These manipulations allow us to make causal claims about across-group average treatment effects. To test how expectations may also be determined by other, individual level characteristics, we also examine within-group differences based on support for the ECB, news consumption, and an individual's policy congruence with the ECB's target. The next section reports the results of our experiments.

¹⁵Tverdova 2012; Mondak 1993.

¹⁶Hobolt and Wratil 2015; Hayo and Neuenkirch 2014.

2 Research design

2.1 Case selection

In order to evaluate the effect of central bank statements on inflation expectations formation, we conducted a 2-wave survey experiment on a panel of respondents in Germany in 2014 and 2015. Germany offers an interesting study environment to examine inflation expectations for two reasons. First, inflation rates during the experimental period were very low in Germany. In low inflation environments, it is relatively cheap for citizens to pay scant attention to the economy, which might make respondents' priors more diffuse. According to models of Bayesian learning, more diffuse priors might mean that citizens make *larger* updates to their inflation expectations when presented with new information. On the other hand, Germany's inflation is so low during the study period that the country is experiencing disinflation – or when inflation rates are slowing down, and even deflation – or where inflation rates are negative – for a couple of months. Disinflation generates significant uncertainties for consumers, especially if they think that prices will be substantially lower in the future. Deflation and disinflation can cause individuals to postpone consumption decisions, for example deciding to buy big purchase items like cars and household appliances in the future because they expect that future prices will be lower. Therefore, during this time period, it may also be costly for citizens to ignore important economic information from the central bank, thus making their priors harder to move and therefore *smaller* updates to their inflation expectations.

In addition to the economic context, it is also important to consider the political context and political salience of monetary policy during this time-period in Germany and across Europe. Throughout the study period, the German and European news-media was engaged in a lively debate about whether or not the ECB should engage in asset purchases of euro-area government bonds in order to help re-inflate struggling European economies (a debate that continues through to 2019). Opinions in Germany on euro-bond purchases varied enormously, with some pundits arguing that by purchasing assets, the ECB was over-extending its legal reach, yet others arguing in support of more activist policies aimed at re-inflating Europe. Important for us, ECB and inflation-related news was noteworthy and contentious during this period, making it a good opportunity to ask survey respondents' about monetary policy, which as we mention in the introduction, is usually less politicized. We especially exploit the timing of this political debate in wave 2 of our study where we encourage citizens to think about the asset purchase program

directly and link the ECB's policy to inflation outcomes.

2.2 Panel

In order to examine the effects of monetary policy communications on individual's inflation expectations, we ran experimental treatments on German households participating in two waves of the German Internet Panel (GIP). GIP respondents are German residents in private households between 16 and 75 years of age. Sampling is based on multistage proportionate stratified random sampling, including equipping previously offline individuals and making them online. Our survey experiments were fielded in November 2014 (Wave 14) and November 2015 (Wave 20). In order to keep things simple, in this paper, we refer to these two runs as waves 1 and 2. During our waves, the total number of respondents for wave 1 was 3,575 and wave 2, 3,159. In wave 1, 948 respondents came from the first panel recruitment in 2012 and the remaining 2,627 respondents from the 2014 November recruitment, which is the start of our sample. In wave two, 859 respondents remained from the 2012 recruitment and 2,300 respondents from the November 2014 recruitment. Of the respondents in the sample, 96% were given our treatments in wave 1 and 97% in wave 2. Non-response answers for our questions was very low, ranging from 2 respondents to 70 respondents. The highest non-response rate in our set of questions appears on the question asking respondents to report their general news consumption levels (70 people, 2%). More details on general panel attrition and non-response are given in the appendix.

2.3 Experimental design

We incorporate two sets of information treatments, one in each wave, in order to identify the causal effects of central bank information on citizens' inflation expectations. In both waves, we implement two information manipulations that vary the level of clarity (wave 1 and wave 2) by including (or not) numerical anchors as well as varying the brevity of the statement given to respondents (wave 2).

In wave 1, we first elicit respondents' prior inflation expectations. Respondents are asked to give an estimate of expected inflation over the next 12 months, which we denote as $\pi_{i,t}^0$. Rather than being asked directly about the annual rate of inflation, respondents are given a hypothetical scenario in which a person is said to have spent 1500 Euros per month on typical purchases for food, goods, and services such as groceries, clothes and a hair-cut. Respondents are then asked by how much they think the same person would spend on the same items 12 months from now.

As response options, respondents are given a list of different Euro amounts ranging from “less than 1500 Euros” to “1650 Euros or more.” Each response option is measured in increments of 1 percent annual inflation, forcing respondents to consider the same scale, but panelists are not told the interval lengths at the time of answering.

On the next screen, respondents are then asked to consider inflation in Germany in general. Respondents are given a short explanation about inflation, including a definition, and about the role of the ECB in managing inflation in the Eurozone. Then, respondents receive either a vignette with a text snippet that gives information about inflation and also the ECB’s policy goals, with explicit numerical anchors (*Precise Information*) or a similar text that uses vaguer language without numerical anchors (*Vague Information*). The (English translation) of the vignettes read as follows:

Precise Information: The European Central Bank expects the important interest rates to remain at the current level or below for a longer period of time. This assessment rests on the general expectation of low inflation of 1 percent per year. The expected inflation for the Eurozone is in line with the objective of the Central Bank to keep inflation at 2 percent.

Vague Information: The European Central Bank expects the important interest rates to remain at the current level or below for a longer period of time. This assessment rests on the general expectation of low inflation. The expected inflation for the Eurozone is in line with the objective of the Central Bank to keep inflation at an appropriate level.

Respondents are then asked a number of questions, including a manipulation check, to make sure that they understood the question. Importantly, respondents are also asked to give their evaluation of how well the ECB is doing in terms of delivering on its mandate. In order to proxy an individual’s support for the central bank, we give respondents a 5 point scale ranging from “very good” to “not good” for their assessment.

Finally, before measuring our main outcome variable, respondents are shown their answer to the initial inflation question and told how their initial response translates into an annual inflation rate. This computation makes their initial beliefs directly comparable to the annual inflation rate information presented in the treatment text. We then measure the main outcome variable, 12-month ahead inflation expectations, to assess the effect of the information treatment on respondents’ expected inflation. In order to cue the respondents to think about their priors

explicitly when answering the question, we add the text, “considering these expectations by the ECB [...]”. We denote respondent’s answers to this question as, $\pi_{i,1}^1$, and we call this measure their posterior inflation expectations.

Wave 2 occurs exactly 12 months later and, because it is a panel, has the same respondents, with the exception of a loss of some respondents discussed above. We again use a similar treatment, but now vary the information on two dimensions, the use of a numerical anchor or not, as before, and the length of the text, short and long. As mentioned above, we also tap into the controversy of the ECB asset purchase program, which was highly salient in the German media during this time period. German politicians and right-wing figures legally challenged the ECB’s emergency bond-buying scheme in a number of prominent court-cases. While Germany’s constitutional court ruled that the bond-program was legal, Jens Weidmann, the president of Germany’s central bank, frequently criticized the program publicly.

The four (English translations) of the treatment conditions read as follows:

Precise, long text: The ECB extends its purchase of bonds to those issued by Eurozone governments, issuers with development objects, and issued by European institutions. Overall, monthly purchases of a total value of 60 million Euros are planned. These purchases will continue until September 2016 at a minimum. The program serves to fulfill the ECB mandate to ensure price stability and reach a medium-term inflation rate close to 2%.

Vague, long text: The ECB extends its purchase of bonds to those issued by Eurozone governments, issuers with development objects, and issued by European institutions. Overall, monthly purchases of high total value are planned. These purchases will continue until the middle of next year at a minimum. The program serves to fulfill the ECB mandate to ensure price stability and reach a medium-term inflation rate close to an appropriate level.

Precise, short text: The ECB extends its purchase of bonds. Purchases of a total value of 60 million Euros will continue until September 2016 and serve to fulfill the ECB mandate to ensure price stability and reach a medium-term inflation rate close to 2%.

Vague, short text: The ECB extends its purchase of bonds. Purchases of high total value will continue until the middle of next year and serve to fulfill the ECB mandate to ensure price stability and reach a medium-term inflation rate close to an appropriate level.

As in wave 1, we again ask respondents for their posterior inflation expectations using the same text as we used in wave 1, and we denote wave 2, one-year ahead posterior expectations as $\pi_{i,2}^1$. Questionnaire items are given verbatim (in German) in the appendix.

2.3.1 Measures

The main variables that we are interested in include the respondent's prior beliefs about the rate of annual inflation over the next 12 months, $\pi_{i,1}^0$, as well as their posterior beliefs after receiving the information treatment $\pi_{i,1}^1, \pi_{i,2}^1$. Additionally, we are also interested in the respondent's opinion of the ECB, *ECB approval*, as well as their policy congruence with the ECBs target which we discuss more below.

We also ask respondents a number of other questions and we use answers to these questions in our analyses as well. In wave 1, in addition to measuring the 12-month ahead inflation expectations, we also ask respondents for their 5-year and 10-year ahead inflation expectations, $\pi_{i,1}^5, \pi_{i,1}^{10}$. Finally, we ask respondents to self report how much general news consumption (*News consumption*) and business/financial news consumption (*Business news consumption*) they watch, listen to, or read. We use these measures as proxies for financial literacy and financial sophistication.

As mentioned above, in wave 2, we ask respondents about the preferred inflation rate so as to measure policy congruence with the ECB's target rate. We elicit respondents' preferred inflation rate by deploying a number of techniques. Rather than consider only their self-reported preferences when asked directly, respondents also indicate their inflation preferences by completing a number of small interactive tasks. In all of these tasks, we also include an additional comprehension checks.

- A. Respondents decide between either an economic scenario of high unemployment and low inflation in Germany and the Eurozone with an additional comprehension questions. A scenario where both indicators are stable is not given as an option.
- B. Respondents move interconnected sliders for interest rate, inflation, unemployment rate, and growth rate (order of sliders is randomized), for Germany, the Eurozone, or for their individual situation. These sliders cue respondents that these indicators involve trade-offs. For example, when inflation rates increase, so do interest rates. Respondents are then asked to choose their preferred outcome.
- C. Respondents report their preferred weighting that the ECB (or the German federal gov-

ernment) should apply to lowering inflation vs reducing unemployment on a scale of 0 to 10.

Using the outputs from these interactive tasks, we then measure *Policy Congruence* as the (quadratic) distance between the respondent’s preferred inflation rate and the ECB’s announced 2% target rate. In the main results, the policy rate we use comes from the task where respondents use sliders to specify their preferred inflation rate, however, we also run the results using the alternative measures and present them in the appendix. Interestingly, we find little individual-level variation across the number of ways we try to get at preferred policy rates and find that an individual holds similar preferences regardless of whether they are considering the Eurozone, Germany, or their own personal situation. Alternatively, however, we do observe significant across-respondent variation. For example, while two-thirds of the respondents prefer the low inflation, high-unemployment scenario, a remaining one-third of respondents prefer the converse.

Table 1 summarizes the treatment and outcome measures. The time-line indicates in which of the two waves of the survey and at which point within the wave an outcome was measured as well as when the treatment intervention happened. While the survey experiment was not pre-registered, an earlier pre-test survey was fielded between July and August 2014, using a quota-sample of German households. All questions used in the analysis are also contained in the pre-test.¹⁷

Table 1: Time-line of treatments and outcome measures within and across the two waves of the German Internet Panel (GIP)

→ Time →						
	Wave 1, November 2014				Wave 2, November 2015	
Treatments		$\pi_{i,1}^T$			$\pi_{i,2}^T$	
Outcome measures	$\pi_{i,1}^0$				$\pi_{i,2}^1$	
Manipulation checks			✓	$\pi_{i,1}^1, \pi_{i,1}^5, \pi_{i,1}^{10}$		
Additional measures			ECB approval, News consumption, Business News consumption			Policy Congruence

As shown in 1, because the ECB approval, news consumption, and business news consumption questions are asked after treatment but before the outcome measures, these variables operate as possible mechanisms. Alternatively, in wave 2, the policy congruence question is asked after the outcome measure. Because of this sequencing, we refer to this variable as a possible moderator.

¹⁷Author

3 Results

In this section, we present the results from our experiments starting with descriptive information. For valid claims based on our experimental manipulations, we need to ensure balance across our treatment groups in relevant observables. In particular, we must ensure that there are no significant differences in respondents' reported prior inflation expectations across the treatment and the control group. Figure 1 shows little evidence that respondents allocated into the different groups start off with any significant variation in their prior expectations of future inflation. Second, we also examine the posterior inflation expectations across treatment groups in wave 1, measured after respondents received the information manipulation. Recall the two different messages: half of our respondents receive numerical information about both the value of inflation and the ECB's target whereas the other half of our respondents receive no-numerical targets and less clear information about the ECB's policy objective. Figure 2 describes the effect of the different information treatment conditions on posterior expectations graphically. As is apparent from the figure, more precise information substantially reduces respondents' average posterior inflation expectations as well as lowers the variance. It is important to note, however, that the variance decreases in both groups, suggesting that both groups of respondents lowered their expectations likely as a consequence of calculated inconsistencies between the euro amount selected when eliciting their priors and the computed annual inflation rate given post treatment.

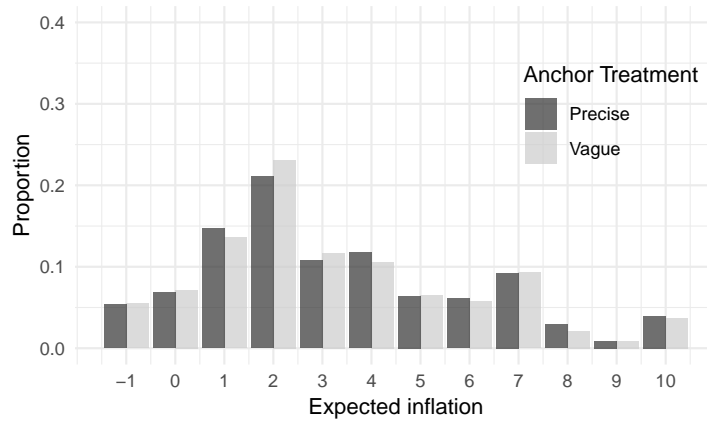


Figure 1: Respondents' Prior Inflation Expectations

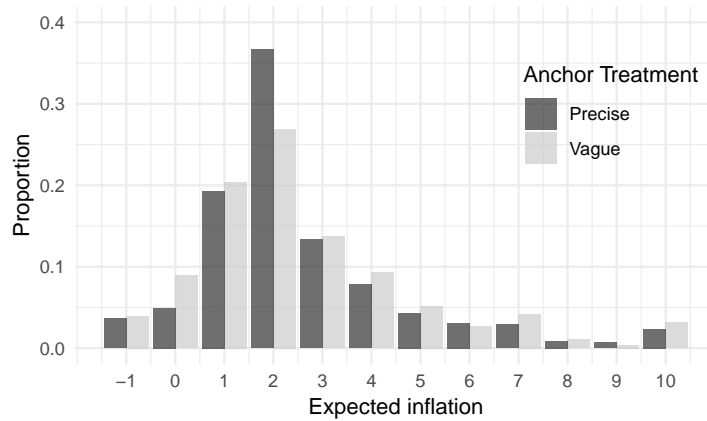


Figure 2: Respondents' Posterior Inflation Expectations

Figure 3 illustrates the relationship between respondents' prior and posterior one-year ahead inflation expectations, grouped by the information treatment that they are allocated to. We find a clear distinction between those respondents who are given more clear information compared to those who are given less clear information. Those respondents in the clear treatment group are more likely to tighten around the ECB's numerical inflation target than those respondents given less clear information. This can be seen by examining the weight of the prior across the two groups. Individuals in the group that receive clear information down-weight their priors and update their posteriors to the new information more so than those given less clear information.

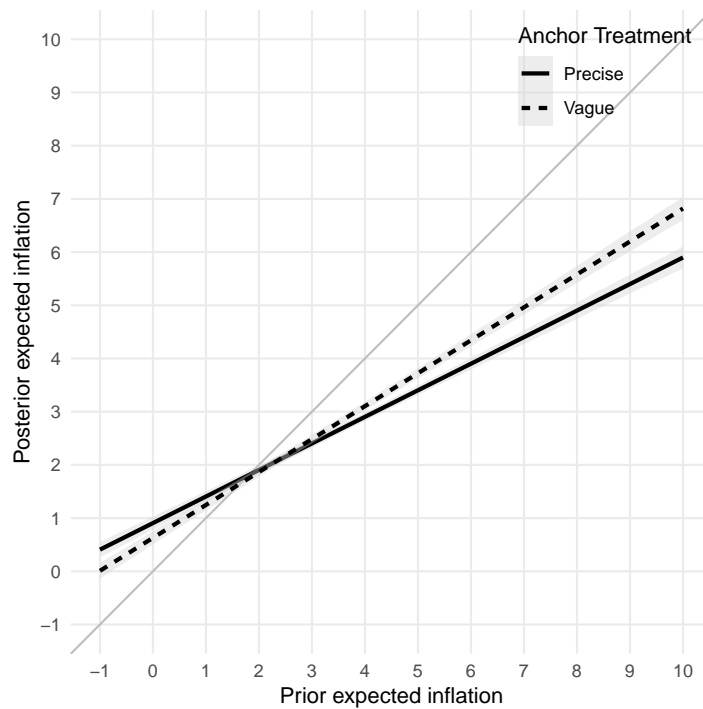


Figure 3

In order to check whether or not movements in expectations are consistent with Bayesian learning, we examine the difference in updating over different values of respondents' prior inflation expectations. This information is shown graphically in Figure 4. Here we find that the largest treatment effect arises for those respondents who hold prior beliefs that are furthest away from the ECB's target rate (i.e. those that are most uninformed). On average, we see that respondents with prior beliefs just below the ECB target rate at 1% update positively. Those who think that inflation will go down also update positively, with the exception of those at 0. Moving to those individuals with prior inflation expectations above the ECB's target rate of 2%, here we see that respondents update negatively. Perhaps unsurprisingly, as the number of respondents who hold relatively higher prior inflation beliefs ($\geq 5\%$) gets smaller, the estimates become more uncertain, and many of the estimates cross the 0 line.

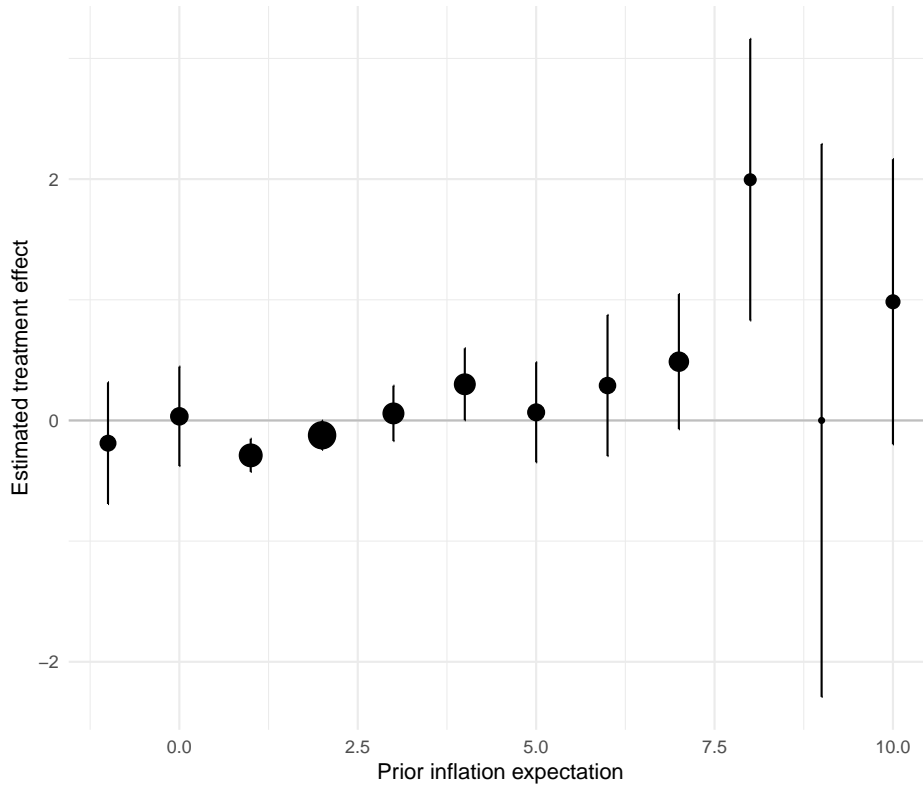


Figure 4: Estimated treatment effect on posterior inflation expectation over prior inflation expectation

To better understand aggregate differences across the groups, we examine whether the marginal effect of prior inflation expectation (as elicited in wave 1) on posterior inflation expectation differs by treatment condition. The marginal effects are estimated from a linear regression of posterior inflation expectation on prior inflation expectation, including a dummy variables for the different treatment condition (vague or precise information in wave 1; vague/short, vague/long, precise/short, or precise/long information in wave 2), as well as individual-level controls (See Table 2). These marginal effects are presented in Figure 5 and speak directly to our first and second hypotheses (H1,H2). On average, those respondents that receive the precise information treatment place a significantly lower weight on their priors (and therefore a higher weight on new data) than those respondents that receive vague information. These results are consistent with the idea that more precise signals are more effective than information that is vague. Second, the fact that those with more mistaken priors update more is also consistent with arguments that the central bank can indeed provide informative information to the general public.

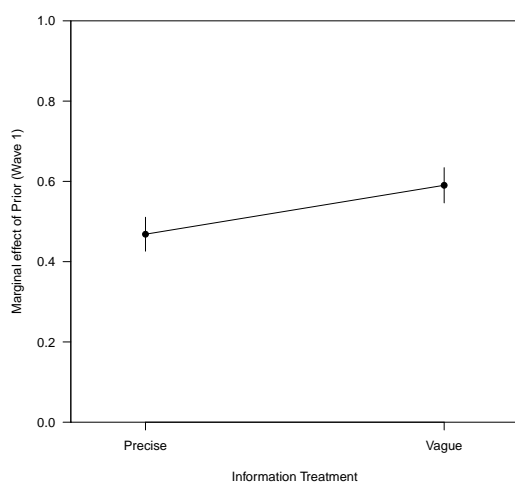


Figure 5: Marginal Effect of Vague (0) and Precise (1) Information on Priors (Wave 1)

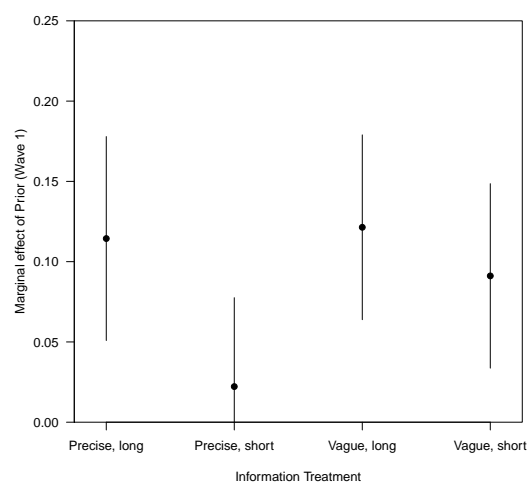


Figure 6: Marginal Effect of Information (Wave 2) on Priors (Wave 1) by Content and Length

We also want to investigate the marginal effect of wave 1-priors on wave 2-posterior beliefs. Recall, the information treatment in wave 2 varies both the length of the statement given to respondents in addition to its level of clarity. Because we have already elicited prior expectations one-year earlier, and we assume that priors are relatively sticky, we also include respondents' prior expectations into the analysis. As before, figure 6 shows that clear information is more effective at reducing the weight of one's priors than less clear information. Also important is that we find that brevity also matters. Information that is both precise and short shows the weakest association between a respondent's prior and posterior inflation expectations when compared to either longer, clear information or vague information, and even when we account for individuals' fundamental beliefs about the economy.

A range of important conclusions can be drawn from the results of our initial experiments. First, we find evidence that when the monetary authority communicates in a more clear manner using numerical targets, on average, individuals' inflation expectation will adjust to the ECB's target rate – with those inflation priors just below 2% adjusting up to the target and those with inflation priors just above 2% adjusting down to the target. Second, we also find that the length of the statement also matters, and this is true even if we account for pre-treatment characteristics, such as an individual's prior beliefs asked in the previous year (wave 1). Third, we also find that central bank communication moves citizens' inflation expectations in ways consistent with the information given, both upwards and downwards and that they move towards

the target rate and not the true rate of inflation. Thus, our findings confirm observational studies that show that central banks can alter agents' expectations and in ways that they intend.¹⁸ It is important to note, however, that the substantive effect of the information on respondents' prior beliefs is relatively small. For example, going from a clear long piece of information to a clear short text lowers the estimated weight of the prior on posterior inflation expectation by $\approx 0.10(.05, 0.15)$.

Table 2: Regression Results

	<i>Dependent variable: Posterior wave 1</i>				
	(1)	(2)	(3)	(4)	(5)
Prior	0.499*** (0.457,0.542)	0.414*** (0.329,0.499)	0.525*** (0.400,0.651)	0.261*** (0.142,0.381)	0.263*** (0.087,0.438)
Precise information treatment	-0.278*** (-0.443,-0.113)	-0.295*** (-0.460,-0.130)	-0.278*** (-0.443,-0.112)	-0.272*** (-0.436,-0.109)	-0.292*** (-0.457,-0.127)
Business news consumption		-0.059** (-0.106,-0.013)			-0.074** (-0.138,-0.011)
News consumption			-0.001 (-0.065,0.063)		0.049 (-0.042,0.141)
ECB approval				0.064 (-0.043,0.170)	0.070 (-0.037,0.177)
Prior \times Precise information treatment	0.120*** (0.060,0.180)	0.128*** (0.068,0.188)	0.119*** (0.059,0.179)	0.113*** (0.054,0.172)	0.122*** (0.063,0.181)
Prior \times Business news consumption		0.017** (0.0004,0.033)			0.019* (-0.002,0.041)
Prior \times News consumption			-0.004 (-0.025,0.016)		-0.014 (-0.042,0.014)
Prior \times ECB Approval				0.074*** (0.036,0.111)	0.068*** (0.031,0.105)
Constant	0.906*** (0.792,1.020)	1.207*** (0.950,1.464)	0.912*** (0.511,1.313)	0.774*** (0.462,1.086)	0.836*** (0.328,1.344)
Observations	3,464	3,438	3,457	3,457	3,432
R ²	0.457	0.457	0.460	0.474	0.472
Adjusted R ²	0.457	0.456	0.459	0.473	0.470
<i>Note:</i>	* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$				

3.1 Political biases: Mechanisms and Moderators?

Estimated treatment effects above show substantial individual-level heterogeneity. So as to determine what other factors may be influencing the take-up of information, we also consider a number of political variables that we think may work as additional mechanisms and moderators,

¹⁸Ehrmann and Fratzscher 2009.

influencing individuals' inflation expectations. In this section, we examine the influence of individual's perceptions of the ECB and media consumption by treatment group, conditional on respondents' prior inflation expectations. We further consider respondent's self-reported consumption of news media and self-reported consumption of financial news media as well as their policy congruence with the ECB's target rate.

The regression reported in Table 2 (Model 4) tests for a relationship between respondent's inflation expectation and respondent's attitudes towards the ECB speaking to our hypothesis 3. As mentioned, respondents' opinions of the ECB are measured on a Likert-type scale, where 1 is very good and 5 not very good. The middle category is neither good nor bad. If opinions about the ECB have an effect on the receptivity of central bank communications, then we should expect that respondents with more favorable opinions of the ECB (lower values) should also be more likely to up-weight information given by the ECB and down-weight their prior inflation expectations in forming posterior inflation expectations. Furthermore, we might expect that the information treatment works stronger for supporters the clearer the information. In order to test this, we first examine the marginal effect of prior expectations on posterior inflation expectation at each realization of the Likert-scale of attitudes towards the ECB by treatment condition. Our results are shown in Figure 7. Indeed, we find evidence that respondents who view the ECB favorably are also more likely to down-weight their priors and conversely, those less likely to view the ECB favourably are less affected. Going from a rating of the ECB is doing a good job to the ECB is doing a bad (from interval 2 to 4 on the scale) reduces the weight of the prior around 0.15. Interestingly, the substantive effect that we find is similar in magnitude to manipulation of the short text to the long text. This may imply that one way that the central bank can compensate for negative public approval is by increasing the clarity and reducing the length of its communications. Secondly, we also see that this effect is magnified for the precise treatment group, with statistically significant differences across groups of respondents for those that answered between 2 and 4 on the scale.

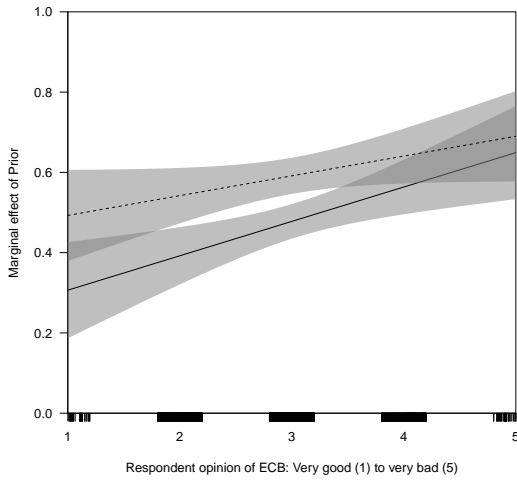


Figure 7: Marginal Effect of Prior on Posterior Inflation Expectation by Attitudes towards the ECB (Vague – dashed line, Precise – solid line)

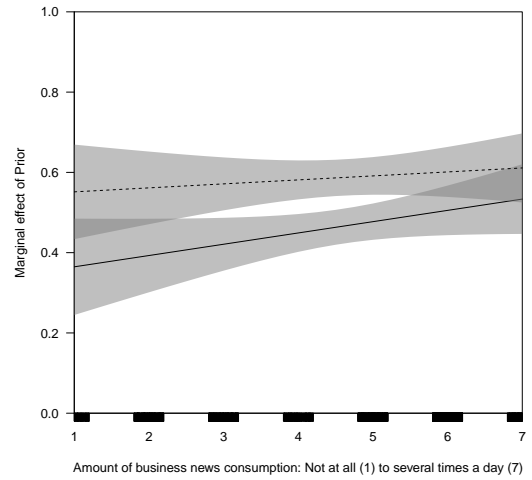


Figure 8: Marginal Effect of Priors on Posterior Inflation Expectation by Business News Consumption (Vague – dashed line, Precise – solid line)

In addition to opinions about the ECB, we also want to test whether financial sophistication matters for information uptake. We proxy financial sophistication by asking respondents to self-report their media consumption, asking for both general as well as business news consumption. As shown in Table 2 (Model 3), the general consumption of news media does not matter for respondents' posterior inflation expectations and does not interact with prior inflation expectation in determining the posterior. Respondents who self-report consuming more business news, however, hold lower posterior inflation expectations than those who do not consume business news as much. Business news consumption also interacts significantly with prior inflation expectation. In particular, as shown in Figure 8, the weight on prior inflation expectation increases with business news consumption. Further, respondents who report to consume more business news are also more likely to have inflation priors closer to the ECB target, which implies that they are learning about the economy from private sector sources and have a more sophisticated understanding of the economy. Interestingly and unlike in models where individuals with political sophistication are more likely to take up elite cues, in the case of central bank news, we see that people more exposed to business news have stickier priors than those with less exposure, which is consistent with models of Bayesian learning.

Our final consideration is whether deviations in individual's preferences from the ECB's monetary target may also condition the influence of monetary information. As mentioned above, we try to elicit respondents priors in a number of ways. We first ask them directly, both for

their own personal inflation preferences, their preferences for the Eurozone as a whole, and their preferences for Germany. On average, respondents do not vary much in their answers despite these different hypothetical scenarios, with a median response that is very stable across the three types of questions (2.8, 2.8, 2.7). For inducing respondents to consider monetary policy as if it involves trade-offs, we show sliders on respondents' screen and ask them to select their preferred inflation rate, while they can see the effect of their preferred rate on other variables of interest (interest rate, unemployment rate, and growth rate). Respondents' preferred inflation rate emerges at a very similar 2.5 percent. Unlike the above, we find little evidence of a relationship between policy distance from the ECB's inflation target and the marginal effect of the prior. The fact that individual's preferences matter little makes our findings that public opinions about the ECB do matter even more interesting. It seems that information is conditioned by whether or not someone positively (or negatively) evaluates the ECB and is irrespective of their own preferred policy.

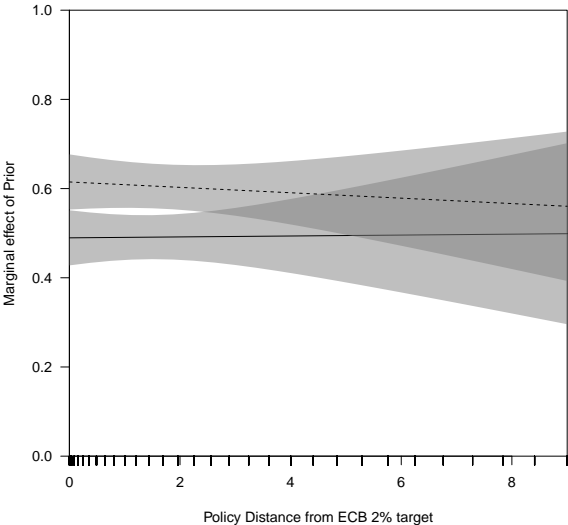


Figure 9: Marginal Effect of Priors on Posterior Inflation Expectation by Policy Convergence (Vague – dashed line, Precise – solid line)

4 Conclusion

In this note, we provide some evidence that German households are sensitive to (short) textual information communicated by the European Central Bank. Furthermore, we find that this is true even during a time period where current inflation is low, less than two-percent, and the ECB's policy is hotly contested in the media.

We motivated our experiment as a tool to test predictions from different theories, however, we find evidence that both Bayesian learning and political predispositions matter. Our findings are important for understanding how central banks can help in improving the public's financial literacy. In Bayesian learning, political institutions transfer knowledge to citizens and this knowledge is expected to improve citizens' financial literacy and we find three supporting pieces of evidence which suggests that indeed this occurs. Firstly, people update properly (i.e. in the correct direction) and do so more when more precise information is given. Secondly, individuals that are either supportive of the ECB or less opinionated (the middle category) are more affected by precise information than others. Thirdly, individuals that know more about the economy from private sources, update less, which is also consistent with models of Bayesian learning.

As a warning, however, our evidence also suggest that the central bank's communication policy may be less effective for those that hold stronger negative opinions of the central bank. Potentially mitigating this, we find that communications that are shorter and more precise may go some way in helping respondents update their inflation forecasts correctly, which may act as a counterbalance against negative public opinion of the institution. Interestingly, the German public, and its monetary elites, have become even more critical of the ECB since our study was fielded.¹⁹ According to our results, elite signals in the German media toting the ineffectiveness of ECB policy may indeed undermine the communication tools the ECB has in its arsenal for stabilizing inflation. Such a finding is therefore analogous to claims that increases in Euroskepticism can reduce the legitimacy of European institutions and also their effectiveness.²⁰

In addition to these empirical contributions, our findings provide a number of new findings for the literature on public opinion. While previous studies suggest that political sophisticates may be more likely to adopt political information by their favored elites, in our experiment, we find little evidence that public information crowds out private sector information for those well informed. We also find surprising stability in households' personal preferences over inflation and we find that households are likely to report consistent preferences and make little distinction between personal inflation preferences, Eurozone inflation, and German inflation. Furthermore, while many studies have examined how non-elected political elites change citizens' opinion,²¹ new to this study is testing whether or not central banks can change citizens' understanding of the economy, and how, which also has important knock-on effects of models of politics, for

¹⁹German scepticism of the ECB reveals a eurozone paradox

²⁰Baerg and Hallerberg 2016.

²¹Iyengar and Kinder 1987; Broockman and Butler 2017.

example, models of economic voting.

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Appendix

A Statistical appendix

A.1 Attrition details

	2012 sample	2014 sample	Completion rate	Cumulative response
Wave 14 (November 2014)	948	2627	72.4%	14.8%
Wave 20 (November 2015)	859	2300	63.8%	13.0%

Table A.1: Attrition statistics for the German Internet Panel

A.2 Wave and treatment statistics

	Frequency	Proportion
Wave 1		
Precise information	1729	.499
Vague information	1735	.501
	3464	
Wave 2		
Precise information	short	.25
	long	.25
Vague information	short	.25
	long	.25
	3072	

Table A.2: Wave and treatment statistics

B Experimental design

B.1 Questionnaire items

B.1.1 Wave 1 (November 2014)

1. Assessing inflation

(a) German original:

Bei den folgenden Fragen besteht Ihre Aufgabe darin, Preisentwicklungen einzuschätzen. Eine Person gibt aktuell 1500 Euro für Lebensmittel und Kleidung sowie für Friseurbesuche pro Monat aus. Wie werden sich diese Ausgaben in 12 Monaten verändern? Geben Sie bitte an, wie viel diese Person für Lebensmittel und Kleidung sowie für Friseurbesuche in 12 Monaten ausgeben wird. Gehen Sie bitte davon aus, dass sich weder die Lebensumstände noch das Konsumverhalten der Person verändern wird, d.h. sie wird in 12 Monaten ähnliche Produkte und Dienstleistungen im gleichen Umfang wie derzeit nutzen. Bei dieser Frage können Sie nur eine Antwort geben.

Ausgaben in 12 Monaten [Answer key:] weniger als 1500 EUR, 1500 EUR, 1515 EUR, 1530 EUR, 1545 EUR, 1560 EUR, 1575 EUR, 1590 EUR, 1605 EUR, 1620 EUR, 1635 EUR, 1650 EUR oder mehr.

2. Inflation expectation, vague/ precise treatment condition

(a) German original:

Bei den folgenden Fragen besteht Ihre Aufgabe darin, Preisentwicklungen einzuschätzen. Eine Person gibt aktuell 1500 Euro für Lebensmittel und Kleidung sowie für Friseurbesuche pro Monat aus. Wie werden sich diese Ausgaben in 12 Monaten verändern? Geben Sie bitte an, wie viel diese Person für Lebensmittel und Kleidung sowie für Friseurbesuche in 12 Monaten ausgeben wird. [Anchoring treatment 1 (AT1):]

AT1.1 Vague information:

Die europäische Zentralbank erwartet, dass die wichtigen Zinssätze für eine längere Zeit auf dem gegenwärtigen Level oder darunter liegen werden. Diese Einschätzung beruht auf den insgesamt gedämpften Inflationsaussichten. Die Inflationserwartung für die Eurozone deckt sich mit dem Ziel der Zentralbank die Preissteigerung auf angemessenem Niveau zu halten.

AT1.2 Precise information:

Die europäische Zentralbank erwartet, dass die wichtigen Zinssätze in den nächsten 6 bis 12 Monaten auf dem gegenwärtigen Level oder darunter liegen werden. Diese Einschätzung beruht auf den insgesamt gedämpften Inflationsaussichten von derzeit 1 Prozent pro Jahr. Die Inflationserwartung für die Eurozone deckt sich mit dem Ziel der Zentralbank die Preissteigerung nahe 2 Prozent zu halten.

Bei der vorherigen Frage haben Sie angegeben, dass eine Person im [Date, year from now][Answer from question 1] für Lebensmittel und Kleidung ausgeben wird. Dieser Betrag entspricht einer jährlichen Inflationsrate von [Answer from question 1 expressed as inflation rate]. Wenn Sie nun die Erwartungen der EZB berücksichtigen, was schätzen Sie: Wie viel Euro wird diese Person für die gleichen Lebensmittel und die gleiche Kleidung im [Date, year from now] bezahlen? Gehen Sie bitte davon aus, dass sich weder die Lebensumstände noch das Konsumverhalten der Person verändern wird, d.h. sie wird in 12 Monaten ähnliche Produkte und Dienstleistungen im gleichen Umfang wie derzeit nutzen. Bei dieser Frage können Sie nur eine Antwort geben.

Ausgaben in 12 Monaten [Answer key:] weniger als 1500 EUR, 1500 EUR, 1515 EUR, 1530 EUR, 1545 EUR, 1560 EUR, 1575 EUR, 1590 EUR, 1605 EUR, 1620 EUR, 1635 EUR, 1650 EUR oder mehr.

3. Medium-term inflation expectation

(a) German original:

Mit welcher jährlichen Inflationsrate rechnen Sie in 5 Jahren? Bei dieser Frage können Sie nur eine Antwort geben. [Answer key:] -1,0,1,2,3,4,5,6,7,8,9,10 %

4. Long-term inflation expectation

(a) German original:

Mit welcher jährlichen Inflationsrate rechnen Sie in 10 Jahren? Bei dieser Frage können Sie nur eine Antwort geben. [Answer key:] -1,0,1,2,3,4,5,6,7,8,9,10 %

5. Manipulation check

(a) German original:

Vague information treatment condition:

In einer der vorherigen Fragen haben Sie folgende Informationen gelesen: Die Inflationserwartung für die Eurozone deckt sich mit dem Ziel der Europäischen Zentralbank, die Preissteigerung auf angemessenem Niveau zu halten.

Precise information treatment:

In einer der vorherigen Fragen haben Sie folgende Informationen gelesen: Die Inflationserwartung für die Eurozone deckt sich mit dem Ziel der Europäischen Zentralbank, die Preissteigerung nahe 2% zu halten.

Für wie detailliert halten Sie diese Information?

Answer key: *überhaupt nicht detailliert, wenig detailliert, mäßig detaillier, ziemlich detaillier, sehr detailliert*

6. Approval of ECB

(a) German original:

Die Hauptaufgabe der Europäischen Zentralbank (EZB) ist es, dafür zu sorgen, dass die Preise in der gesamten Eurozone stabil bleiben. Das bedeutet, dass die EZB dafür verantwortlich ist, dass sich die Preise über die Zeit nur wenig verändern. Wie erfüllt die EZB Ihrer Meinung nach die Aufgabe, die Preise stabil zu halten?

Answer key: *sehr gut, gut, weder gut noch schlecht, schlecht, sehr schlecht*

7. News consumption

(a) German original:

Wie oft schauen oder lesen Sie Nachrichten?

Answer key: *gar nicht, seltener als einmal pro Woche, einmal pro Woche, alle 4-6 Tage, alle 2-3 Tage, einmal am Tag, mehrmals am Tag*

8. Business news consumption

(a) German original:

Wie oft schauen oder lesen Sie Nachrichten zu wirtschaftlichen Themen?

Answer key: *gar nicht, seltener als einmal pro Woche, einmal pro Woche, alle 4-6 Tage, alle 2-3 Tage, einmal am Tag, mehrmals am Tag*

B.1.2 Wave 2 (November 2015)

1. Preference inflation vs unemployment Germany (*CD20100 pref_inflation_unemployment_de*)

(a) German original:

Bei den folgenden Fragen geht es um Inflation. Wenn alles teurer wird spricht man von Inflation und meint damit, dass Sie sich für denselben Geldbetrag weniger kaufen können. Die Stärke der Inflation wird als Inflationsrate bezeichnet. Die Inflation wirkt sich auf die Arbeitslosenrate aus. Üblicherweise sind entweder die Inflationsrate oder die Arbeitslosenrate niedrig, nicht aber beide zum selben Zeitpunkt. Stellen Sie sich vor, dass Sie für Deutschland zwischen zwei extremen Szenarien wählen müssten. Für welches dieser beiden Szenarien würden Sie sich entscheiden? [Answer key:] Deutschland hätte in den nächsten 2 Jahren eine Inflationsrate von nur 2% pro Jahr, bei einer gleichzeitigen Arbeitslosenrate von 15%. Deutschland hätte in den nächsten 2 Jahren eine Inflationsrate von 15% pro Jahr, bei einer gleichzeitigen Arbeitslosenrate von nur 2%.

2. Comprehension inflation vs unemployment trade-off Germany (*CD20101 pref_inflation_unemployment_de_* or *CD20102 pref_inflation_unemployment_de_s3*)

(a) German original:

Sie haben sich bei der vorherigen Frage für das [erste/zweite] Szenario entschieden: Deutschland hätte in den nächsten 2 Jahren eine Inflationsrate von nur [2/15]% pro Jahr, bei einer gleichzeitigen Arbeitslosenrate von [15/2]%. Das [zweite/erste]

- Szenario lautete: Deutschland hätte in den nächsten 2 Jahren eine Inflationsrate von [15/2]% pro Jahr, bei einer gleichzeitigen Arbeitslosenrate von nur [2/15]%. Wie hoch müsste die prozentuale Arbeitslosenrate im ersten Szenario mindestens sein, damit Sie sich für das zweite Szenario entscheiden würden? Bitte tragen Sie eine Zahl [zwischen 16 und 100/größer als 15] ein. [Answer key:] Integer [16-100/>15]*
3. Preference inflation vs unemployment Eurozone (*CD20103 pref_inflation_unemployment_eu*)
- (a) German original:
Stellen Sie sich vor, dass Sie für den Euroraum zwischen zwei extremen Szenarien wählen müssten. Für welches dieser beiden Szenarien würden Sie sich entscheiden ? [Answer key:] Der Euroraum hätte in den nächsten 2 Jahren eine Inflationsrate von nur 2% pro Jahr, bei einer gleichzeitigen Arbeitslosenrate von 15%. Der Euro-raum hätte in den nächsten 2 Jahren eine Inflationsrate von 15% pro Jahr, bei einer gleichzeitigen Arbeitslosenrate von nur 2%.
4. Comprehension inflation vs unemployment trade-off Eurozone
 (*CD20104 pref_inflation_unemployment_de_s2* or *CD20105 pref_inflation_unemployment_de_s1*)
- (a) German original:
Sie haben sich bei der vorherigen Frage für das [erste/zweite] Szenario entschieden: Der Euroraum hätte in den nächsten 2 Jahren eine Inflationsrate von nur [2/15]% pro Jahr, bei einer gleichzeitigen Arbeitslosenrate von [15/2]%. Das [zweite/erste] Szenario lautete: Der Euroraum hätte in den nächsten 2 Jahren eine Inflationsrate von [15/2]% pro Jahr, bei einer gleichzeitigen Arbeitslosenrate von nur [2/15]%. Wie hoch müsste die prozentuale Arbeitslosenrate im ersten Szenario mindestens sein, damit Sie sich für das zweite Szenario entscheiden würden? Bitte tragen Sie eine Zahl [zwischen 16 und 100/größer als 15] ein. [Answer key:] Integer [16-100/>15]
5. Inflation/interest rate/unemployment rate/growth rate preference Eurozone/Germany
 (*CD20106 pref_inflation_eu* or *CD20107 pref_inflation_de*)
- (a) German original:
Die Europäische Zentralbank (EZB) und die Euroländer, wie beispielsweise die Deutsche Bundesbank, legen die wichtigsten Zinssätze für den Euroraum fest. Dieser Zins wird als Leitzins bezeichnet, da er die gesamte Volkswirtschaft beeinflusst. Durch die Erhöhung des Leitzinses macht die Zentralbank das Geld "teurer," das heißt Bürger und Unternehmen nehmen weniger Kredite auf. Damit ist das Geld der Banken weniger gefragt und die Inflation sinkt. In den folgenden zwei Fragen werden Sie gebeten, einmal die Rolle der EZB einzunehmen und den Leitzins für den Euro-raum festzulegen und einmal die Rolle der deutschen Bundesbank einzunehmen und entsprechend den Leitzins für Deutschland festzulegen. In der dritten Frage bittet man Sie, einen Leitzins festzulegen, der für Ihre eigene finanzielle Situation am besten ist. Der Leitzins hat einen Einfluss auf die Höhe der Inflation, der Arbeitslosigkeit und des Wirtschaftswachstums im Euroraum und auch in Deutschland. Stellen Sie sich vor, dass Sie die Rolle der [EZB/Bundesbank] übernehmen und den Leitzins für [den Euroraum/Deutschland] festlegen. Der Leitzins hat einen Einfluss auf die Höhe der Inflation, der Arbeitslosigkeit und des Wirtschaftswachstums im Euro-raum. Die vier unten stehenden Linien sind so miteinander verbunden, dass ein höherer Zinssatz zu einer niedrigeren Inflation, einer höheren Arbeitslosenrate und einem niedrigeren Wirtschaftswachstum führt. Ein niedrigerer Zinssatz hat die gegenteiligen Auswirkungen. Bitte klicken Sie auf die [erste/zweite/dritte/vierte] Linie, um Ihren

bevorzugten Zinssatz auszuwählen. Anschließend können Sie die Werte verändern, indem Sie eines der Vierecke verschieben [order of sliders is randomized]. [Answer key:]

The screenshot shows a survey interface with four sliders, each representing an economic indicator. The sliders are arranged vertically and are interconnected. The current values are as follows:

Indicator	Minimum Value	Maximum Value	Current Value
Zinssatz (Interest Rate)	-0,5%	4,5%	~1,5%
Inflation	0,0%	5,0%	~2,5%
Arbeitslosenrate (Unemployment Rate)	4,5%	9,5%	~7,5%
Wirtschaftswachstum (Economic Growth)	-1,0%	4,0%	~1,5%

Figure B.1: Example of screen as displayed to respondents to answer question item *CD20106* and *CD20107*

6. Preferences personal inflation (*CD20108 pref_inflation_personal*)

(a) German original:

Stellen Sie sich vor, dass man Sie persönlich beauftragt hat, einen Leitzins festzulegen, der für ihre eigene finanzielle Situation am besten ist. Der Leitzins hat einen Einfluss auf die Höhe der Inflation, der Arbeitslosigkeit und des Wirtschaftswachstums in Deutschland. Die vier unten stehenden Linien sind so miteinander verbunden, dass ein höherer Zinssatz zu einer niedrigeren Inflation, einer höheren Arbeitslosenrate und einem niedrigeren Wirtschaftswachstum führt. Ein niedrigerer Zinssatz hat die gegenteiligen Auswirkungen. Bitte klicken Sie auf die [erste/zweite/dritte/vierte] Linie, um Ihren bevorzugten Zinssatz auszuwählen. Anschließend können Sie die Werte verändern, indem Sie eines der Vierecke verschieben [order of sliders is randomized]. [Answer key:] See previous question item.

7. Weighting inflation/unemployment rate (*CD20109 weight_unemployment_EZB*, *CD20110 weight_inflation_EZB*, *CD201011 weight_unemployment_EZB*, and *CD201102 weight_inflation_EZB*)

(a) German original:

Die Politik der [EZB/deutschen Bundesregierung] beeinflusst die Inflation und die Arbeitslosenrate. Auf einer Skala von 0 bis 10: Wie stark sollte Ihrer Meinung nach die Verringerung der Inflation und wie stark die Reduzierung der Arbeitslosenrate gewichtet werden? Die Summe der Antworten muss 10 ergeben. [Answer key:]

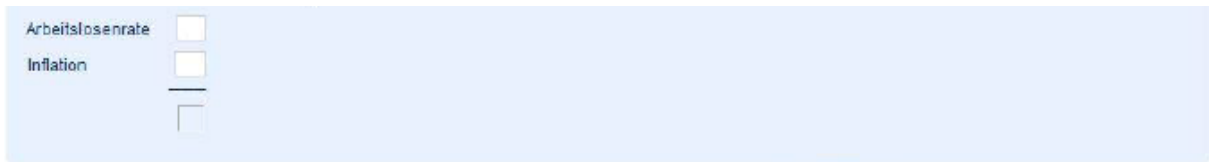


Figure B.2: Example of screen as displayed to respondents to answer question item *CD20106* and *CD20107*

8. Inflation expectation (next 12 month, (*CD20113 change_inflation_ecb*))

(a) German original:

Der folgende Bericht beschreibt und erklärt die Handlungen der EZB für die Öffentlichkeit. Bitte beachten Sie diese Informationen bei der Beantwortung der anschließenden Frage. [Anchoring treatment 2 (AT2):]

AT2.1 Precise information, long:

Die EZB dehnt ihre Ankäufe auf Anleihen aus, die von im Euroraum ansässigen Zentralstaaten, Emittenten mit Förderauftrag und europäischen Institutionen begeben werden. Insgesamt sind monatliche Ankäufe von Vermögenswerten in Höhe von 60 Milliarden Euro geplant. Die Ankäufe sollen mindestens bis September 2016 erfolgen. Das Programm dient der Erfüllung des Mandats der EZB, die Preisstabilität zu gewährleisten und mittelfristige Inflationsraten nahe 2% zu erreichen.

AT2.2 Vague information, long:

Die EZB dehnt ihre Ankäufe auf Anleihen aus, die von im Euroraum ansässigen Zentralstaaten und anderen Emittenten und Institutionen begeben werden. Insgesamt sind monatliche Ankäufe von Vermögenswerten in großer Höhe geplant. Die Ankäufe sollen mindestens bis Mitte nächsten Jahres erfolgen. Das Programm dient der Erfüllung des Mandats der EZB, die Preisstabilität zu gewährleisten und mittelfristige Inflationsraten nahe einem angemessenen Level zu erreichen.

AT2.3 Precise information, short:

Die EZB dehnt ihre Ankäufe auf Anleihen aus. Die Ankäufe in Höhe von 60 Milliarden Euro sollen bis September 2016 erfolgen und dienen der Erfüllung des Mandats der EZB zur Gewährleistung von Preisstabilität und einer Inflationsrate nahe 2%.

AT2.4 Vague information, short:

Die EZB dehnt ihre Ankäufe auf Anleihen aus. Die Ankäufe in großer Höhe sollen bis Mitte nächsten Jahres erfolgen und dienen der Erfüllung des Mandats der EZB zur Gewährleistung von Preisstabilität und einer angemessenen Inflationsrate.

Wie sehr wird Ihrer Meinung nach die Inflationsrate in den nächsten 12 Monaten steigen oder sinken (in Prozent)? [Answer key]: -1 oder mehr sinken, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10% oder mehr steigen.