Department Socioeconomics

Don't Worry, Be Right!
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Perceptions and Expectation

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Abstract

We compare the formation of quantitative inflation perceptions and expectations from questions asked either in terms of *price changes* or in terms of the *inflation rate* in a new socio-economic household survey established at the University of Hamburg. In addition to socio-demographic characteristics, we evaluate effects of happiness, trust in people and the central bank, risk attitudes as well as news heard on monetary policy or inflation. We find that the upwards bias of reported perceptions and expectations is higher under the *price* wording and responses are more heterogeneous, but non-response rates are higher in the *inflation* wording. Generally, consumers have lower perceptions or expectations with a higher level of education, which also significantly lowers the probability of non-response. Consumers that perceived positive news on monetary policy or inflation also tend to give lower inflation estimates and *vice versa*. Additionally, our results suggest that happier individuals have significantly lower perceptions and expectations under the *price* wording, while more risk-averse consumers give significantly higher inflation estimates under the *inflation* wording.

Keywords: inflation perceptions; inflation expectations; survey design; mental representations; economic beliefs

JEL Classification: E31, D84, C83

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*Corresponding author. Email: Lena.Draeger@wiso.uni-hamburg.de. University of Hamburg, Hamburg, Germany.

†University of Hamburg, Hamburg, Germany & KOF Swiss Economic Institute, ETH Zurich, Switzerland & Member of Research Program on Forecasting at George Washington University, Washington, D.C.

I Introduction

Survey-based (aggregate) measures of household's perceptions and expectations are often found to be superior in forecasting macroeconomic time series (Ang et al., 2007). They have found their way into the estimation and calibration of macroeconomic models (Carroll, 2003; Mankiw and Reis, 2007, 2006) and are regularly reported for large industrialized countries (Curtin, 2006; European Commission, 2008). Moreover, survey data provides an important benchmark for central banks aiming to anchor inflation expectations at their target inflation level. Joint experimental and survey analyses show that survey-based inflation expectations by consumers are economically meaningful since consumers act on their expectations in economic decisions involving future inflation (Armantier et al., 2013). However, survey cross-sections frequently show strong degrees of heterogeneity between consumers with significant differences between socio-demographic groups (Jonung, 1981; Mankiw et al., 2003; Pfajfar and Santoro, 2009; Anderson et al., 2010) and survey measures may be influenced by consumers' degree of economic literacy with respect to inflation (Blanchflower and Kelly, 2008).

In this paper, we use a new survey data set to evaluate the effect of question wording on survey measures of consumers' quantitative inflation perceptions and expectations across demographic groups. Controlling for survey wording effects, we also analyse the importance of individual personality traits, namely risk attitude, trust in people and consumers' happiness. Additionally, we account for consumers' trust in the European Central bank (ECB) as well as news on the ECB's monetary policy and inflation remembered by the consumer. Thereby, we can indirectly evaluate an effect of central bank transparency and communication first on the perception of monetary policy by the respondent, and second on his inflation estimates. Finally, we test whether illiteracy with respect to inflation plays an important role in the formation of perceptions and expectations in either wording scheme.

We employ a new data set from the Hamburg-BUS survey, established at the University of Hamburg in 2012/13 as a large social science household survey representative of the population in the city of Hamburg. We added questions on consumers' qualitative and quantitative inflation perceptions and expectations to the second wave of the survey, where consumers are assigned randomly to one of two wordings.[1] Specifically, the questions are phrased either in terms of the perceived/expected *"inflation rate"* or in terms of *"increasing/decreasing prices in general"*. To the best of our knowledge, this is the first analysis of quantitative inflation perception and expectation data in a detailed micro-survey for Germany. Furthermore, this is also the first paper evaluating effects of personality traits on the formation of perceptions and expectations under different wording schemes.

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[1]The full questionnaire is available in German on the website of the University of Hamburg, see `https://www.wiso.uni-hamburg.de/fileadmin/einrichtungen/forschungslabor/HH_BUS_WP_20130507.pdf`

There are several papers in the literature dealing with the effects of wording types on consumers' inflation perceptions and expectations. Based on data from a project of the New York Fed, Bruine de Bruin et al. (2012) report findings on wording and framing issues in the design of quantitative inflation expectation surveys. The authors show that consumers' perceptions and expectations are significantly lower and less dispersed if the survey question asked about *"inflation"* rather than *"prices in general"* or *"prices you pay"*. Generally, the strong effect of small wording changes may be due to framing or reference point effects (Bruine de Bruin, 2011). Bruine de Bruin et al. (2012) relate the effect of inflation wording types to strong increases in specific prices at the time of the survey, such as gas prices, which seemingly affected consumers' expectations of *prices you pay* more strongly. The authors suggest that more general *inflation* expectations are more likely to affect consumers' investment decisions, while expectations of price changes in *prices you pay* may influence consumers' purchasing decisions more strongly. We replicate their analysis with our Hamburg dataset and extend it by evaluating the strength of wording effects across demographic groups and jointly with personality traits as well as monetary policy news perceived by the consumer.

Biau et al. (2010) report further evidence that consumers rely on specific baskets of goods when judging general price increases, as only a minority of people use a broad set of prices when reporting their inflation estimate. Georganas et al. (2013) use an experimental design to investigate a possible "frequency bias" (price changes of frequently bought goods receive a larger weight) in the formation of inflation perceptions and find evidence for such effects. This is also in line with the arguments in Brachinger (2008).

Our paper is further related to the literature dealing with the influence of personal attributes and psychological factors on the formation of perceptions and expectations of macroeconomic aggregates as well as the literature dealing with news effects. Svenson and Nilsson (1986) and Leiser and Drori (2005) show that the depth of understanding of the term *inflation* differs enormously across socio-demographic groups and depends on mental as well as social representations. Malmendier and Nagel (2012) test for and verify cohort "imprintings", i.e. that households rely on inflation experiences early in their lifetime when forming expecations today. Orland (2013) analyzes how the perception of macroeconomic indicators depends on personality traits. In a broader sense, trust in people and trust in institutions might affect the way in which inflation perceptions and expectations are formed. Blanchflower and MacCoille (2009) argue for instance that individuals who are more satisfied with the policy of the central bank show lower inflation expectations. Evaluating the impact of media news on households' inflation expectations and perceptions in Germany, Lamla and Lein (2008, 2010) and Menz and Poppitz (2013) show that the tone of media reports matters and that the informational content differs across media types and, thus, can affect socio-demographic groups differently. Additionally, Dräger and Lamla (2013a,b) show that good or bad news on inflation perceived by U.S. consumers in the University of Michigan Survey

of Consumers have asymmetric effects on their forecast accuracy and the anchoring of long-run inflation expectations.

We add to this literature by analyzing the role of socio-demographic factors, psychological self-assessment and trust questions as well as perceived monetary policy news on the wording scheme results. In general, the most important socio-demographic factor in both wordings seems to be the level of education: Consumers give lower inflation estimates, the more educated they are. Moreover, our results indicate that women tend to give significantly higher estimates for both perceived and expected inflation rates, but only if asked about *general price increases*. Under the *inflation* wording, we additionally find some income and age effects. The most important factor beyond the usual socio-demographic characteristics correlated with inflation perceptions/ expectations is the degree of self-assessed happiness: Happier people tend to have lower perceptions of past *price increases* and seem to be less worried about future price changes. Additionally, more risk-averse consumers give significantly higher inflation estimates under the *inflation* wording scheme. Interestingly, trust in people only affects *price* expectations, while trust in the ECB has no significant effect at all. Finally, the effects of news on monetary policy or inflation observed by the consumer do not differ across wording schemes. We find that respondents who report positive news give lower inflation estimates and *vice versa*. The asymmetric news effect may be related to the general optimism/pessimism effect implied by our result on self-assessed happiness.

Last but not least, the literature on "financial illiteracy" (Lusardi and Mitchell, 2008; Lusardi, 2008) and "macroeconomic illiteracy" (Blanchflower and Kelly, 2008) is intertwined with both literature strands discussed above. Blinder and Krueger (2004) and Curtin (2007) discuss the familiarity of the general public with macroeconomic concepts like "inflation" or "unemployment" for the US. Blanchflower and Kelly (2008) use several data sets for the UK to investigate the role of illiteracy or the degree of numeracy in inflation expectation data, where the degree of illiteracy is evaluated with the non-response rates to the respective questions. Burke and Manz (2011) and Bruine de Bruin et al. (2010) argue that a large fraction of the observable heterogeneity in survey data might be due to different degrees of financial literacy. In the context of our analysis, we are not only interested in evaluating consumers' illiteracy with respect to the questions on perceived and expected inflation, but the question emerges which wording setting best captures the price changes that individuals act upon.

We contribute to the discussion of illiteracy by using the non-response to quantitative questions regarding perceptions or expectations as a proxy for the degree of illiteracy with respect to inflation as in Blanchflower and Kelly (2008). We find evidence for gender and educational differences under the *inflation* wording. Under the *price* wording scheme, the non-response rates are generally lower and there are only small education effects.

The paper is organized as follows: Section II describes the new data set briefly. Section III presents the empirical results and section IV concludes.

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II   Data

The data set used here is the second wave of the Hamburg-BUS Survey (acronym for ***B**evölkerungs-**U**mfrage der **S**ozialwissenschaften*). This is a representative telephone survey of the population in the city (and the federal state) of Hamburg on issues relevant for political and social sciences. The survey was established at the University of Hamburg with a first wave in 2012. In the second wave of the survey between May, 8th, and June, 24th 2013, 636 inhabitants of the city of Hamburg were interviewed. The households were selected using the Häder-Gabler approach (Häder et al., 2009).[2] In addition to previous waves, the second wave of the survey includes a number of specific questions to test for the importance of wording schemes for quantitative and qualitative inflation perception/expectation questions.[3]

Beyond that, it contains, *inter alia*, questions regarding political preferences, self-assessments of personal characteristics, mental balances and stress factors as well as the socio-demographic background questions. Additional questions deal with attitudes towards risk and trust in local, national and supra-national institutions as well as attitudes towards financial decisions and other economic issues.[4]

To test for wording scheme effects with regard to inflation perceptions/expectations, the sample was split randomly among two different question wordings. The first wording phrases the questions in terms of *"inflation"* and *"deflation"* and the second wording uses *"prices in general increase (or decrease)"*.[5] The survey starts with a question regarding directional (*qualitative*) perceptions/expectations, which in the first wording setting for perceptions reads as follows:[6]

- *Do you think that over the last 12 months Germany suffered from either inflation or deflation or none of them?*

    - *Inflation*
    - *Deflation*
    - *None of them*
    - *Don't know*
    - *No answer*

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[2] Unfortunately, the BUS Survey does not have a panel dimension, but only repeated cross-sections.

[3] For general background information on the Hamburg-BUS project refer to the project page: `http://www.wiso.uni-hamburg.de/forschung/forschungslabor/telefonlabor/aktuelle-projekte/hh-bus/` The full survey questionaire is available here (in German): `http://www.wiso.uni-hamburg.de/fileadmin/einrichtungen/forschungslabor/HH_BUS_WP_20130507.pdf`.

[4] As the focus of this specific paper is on the effects of wording schemes regarding inflation questions, we will analyze the full data set with respect to risk, trust in institutions, trust in the European currency, financial decisions and other related issues in much more detail in a companion paper.

[5] As perceptions and expectations related questions are asked in a similar way, we report survey questions on perceptions only. The same wording scheme applies without loss of generality to questions regarding expectations.

[6] A documentation of the inflation perception/expectation questions in English (translated by the authors) can be found in the appendix of this paper.

The corresponding question under the alternative wording scheme reads as follows:

- *Do you think that prices in general in Germany over the last 12 months increased, decreased, or stayed about the same?*

    - *Increase*

    - *Decrease*

    - *Stayed about the same*

    - *Don't know*

    - *No answer*

Next, the survey asks about *quantitative perceptions/expectations*. The interviewed consumer is first asked to give a specific point estimate: *"How many percent do you think the inflation/deflation rate was over the last 12 months?"* under the *inflation* wording or *"By how many per cent do you think prices in general increased/decreased?"* under the *price* wording.[7]

For those who give a *"don't know"* answer for the quantitative question on a point estimate, a further question is then activated to receive information about the range of quantitative inflation/deflation or price increases/decreases that the respondents thinks actual/expected inflation lies in. We did not restrict the range. As in the case of point forecasts above 5%, however, a "proof question" was asked about whether the given range was correct if ranges above 5% were given.[8]

Regarding the socio-economic background, we make use of questions concerning sex, age, education as well as personal income of the respondents. The dummy variables *male* and *female* account for consumers' gender. *Age* is measured in years, and for some parts of the analysis is grouped into age groups from 16-29, 30-44, 45-59 and 60+. The two categories in the middle approximately capture the working population, with the young below and the retired above. The degree of education of consumers is given by the categorical variable *educ* in six categories, ranging from *1 – no highschool* to *6 – PhD*. These may be grouped into three education groups: Low education: no highschool diploma, medium education: highschool diploma and/or vocational training and high education: some university degree. Personal income is grouped into quartiles, which are either used separately or grouped into the categorical variable *inc_quart* ranging from 1 to 4. Finally, we account for consumers' employment status, where we differentiate between consumers out of the labour force (including, *inter alia*, pensioners, students,

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[7]As in the Michigan survey, we asked a second (proof) question if a person reported an inflation rate above 5%. The question reads *"To make sure that I got it right: You said the inflation rate will be about x per cent. Is that correct?"*. Alternatively, the term *"inflation rate"* was exchanged by *"price increase/ price decrease"* under the second wording scheme. However, none of the respondents changed their estimate after the proof question.

[8]Note that none of the respondents providing a range on perceived or expected inflation corrected their answer after the proof question.

housewifes and people on parental leave), the unemployed, consumers working in so-called mini jobs (wage of max. 450 € per month), part-time and full-time working respondents. These are grouped into the categorical variable *employ*, which gives the lowest value of 1 to the category *non-working* and the highest value of 5 to the category *full time*.

Moreover, we employ a number of self-assessment questions on personality traits. First, we measure the degree of happiness in general (*happy_general*) with the question: *"All in all, how satisfied are you with your life these days? Imagine a ladder where the lowest rung means the worst possible life and the highest rung means the best possible life. How do you rank your life on the ladder?"*. Second, we use a question on trust in people (*trust_people*) in general, stated as *"Do you believe that you can trust people in general?"* with the answer categories ranging from *"I am very sceptical to trust anyone"* to *"I can trust most people"*. Finally, we measure consumers' risk-assessment (*risk*) with the question asking *"How would you rate your willingness to carry a risk?"*. All answers to the questions on personality traits are measured on a scale which runs from 0 (lowest value) to 10 (highest value) with the further options of *"don't know"* and *"no answer"*.

In addition to the variables capturing general personality traits, we evaluate the relation between consumers' perception of monetary policy and their inflation forecasts. To do so, we include a question on trust in the European Central Bank (ECB) (*trust_ecb*), which asks *"How much do you personally trust the European Central Bank?"*. Again, answers are given on a scale from 0 to 10, where 0 means *"I don't trust this institution at all"* and 10 stands for *"I completely trust this institution"*. Moreover, we capture whether consumers perceived any news on the monetary policy of the ECB or on inflation. This is measured with an open question asking consumers *"In the past three months, did you hear or read positive or negative news about the economy in general?"*. If consumers answer "yes, positive" or "yes, negative", an open question follows asking them what they heard. Consumers in the BUS Survey gave at most six answers to the open question, which were consecutively coded into categories, thereby generally distinguishing between positive and negative news heard according to the answers given above. We thus construct the dummy variables *newsheard_pos* and *newsheard_neg*, which take on the value of one if the respondent heard any positive or negative economic news in general. Additionally, the dummy variables *news_monpol = news_monpol_pos + news_monpol_neg + news_monpol_other* account for consumers who observed news on changes in interest rates and other monetary policy actions by the ECB, where the latter three dummies distinguish between positive, negative and neutral news. Depending on the perspective of the respondent, news for instance about low interest rates set by the ECB may be perceived as either good or bad news. When coding the answers from the open question on what news the respondent heard, the tone of their statement is evaluated in order to infer whether the news were perceived as positive, negative or neutral. Finally, *news_inflation = news_infl_pos + news_infl_neg*

indicates respondents who reported news on inflation or prices. Here, good news generally imply observed news on falling or lower inflation and *vice versa* for bad news.

III   Analysis

III.1   Effects of Question Wording: Some Stylized Facts

As a first step, we establish stylised facts about the effect of question wording on the formation of quantitative inflation perceptions and expectations by consumers. Specifically, we evaluate whether phrasing the question in terms of the *inflation rate* or in terms of *price changes* significantly affects the distribution and moments of perceptions and expectations. For the analysis, we exclude the *"don't know"* and *"no answer"* responses, which we evaluate in more detail in section III.3 on the effect of wording on illiteracy towards inflation. Moreover, there exist a number of extreme outliers in the original data from the BUS survey, which range from -10% – +100% for inflation perceptions and from -99% – +30% for expectations. Since only very few observations show these extreme values, we truncate the data for the analysis and only evaluate perceptions and expectations in the range from -5% – +30%.[9] Note that this excludes only about 2% of the responses to the perception questions and about 0.5% of the responses to the expectation questions.[10]

Figure 1 presents the distributions of the truncated data. All variables show a right-skewed distribution around perceptions and expectations of 2%, which corresponds to the official ECB target of keeping inflation below, but close to 2%. Moreover, all variables have significant frequencies at 5, 10, 15 and 20%, suggesting that "digit-preference" is present in our data set. This is in line with the evidence from households' inflation perceptions/expectations in the U.S. and in Sweden in Curtin (2010) and Bryan and Palmqvist (2005). However, it seems that the distributions for "inflation" perceptions and expectations are narrower around 2% and that "digit-preference" is less pronounced when the question is phrased in terms of *inflation*, rather than *price changes*.

The test results in Table 1 further confirm that the mean, median and variance of quantitative inflation perceptions and expectations differ significantly across wording schemes: Both a t-test for equality of means and the non-parametric tests for equality of distributions (Wilcoxon-Mann-Whitney test) and of variances (Levene's robust test) find highly significant differences between the two samples. This result also holds for most socio-demographic subgroups: The wording of the survey questions significantly

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[9]This range is also applied in Pfajfar and Santoro (2012) to the microdata of quantitative inflation expectations of consumers in the US from the University of Michigan Survey of Consumers.

[10]We checked for robustness of our results to truncating the data and reproduced the analysis with untruncated variables. Generally, our results are not affected qualitatively by our choice of truncation. Without truncation, mean values of perceived and expected inflation are somewhat higher (with the exception of expectations of price changes, where there is a negative outlier) and we find a few more significant differences within sociodemographic groups.

Figure 1: Distribution of Inflation Perceptions and Expectations with Different Wordings

Quantitative Inflation Perceptions and Expectations
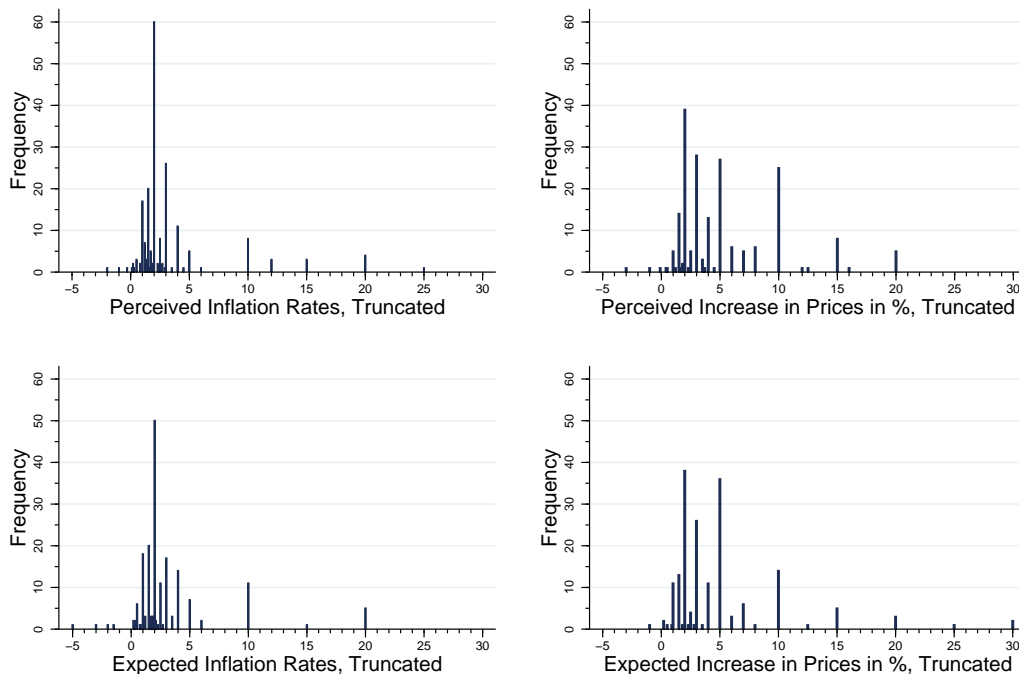
affects inflation perceptions and expectations of men and women as well as those of most age, education, income and employment groups. Interestingly, the test results suggest that those groups which most studies find to have less accurate inflation forecasts, namely low education and income groups as well as the unemployed, are less affected by the type of question wording.

Next, we evaluate the summary statistics for quantitative perceptions and expectations of *price changes* in Tables 2 and 3 and of the *inflation rate* in Tables 4 and 5. We compare both overall perceptions and expectations and differences across demographic groups.

Overall, consumers in the Hamburg BUS survey on average perceived *price increases* of 5.1% (and 3.5% in the median) in Germany over the previous year and expect price increases in Germany of 4.7% on average (and 3% in the median) in the next year. Considering that the year-on-year inflation rate of the German harmonised index of consumer prices (HICP) in May 2013 was 1.6%, this suggests that even the median consumer had inflation perceptions of more than double the actual inflation rate, im-

Table 1: Testing for Differences with Respect to Question Wording

	Perceptions			Expectations		
	t-Test Means	Wilcoxon-Mann-Whitney Test	Levene's Robust Test Variances	t-Test Means	Wilcoxon-Mann-Whitney Test	Levene's Robust Test Variances
All	-4.787***	-7.045***	13.266***	-3.764***	-5.522***	6.623***
Male	-3.086***	-4.759***	5.113**	-2.380**	-4.481***	1.917
Female	-3.465***	-5.140***	6.814***	-2.901***	-3.596***	4.299**
16-29	-2.251**	-3.092***	1.954	-1.736*	-2.442**	1.920
30-44	-3.929***	-5.049***	11.652***	-2.859***	-4.185***	6.287**
45-59	-1.323	-2.073**	0.990	-1.580	-2.465**	0.935
60+	-3.381***	-4.348***	9.675***	-1.756*	-2.752***	1.173
Low Education	-0.854	-1.894*	0.107	-1.076	-2.159**	0.051
Medium Education	-2.735***	-4.631***	1.617	-2.139**	-3.039***	1.688
High Education	-4.902***	-5.026***	45.150***	-3.500***	-4.204***	11.413***
0-25% Income	-0.951	-2.745***	0.126	-1.838*	-2.987***	2.215
25-50% Income	-2.882***	-3.267***	12.570***	-1.653	-3.124***	0.614
50-75% Income	-2.836***	-3.212***	4.375**	-1.188	-1.931*	0.024
75-100% Income	-4.465***	-3.773***	26.765***	-2.948***	-2.627***	11.006***
Non-Working	-3.238***	-4.985***	2.991*	-1.616	-3.409***	0.096
Unemployed	-0.906	-0.846	0.331	-0.411	-1.165	2.664
Mini Job	-0.192	-0.952	3.816*	-1.788*	-2.127**	1.760
Part Time	-1.736*	-3.321***	2.469	-1.593	-2.715***	2.298
Full Time	-2.839***	-3.579***	7.215***	-2.679***	-3.064***	5.643***

Note: The tests evaluate whether the sample populations between questions framed in terms of inflation and questions framed in terms of prices differ significantly from each other. Test statistics are with p-values in parentheses. */**/*** denote rejection of the null hypothesis of equality of population/variance at the 1/5/10% level.

plying a strong upwards bias.[11] Note that upward biases in quantitative survey-based measures of inflation perceptions/expectations of households are a well-reported finding also for the U.S. (Bryan and Venkatu, 2001a,b; Curtin, 2007).

By contrast, consumers' perceptions and expectations of the *inflation rate* are significantly lower, both in the mean and in the median (albeit still upwards biased): Consumers perceive and expect German inflation rates around 3% on average and 2% in the median. Bruine de Bruin et al. (2012) find a similar result for inflation perceptions and expectations of U.S. consumers under different wordings. Notably, median *inflation* perceptions and expectations of consumers are in line with the official inflation target of the European Central Bank (ECB). Moreover, smaller standard deviations and interquartile ranges compared to the data from the *price* question show that there exists less heterogeneity in the data when the question is phrased in terms of the *inflation rate*.

Regarding the differences across demographic groups, we find that women, the young and low education as well as low income groups on average have higher inflation perceptions and expectations. These socio-demographic differences are frequently reported in the literature and hold regardless of the question wording. Age seems to be an exception, as we find consumers in the 16-29 age group to have the highest perceptions and expectations of *price changes*, while consumers aged 45-59 have the highest point estimates of current and future *inflation rates*. Regarding differences across employment status groups, we find that the unemployed and people working in so-called mini jobs stand out in both wordings. While they have higher expectations or perceptions in most cases, people in mini jobs have exceptionally low *inflation* expectations. Note, however, that the groups sizes in these two groups are relatively small. Generally, those groups with higher mean inflation perceptions and expectations also show relatively larger interquartile ranges. This might indicate that the larger heterogeneity of inflation forecasts in these groups might be partly due to higher illiteracy and uncertainty regarding inflation.

However, the Kruskal Wallis tests cannot reject the null hypothesis of equal populations for any demographic category in the variables from the questions on *price changes*, implying that the differences in first moments are not statistically significant. We do find some evidence of significantly different variances between perceptions of men and women and expectations of different age, income and employment groups in the *price* questions. Variability between demographic groups in the data from the *inflation* questions seems more pronounced: We find significant differences in distributions

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[11]Note that the questions ask explicitly for an estimate of current and future inflation in Germany, so that this inflation rate is the correct benchmark. Nevertheless, consumers in Hamburg might face higher costs of living than the German average and different household types might experience different inflation rates. All these factors could lead to an upwards bias in perceived and expected inflation. However, while unfortunately official inflation statistics for the city of Hamburg do not exist, it is still implausible that this difference could account completely for the strong bias. Similarly, as shown in Colavecchio et al. (2011), differences in inflation rates across household types in European countries are persistent, but relatively small.

and/or variances within all groups, except for the employment categories, of percep-
tions from the inflation question and significant differences within the education and
income groups groups of inflation expectations.

Table 2: Summary Statistics Quantitative Inflation Perceptions, Price Question

	Mean	Median	SD	IQR	Min	Max	N	Kruskal Wallis	Levene's Robust
All	5.10	3.50	4.35	5.00	-3.00	20.00	204	–	–
Male	4.43	3.00	3.59	3.00	-3.00	16.00	94	2.107	8.552***
Female	5.68	4.00	4.86	7.00	-0.10	20.00	108	–	–
16-29	5.45	4.00	4.07	5.50	0.40	15.00	33	1.741	0.267
30-44	5.33	3.85	4.29	5.00	1.00	20.00	42	–	–
45-59	5.04	3.00	5.09	3.00	-3.00	20.00	51	–	–
60+	4.97	3.50	4.03	4.00	-1.00	20.00	73	–	–
Low Education	4.99	3.75	3.59	5.00	-1.00	15.00	30	2.903	0.363
Medium Education	5.40	4.00	4.49	6.00	-3.00	20.00	102	–	–
High Education	4.74	3.00	4.47	3.00	-0.10	20.00	72	–	–
0-25% Income	5.50	3.50	4.99	5.00	0.40	20.00	37	0.732	1.657
25-50% Income	5.68	3.00	5.39	5.00	1.00	20.00	45	–	–
50-75% Income	5.29	5.00	3.44	8.00	1.00	10.00	30	–	–
75-100% Income	4.78	4.00	3.78	3.00	1.00	15.00	37	–	–
Non-Working	4.90	3.85	3.68	4.00	-0.10	20.00	86	1.637	1.755
Unemployed	6.75	5.00	5.31	7.50	1.50	20.00	12	–	–
Mini Job	5.03	4.50	3.14	5.25	0.40	10.00	16	–	–
Part Time	4.94	3.00	5.32	3.00	-1.00	20.00	36	–	–
Full Time	5.55	4.00	4.56	8.00	1.00	16.00	42	–	–

Note: Observations are truncated to lie in the range -5% – +30%. The Kruskal Wallis test is a non-parametric test for equality of distributions with two or more groups. Levene's robust test statistic tests for the equality of variances between the groups. Test statistics evaluate whether the values in the sex, age, education and income groups are significantly different from each other. */**/*** denote rejection of the null hypothesis of equality of population/variance at the 1/5/10% level.

Table 3: Summary Statistics Quantitative Inflation Expectations, Price Question

	Mean	Median	SD	IQR	Min	Max	N	Kruskal Wallis	Levene's Robust
All	4.73	3.00	4.80	3.00	-1.00	30.00	184	–	–
Male	4.47	3.00	4.57	3.00	-1.00	30.00	83	0.001	1.454
Female	4.99	3.00	5.00	3.00	0.20	30.00	100	–	–
16-29	5.73	4.00	6.56	3.00	0.20	30.00	27	1.103	2.275*
30-44	5.28	3.00	5.90	3.00	1.00	30.00	41	–	–
45-59	4.70	3.00	4.56	3.00	-1.00	20.00	50	–	–
60+	4.03	3.00	3.05	3.00	0.20	15.00	63	–	–
Low Education	6.00	5.00	6.22	5.00	0.20	30.00	27	3.051	0.935
Medium Education	4.73	3.00	4.74	3.00	0.20	30.00	93	–	–
High Education	4.19	3.00	4.14	3.00	-1.00	25.00	64	–	–
0-25% Income	5.83	3.25	6.64	3.50	0.20	30.00	32	1.906	2.776**
25-50% Income	5.38	3.00	5.57	3.00	1.50	30.00	44	–	–
50-75% Income	4.49	3.00	3.03	3.00	1.00	10.00	26	–	–
75-100% Income	3.74	3.00	3.10	3.00	-1.00	15.00	33	–	–
Non-Working	4.33	3.25	3.40	3.00	0.20	20.00	74	1.107	2.579**
Unemployed	4.92	5.00	2.75	2.00	1.00	10.00	12	–	–
Mini Job	6.11	4.00	7.38	8.00	0.20	30.00	15	–	–
Part Time	5.33	3.00	6.52	3.00	-1.00	30.00	34	–	–
Full Time	4.89	3.00	4.98	3.00	1.00	25.00	38	–	–

Note: Observations are truncated to lie in the range -5% – +30%. The Kruskal Wallis test is a non-parametric test for equality of distributions with two or more groups. Levene's robust test statistic tests for the equality of variances between the groups. Test statistics evaluate whether the values in the sex, age, education and income groups are significantly different from each other. */**/*** denote rejection of the null hypothesis of equality of population/variance at the 1/5/10% level.

Table 4: Summary Statistics Quantitative Inflation Perceptions, Inflation Question

	Mean	Median	SD	IQR	Min	Max	N	Kruskal Wallis	Levene's Robust
All	3.17	2.00	3.85	1.50	-2.00	25.00	209	–	–
Male	2.89	2.00	3.52	1.50	-2.00	25.00	111	0.019	3.794*
Female	3.48	2.00	4.19	1.50	0.10	20.00	98	–	–
16-29	3.12	2.00	3.70	1.80	-0.30	15.00	25	8.979**	2.573*
30-44	2.36	1.70	2.36	1.30	0.20	10.00	42	–	–
45-59	3.83	2.00	4.67	1.15	-1.00	25.00	64	–	–
60+	2.89	2.00	3.34	1.20	-2.00	20.00	73	–	–
Low Education	4.02	2.00	4.70	2.80	0.10	20.00	23	8.574**	12.283***
Medium Education	3.72	2.00	4.53	1.40	-1.00	25.00	114	–	–
High Education	2.04	2.00	1.39	0.50	-2.00	10.00	72	–	–
0-25% Income	4.31	2.00	5.79	1.80	0.10	20.00	37	0.368	10.690***
25-50% Income	3.03	2.00	2.88	1.50	-1.00	12.00	44	–	–
50-75% Income	2.93	2.00	3.13	1.50	-0.30	15.00	32	–	–
75-100% Income	2.20	2.00	1.25	1.50	-2.00	6.00	49	–	–
Non-Working	3.14	2.00	3.70	1.35	-2.00	20.00	100	6.440	1.534
Unemployed	4.96	2.75	4.34	5.50	1.50	15.00	12	–	–
Mini Job	4.69	2.25	5.55	6.25	0.50	15.00	8	–	–
Part Time	2.90	2.00	3.78	1.50	0.20	20.00	29	–	–
Full Time	3.05	2.00	4.00	1.50	-0.30	25.00	52	–	–

Note: Observations are truncated to lie in the range -5% – +30%. The Kruskal Wallis test is a non-parametric test for equality of distributions with two or more groups. Levene's robust test statistic tests for the equality of variances between the groups. Test statistics evaluate whether the values in the sex, age, education and income groups are significantly different from each other. */**/*** denote rejection of the null hypothesis of equality of population/variance at the 1/5/10% level.

Table 5: Summary Statistics Quantitative Inflation Expectations, Inflation Question

	Mean	Median	SD	IQR	Min	Max	N	Kruskal Wallis	Levene's Robust
All	3.07	2.00	3.69	1.50	-5.00	20.00	192	–	–
Male	3.01	2.00	3.71	1.50	-2.00	20.00	100	0.009	0.680
Female	3.13	2.00	3.70	2.25	-5.00	20.00	92	–	–
16-29	2.91	2.00	4.54	2.00	-5.00	20.00	23	5.268	1.061
30-44	2.32	2.00	2.51	1.50	-1.50	10.00	38	–	–
45-59	3.37	2.00	4.17	1.00	-3.00	20.00	58	–	–
60+	3.03	2.00	3.39	1.50	0.50	20.00	66	–	–
Low Education	4.20	2.00	5.45	3.00	0.30	20.00	23	6.572**	6.651***
Medium Education	3.39	2.00	3.97	1.20	-5.00	20.00	101	–	–
High Education	2.21	2.00	2.08	1.00	-3.00	10.00	68	–	–
0-25% Income	3.11	2.00	5.00	2.00	-5.00	20.00	31	2.150	4.059***
25-50% Income	3.52	2.00	4.58	2.00	-2.00	20.00	40	–	–
50-75% Income	3.47	2.10	3.38	2.50	0.30	15.00	31	–	–
75-100% Income	2.19	2.00	1.30	1.00	-1.50	6.00	43	–	–
Non-Working	3.38	2.00	4.01	2.00	0.30	20.00	91	5.694	1.025
Unemployed	4.36	2.00	3.67	8.00	1.50	10.00	11	–	–
Mini Job	0.90	1.00	2.86	2.70	-5.00	3.50	7	–	–
Part Time	3.05	2.00	4.23	1.75	-3.00	20.00	28	–	–
Full Time	2.63	2.00	2.73	1.50	-1.50	15.00	48	–	–

Note: Observations are truncated to lie in the range -5% − +30%. The Kruskal Wallis test is a non-parametric test for equality of distributions with two or more groups. Levene's robust test statistic tests for the equality of variances between the groups. Test statistics evaluate whether the values in the sex, age, education and income groups are significantly different from each other. */**/*** denote rejection of the null hypothesis of equality of population/variance at the 1/5/10% level.

III.2 Testing for Effects of Personal Factors and Monetary Policy News Across Wording Schemes

In the next step, we evaluate the influence of socio-demographic factors, personality traits and trust in the ECB as well as monetary policy news on the formation of inflation perceptions and expectations under different wording schemes in the cross-section of consumers. In order to test for differences of the effects across wording schemes, we include level and interaction dummies identifying the type of question wording. We estimate models with *dummy_price*, which takes on the value of one if the questions were asked in terms of *increasing/decreasing prices*, and with *dummy_infl* identifying the sample asked about *inflation/deflation*. While the interaction effects measuring the difference in the effects of the explanatory variables across wording schemes are of course symmetric, regressing with both *dummy_price* and *dummy_infl* allows us to distinguish the level effects of the determinants under each wording type separately. We thus estimate regressions of the following form:

$$\pi_i^{e,p} = \alpha_0 + \alpha_1 dummy\_wording_i + \sum_k \beta_1^k X_i^k + \sum_k \beta_2^k (X_i^k * dummy\_wording_i) + u_i, \ (1)$$

where π_i^p and π_i^e denote inflation perceptions and expectations of consumer i, respectively, X_i^k denotes the kth regressor and u_i is an error term capturing random individual effects. Tables 6 and 7 show the β_1^k coefficients from the encompassing models with all explanatory variables and *dummy_infl* and *dummy_price*, respectively, where we omit the interaction coefficients β_2^k, the level dummy effect α_1 and the constant term α_0 in order to focus on the level effects of the determinants across the wording schemes. The full models with all coefficients and regressions with sub-sets of determinants are shown in Tables A1-A8 in the appendix.

Generally, we find that the determinants have significantly different effects on the formation of consumers' inflation perceptions and expectations across wording schemes. This is indicated by the F-tests on joint significance of the level dummy and all interaction effects. Both with respect to socio-demographic and to personal factors, we find that certain characteristics affect perceptions and expectations only under the *price* or the *inflation* wording.

Results in Table 6 show that the most important socio-demographic determinant on the formation of consumers' inflation perceptions and expectations is the level of education. We find that consumers with higher levels of education form significantly lower inflation perceptions and expectations under both wordings. This result may be related to an increase in macroeconomic and financial literacy in higher education groups. Indeed, Svenson and Nilsson (1986) report significant differences in causal chains of psychological reasoning about inflation between people trained in economics and "economic laymen". Leiser and Drori (2005) evaluate literacy with respect to the

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concept of "inflation" across socio-demographic groups: The authors show that the core understanding of the concept "inflation" is quite similar across groups, while the depth of understanding differs strongly across educational levels. Although personal income is positively correlated with the level of education, it only significantly affects *inflation* perceptions and expectations, where the negative effect complements the education effect. Consumers' employment status seems to have very little effect on their inflation perceptions or expectations, as we find only a marginally significant positive effect on *inflation* perceptions.

Moreover, our results imply that women give significantly higher estimates for perceived and expected inflation, but only when asked about *increasing/decreasing prices*. Similar results are reported by Jonung (1981) and Bryan and Venkatu (2001c) who also analyze survey responses to questions on *"prices in general"*. A possible explanation of the gender gap in *price* perceptions and expectations could be that men and women recall different sets of prices under this type of wording. Hence, they might be affected differently by a frequency bias, where price changes in frequently bought goods are assigned a higher weight in the calculation of individual inflation perceptions and expectations.[12]

While the age of consumers is not significantly related to their inflation perceptions under either wording, we a significantly positive effect with respect to expectations in the *inflation* wording. Malmendier and Nagel (2012) argue that the imprinting effect of experiencing high inflation periods (or at least public debates about the danger of high inflation episodes) slowly dies out in survey data as the cohorts move towards the upper tail of the distribution. Ehrmann and Tzamourani (2012) show that less extreme inflation episodes fade out much faster from memories of the general public than hyperinflations which are remembered over generations. The older consumers in our sample stem from cohorts which were influenced by the experience of their parents in the hyperinflation of the 1920s as well as by the public debates about rising inflation after the first and second oil price shock and, thus, might have higher "imprinted" inflation fears than younger cohorts. Interestingly, however, this effect emerges only when consumers are asked explicitly about *inflation*, where in this case the wording might serve as some kind of trigger for memories of inflation worries.

Regarding the relation between consumers' self-assessment of their personal happiness, trust in people and risk attitude to their inflation perceptions and expectations, we find that happier people give significantly lower estimates of current and future *price increases*, while there is no significant effect under the *inflation* wording. The happiness effect might be either due to a different framing in the way that economic news or price changes are perceived (Tversky and Kahneman, 1981) – happier people see the world in a "rosier" fashion – or the causality runs the other way round: People with

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[12]Several studies find evidence of a frequency bias on inflation perceptions. Recently, Bruine de Bruin et al. (2011) report evidence for biasing effects of thoughts about specific prices and Georganas et al. (2013) in an experimental setting also find evidence for the frequency bias in the formation of inflation expectations.

Table 6: Effects of Socio-Demographic Factors and Personal Traits Across Wordings

	Perceptions		Expectations	
	Price Wording	Inflation Wording	Price Wording	Inflation Wording
male	-3.407***	0.159	-1.940**	0.684
	(0.696)	(0.631)	(0.923)	(0.806)
age	-0.032	0.036	-0.032	0.056**
	(0.027)	(0.027)	(0.030)	(0.025)
educ	-0.214	-0.476**	-0.677**	-0.454*
	(0.241)	(0.185)	(0.331)	(0.238)
inc_quart	0.601	-0.815**	-0.221	-0.784*
	(0.399)	(0.397)	(0.464)	(0.433)
employ	0.010	0.397*	0.452	0.395
	(0.308)	(0.234)	(0.317)	(0.255)
happy_general	-0.510**	-0.058	-0.656**	-0.008
	(0.240)	(0.230)	(0.308)	(0.278)
trust_people	0.074	-0.070	0.385**	-0.074
	(0.139)	(0.118)	(0.191)	(0.143)
risk	0.297	-0.265**	0.047	-0.234
	(0.202)	(0.128)	(0.244)	(0.160)
Observations	288	288	256	256
Adj. R^2	0.160	0.160	0.129	0.129
F-test wording	7.250	7.250	3.986	3.986
p-value F-test	0.000	0.000	0.000	0.000

Note: The coefficients shown are the level effects of the variables from models with either *dummy_price* or *dummy_infl*. In the models with *dummy_price*, the level effects measure the marginal effects of the explanatory variables on perceptions or expectations under the "inflation" wording and *vice versa* for the models with *dummy_infl*. The interaction terms measure the differences between the wordings and are not shown here. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1. The F-test statistic tests for joint significance of the level dummy and all the interaction terms to evaluate whether the coefficients are significantly different across wording settings.

lower inflation worries are simply happier with their life. Interestingly, consumers with a higher trust in people have significantly higher inflation expectations, where again the effect is only significant under the *price* wording. By contrast, more risk-loving consumers show significantly lower inflation perceptions and expectations, but only when asked about *inflation*. Here again, a certain framing effect might be at work. People willing to carry more risk might evaluate economic news differently. Conversely, this implies that more risk-averse consumers give significantly higher inflation estimates, which might be driven by a general fear of negative outcomes.[13]

Even if the exact explanatory factors are not clear, it is an interesting result that the more general wording with *increasing/decreasing prices* shows a correlation with consumers' general happiness and trust in people, while their risk-attitude is correlated with the more specific *inflation* wording. Together with our results for the socio-demographic

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[13]The negative effect of risk attitude on inflation expectations is only significant in a sub-set model excluding *happy_general* and *trust_people*. All the results have to be interpreted with some caution as Spearman's rank correlation test implies that the personality trait variables are not completely independent.

factors, this indicates that the associations triggered by the question wordings are quite different.

Table 7: Effects of Trust in the ECB and Monetary News Across Wordings

	Perceptions		Expectations	
	Price Wording	Inflation Wording	Price Wording	Inflation Wording
trust_ecb	0.064	-0.141	0.386	-0.145
	(0.248)	(0.114)	(0.335)	(0.095)
news_monpol_pos	-1.590*	-1.590*	0.839	0.839
	(0.830)	(0.830)	(1.023)	(1.023)
news_monpol_neg	0.865	3.773*	1.880	7.815*
	(1.759)	(2.262)	(1.819)	(4.269)
news_infl_pos	-2.066*	-0.302	-2.133*	-0.006
	(1.052)	(0.512)	(1.129)	(0.659)
news_infl_neg	-1.479	0.096	-1.154	0.929
	(1.131)	(0.785)	(1.940)	(0.757)
Observations	221	221	190	190
Demogr. Controls	Yes	Yes	Yes	Yes
Adj. R^2	0.148	0.148	0.148	0.148
F-test wording	5.118	5.118	3.128	3.128
p-value F-test	0.000	0.000	0.001	0.001

Note: The coefficients shown are the level effects of the variables from models with either *dummy_price* or *dummy_infl*. In the models with *dummy_price*, the level effects measure the marginal effects of the explanatory variables on perceptions or expectations under the "inflation" wording and *vice versa* for the models with *dummy_infl*. The interaction terms measure the differences between the wordings and are not shown here. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1. The F-test statistic tests for joint significance of the level dummy and all the interaction terms to evaluate whether the coefficients are significantly different across wording settings.

Next, we evaluate the effects of consumers' trust in the ECB as well as perceived news on monetary policy and inflation on consumers' inflation perceptions and expectations in Table 7.[14] Across wording types, we find that consumers' level of trust in the ECB does not affect their inflation estimates. However, we do find a number of significant news effect. While the type of news with significant effects differs between the *price* and the *inflation* wording, a general pattern emerges: Regardless of the survey wording, if consumers perceive positive news, they form lower inflation perceptions and expectations and *vice versa* for negative news. Our result of asymmetric effects of bad vs. good news on consumers' inflation estimates is also in line with the findings in Dräger and Lamla (2013a,b).

In the case of news on inflation, news perceived as positive by the respondent are generally news on falling or lower inflation and conversely for negative news. The negative effect of positive inflation news on consumers' inflation perceptions and expectations thus means that consumers correctly use the information in the news and lower their inflation estimates. However, in the case of news on interest rates and monetary

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[14]We include the same socio-demographic controls as in Table 6, but omit the coefficients for a clearer exposition of the results.

policy in *news_monpol_pos* and *news_monpol_neg*, it depends on the perspective of the consumer, if for example news on low interest rates are perceived as positive or negative. Here, the expected effect of positive or negative news on consumers' inflation estimates is thus not clear *ex ante*. The negative effect of positive news, or the positive effect of negative ones, might thus capture an optimism vs. pessimism effect, where respondents who received positive news are less worried about current and future inflation. This relates also to our result regarding the inflation estimates of happy consumers discussed above. As shown in Tables A5-A8, consumers also give significantly lower inflation perceptions and expectations if they perceived any positive economic news in general.

III.3 Testing for Illiteracy With Respect to Inflation Across Wording Schemes

Finally, we analyse differences of illiteracy across wording schemes by evaluating the marginal effects of socio-demographic and personal characteristics from probit models on the likelihood of answering "*don't know*" or "*no answer*" in the quantitative questions about inflation perceptions and expectations. This part of the analysis also relates to Blanchflower and Kelly (2008) as well as Blanchflower and MacCoille (2009) who conduct a similar excercise with a survey of UK consumers.

Table 8: Illiteracy Shares across Demographic Groups

	price perc	price exp	infl perc	infl exp
All	0.07	0.09	0.14	0.10
Male	0.02	0.06	0.06	0.05
Female	0.11	0.11	0.23	0.15
16-29	0.03	0.07	0.20	0.13
30-44	0.05	0.07	0.12	0.08
45-59	0.06	0.04	0.11	0.12
60+	0.10	0.13	0.14	0.08
Low Education	0.10	0.15	0.35	0.13
Medium Education	0.08	0.10	0.17	0.14
High Education	0.04	0.05	0.04	0.03
0-25% Income	0.00	0.03	0.14	0.13
25-50% Income	0.11	0.09	0.14	0.07
50-75% Income	0.20	0.23	0.19	0.10
75-100% Income	0.00	0.03	0.04	0.05
Unemployed	0.00	0.00	0.00	0.00
Non Working	0.09	0.11	0.15	0.11
Mini Job	0.00	0.07	0.13	0.14
Part Time	0.06	0.06	0.28	0.18
Full Time	0.10	0.11	0.08	0.04

Table 9: Effects on Non-Response When Asking About Inflation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
male	-0.125**	-0.145***	-0.146***	-0.141***	-0.143***	-0.114**	-0.116**
	(0.050)	(0.042)	(0.042)	(0.043)	(0.044)	(0.047)	(0.049)
age	-0.002						
	(0.001)						
educ	-0.036**	-0.055***	-0.055***	-0.051***	-0.045***	-0.057***	-0.056***
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.018)	(0.018)
inc_quart	0.016						
	(0.023)						
employ	-0.022						
	(0.016)						
happy_general		0.006					0.011
		(0.011)					(0.014)
trust_people			0.011				-0.002
			(0.008)				(0.010)
risk				0.004			-0.006
				(0.009)			(0.012)
trust_ecb					-0.010		-0.006
					(0.008)		(0.009)
news_monetary_policy						-0.063	-0.064
						(0.054)	(0.057)
news_inflation						0.024	0.037
						(0.126)	(0.141)
Observations	171	237	236	236	230	186	178
pseudo R^2	0.123	0.139	0.145	0.126	0.129	0.118	0.123

Note: Marginal effects from probit models for the likelihood of answering *"don't know"* or *"no answer"* when asked about perceptions or expectations of price changes. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Non-missing observations are truncated to lie in the range -5% − +30%.

Table 10: Effects on Non-Response When Asking About Price Changes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
male	-0.064	-0.055	-0.042	-0.036	-0.043	-0.020	-0.003
	(0.048)	(0.035)	(0.034)	(0.035)	(0.032)	(0.040)	(0.037)
age	0.001						
	(0.002)						
educ	-0.024	-0.020*	-0.017	-0.019*	-0.019*	-0.021	-0.015
	(0.016)	(0.012)	(0.012)	(0.012)	(0.011)	(0.013)	(0.011)
inc_quart	0.024						
	(0.023)						
employ	0.001						
	(0.015)						
happy_general		0.000					0.011
		(0.009)					(0.010)
trust_people			-0.002				0.005
			(0.007)				(0.008)
risk				-0.008			-0.012
				(0.007)			(0.008)
trust_ecb					-0.011*		-0.010
					(0.006)		(0.006)
news_monetary_policy						0.003	0.016
						(0.073)	(0.078)
news_inflation						0.076	0.078
						(0.096)	(0.096)
Observations	153	217	216	215	208	154	147
pseudo R^2	0.0498	0.0393	0.0307	0.0449	0.0605	0.0474	0.105

Note: Marginal effects from probit models for the likelihood of answering "*don't know*" or "*no answer*" when asked about perceptions or expectations of price changes. Robust standard errors are in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Non-missing observations are truncated to lie in the range -5% − +30%.

Generally, the non-response rates across questions on inflation perceptions and expectations are relatively low, as shown in Table 8. For all consumers, they range between 7% for perceptions of price changes to 14% for perceptions of inflation changes. From Table 8, we observe that non-response rates seem to be substantially higher for women and for the low education group. With respect to age, the young and the old have somewhat higher non-response rates, especially in the *inflation* wording scheme. Income or employment status do not seem to be related to illiteracy with respect to inflation.

In order to investigate the issue more thoroughly, we construct illiteracy-dummies, which take on the value of 1 if the respondent did not answer the question on perceptions or expectations in either wording scheme, and 0 if the question was answered. The result in Tables 9 and 10 then show the marginal effects from probit regressions on the illiteracy-dummies, where we include the same regressors as in the previous sec-

tion.[15] Due to the low number of observations for non-responses and also because the majority of non-response cases happens jointly for perceptions and expectations, the probit models are estimated separately for wording schemes, but jointly for answers to the perceptions and the expectations questions. The probit models are estimated as follows:

$$P(y_i = 1 | X) = \Phi(\mathbf{X_i}\beta) \tag{2}$$

where P is the probability of y_i being 1, i.e. the probability that an individual consumers reports "*don't know*" or "*no answer*" in response to the questions on quantitative perceptions or expectations, Φ is the cumulative distribution function (CDF) of the standard normal distribution, $\mathbf{X_i}$ is the matrix of regressors and β is the vector of coefficients. In both wording schemes, age, income and employment status have no significant effects on the likelihood of non-response. In order to increase efficiency, *age*, *inc_quart* and *employ* are thus excluded from the models with personal traits and news. By contrast, we find strongly significant and negative marginal effects of *male* and *educ* in the models for non-response in the *inflation* questions. This suggests that women and lower education groups are significantly more likely to not respond to the quantitative questions when the question is phrased in terms of the *inflation rate*. Our result of a higher macroeconomic illiteracy in these groups is in line with the findings in Blanchflower and Kelly (2008) and Blanchflower and MacCoille (2009). However, the authors find additional effects for the young and low income groups, which we cannot replicate here.

Overall, the education of consumers seems to be the dominant factor for illiteracy with respect to inflation across wording schemes. While we find no significant gender effect on non-response to the *price* questions in Table 10, we do find some (marginally) significant negative marginal effects of *educ*, implying again that illiteracy is higher for lower education groups. The lower significance of the results might be due to the relatively low number of non-responses in the price wording scheme. It thus seems that illiteracy is less pronounced when the questions are phrased in terms of *price changes*, rather than the *inflation rate*. People find it easier to give a quantitative estimate of *price changes in general*. However, this does not necessarily imply that consumers have HICP inflation in mind when answering the question phrased in terms of *price changes*.

With respect to the variables measuring personal characteristics and observed news, we find no significant effects of consumers' happiness, trust, risk aversion or monetary news on the likelihood of non-response in either wording scheme.

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[15]We cannot include the news variables distinguishing between positive or negative news, since the relatively low number of observations means that consumers who observed a certain type of news always answer the questions in some case. Therefore, we use the encompassing news variables containing both positive and negative news on monetary policy and inflation.

IV Conclusion

Our investigation yields several interesting results. First and foremost: question wording matters! However, a clear result regarding the preferred survey wording does not arise. Rather, a trade-off emerges between more accurate and less dispersed inflation estimates in the *inflation* wording, and higher response-rates in the *price* wording.

Generally, the distributions of responses from inflation perception and expectation questions are significantly different across the wording schemes. This is true for the mean, the variance and the whole shape of the distribution. The result also holds for most of the defined socio-demographic subgroups. Interestingly, point estimates by those groups which tend to have less accurate forecasts (low education and income groups) are less affected by the type of wording. In general, consumer's expectations and perceptions under the *inflation rate* wording scheme are significantly lower both in the mean and the median and are less dispersed.

Testing for socio-demographic and other personal factors in the formation process yields further interesting insights: In general, the level of education is the main factor driving the results in both wording schemes: higher educated people seem to understand the concept of "inflation" better and, thus, give more accurate point estimates. We further find that women tend to give significantly higher estimates for both perceived and expected price increases under the *price* wording scheme, but not if they are explicitly asked about *inflation*. Regarding age-cohort effects, our results indicate that elderly people in Germany might show some "inflation worry rememberance" from the high inflation period in the 70s and 80s. Interestingly, the most important personal factor beyond the usual socio-demographic characteristics is the level of self-assessed happiness in the *price* wording: Happier people tend to have lower inflation perceptions and are less worried about future price increases.[16] Additionally, our results suggest that more risk-averse respondents give significantly higher inflation estimates under the *inflation* wording scheme, which can be interpreted in the same vein: More risk-averse people are more worried about negative outcomes such as inflation.

While we find almost no effects of trust in people or in the ECB on the formation of inflation perceptions and expectations, it seems that the nature of monetary policy news observed by consumers significantly affects inflation estimates. Importantly, this effect does not depend on the type of question wording. We find, that consumers who observed positive news on the ECB's monetary policy or inflation give lower inflation point estimates, while consumers who observed negative news increase their forecasts. Since positive economic news in general have the same effect, this may point both to a correct use of the information in the news by consumers and to an optimism/pessimism effect where optimistic consumers are less worried about inflation.

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[16]As we are lacking appropriate instruments, we cannot rule out the causality running from low inflation estimates to high happiness.

Regarding the effects of illiteracy, we find evidence for gender and education differences under the *inflation* wording scheme: Men and higher educated people show significantly lower non-response rates. Under the price wording scheme, the non-response rates are generally lower and there are only small education effects. It seems that the majority of people understand the question about *price increases* slightly better than the concept of *inflation*, but also tend to give more biased and dispersed answers under the *price* wording scheme.

All in all, the results are in line with most of the literature. However, our analysis goes beyond the existing papers as it allows to evaluate the importance of the trade-off between more accurate answers and higher non-response rates under the *inflation* wording scheme compared to less accurate answers with lower non-response rates under the *price* wording scheme. Further, the stronger bias under the *price* wording scheme emphasises the importance of the frequency bias effect. Hence, it might be the case that question wordings in terms of *inflation* yield more accurate inflation estimates as consumers coordinate more on officially published numbers, but the *price* wording captures the price changes that consumers actually recall. The latter might thus be more likely to give us the individual inflation perceptions and expectations that consumers act upon, at least in their short-run consumption and saving choices.

Regardless of the type of survey wording, our results further show that news on monetary policy and on inflation developments observed by consumers are incorporated into their inflation perceptions and expectations. While the news reach consumers most likely through the media channel, this means that central bank communication efforts do reach the general public and significantly affect their views on inflation. If central banks wish to reduce the upwards bias in consumers' inflation estimates, communication efforts should be concentrated on positive news in order to reduce the "inflation worry" of the general public.

Further research should focus on the quantification of the frequency bias using experimental evidence as in Georganas et al. (2013) and a better understanding of the relationship between personality traits and the formation of inflation perceptions or expectations. Moreover, the relevance of the perception/ expectation results for households' economic decisions (consumption, investment, savings) has to be analysed in more detail.

V   Acknowledgments

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Appendix

Questions on Inflation/Prices

Question 10A1 (Inflation retrospective): "Do you think that over last 12 months there was inflation or deflation or neither in Germany?" (Explanation "Deflation is the opposite of inflation" is given by the interviewer)[17]

- Inflation

- Deflation

- None of both items

- Don't know

- No answer

Question 10A1X (Inflation unknown): To the interviewer – please mark only if the person asked for a definition of inflation!

- No answer

- Asked for definition of inflation

Question F10A1A (Inflation rate – asked only if the person gave the respective qualitative answer of inflation): "How many percent do you think the inflation rate was over the last 12 months?"[18]

- Per cent:

- Don't know

- No answer

Question F10A1A1A (Inflation rate, range – asked if the person did not give a specific number): "Please indicate a range for the inflation rate in percent."

- Range from ...

- to...

Question F10A1A2 (Inflation rate, range, 2nd question): "I want to make sure that I got it right. You said that the inflation rate over the last 12 months was on average in a range between x and y per cent? Is that right?"

- Yes

- No

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[17]All questions were asked in a retrospective way (over the last 12 months) and in a prospective way (over the next 12 months). We report only the retrospective version as the phrasing is almost identical.

[18]If the person indicated "deflation" the interviewer used the wording "deflation rate" for all questions in the scheme. We report only the version with "inflation" here.

- Don't know

- No answer

Question F10A1A2A1 (Inflation rate, range, correction): "Please give me the correct range for the inflation rate."

- Range from ...

- to...

Question F10A1A3 (Inflation rate, 2nd question): "I want to make sure that I got it right. You said that the inflation rate over the last 12 months was on average x per cent? Is that right?"

- Yes

- No

- Don't know

- No answer

Question F10A1A3A (Inflation rate, correction): "And which percentage is correct? Please give me the correct number."

- ... per cent

For the second wording scheme we exchanged the "inflation" or "deflation" by "did prices in general increase/decrease". All the other questions remained the same in spirit.

Full Regression Tables

Table A1: Effects of Personal Traits on Inflation Perceptions Across Wording Types

	(1)	(2)	(3)	(4)	(5)
male	-3.122***	-3.276***	-3.112***	-3.228***	-3.407***
	(0.678)	(0.681)	(0.679)	(0.692)	(0.696)
male*dummy_infl	3.196***	3.246***	3.268***	3.373***	3.566***
	(0.939)	(0.925)	(0.949)	(0.947)	(0.939)
age	-0.026	-0.039	-0.026	-0.018	-0.032
	(0.028)	(0.027)	(0.028)	(0.029)	(0.027)
age*dummy_infl	0.070*	0.082**	0.072*	0.051	0.068*
	(0.039)	(0.037)	(0.039)	(0.039)	(0.038)
educ	-0.156	-0.154	-0.201	-0.183	-0.214
	(0.233)	(0.238)	(0.241)	(0.223)	(0.241)
educ*dummy_infl	-0.315	-0.334	-0.247	-0.282	-0.261
	(0.292)	(0.299)	(0.303)	(0.284)	(0.304)
inc_quart	0.357	0.563	0.317	0.394	0.601
	(0.452)	(0.408)	(0.455)	(0.454)	(0.399)
inc_quart*dummy_infl	-1.316**	-1.461**	-1.336**	-1.174*	-1.416**
	(0.633)	(0.569)	(0.644)	(0.628)	(0.563)
employ	0.031	-0.032	0.048	0.065	0.010
	(0.311)	(0.307)	(0.312)	(0.311)	(0.308)
employ*dummy_infl	0.383	0.433	0.365	0.335	0.387
	(0.394)	(0.385)	(0.396)	(0.392)	(0.387)
happy_general		-0.462*			-0.510**
		(0.240)			(0.240)
happy_general*dummy_infl		0.322			0.452
		(0.327)			(0.332)
trust_people			0.117		0.074
			(0.153)		(0.139)
trust_people*dummy_infl			-0.240		-0.144
			(0.192)		(0.182)
risk				0.274	0.297
				(0.216)	(0.202)
risk*dummy_infl				-0.542**	-0.562**
				(0.243)	(0.239)
dummy_infl	-4.144*	-6.739**	-3.063	-1.150	-3.987
	(2.150)	(2.953)	(2.389)	(2.785)	(3.490)
Constant	7.794***	11.472***	7.332***	6.082**	9.693***
	(1.700)	(2.273)	(1.818)	(2.368)	(2.894)
Observations	291	289	290	291	288
Adj. R^2	0.140	0.151	0.138	0.150	0.160
F-test wording	8.010	7.330	7.289	7.893	7.250
p-value F-test	0.000	0.000	0.000	0.000	0.000

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. The F-test statistic tests for joint significance of *dummy_infl* and all the interaction terms to evaluate whether the coefficients are significantly different across wording settings.

Table A2: Effects of Personal Traits on Inflation Perceptions Across Wording Types

	(1)	(2)	(3)	(4)	(5)
male	0.074	-0.030	0.156	0.145	0.159
	(0.650)	(0.626)	(0.663)	(0.647)	(0.631)
male*dummy_price	-3.196***	-3.246***	-3.268***	-3.373***	-3.566***
	(0.939)	(0.925)	(0.949)	(0.947)	(0.939)
age	0.044*	0.043*	0.046	0.033	0.036
	(0.026)	(0.025)	(0.028)	(0.026)	(0.027)
age*dummy_price	-0.070*	-0.082**	-0.072*	-0.051	-0.068*
	(0.039)	(0.037)	(0.039)	(0.039)	(0.038)
educ	-0.471***	-0.489***	-0.448**	-0.464***	-0.476**
	(0.177)	(0.181)	(0.183)	(0.176)	(0.185)
educ*dummy_price	0.315	0.334	0.247	0.282	0.261
	(0.292)	(0.299)	(0.303)	(0.284)	(0.304)
inc_quart	-0.959**	-0.898**	-1.019**	-0.781*	-0.815**
	(0.443)	(0.397)	(0.456)	(0.434)	(0.397)
inc_quart*dummy_price	1.316**	1.461**	1.336**	1.174*	1.416**
	(0.633)	(0.569)	(0.644)	(0.628)	(0.563)
employ	0.415*	0.400*	0.413*	0.400*	0.397*
	(0.242)	(0.231)	(0.243)	(0.239)	(0.234)
employ*dummy_price	-0.383	-0.433	-0.365	-0.335	-0.387
	(0.394)	(0.385)	(0.396)	(0.392)	(0.387)
happy_general		-0.140			-0.058
		(0.222)			(0.230)
happy_general*dummy_price		-0.322			-0.452
		(0.327)			(0.332)
trust_people			-0.123		-0.070
			(0.117)		(0.118)
trust_people*dummy_price			0.240		0.144
			(0.192)		(0.182)
risk				-0.268**	-0.265**
				(0.113)	(0.128)
risk*dummy_price				0.542**	0.562**
				(0.243)	(0.239)
dummy_price	4.144*	6.739**	3.063	1.150	3.987
	(2.150)	(2.953)	(2.389)	(2.785)	(3.490)
Constant	3.650***	4.733**	4.269***	4.932***	5.706***
	(1.316)	(1.886)	(1.550)	(1.465)	(1.950)
Observations	291	289	290	291	288
Adj. R^2	0.140	0.151	0.138	0.150	0.160
F-test wording	8.010	7.330	7.289	7.893	7.250
p-value F-test	0.000	0.000	0.000	0.000	0.000

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. The F-test statistic tests for joint significance of *dummy_price* and all the interaction terms to evaluate whether the coefficients are significantly different across wording settings.

Table A3: Effects of Personal Traits on Inflation Expectations Across Wording Types

	(1)	(2)	(3)	(4)	(5)
male	-1.797*	-1.935**	-1.777**	-1.823**	-1.940**
	(0.914)	(0.946)	(0.902)	(0.897)	(0.923)
male*dummy_infl	2.475**	2.526**	2.522**	2.480**	2.624**
	(1.218)	(1.236)	(1.224)	(1.199)	(1.226)
age	-0.017	-0.033	-0.015	-0.015	-0.032
	(0.032)	(0.030)	(0.031)	(0.032)	(0.030)
age*dummy_infl	0.075*	0.091**	0.077*	0.066	0.088**
	(0.041)	(0.038)	(0.040)	(0.041)	(0.039)
educ	-0.517	-0.508*	-0.667*	-0.528*	-0.677**
	(0.316)	(0.300)	(0.344)	(0.304)	(0.331)
educ*dummy_infl	0.067	0.032	0.241	0.084	0.223
	(0.390)	(0.380)	(0.418)	(0.380)	(0.407)
inc_quart	-0.364	-0.118	-0.482	-0.356	-0.221
	(0.464)	(0.469)	(0.477)	(0.461)	(0.464)
inc_quart*dummy_infl	-0.494	-0.702	-0.450	-0.362	-0.563
	(0.672)	(0.634)	(0.694)	(0.662)	(0.635)
employ	0.426	0.383	0.488	0.435	0.452
	(0.339)	(0.325)	(0.333)	(0.335)	(0.317)
employ*dummy_infl	-0.030	0.006	-0.093	-0.043	-0.057
	(0.430)	(0.412)	(0.424)	(0.425)	(0.407)
happy_general		-0.597*			-0.656**
		(0.326)			(0.308)
happy_general*dummy_infl		0.514			0.648
		(0.425)			(0.415)
trust_people			0.347**		0.385**
			(0.172)		(0.191)
trust_people*dummy_infl			-0.455**		-0.459*
			(0.226)		(0.239)
risk				0.099	0.047
				(0.266)	(0.244)
risk*dummy_infl				-0.317	-0.281
				(0.297)	(0.292)
dummy_infl	-5.865**	-9.708**	-3.934	-4.304	-7.489*
	(2.725)	(3.838)	(2.537)	(3.355)	(4.186)
Constant	8.138***	12.662***	6.712***	7.576**	11.259***
	(2.431)	(3.290)	(2.084)	(3.020)	(3.647)
Observations	258	257	257	258	256
Adj. R^2	0.0973	0.116	0.108	0.0957	0.129
F-test wording	4.430	3.894	4.039	4.125	3.986
p-value F-test	0.000	0.000	0.000	0.000	0.000

Note: Robust standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. The F-test statistic tests for joint significance of $dummy\_infl$ and all the interaction terms to evaluate whether the coefficients are significantly different across wording settings.

Table A4: Effects of Personal Traits on Inflation Expectations Across Wording Types

	(1)	(2)	(3)	(4)	(5)
male	0.678	0.591	0.745	0.657	0.684
	(0.805)	(0.797)	(0.827)	(0.795)	(0.806)
male*dummy_price	-2.475**	-2.526**	-2.522**	-2.480**	-2.624**
	(1.218)	(1.236)	(1.224)	(1.199)	(1.226)
age	0.058**	0.058**	0.061**	0.051**	0.056**
	(0.026)	(0.024)	(0.027)	(0.025)	(0.025)
age*dummy_price	-0.075*	-0.091**	-0.077*	-0.066	-0.088**
	(0.041)	(0.038)	(0.040)	(0.041)	(0.039)
educ	-0.451**	-0.476**	-0.426*	-0.444*	-0.454*
	(0.229)	(0.233)	(0.237)	(0.227)	(0.238)
educ*dummy_price	-0.067	-0.032	-0.241	-0.084	-0.223
	(0.390)	(0.380)	(0.418)	(0.380)	(0.407)
inc_quart	-0.858*	-0.820*	-0.931*	-0.718	-0.784*
	(0.485)	(0.426)	(0.504)	(0.476)	(0.433)
inc_quart*dummy_price	0.494	0.702	0.450	0.362	0.563
	(0.672)	(0.634)	(0.694)	(0.662)	(0.635)
employ	0.396	0.388	0.396	0.392	0.395
	(0.264)	(0.253)	(0.262)	(0.262)	(0.255)
employ*dummy_price	0.030	-0.006	0.093	0.043	0.057
	(0.430)	(0.412)	(0.424)	(0.425)	(0.407)
happy_general		-0.083			-0.008
		(0.273)			(0.278)
happy_general*dummy_price		-0.514			-0.648
		(0.425)			(0.415)
trust_people			-0.107		-0.074
			(0.147)		(0.143)
trust_people*dummy_price			0.455**		0.459*
			(0.226)		(0.239)
risk				-0.218*	-0.234
				(0.132)	(0.160)
risk*dummy_price				0.317	0.281
				(0.297)	(0.292)
dummy_price	5.865**	9.708**	3.934	4.304	7.489*
	(2.725)	(3.838)	(2.537)	(3.355)	(4.186)
Constant	2.273*	2.954	2.778*	3.272**	3.770*
	(1.231)	(1.976)	(1.446)	(1.461)	(2.054)
Observations	258	257	257	258	256
Adj. R^2	0.0973	0.116	0.108	0.0957	0.129
F-test wording	4.430	3.894	4.039	4.125	3.986
p-value F-test	0.000	0.000	0.000	0.000	0.000

Note: Robust standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. The F-test statistic tests for joint significance of *dummy_price* and all the interaction terms to evaluate whether the coefficients are significantly different across wording settings.

Table A5: Effects of Trust in the ECB and Monetary News on Inflation Perceptions Across Wording Types

	(1)	(2)	(3)	(4)	(5)
trust_ecb	-0.053	0.057	0.031	0.058	0.064
	(0.198)	(0.245)	(0.242)	(0.246)	(0.248)
trust_ecb*dummy_infl	-0.025	-0.188	-0.174	-0.194	-0.205
	(0.227)	(0.271)	(0.267)	(0.271)	(0.273)
newsheard_pos	-1.537**				
	(0.717)				
newsheard_pos*dummy_infl	0.405				
	(0.977)				
newsheard_neg	1.248				
	(0.830)				
newsheard_neg*dummy_infl	-1.137				
	(1.085)				
news_monetary_policy		0.032			
		(1.322)			
news_monetary_policy*dummy_infl		2.075			
		(2.049)			
news_inflation		-1.491			
		(1.073)			
news_inflation*dummy_infl		1.312			
		(1.139)			
news_monpol_pos			-1.339*		-1.590*
			(0.796)		(0.830)
news_monpol_pos*dummy_infl	–	–	–	–	–
news_monpol_neg			0.808		0.865
			(1.723)		(1.759)
news_monpol_neg*dummy_infl			2.975		2.908
			(2.823)		(2.866)
news_infl_pos				-2.083**	-2.066*
				(1.042)	(1.052)
news_infl_pos*dummy_infl				1.519	1.764
				(1.164)	(1.170)
news_infl_neg				-1.407	-1.479
				(1.144)	(1.131)
news_infl_neg*dummy_infl				1.470	1.575
				(1.392)	(1.376)
dummy_infl	-2.757	-3.052	-2.511	-2.466	-2.647
	(2.666)	(2.878)	(2.874)	(2.863)	(2.937)
Constant	7.005***	8.001***	7.644***	7.944***	7.804***
	(2.039)	(2.171)	(2.240)	(2.228)	(2.297)
Observations	282	221	221	221	221
Demographic Controls	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.146	0.151	0.160	0.144	0.148
F-test wording	5.184	4.375	4.969	5.320	5.118
p-value F-test	0.000	0.000	0.000	0.000	0.000

Note: Robust standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Due to the low number of observations for *news_monpol_pos*, the interaction term with the wording-dummy cannot be estimated. The F-test statistic tests for joint significance of *dummy_infl* and all the interaction terms to evaluate whether the coefficients are significantly different across wording settings.

Table A6: Effects of Trust in the ECB and Monetary News on Inflation Perceptions Across Wording Types

	(1)	(2)	(3)	(4)	(5)
trust_ecb	-0.078	-0.132	-0.143	-0.136	-0.141
	(0.112)	(0.115)	(0.113)	(0.113)	(0.114)
trust_ecb*dummy_price	0.025	0.188	0.174	0.194	0.205
	(0.227)	(0.271)	(0.267)	(0.271)	(0.273)
newsheard_pos	-1.132*				
	(0.664)				
newsheard_pos*dummy_price	-0.405				
	(0.977)				
newsheard_neg	0.111				
	(0.699)				
newsheard_neg*dummy_price	1.137				
	(1.085)				
news_monetary_policy		2.106			
		(1.566)			
news_monetary_policy*dummy_price		-2.075			
		(2.049)			
news_inflation		-0.179			
		(0.383)			
news_inflation*dummy_price		-1.312			
		(1.139)			
news_monpol_pos			-1.339*		-1.590*
			(0.796)		(0.830)
news_monpol_pos*dummy_price			–		–
news_monpol_neg			3.783*		3.773*
			(2.235)		(2.262)
news_monpol_neg*dummy_price			-2.975		-2.908
			(2.823)		(2.866)
news_infl_pos				-0.564	-0.302
				(0.519)	(0.512)
news_infl_pos*dummy_price				-1.519	-1.764
				(1.164)	(1.170)
news_infl_neg				0.063	0.096
				(0.793)	(0.785)
news_infl_neg*dummy_price				-1.470	-1.575
				(1.392)	(1.376)
dummy_price	2.757	3.052	2.511	2.466	2.647
	(2.666)	(2.878)	(2.874)	(2.863)	(2.937)
Constant	4.248**	4.949***	5.133***	5.478***	5.157***
	(1.717)	(1.889)	(1.801)	(1.798)	(1.829)
Observations	282	221	221	221	221
Demographic Controls	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.146	0.151	0.160	0.144	0.148
F-test wording	5.184	4.375	4.969	5.320	5.118
p-value F-test	0.000	0.000	0.000	0.000	0.000

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Due to the low number of observations for *news_monpol_pos*, the interaction term with the wording-dummy cannot be estimated. The F-test statistic tests for joint significance of *dummy_price* and all the interaction terms to evaluate whether the coefficients are significantly different across wording settings.

Table A7: Effects of Trust in the ECB and Monetary News on Inflation Expectations Across Wording Types

	(1)	(2)	(3)	(4)	(5)
trust_ecb	0.150	0.363	0.340	0.357	0.386
	(0.239)	(0.330)	(0.292)	(0.327)	(0.335)
trust_ecb*dummy_infl	-0.215	-0.499	-0.484	-0.511	-0.531
	(0.259)	(0.344)	(0.307)	(0.341)	(0.348)
newsheard_pos	-1.798**				
	(0.719)				
newsheard_pos*dummy_infl	1.222				
	(1.015)				
newsheard_neg	0.943				
	(0.893)				
newsheard_neg*dummy_infl	-0.594				
	(1.187)				
news_monetary_policy		0.679			
		(1.376)			
news_monetary_policy*dummy_infl		3.522			
		(3.030)			
news_inflation		-1.369			
		(1.810)			
news_inflation*dummy_infl		1.941			
		(1.852)			
news_monpol_pos			1.050		0.839
			(0.828)		(1.023)
news_monpol_pos*dummy_infl			–		–
news_monpol_neg			1.762		1.880
			(1.749)		(1.819)
news_monpol_neg*dummy_infl			6.041		5.935
			(4.567)		(4.640)
news_infl_pos				-2.166*	-2.133*
				(1.117)	(1.129)
news_infl_pos*dummy_infl				2.181*	2.127
				(1.318)	(1.307)
news_infl_neg				-1.004	-1.154
				(1.920)	(1.940)
news_infl_neg*dummy_infl				1.637	2.083
				(2.073)	(2.082)
dummy_infl	-3.476	-2.071	-0.980	-1.266	-0.826
	(2.978)	(2.515)	(2.478)	(2.619)	(2.556)
Constant	6.113**	4.993***	4.735***	4.938***	4.601**
	(2.504)	(1.807)	(1.812)	(1.836)	(1.876)
Observations	246	190	190	190	190
Demographic Controls	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.0811	0.134	0.164	0.103	0.148
F-test wording	2.729	3.139	3.643	2.973	3.128
p-value F-test	0.005	0.002	0.001	0.003	0.001

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Due to the low number of observations for *news_monpol_pos*, the interaction term with the wording-dummy cannot be estimated. The F-test statistic tests for joint significance of *dummy_infl* and all the interaction terms to evaluate whether the coefficients are significantly different across wording settings.

Table A8: Effects of Trust in the ECB and Monetary News on Inflation Expectations Across Wording Types

	(1)	(2)	(3)	(4)	(5)
trust_ecb	-0.065	-0.135	-0.144	-0.153	-0.145
	(0.100)	(0.097)	(0.094)	(0.096)	(0.095)
trust_ecb*dummy_price	0.215	0.499	0.484	0.511	0.531
	(0.259)	(0.344)	(0.307)	(0.341)	(0.348)
newsheard_pos	-0.576				
	(0.717)				
newsheard_pos*dummy_price	-1.222				
	(1.015)				
newsheard_neg	0.348				
	(0.782)				
newsheard_neg*dummy_price	0.594				
	(1.187)				
news_monetary_policy		4.201			
		(2.700)			
news_monetary_policy*dummy_price		-3.522			
		(3.030)			
news_inflation		0.572			
		(0.394)			
news_inflation*dummy_price		-1.941			
		(1.852)			
news_monpol_pos			1.050		0.839
			(0.828)		(1.023)
news_monpol_pos*dummy_price			–		–
news_monpol_neg			7.803*		7.815*
			(4.219)		(4.269)
news_monpol_neg*dummy_price			-6.041		-5.935
			(4.567)		(4.640)
news_infl_pos				0.015	-0.006
				(0.700)	(0.659)
news_infl_pos*dummy_price				-2.181*	-2.127
				(1.318)	(1.307)
news_infl_neg				0.633	0.929
				(0.781)	(0.757)
news_infl_neg*dummy_price				-1.637	-2.083
				(2.073)	(2.082)
dummy_price	3.476	2.071	0.980	1.266	0.826
	(2.978)	(2.515)	(2.478)	(2.619)	(2.556)
Constant	2.637	2.922*	3.755**	3.672*	3.775**
	(1.611)	(1.750)	(1.690)	(1.868)	(1.737)
Observations	246	190	190	190	190
Demographic Controls	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.0811	0.134	0.164	0.103	0.148
F-test wording	2.729	3.139	3.643	2.973	3.128
p-value F-test	0.005	0.002	0.001	0.003	0.001

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Due to the low number of observations for *news_monpol_pos*, the interaction term with the wording-dummy cannot be estimated. The F-test statistic tests for joint significance of *dummy_price* and all the interaction terms to evaluate whether the coefficients are significantly different across wording settings.