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# The Hidden Heterogeneity of Inflation Expectations and its Implications<sup>\*</sup>

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#### Abstract

Using a new consumer survey dataset, we document a new dimension of heterogeneity in inflation expectations that has implications for consumption and saving decisions as well as monetary policy transmission. We show that German households with the same inflation expectations differently assess whether the level of expected inflation and of nominal interest rates is appropriate or too high/too low. The 'hidden heterogeneity' in expectations stemming from these opinions is related to demographic characteristics and affects current and planned spending in addition to the Euler equation effect of the perceived real interest rate. Furthermore, these differences in opinions affect German households differently depending on whether they are renters or homeowners.

Keywords: Macroeconomic expectations, monetary policy perceptions, survey microdata.

JEL classification: E31, E52, E58, D84.

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# 1 Introduction

In recent years, a large literature has developed that focuses on the formation of consumers' macroeconomic expectations. Phenomena such as the tendency of consumers to overestimate actual inflation or patterns in forecast accuracy across socio-demographic groups have been widely observed across different surveys and countries (Jonung, 1981; Bryan and Venkatu, 2001; Coibion and Gorodnichenko, 2015). Several papers have shown that inflation expectations are formed heterogeneously and document that these heterogeneous expectations have implications for consumption and saving decisions (Bachmann et al., 2015; Duca et al., 2018; Dräger and Nghiem, 2020).<sup>1</sup>

In this paper, we present new evidence regarding the relevance of opinions on expected future economic developments. Specifically, we show that even households with the same inflation expectations can have very different opinions about the appropriate level of inflation and interest rates, and thereby about the right stance of monetary policy. This heterogeneity has implications for the transmission channel of monetary policy. While in the economics profession opinions have so far been somewhat neglected as a source of heterogeneity, in the social psychology literature – specificly in attribution theory – it has been long established how people form opinions and how they justify them. Jones and Nisbett (1972) and Tversky and Kahneman (1973) report findings that people tend to view their own behavior as reflecting the changing demands of their environment.<sup>2</sup> This provides some understanding how opinions could also matter for economic decisions. It would not be surprising to see that consumers in our survey 'act' on their opinions and actually make spending decisions based on their opinions.

We first detail the 'hidden heterogeneity' in expectations using the Bundesbank Online Pilot Survey on Consumer Expectations. Overall, the majority of consumers believe that expected inflation is too high and expected interest rates are too low. Remarkably, even consumers with inflation expectations that are well within the ECB's target inflation rate of close to, but under 2%, differ substantially in their opinions of whether this is an appropriate level of inflation. Specifically, for consumers with inflation expectations between 1.5% and 2%, about 49% believe that expected inflation is appropriate, 46% think it should be lower and 5% think it should be higher. Strikingly, even among consumers who expect deflation in the next year, about 30% would still prefer lower inflation. Generally, a large share of German households believes that inflation is too high. We observe similar heterogeneity also for consumers' opinions regarding the stance of monetary policy, i.e., future interest rates.

We further document that these differences in attitudes result in some heterogeneity in households' consumption and savings profiles, even for consumers who share similar inflation expectations. This implies an additional channel of monetary policy transmission via the attitudes of households in addition to the effect of inflation expectations on spending via the real interest rate. We find that when households perceive higher real rates, they postpone part of their spending on durable goods. This effect is in line with the theory, namely the intertemporal substitution effect in the

 $<sup>^{1}</sup>$ For a recent survey on the formation of inflation expectations and their effect on economic decisions see Coibion et al. (2020).

 $<sup>^{2}\</sup>mathrm{They}$  also report that people think that the behavior of others is trait dominated.

consumption Euler equation. Interestingly, the negative effect of perceived rates is only significant for consumers with inflation expectations in line with the ECB target, i.e., between 1.5% and 2%. Furthermore, those who believe interest rates should be lower in the future, are de facto acting as if (nominal) interest rates – and thus real interest rates – are already lower, as they have significantly higher durable goods spending and also a higher negative elasticity with respect to real rates. Interestingly, the effect of attitudes is not only relevant for current spending decisions, but also affects future planned spending on durable goods in a way which is consistent with theory. Distinguishing further between homeowners and renters, we find opposing effects of preferring lower inflation on current durable goods spending: Homeowners report lower current spending when they think inflation should be lower (in line with an Euler equation), while renters report higher durable goods spending.

Our paper relates to the literature explaining the heterogeneity of expectations across sociodemographic groups. Earlier contributions by Jonung (1981), Bryan and Venkatu (2001) and Pfajfar and Santoro (2009) demonstrate higher levels of both perceived and expected inflation for women, low education and low income groups, with a u-shaped effect of age where young and old respondents have higher expectations than middle age respondents. This pattern is highly prevalent in many different surveys across both different countries and time spans. More recent approaches by D'Acunto et al. (2019) and D'Acunto et al. (2019) demonstrate that the gender differences in inflation expectations can be traced to differences in daily grocery shopping experiences (as hypothesized in Jonung, 1981) and that they spill over into gender differences in expectations on other macroeconomic variables. Moreover, Ehrmann et al. (2017) demonstrate that consumers' attitudes like optimism or pessimism regarding the economic outlook influence also the level of inflation expectations, while D'Acunto et al. (2019) show that cognitive abilities play an important role. Finally, personal inflation experience can explain some of the differences in inflation expectations across age cohorts (Malmendier and Nagel, 2016) and across different political systems, e.g., the Western part of Germany and the former German Democratic Republic (GDR) in the East of Germany before 1989 (Goldfayn-Frank and Wohlfahrt, 2019).

Our paper is related also to a growing literature evaluating the link between survey inflation expectations and household spending decisions. Assuming consumers are following an Euler equation, one would expect a positive effect from higher inflation expectations on current spending via its effect on the real rate, which could become particularly important when nominal interest rates are at the zero lower bound. While Bachmann et al. (2015) and Burke and Ozdagli (2013) find little evidence of a significant link between inflation expectations and consumers' reported readiness to spend (or actual spending) on durables in the US, Crump et al. (2015) report a positive relation between consumption growth and inflation expectations of US consumers in the Survey of Consumer Expectations (SCE) conducted at the New York Fed. Other studies on European and Japanese households find significantly positive links between household inflation expectations and (intended or actual) spending on both durables and non-durables (Ichiue and Nishiguchi, 2015; D'Acunto et al., 2016; Duca et al., 2018; Vellekoop and Wiederholt, 2018; Dräger and Nghiem, 2020). The remainder of the paper is organized as follows: Section 2 explains the data we use, while Section 3 discusses our results. Section 4 concludes.

# 2 Data

Our research question is evaluated using a new survey dataset coming from the Bundesbank Online Pilot Survey on Consumer Expectations, which was fielded on a representative sample of German households in three waves from April 2019 to June 2019. Overall, the dataset includes 6653 observations, with 2009 participants in the first wave, 2052 in the second wave and 2592 in the third wave. In addition, the survey includes a panel component, as about 500 respondents participated in all three waves, 500 in wave 1 and 2, 500 in wave 2 and 3 and 500 in wave 1 and 3. For our analysis, we use mainly the first and second wave of the dataset and thus have about 1000 participants with responses in both waves.

The Bundesbank Online Pilot Survey on Consumer Expectations core questionnaire asks about consumers' macroeconomic expectations, housing market expectations and housing choices, current and planned spending and saving choices, as well as a large range of socio-demographic characteristics. We add the following questions to the core questionnaire. First, after the question on point estimates for inflation 12 months ahead, we ask about opinions on the expected level of inflation (included in the first wave):

- 1. Do you think the average level of inflation you expect for the next 12 months will be more or less appropriate, or do you think a higher or lower inflation rate would be better?
  - (a) Higher inflation than expected would be better (*d\_infl\_highbetter*)
  - (b) Inflation will be more or less appropriate (*d\_infl\_reason*)
  - (c) Lower inflation than expected would be better (*d\_infl\_lowbetter*)

Similarly, we ask about opinions on the expected level of nominal interest rates after the question on point estimates for expected saving rates in the next 12 months (included in the second wave):

- 2. Do you think the average level of interest rates you expect for the next 12 months will be more or less appropriate, or do you think a higher or lower interest rate would be better?
  - (a) Higher interest rate than expected would be better (*d\_int\_highbetter*)
  - (b) The interest rate will be more or less appropriate (*d\_int\_reason*)
  - (c) Lower interest rate than expected would be better  $(d_int_lowbetter)$

In our analysis, we further control for quantitative point forecasts for the next 12 months regarding consumer price inflation,  $\pi^e$ , the average savings rate,  $i^e_{savings}$  and the average mortgage rate,  $i^e_{mortgage}$ . In order to avoid an effect from extreme outliers, inflation expectations are truncated in the range between -5% and +25% and interest rate expectations are truncated to be below or equal to 25%. Socio-demographic controls comprise a dummy variables for being male  $(d\_male)$ , age, three income groups  $(inc\_low - \text{monthly net income below or equal } 1.000 \in$ ,  $inc\_middle - \text{monthly net}$ income between  $1.000 \in$  and  $3.000 \in$  and  $inc\_high - \text{monthly net income above } 3.000 \in$ ), four education groups  $(edu\_haupt - \text{lowest highschool level in Germany (Hauptschule)}, edu\_real - medium$  $highschool level in Germany (Realschule), <math>edu\_abi - \text{highest highschool level in Germany enabling}$ to study at a university (Abitur),  $edu\_uni - \text{university degree}$ , three work categories  $(d\_fulltime - \text{working full time, } d\_parttime - \text{working part time, } d\_noemploy - \text{no employment (voluntary or$  $involuntary), <math>d\_retired - \text{retired}$ , a dummy for owning a house  $(d\_ownhouse)$ , a dummy for being a renter  $(d\_renthouse)$  and a dummy for having lived in the GDR (German Democratic Republic in the Eastern part of Germany) before 1989  $(d\_east1989)$ .

Finally, we evaluate implications of opinions on inflation and interest rates for spending and saving decisions. These include levels of spending in the previous month on durables  $(c^{dur})$ , consumption goods  $(c^{cons})$ , housing (rent or mortgage payments,  $c^{house}$ ) and saving (saving), all measured in Euros. We use log levels and truncate the highest 5% in order to exclude unreasonable values. The fact that the survey asks to report actual spending in Euros represent an important advantage over surveys measuring only consumers' readiness to spend. Spending plans are measured with qualitative questions asking for plans to spend/save more/about the same/less on the same categories in the next 12 months. We define dummy variables for those planning to spend more on durables  $(c^{dur,e})$ , consumption goods  $(c^{cons,e})$ , housing  $(c^{house,e})$  and saving  $(saving^e)$ .

### 3 Results

#### 3.1 Summary Statistics: The Hidden Heterogeneity of Expectations

Table 1 shows a cross-tabulation of our variables of interest. From this table we observe that the majority of households (43%) express that inflation should be lower and interest rates should be higher. This would be consistent with a Taylor rule. 38% of the surveyed population feel inflation will be at a reasonable level and 16.8% have the same opinion regarding interest rates. However, only 7.4% of our sample think that both inflation and interest rates will be at appropriate levels. Hence, our sample has many individuals who feel that inflation as well as interest rates should be different from the levels that they currently expect. The majority opinion on interest rates is perhaps not surprising, given that the main refinancing rate was zero for a protracted period of time when the respondent were surveyed. The views that inflation should be lower, at a time with very moderate price movements, could be explained by the overall negative attitude towards inflation in Germany.

As a next step, we explore our variables of interest visually by plotting the opinions against the levels of the underlying expectations. Figure 1 plots various opinions against macroeconomic expectations. To help with the interpretation, we smooth the individual observations using a Lowess smoother. As we can see, there is a substantial heterogeneity of opinions. First, in Figure 2(a) we plot the share of people believing that inflation will be reasonable, should be higher or should be

	Ex	pected inter	rest rate	
Expected inflation	higher better	reasonable	lower better	Total
	%	%	%	%
higher better	3.4	1.2	0.2	4.8
reasonable	28.9	7.4	1.9	38.3
lower better	43.0	8.1	5.8	56.9
Total	75.3	16.8	7.9	100.0

Table 1: Opinions on Expected inflation and Expected Interest Rate

lower against their own expected inflation rate in 12 months. This visualizes the heterogeneity of opinions of respondents sharing the same inflation point forecast.



Figure 1: Opinions and Expectations

(c) Opinions and Savings Rate Expectations

Even when considering inflation expectations that are in line the ECB's mandate, i.e., lying between 1.5-2%, we observe that only about 50% of the respondents believe that this expected level of inflation is appropriate. From the remaining 50%, most people believe that this level of inflation is too high. This reflects a substantial degree of hidden heterogeneity within point expectations that would otherwise be considered as anchored at the inflation target, emphasizing the importance of considering these underlying opinions. For inflation expectations above the announced inflation target of the ECB, we observe that the share of people believing inflation will be reasonable substantially declines, while the share of households believing inflation will be too high sharply increases. Both movements are as one would expect. Strikingly, as we move to expected inflation levels below 1.5%, the share of respondents believing that these low expected inflation rates are appropriate remains high at about 50%, while the share of households believing inflation should be higher rises only up to levels around 20% and the share believing inflation should be lower remains high around 30%. Hence, there exists a substantial fraction of consumers who do not think that very low inflation or even deflation is harmful or who would prefer even lower inflation rates. This implies considerable lack of understanding of the economic problems related to missing the inflation target from below.

Figure 2(b) plots the opinions on future interest rates against the level of individual inflation expectations. We find a peak in the share of consumers preferring higher interest rates for those with inflation expectations around the inflation target, while the share thinking interest rates are appropriate increases when inflation expectations are very low. In Figures 2(d) and 2(c), we replicate Figure 2(a) for expectations on interest rates (saving rates and mortgage rates). The main message remains the same. There is a substantial and persistent heterogeneity of opinions conditional on having the same level expectations across the whole spectrum of expectations. This is what we term the 'hidden heterogeneity' in inflation and interest rate expectations. The shares remain relatively constant across levels of mortgage rate expectations, while the share of those preferring higher interest rates declines with higher savings interest rate expectations.

#### 3.2 Identifying the Hidden Heterogeneity

In Figure 1 in the previous section, we show that there exists a large degree of 'hidden heterogeneity' in opinions about future inflation and interest rates for consumers sharing the same expectations. This is true even when inflation expectations are 'anchored', i.e., close to the announced inflation target. In this section, we aim to characterize this heterogeneity in opinions according to demographic variables as well as macroeconomic expectations.

All models estimate the likelihood of choosing either opinion category using probit models with population weights. The estimation output tables report marginal effects evaluated at the sample mean. Quantitative interest rate expectations are truncated to be lower than 25%. Models for inflation opinions with demographic characteristics are estimated using the first wave only when this question was included into the questionnaire. The second wave contains the questions regarding interest rate opinions as well as quantitative interest rate expectations. Therefore, we matched consumers in the first wave who answered questions on inflation expectations to their answers in the second wave and use the second wave for all models including either interest rate opinions or macroeconomic expectations.<sup>3</sup>

<sup>&</sup>lt;sup>3</sup>Given that there is only a gap of one month between those survey waves, economic and personal conditions should not have changed substantially.

Table 2 shows the role of demographic characteristics on the likelihood of responding that inflation should be lower, is appropriate or should be higher, respectively. In the first three columns we report the effects for the full range of quantitative inflation expectations. The second three columns use only the responses of those consumers who expect either deflation or very low inflation rates below 1.5% in the next 12 months. The third block shows effects for responses in the 'inflation target zone', i.e., between 1.5% and 2%, while the last three columns use only high inflation expectations above 2%.

In the full sample, consumers are more likely to think expected inflation is appropriate or should be higher and less likely to think it should be lower if they are male, in the high income group, have a university degree or own their home. The reverse is true for respondents who are unemployed or out of the labor market. Interestingly, consumers who lived in the GDR prior to 1989 are also significantly more likely to think that inflation should be lower, and less likely to view expected inflation as appropriate. This is in line with recent findings in Goldfayn-Frank and Wohlfahrt (2019). Overall, it thus seems that the demographic groups who typically report higher inflation forecasts with lower forecast accuracy are also more likely to think that inflation rates should be lower.<sup>4</sup> This is corroborated by our results in Table A.1 in the appendix, which shows that consumers with higher inflation expectations are more likely to view expected inflation as too high, rather than appropriate or too low.

However, when we distinguish between different ranges of inflation expectations, the results in Table 2 suggest that most of the demographic heterogeneity in inflation opinions actually takes place within the 'inflation target zone'  $1.5 \leq \pi^e \leq 2$ , where inflation expectations are both relatively homogeneous and close to the official inflation target of the ECB. Thus, even when inflation expectations seem anchored, there is considerable underlying heterogeneity with respect to the opinions of consumers regarding these expectations: The differences in opinions across gender, income, education and for those having lived in Eastern Germany before 1989 are mostly significant only in the 'inflation target zone', where the marginal effects are often higher than for the overall sample. By contrast, only few demographic effects remain significant when inflation expectations lie below 1.5% or above 2%.

Next, in Table 3 we evaluate the heterogeneity across opinions on future interest rates. Overall, consumers in the second wave are more likely to think that interest rates should be higher, i.e., less likely to think interest rates are appropriate or should be lower, with rising age and in the higher income and education groups. Hence, those groups of the population who typically save more than average are also more likely to prefer higher interest rates. Interestingly, consumers who own their home are also less likely to prefer lower interest rates and more likely to think they are reasonable. Again, we observe considerable heterogeneity in these demographic effects when restricting the range of inflation forecasts: The view that higher income groups who save more would generally prefer higher interest rates only holds for those consumers with relatively high inflation expectations above 2%. By contrast, those with inflation expectations in the 'inflation target zone'  $1.5 \leq \pi^e \leq 2$  and

<sup>&</sup>lt;sup>4</sup>Inflation expectations are typically found to be higher/less accurate for females as well as low education and low income groups. This finding is highly robust across different time periods and different country surveys, see for instance, Jonung (1981); Bryan and Venkatu (2001); Pfajfar and Santoro (2009).

higher income are more likely to state that interest rates should be lower. Finally, consumers with relatively low inflation expectations below 1.5% seem to prefer higher interest rates more when their income is low, rather than middle or high.

Finally, Tables A.1-A.2 in the appendix evaluate the heterogeneity in opinions on future inflation and interest rates across different levels of inflation and interest rate expectations, while controlling for demographic effects. With rising inflation expectations, consumers are more likely to view inflation as too high, and less likely to think it is appropriate or should be higher. Not surprisingly, this effect is extinguished by restricting inflation expectations in the 'inflation target zone' between 1.5% and 2%. The heterogeneity among inflation opinions in this range is thus not driven by the level of inflation expectations as already indicated in Figure 2(a). Moreover, there is some evidence that consumers with higher mortgage rate expectations are more likely to think inflation should be lower and less likely to think it is appropriate or should be higher. This effect remains also in the 'inflation target zone.'

Evaluating interest rate opinions in Table A.2 in appendix, we find no effects of inflation expectations. Instead, as expected, consumers are more likely to prefer lower interest rates, and less likely to think they should be higher, if they have higher savings or mortgage rate expectations. This relation does not differ significantly between the full sample and the 'inflation target zone,' suggesting that inflation and interest rate opinions are formed somewhat independently.

#### 3.3 Implications for Spending on Durable Goods and for Saving

So far we have identified a new dimension of heterogeneity of inflation expectations which is related to the perceptions of whether inflation and interest rates are expected to be at an appropriate level. This 'hidden heterogeneity' is present even for similar levels of inflation expectations. In this section, we assess whether this hidden heterogeneity also has implications for consumption and savings decisions. One nice feature of our dataset is that it asks for both the level of expenditures/saving in  $\in$  in the past month and whether households intend to spend/save more/less/about the same over the next 12 months. The survey asks for the  $\in$  amount of spending on durable goods, consumer goods, clothes and shoes, leisure activities, transport costs, services, vacation, housing costs, and financial reserves (savings). We will focus on a selection of expenditures in this section: Intuitively, durable good purchases should be more sensitive to interest rates than most other purchases, as their frequency is lower and they may be credit-financed. Thus, they are particularly interesting to study. Also the amount of savings may be important for the type of heterogeneity that we study in this paper.

In all estimations, we control for demographic characteristics, where income plays a crucial role (these results are omitted, but available on request). In line with the Euler equation model of consumption, we additionally control for (perceived) real interest rates on savings, defined as  $r_{savings}^{e} = i_{savings}^{e} - \pi^{e}$  and for planned spending in the models for current spending (or current

		Full sample		I	$5 \leq \pi^e < 1$	5		$1.5 \leq \pi^e \leq 2$	01		$2 < \pi^e \leq 25$	
	inf	$\inf$	inf	$\inf$	$\inf$	inf	$\inf$	$\inf$	inf	inf	$\inf$	inf
	_lowbetter	_reason	_highbetter	_lowbetter	_reason	_highbetter	_lowbetter	_reason	highbetter	_lowbetter	_reason	_highbetter
$d\_male$	-0.084***	$0.049^{*}$	$0.039^{***}$	-0.079	0.003	$0.086^{**}$	-0.083**	0.040	$0.053^{***}$	-0.038	0.032	0.007
	(0.027)	(0.027)	(0.012)	(0.067)	(0.069)	(0.038)	(0.042)	(0.042)	(0.019)	(0.038)	(0.037)	(0.012)
age	-0.002	0.002	0.001	-0.003	0.004	-0.001	-0.003	0.001	$0.002^{*}$	-0.002	0.002	0.001
	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)
$inc\_middle$	-0.065	0.096	-0.024	$0.406^{**}$	-0.241	-0.118	-0.256*	0.218	$0.305^{***}$	-0.082	0.109	-0.016
	(0.081)	(0.083)	(0.032)	(0.179)	(0.203)	(0.097)	(0.139)	(0.140)	(0.055)	(0.102)	(0.105)	(0.025)
$inc_high$	-0.143*	$0.178^{**}$	-0.028	$0.369^{**}$	-0.187	-0.137	-0.323**	$0.278^{**}$	$0.310^{***}$	-0.154	$0.193^{*}$	-0.029
	(0.082)	(0.084)	(0.033)	(0.182)	(0.205)	(0.098)	(0.140)	(0.141)	(0.056)	(0.106)	(0.108)	(0.026)
$d\_east1989$	$0.132^{***}$	$-0.140^{***}$	0.006	0.011	-0.070	0.058	$0.198^{***}$	-0.187***	-0.017	$0.101^{**}$	$-0.103^{**}$	0.000
	(0.036)	(0.035)	(0.014)	(0.090)	(0.092)	(0.042)	(0.051)	(0.052)	(0.022)	(0.051)	(0.050)	(0.015)
$d\_edu\_real$	-0.048	0.040	0.010	0.077	-0.082	0.008	-0.074	0.058	0.018	-0.043	0.041	0.002
	(0.034)	(0.033)	(0.016)	(0.080)	(0.081)	(0.053)	(0.051)	(0.052)	(0.020)	(0.048)	(0.046)	(0.016)
$d\_edu\_abi$	-0.075	0.062	0.015	-0.085	0.086	0.018	$-0.153^{**}$	$0.139^{**}$	0.012	0.052	-0.073	0.019
	(0.047)	(0.047)	(0.019)	(0.133)	(0.132)	(0.071)	(0.068)	(0.068)	(0.025)	(0.067)	(0.066)	(0.019)
$d\_edu\_uni$	-0.197***	$0.155^{***}$	$0.039^{**}$	-0.051	-0.031	0.080	-0.289***	$0.268^{***}$	0.019	-0.079	0.040	$0.035^{*}$
	(0.039)	(0.038)	(0.016)	(0.092)	(0.093)	(0.050)	(0.057)	(0.057)	(0.021)	(0.059)	(0.058)	(0.018)
$d\_part time$	0.051	-0.042	-0.010	0.065	-0.033	-0.017	0.009	-0.004	-0.022	0.019	-0.020	0.004
	(0.046)	(0.046)	(0.019)	(0.116)	(0.123)	(0.067)	(0.078)	(0.078)	(0.033)	(0.060)	(0.059)	(0.016)
$d\_noemploy$	$0.121^{**}$	$-0.100^{*}$	$-0.025^{**}$	0.152	-0.130	-0.041	0.052	-0.054	0.002	$0.109^{*}$	-0.091	-0.016
	(0.052)	(0.052)	(0.012)	(0.121)	(0.129)	(0.036)	(0.080)	(0.081)	(0.013)	(0.065)	(0.063)	(0.011)
$d\_retired$	-0.049	0.051	0.002	0.091	-0.068	-0.029	-0.029	0.049	-0.023	-0.058	0.060	0.001
	(0.058)	(0.058)	(0.014)	(0.144)	(0.149)	(0.052)	(0.088)	(0.089)	(0.019)	(0.074)	(0.071)	(0.015)
$d\_ownhouse$	-0.046*	$0.050^{*}$	-0.004	-0.212***	$0.171^{***}$	0.049	-0.037	0.062	$-0.026^{*}$	0.050	-0.041	-0.008
	(0.028)	(0.027)	(0.011)	(0.063)	(0.066)	(0.037)	(0.042)	(0.042)	(0.016)	(0.040)	(0.039)	(0.011)
N	1515	1515	1515	267	267	267	669	669	699	579	579	579
$\chi^2$	100.097	82.074	32.355	26.807	16.819	28.257	69.038	59.393	874.729	20.979	22.191	17.571
Pseudo $R^2$	0.055	0.047	0.054	0.083	0.052	0.146	0.089	0.076	0.086	0.030	0.032	0.064
Note: Bunder	sbank Online	Pilot Survey	on Consumer	Expectation:	, first wave	. Average mai	ginal effects	for the likeli	hood of report	ing that inflat	tion should	be lower/is
reasultable/ st	iouiu pe mgue	are reput	aurine estint	autous with pu	pulation we	ignes. nouuse	stannarn en	ors in parent	ILESES. p </td <td>ייי∨ע ∵ אייי</td> <td>10, p<u.< td=""><td></td></u.<></td>	ייי∨ע ∵ אייי	10, p <u.< td=""><td></td></u.<>	

Table 2: Opinions about Future Inflation

				TAULE 9. O	p emonud.	JOUL FULUE	TILVETEDU TVC	cont				
		Full sample			$-5 \leq \pi^e < 1.$	5		$1.5 \leq \pi^e \leq 2$			$2 < \pi^e \leq 2$	
	int	int	int	int	int	int	int	int	int	int	$\operatorname{int}$	int
	_lowbetter	_reason	_highbetter	_lowbetter	_reason	_highbetter	_lowbetter	_reason	_highbetter	_lowbetter	_reason	_highbetter
$d\_male$	-0.018	0.026	-0.008	0.042	0.060	-0.103	-0.015	0.015	0.001	-0.019	0.012	0.010
	(0.017)	(0.022)	(0.026)	(0.039)	(0.060)	(0.069)	(0.020)	(0.036)	(0.040)	(0.027)	(0.029)	(0.038)
age	-0.003***	0.000	$0.003^{**}$	-0.002	0.001	0.002	-0.004***	0.001	$0.003^{*}$	$-0.003^{*}$	0.001	0.002
	(0.001)	(0.001)	(0.001)	(0.002)	(0.003)	(0.004)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)
$inc\_middle$	-0.069	-0.014	0.114	0.061	$1.244^{***}$	-0.334**	$0.381^{***}$	$-0.185^{**}$	0.134	$-0.138^{**}$	0.030	$0.170^{*}$
	(0.045)	(0.056)	(0.072)	(0.062)	(0.190)	(0.166)	(0.079)	(0.092)	(0.110)	(0.068)	(0.083)	(0.099)
$inc_high$	-0.095**	0.002	$0.122^{*}$	-0.061	$1.331^{***}$	-0.290*	$0.378^{***}$	$-0.159^{*}$	0.107	$-0.155^{**}$	0.031	$0.182^{*}$
	(0.046)	(0.057)	(0.073)	(0.060)	(0.204)	(0.168)	(0.080)	(0.093)	(0.112)	(0.069)	(0.086)	(0.100)
$d\_east1989$	0.004	-0.037	0.032	0.013	$0.135^{*}$	$-0.153^{*}$	-0.015	-0.074	$0.089^{*}$	0.010	-0.046	0.035
	(0.024)	(0.028)	(0.035)	(0.034)	(0.079)	(0.088)	(0.025)	(0.047)	(0.051)	(0.039)	(0.039)	(0.052)
$d\_edu\_real$	-0.007	-0.029	0.032	0.052	-0.031	-0.014	-0.023	0.003	0.010	-0.008	-0.054	0.055
	(0.020)	(0.025)	(0.031)	(0.051)	(0.069)	(0.083)	(0.026)	(0.040)	(0.046)	(0.033)	(0.035)	(0.045)
$d\_edu\_abi$	-0.086***	-0.092**	$0.168^{***}$	0.059	-0.119	0.062	-0.086*	$-0.125^{**}$	$0.199^{***}$	$-0.133^{**}$	-0.039	$0.151^{**}$
	(0.032)	(0.037)	(0.044)	(0.052)	(0.106)	(0.115)	(0.046)	(0.061)	(0.069)	(0.056)	(0.050)	(0.066)
$d\_edu\_uni$	-0.042*	$-0.056^{*}$	$0.090^{**}$	0.043	-0.099	0.070	$-0.061^{*}$	-0.055	$0.102^{*}$	-0.026	-0.029	0.046
	(0.025)	(0.030)	(0.037)	(0.056)	(0.082)	(0.096)	(0.033)	(0.047)	(0.053)	(0.042)	(0.041)	(0.056)
$d\_part time$	-0.021	0.012	0.006	0.014	-0.006	-0.020	0.020	-0.028	0.008	$-0.085^{*}$	0.045	0.028
	(0.027)	(0.034)	(0.043)	(0.050)	(0.094)	(0.109)	(0.032)	(0.059)	(0.066)	(0.048)	(0.045)	(0.064)
$d\_noemploy$	0.021	-0.020	-0.013	0.011	0.232	-0.237*	0.022	-0.087	0.050	0.004	-0.009	-0.004
	(0.028)	(0.044)	(0.048)	(0.058)	(0.150)	(0.143)	(0.035)	(0.068)	(0.073)	(0.048)	(0.055)	(0.068)
$d\_retired$	-0.025	-0.030	0.060	-0.021	-0.224	0.226	0.020	0.013	-0.028	-0.040	-0.050	0.093
	(0.033)	(0.047)	(0.053)	(0.072)	(0.170)	(0.171)	(0.039)	(0.074)	(0.079)	(0.055)	(0.059)	(0.074)
$d\_ownhouse$	$-0.041^{**}$	$0.047^{**}$	-0.001	0.025	$0.208^{***}$	$-0.214^{***}$	-0.033*	-0.006	0.047	-0.063**	$0.056^{*}$	0.009
	(0.017)	(0.022)	(0.026)	(0.038)	(0.067)	(0.071)	(0.018)	(0.035)	(0.038)	(0.029)	(0.030)	(0.039)
Z	1616	1616	1616	211	211	211	665	665	665	740	740	740
$\chi^2$	48.263	22.850	35.252	15.956	325.288	19.918	323.680	16.887	22.455	34.412	15.224	22.855
Pseudo $R^2$	0.087	0.019	0.026	0.157	0.121	0.096	0.165	0.031	0.042	0.102	0.028	0.034
Note: Bunde lower/is rease	sbank Online mable/should	Pilot Surve be higher ε	ay on Consume are reported free	er Expectation om estimation	ns, second v as with pop	vave. Average	marginal eff. s. Robust sta	ects for the ndard error	likelihood of s in parenthes	reporting tha es. *** p<0.0	t interest ra 11, ** p<0.0	tes should be $5, * p < 0.1$

+ Dotoc F Ġ Tabla 3. Onin spending in the models for planned spending).<sup>5</sup> Our Euler equation estimation extended for opinions thus takes the following form (here the version for durable spending):

$$c_i^{dur} = a_0 + b_1 * c_i^{dur,e} + b_2 * r_{savings,i}^e + c' * X_i^{opinions} + d' * X_i^{controls} + u_i$$
(1)

where  $c_i^{dur}$  and  $c_i^{dur,e}$  are current and expected durable goods spending of household *i*,  $r_{savings,i}^e$  is the subjective perceived real interest rate,  $X_i^{opinions}$  is a vector of dummies for opinions on future inflation and interest rates and  $X_i^{controls}$  is a vector of demographic controls. From the theory, we expect  $b_1 > 0$  and  $b_2 < 0$ , whereas the signs of the coefficients in the vector *c* are not clear ex ante.

Table 4 shows the determinants of the log of spending on durable goods as well as the likelihood to spend more in the next 12 months. In the full sample, we find significantly positive effect of expected spending in some models, but the effect of the perceived real interest rate only becomes significantly negative once we restrict the sample to those respondents with inflation expectations in the range  $1.5 \leq \pi^e \leq 2$ . This means that when households perceive higher real rates, they postpone part of their spending. Results for the overall sample show that our interest rate and inflation attitudes have a relatively limited role in explaining current spending on durables. However, we find that those who believe that interest rates should be lower, are de facto acting as if *current* (nominal) interest rates – and thus real interest rates are lower: They have significantly higher durable goods spending compared to the reference group who thinks interest rates are appropriate. The fact that they act as if real interest rates are lower is consistent with research in attribution theory (see, e.g., Jones and Nisbett, 1972), which gives a potential underlying cause for their behavior: If consumers who believe that real interest rates *should* be lower also believe that this view reflects their environment, it seems rational that they take spending decisions as if real rates *are* indeed lower.

Overall, adding opinions to the model increases the explanatory power in particular when adding views on future interest rates, with the adjusted  $R^2$  rising substantially from 0.022 to 0.041. Hence, albeit the rather low level of significance, the marginal contribution of opinions on top of all the control variables is quite substantial.

For the range of inflation expectations in line with the ECB's inflation objective, attitudes matter more for current spending on durables: We find again a positive effect on current durable spending by those who believe that interest rates should be lower. In addition, the effect of thinking interest rates should be lower interacts with consumers' perceived real interest rate: We see that those consumers who think that lower interest rates would be better have a much stronger negative real interest rate elasticity than other households. One potential interpretation of this asymmetry is that consumers are more sensitive to decreases in the real interest rate than to increases. As interest rates often decrease during contractions, this mechanism is in line with what has been shown in models with reference-dependent preferences and loss aversion by Yogo (2008), Rosenblatt-Wisch (2008), and consistent with the model by Santoro et al. (2014). Yogo (2008) shows that

<sup>&</sup>lt;sup>5</sup>Estimations with nominal interest rates and inflation expectations entered as separate variables are available upon request. When entering both variables separately, it emerges that the effect of perceived real interest rates is mainly driven by consumers' inflation expectations.

				Table .	4: Curr	ent and	l Plann	ied Spe	nding on	Durak	oles					
		Cr	urrent Sp Full samp	ending (i ole	n log€ fi 	or the pre	svious mo $1.5 \leq$	$\pi^e \leq 2$		Plan	ned Sper Full	ıding (pro sample	b. to spend	d more, n 1	ext 12 mol $.5 \leq \pi^e \leq$	nths) 2
cdur										0.021 (0.014)	0.015 (0.014)	0.004 (0.009)	$0.027^{**}$ (0.013)	-0.005 (0.024)	-0.000 (0.016)	0.011 (0.024)
$c^{dur,e}$	0.166	0.123	0.036	$0.212^{**}$	$0.209^{**}$	-0.029	-0.004	0.062	0.060							
$r_{sominus}^e$	(0.103)-0.014	(0.110) - $0.012$	(0.075) 0.002	(0.103) - 0.016	(0.103) - 0.030	(0.145) -0.036	$(0.120) - 0.036^{*}$	$(0.145) - 0.048^{*}$	(0.144)-0.047***	0.003	0.001	0.003	0.001	-0.007	0.001	-0.007
	(0.022)	(0.022)	(0.012)	(0.021)	(0.036)	(0.024)	(0.022)	(0.026)	(0.018)	(0.007)	(0.006)	(0.004)	(0.006)	(0.009)	(0.010)	(0.008)
d_inf_lowbetter		-0.083 (0.149)		-0.062 (0.145)	-0.075 (0.207)	-0.183 ( $0.219$ )		-0.227 (0.213)	(0.420)		-0.047 $(0.034)$		-0.042 (0.033)	-0.057 $(0.055)$		-0.030 ( $0.051$ )
$d\_inf\_highbetter$		-0.263		-0.260	-0.298	-0.875*		$-0.842^{*}$	-1.291		-0.006		-0.003	0.060		0.063
		(0.370)		(0.347)	(0.679)	(0.459)	001.0	(0.455)	(1.030)		(0.060)	* * * * *	(0.058)	(0.080)	******	(0.079)
d_int_lowbetter			(0.245)	(0.321)	0:00.0 (0.369)		0.417)	(0.495)	0.250 (0.447)			-0.137** (0.059)	-0.273*** (0.080)		-0.311** - (0.123)	-0.596*** (0.194)
$d\_int\_highbetter$			0.146	-0.144	-0.091		0.115	-0.297	-0.286			-0.035	-0.043		$-0.100^{*}$	-0.066
			(0.127)	(0.171)	(0.190)		(0.186)	(0.209)	(0.262)			(0.031)	(0.044)		(0.055)	(0.081)
$r^e_{savings} * d\_inf\_highbetter$					-0.026				-0.279							
					(0.369)				(0.579)							
$r_{savings}^{\circ} * d_{-inf-lowbetter}$					GUU.U-				0.230							
me & d int highhatter					(760.0)				0.000							
' savings * w_muguccuci					(0.046)				(0.130)							
$r^e_{savings} * d\_int\_lowbetter$					-0.010				-0.986***							
					(0.078)				(0.279)							
Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes	$\mathbf{Yes}$	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N Ad: R2	379 0.022	380 0.015	786	379 0.041	379	163	317 0.070	163 0 123	163 0.125	379	380	786	379	163	317	163
v2	10.00	01000	0500	120.0	100.0	0.00	0.00	071.0	077.0	19.972	22.137	29.978	36.036	9.514	18.738	16.691
Pseudo $R^2$										0.032	0.032	0.028	0.057	0.021	0.047	0.070
Note: Bundesbank Onlin	e Pilot :	Survey o	on Cons	umer Ex	pectatio	ns, secon	id wave.	OLS es	stimations	on log	truncate	d spendi	ng with p	opulatio	n weights	.
Average marginal effects	for the l	ikelihoo	d of hig	her spen	ding also	from es	timation	is with p	opulation	weights.	. Robust	t standar	d errors ii	n parentl	leses. ***	v
p<0.01, ** p<0.05, * p<(	).1															

during contractions, changes in the real interest rate have a stronger impact on consumption, as the elasticity of intertemporal substitution between current and future consumption increases. Note, however, that the group of consumers who would prefer lower interest rates in the future in our sample is relatively small compared to the group preferring higher interest rates. Nevertheless, the estimated elasticities are large relative to the elasticity with respect to the real rate. In addition to the effect of preferring lower interest rates, we also find a marginally significant negative effect of preferring higher inflation on the level of current durable spending. However, the effect becomes insignificant when adding interaction effects with perceived real rates.<sup>6</sup>

We further check whether there are consistent effects of attitudes also on the likelihood to spend more on durable goods in the next 12 months. The results are reported in the right-hand-side of Table 4, where we show average marginal effects from probit estimations on the likelihood of stating a planned increase in spending. We can see that for both the overall group and for the group with inflation expectations consistent with the ECB's target, the effect of preferring lower interest rates is now negative, implying that these households are less likely to increase their spending on durable goods in the next 12 months. This is again consistent with the Euler equation, suggesting that the intertemporal substitution effect is at work, where households have opted to spend more today and less tomorrow.<sup>7</sup>

In addition, we evaluate implications of the hidden heterogeneity in expectations on current and planned savings. Results are reported in Table 5.<sup>8</sup> While we find strong positive effects of an increase in planned saving on the level of current savings, the real expected savings rate seems to have little impact on the  $\in$  amount of savings. We find an effect from attitudes mostly for the overall sample: Thinking that lower inflation would be better is negatively correlated with the amount of current savings. This effect vanishes when we restrict inflation expectations to the range between 1.5-2%. In a previous study, Ehrmann et al. (2017) show that consumers who are pessimistic about future economic conditions tend to have higher inflation expectations. Our result extends this finding: Consumers who are pessimistic about future inflation and have non-anchored inflation expectations, save less than consumers who view inflation as appropriate. The likelihood to increase savings in the future (reported in the right-hand-side of Table 5) is largely unaffected by the expected real interest rate and attitudes regarding inflation and interest rates. The only determinant that consistently enters significantly is the amount of current savings.

<sup>&</sup>lt;sup>6</sup>We further evaluate implications of inflation and interest rate opinions on spending on consumption goods and on housing. The results in Tables A.3-A.4 in the appendix show that opinions affect current consumption spending, but only in the full sample. Here we find positive level and interaction effects of preferring higher inflation, lower interest rates as well as higher interest rates. Hence, the attitudes may reduce the negative impact of perceived real rates on current spending, which becomes insignificant. Moreover, we find a significantly positive effect of preferring lower inflation, and a significantly negative effect of preferring lower interest rates on current housing expenditures.

<sup>&</sup>lt;sup>7</sup>We further estimate interaction effects between inflation and interest rate opinions and consumers' perceived real interest rate on the likelihood of higher planned spending on durables. Due to the non-linearity of the model, the interaction effects cannot be interpreted directly and are therefore shown graphically in Figure A.1 in the appendix. However, none of the interaction effects are significant.

<sup>&</sup>lt;sup>8</sup>As before, the demographic controls are included (although not reported here). As expected, income has a strong effect, but also age (surprisingly) tends to be significant. Older and richer households save more. Furthermore, complementary to the results on consumption goods spending, males tend to save significantly more than females.

				i					0							
		Ο£	urrent Sp ull sample	ending (in l	og €; for	the previo	is month) $1.5 \le \pi$	$\stackrel{e}{\leq} 2$		Plan	ned Spen Full se	ding (prob mple	. to spend	more, ney 1.	tt 12 mont $5 \leq \pi^e \leq 2$	hs)
saving										$0.062^{***}$	0.061**	$0.072^{***}$	0.060**	0.089***	0.073*** (0.021)	$0.090^{***}$
$saving^e$	$0.226^{**}$	$0.219^{***}$	0.257***	$0.216^{**}$	0.208**	0.330***	0.305***	0.331***	0.317***			(0100)		()		()
$r^e_{savings}$	(0.005)	(0.001)	(000-0-	0.000	(0.004)	-0.046	-0.035**	-0.037	-0.198	0.008	0.008	-0.001	0.008	0.016	-0.008	0.012
d_inf_lowbetter	(0.012)	(0.012) - $0.282^{***}$	(0.008)	(0.012) - $0.285^{***}$	(0.024) -0.197*	(0.063) - 0.195	(0.016)	$(0.065) -0.196^{*}$	(0.276) -0.221	(0.007)	(0.007) -0.010	(0.004)	(0.006) -0.003	(0.031) 0.008	(0.007)	(0.032) 0.009
d_inf_hiahbetter		(0.085) 0.094		(0.087) 0.089	(0.106) 0.226	(0.119) - 0.045		(0.119) -0.058	(0.229) -0.317		(0.037) -0.043		(0.037)-0.043	(0.055) 0.041		(0.055) 0.045
		(0.201)		(0.202)	(0.486)	(0.327)		(0.331)	(0.669)		(0.079)		(0.078)	(0.150)		(0.148)
$d\_int\_lowbetter$			-0.017	-0.050	-0.092		-0.079	-0.110	-0.075			-0.069	-0.190**		0.263*** (n naa)	0.066
$d\_int\_highbetter$			0.006	0.060	0.039		0.139	(0.02.0)	0.361			0.047	-0.031		(880.0)	-0.011
2			(0.077)	(0.106)	(0.126)		(0.120)	(0.142)	(0.435)			(0.034)	(0.043)		(0.052)	(0.063)
$r^{e}_{sav} * d\_inf\_highbetter$					0.088				-0.172							
$r_{a_{\alpha\alpha}}^{e}$ , * $d_{-inf-lowbetter}$					0.045				-0.013							
					(0.028)				(0.146)							
$r_{sav}^e * d\_int\_highbetter$					-0.010				0.198							
$r^e_{sav} * d\_int\_lowbetter$					(cen.u) -0.039				-0.168							
					(0.032)				(0.398)							
Demographic Controls	Yes	Yes	$\mathbf{Y}_{\mathbf{es}}$	Yes	Yes	Yes	$\mathbf{Y}_{\mathbf{es}}$	$\mathbf{Y}_{\mathbf{es}}$	Yes	$\mathbf{Y}_{\mathbf{es}}$	$\mathbf{Y}_{\mathbf{es}}$	$\mathbf{Y}_{\mathbf{es}}$	Yes	$\mathbf{Y}_{\mathbf{es}}$	$\mathbf{Y}_{\mathbf{es}}$	Yes
N : ; ;	609	610	1220	609	609	264	507	264	264	609	610	1220	609	264	507	264
Adj. $\mathbf{K}^{2}$	0.145	0.163	0.142	0.162	0.163	0.236	0.171	0.232	0.223	100 12	000	100.00		100 01	100.07	101
$\chi^{-}$ Pseudo $R^{2}$										0.084	0.084	0.051	0.090	0.123	0.075	0.124
		c	c	F	-	_			_	10000	10000	10000		07T-0	0.00	
Note: Bundesbank UI	uline Pilot	Survey o	n Consui	ner Expec	tations, s	second wa	ve. ULS	estimatic	on son log	truncate	id spendi	ng with ]	populatio	n weights		
Average marginal effec	ts for the	likelihood	l of highe	r spending	s also fro	m estimat	ions with	populati	on weight	s. Robus	t standaı	d errors	in parentl	leses. **:	×	
p<0.01, ** p<0.05, * 1	><0.1															

Table 5: Current and Planned Saving

#### 3.4 The Effect of Homeownership on Spending on Durable Goods

To further study the role of the heterogeneity in opinions for economic decisions, we check whether opinions have heterogeneous effects across different types of households. In this section we focus on heterogeneity across households that own their house and households that rent. This is potentially an important division across households in particular for Germany, as Germany has one of the largest share of renters among OECD countries (53.6%, Source: OECD Affordable Housing Database 2018) so that renters are not restricted to low income groups. Renters may thus be either net savers saving in assets other than real estate, with their wealth affected positively by an increase in nominal rates, or they are poorer households who are either hand-to-mouth or net debtors. Homeowners, on the other hand, are typically net debtors and their disposable income may be affected by changes in the mortgage rate.<sup>9</sup>

Table 6 shows the determinants of durable good spending for both homeowners and for renters. As these are smaller samples, we rely only on the (remaining) full sample. Homeowners' current spending – contrary to the overall sample – does not depend on their planned consumption. However, we do observe a marginally significant negative effect of their perceived real rate in the model with interaction terms, something that we have only observed for those households that have inflation expectations within the 1.5-2% range before. Moreover, homeowners' durable consumption is not correlated with attitudes towards lower interest rates, but instead we find a negative effect from thinking that inflation should be lower. Regarding the interaction with the perceived real interest rates would be better, while the interest rate sensitivity if they believe that lower interest rates are sensitivity becomes insignificant if they prefer higher interest rates.

Renters, on the other hand, display little interest rate sensitivity when deciding on durable good spending. For renters there is some evidence, like in the overall sample, that those who think that interest rates should be lower are actually spending more on durable goods, thus they are acting as if the real rate is already lower today. We also observe opposite effects of views on inflation for homeowners and renters. Those who think that inflation should be lower – the majority of our sample – show significantly higher durable spending for renters, contrary to the result for homeowners. The asymmetric effect may explain the insignificant effect we find in the full sample. If preferring lower inflation implies that consumers act *as if* inflation was lower in the future, we would expect a negative effect on current spending. Interestingly (not displayed here), the log amount of durable good spending is highly dependent on income for renters, but for homeowners income does not play a significant role. These results suggest that the effect of opinions is also heterogeneous depending on the type of the household, where – one could argue – renters behave more like rule-of-thumb consumers and homeowners' behavior is closer to the one expected by the 'standard' economic theory.

<sup>&</sup>lt;sup>9</sup>Note furthermore, that mortgages in Germany are usually fixed-rate mortages for longer periods.

		Home	owners			Ren	ters	
$c_t^{dur,e}$	-0.001	-0.013	0.001	-0.005	0.152	0.067	0.417*	0.429
U C	(0.112)	(0.091)	(0.113)	(0.115)	(0.252)	(0.141)	(0.247)	(0.259)
$r^e_{savings}$	-0.020	-0.003	-0.015	-0.150*	0.033	-0.002	0.001	0.517
5	(0.029)	(0.014)	(0.025)	(0.086)	(0.059)	(0.030)	(0.058)	(0.460)
$d\_inf\_lowbetter$	-0.446***		$-0.421^{***}$	-0.343	0.674**		$0.672^{**}$	0.804
	(0.154)		(0.150)	(0.228)	(0.310)		(0.298)	(0.491)
$d\_inf\_highbetter$	-0.837		-0.853*	-1.208	0.544		0.537	0.964
	(0.534)		(0.516)	(1.757)	(0.560)		(0.547)	(0.588)
$d\_int\_lowbetter$		-0.270	0.423	-0.586		$1.043^{***}$	$1.424^{***}$	0.171
		(0.341)	(0.464)	(0.385)		(0.373)	(0.539)	(1.106)
$d\_int\_highbetter$		-0.064	-0.273	0.004		$0.766^{***}$	0.414	-1.140
		(0.140)	(0.176)	(0.276)		(0.254)	(0.444)	(1.029)
$r_{savings}^{e} * d\_inf\_highbetter$				-0.226				0.262
				(0.841)				(0.421)
$r^e_{savings} * d\_inf\_lowbetter$				0.056				0.050
-				(0.071)				(0.192)
$r^e_{savings} * d\_int\_highbetter$				$0.155^{*}$				-0.643
U U				(0.087)				(0.460)
$r^e_{savings} * d\_int\_lowbetter$				$-0.180^{**}$				-0.471
				(0.077)				(0.468)
Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ν	243	504	243	243	115	244	114	114
$\operatorname{Adj.} \mathbb{R}^2$	0.064	0.029	0.076	0.095	0.041	0.074	0.126	0.130

Table 6: Current Spending on Durables for Homeowners and Renters

Note: Bundesbank Online Pilot Survey on Consumer Expectations, second wave. OLS estimations on log truncated spending with population weights. Average marginal effects for the likelihood of higher spending also from estimations with population weights. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

# 4 Conclusion

In this paper, we show that attitudes towards future inflation and interest rates matter for inflation expectations and have implications for consumption spending and saving decisions. We demonstrate this 'hidden heterogeneity' of inflation expectations using a new survey dataset from the Bundesbank Online Pilot Survey of Consumer Expectations, fielded on the German population in 2019. The majority of consumers in our sample thinks inflation should be lower and interest rates should be higher. Remarkably, even if inflation expectations are around the official inflation target of the ECB, still 46% of consumers in our sample think inflation should be lower, and this range remains high at around 30% even when consumers expect deflation in the next year. We document a similar 'hidden heterogeneity' also for opinions about future interest rates. Overall, observing inflation point forecasts close to the target does not seem to be a reliable indicator for thinking that either expected inflation or expected interest rates will be appropriate.

We demonstrate that the observed 'hidden heterogeneity' in inflation and interest rate expectations is related to socio-demographic characteristics. In particular, for consumers with very similar point forecasts of inflation, differences across gender, income and education are an important driver of diverging views on future inflation. Moreover, we show that the observed heterogeneity in attitudes may have some implications for current and future planned spending and saving decisions, in addition to effects from the level of perceived real rates and from demographic control variables. We also demonstrate that these attitudes affect durable goods spending of different groups of the population heterogeneously.

More generally, we show that also in economics opinions can be an important source of heterogeneity that can have significant implications for economic decisions, like buying a durable good or the amount of savings. This has been previously documented in the social psychology literature. Information about consumers' opinions on future interest rates and inflation expectations together with their level expectations is of great importance for monetary policy makers, as it gives additional insights relevant to the effectiveness of the transmission channel of monetary policy. This was demonstrated when we study the heterogeneity in durable good spending between homeowners and renters. Being able to disentangle attitudes linked to specific expectations allows the central bank to address those concerns more directly and more specifically in their communication and consequently improve monetary policy efficacy.

## References

- Bachmann, R., T. O. Berg, and E. R. Sims (2015). Inflation expectations and readiness to spend: Cross-sectional evidence. American Economic Journal: Economic Policy 7(1), 1–35.
- Bryan, M. F. and G. Venkatu (2001). The demographics of inflation opinion surveys. *Economic Commentary* (15).
- Burke, M. A. and A. Ozdagli (2013). Household Inflation Expectations and Consumer Spending: Evidence from Panel Data. Technical Report 13-25, Federal Reserve Bank of Boston Research Department Working Papers.
- Coibion, O. and Y. Gorodnichenko (2015). Information rigidity and the expectation formation process: A simple framework and new facts. *American Economic Review* 105(8), 2644–78.
- Coibion, O., Y. Gorodnichenko, S. Kumar, and M. Pedemonte (2020). Inflation expectations as a policy tool? *Journal of International Economics*, 103297.
- Crump, R. K., S. Eusepi, A. Tambalotti, and G. Topa (2015). Subjective Intertemporal Substitution. Federal Reserve Bank of New York Staff Reports 734.
- D'Acunto, F., D. Hoang, M. Paloviita, and M. Weber (2019). Cognitive Abilities and Inflation Expectations. AEA Papers and Proceedings 109, 562–566.
- D'Acunto, F., D. Hoang, and M. Weber (2016). Unconventional Fiscal Policy, Inflation Expectations, and Consumption Expenditure. Technical Report 5793, CESifo Working Paper.

- D'Acunto, F., U. Malmendier, J. Ospina, and M. Weber (2019). Exposure to Daily Price Changes and Inflation Expectations. Technical report, mimeo.
- D'Acunto, F., U. Malmendier, and M. Weber (2019). Gender Roles Distort Women's Economic Outlook. Technical report, mimeo.
- Dräger, L. and G. Nghiem (2020). Are Consumers' Spending Decisions in Line With an Euler Equation? *The Review of Economics and Statistics*, forthcoming.
- Duca, I. A., G. Kenny, and A. Reuter (2018). Inflation expectations, consumption and the lower bound: Micro evidence from a large Euro area survey. *ECB Working Paper* (2196).
- Ehrmann, M., D. Pfajfar, and E. Santoro (2017). Consumers' Attitudes and Their Inflation Expectations. *International Journal of Central Banking* 13(1), 225–259.
- Goldfayn-Frank, O. and J. Wohlfahrt (2019). Expectations Formation in a New Environment: Evidence from the German Reunification. *Journal of Monetary Economics*, forthcoming.
- Ichiue, H. and S. Nishiguchi (2015). Inflation Expectations and Consumer Spending at the Zero Bound: Micro Evidence. *Economic Inquiry* 53(2), 1086–1107.
- Jones, E. E. and R. E. Nisbett (1972). The actor and the observer: Divergent perceptions of the causes of behavior. In E. E. Jones, D. E. Kanouse, H. H. Kelley, R. E. Nisbett, S. Valins, and B. Weiner (Eds.), *Attribution: Perceiving the causes of behavior*, pp. 79–94. Lawrence Erlbaum Associates, Hillsdale, NJ, US.
- Jonung, L. (1981). Perceived and expected rates of inflation in sweden. American Economic Review 71(5), 961–68.
- Malmendier, U. and S. Nagel (2016). Learning from inflation experiences. *The Quarterly Journal* of *Economics* 131(1), 53–87.
- Pfajfar, D. and E. Santoro (2009). Asymmetries in Inflation Expectations across Sociodemographic Groups. *mimeo*.
- Rosenblatt-Wisch, R. (2008). Loss aversion in aggregate macroeconomic time series. *European Economic Review* 52(7), 1140 – 1159.
- Santoro, E., I. Petrella, D. Pfajfar, and E. Gaffeo (2014). Loss aversion and the asymmetric transmission of monetary policy. *Journal of Monetary Economics* 68, 19 – 36.
- Tversky, A. and D. Kahneman (1973). Availability: A heuristic for judging frequency and probability. *Cognitive Psychology* 5(2), 207 – 232.
- Vellekoop, N. and M. Wiederholt (2018). Inflation Expectations and Choices of Households: Evidence from Linked Survey and Administrative Data. Technical report.
- Yogo, M. (2008). Asset prices under habit formation and reference-dependent preferences. Journal of Business & Economic Statistics 26(2), 131–143.

# Appendix

		-			-	
		Full sample			$1.5 \le \pi^e \le 2$	
	inf_lowbetter	inf_reason	inf_highbetter	inf_lowbetter	inf_reason	inf_highbetter
$\pi^e$	$0.019^{**}$	$-0.015^{**}$	$-0.012^{***}$	0.112	-0.087	-0.029
	(0.008)	(0.008)	(0.005)	(0.138)	(0.138)	(0.050)
$i^e_{saninas}$	-0.025**	$0.027^{**}$	-0.014	-0.023	0.026	-0.008
	(0.011)	(0.011)	(0.011)	(0.019)	(0.019)	(0.022)
$i^e_{mortaaae}$	$0.018^{***}$	$-0.015^{***}$	-0.004	$0.014^{*}$	-0.009	-0.00*
	(0.005)	(0.005)	(0.003)	(0.008)	(0.008)	(0.005)
Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes
N	867	867	867	378	378	378
$\chi^2$	34.275	25.258	31.168	13.081	7.587	27.202
Pseudo $R^2$	0.039	0.030	0.112	0.029	0.016	0.093
Note: Bundesbank Online J reporting that inflation sho Robust standard errors in r	Pilot Survey on Co uld be lower/is reas parentheses. *** p<	nsumer Expect: sonable/should <0.01, ** p<0.0	ations, second wave be higher are repoi 05. * p<0.1	. Average margina ted from estimatic	l effects for the ons with popula	likelihood of tion weights.

Table A.1: Opinions about Future Inflation and Macro Expectations

	Table A	.2: Opinions	about Future In	terest Rates and	d Macro Exp	ectations
		Full sample			$1.5 \le \pi^e \le 2$	
	int_lowbetter	int_reason	int_highbetter	int_lowbetter	int_reason	int_highbetter
$\pi^e$	0.004	-0.005	0.001	0.046	0.009	-0.020
	(0.002)	(0.004)	(0.004)	(0.062)	(0.088)	(0.096)
$i^e_{savinas}$	0.006*	$0.015^{***}$	-0.033***	0.002	$0.024^{***}$	$-0.051^{***}$
	(0.003)	(0.006)	(0.007)	(0.004)	(0.008)	(0.018)
$i^e_{mortaaae}$	$0.008^{***}$	-0.004	-0.007**	$0.007^{***}$	-0.004	-0.007
	(0.002)	(0.003)	(0.003)	(0.002)	(0.005)	(0.005)
Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes
Ν	1772	1772	1772	732	732	732
$\chi^2$	82.870	18.265	62.278	38.231	16.066	27.841
Pseudo $R^2$	0.106	0.016	0.044	0.194	0.025	0.052
Note: Bundesbank Online of reporting that interest <i>v</i> weights. Rohust standard e	Pilot Survey on Co ates should be lowe rrors in parenthese	nsumer Expect r/is reasonable, s. *** n<0.01.	ations, second wav ∕should be higher a ** n<0.05. * n<0.1	e. Average margin re reported from e	al effects for th stimations with	ie likelihood 1 population
	in a second seco	(->·>< J				

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		Currei Full	ıt Spendiı sample	ng (in € †	for the pr	tevious m $1.5 \leq \tau$	$e \leq 2$		Planned I	Spendin Jull samp	g (prob. tc le	spend mor 1.	e, next 12 $5 \le \pi^e \le$	t months) 2
$c_t^{cons}$									-0.000 (0.017)	0.012 (0.010)	0.003 (0.016)	0.006 (0.026)	0.015 (0.016)	0.006 (0.025)
$c_t^{cons,e}$	0.001	0.065	0.014	0.007	0.035	0.083	0.038	0.036						
$r^e_{sanip  as}$	(0.078) -0.016	(0.058) - 0.009	(0.077) - 0.014	(0.078) -0.053	(0.105) 0.010	(0.083) - 0.037*	(0.105) 0.010	(0.107) 0.006	-0.005	-0.001	-0.006	-0.023***	-0.007	$-0.023^{***}$
d inf lowhetter	(0.012)	(0.008)	(0.011)	(0.035)	(0.014)	(0.019)	(0.014)	(0.010)	(0.005)	(0.003)	(0.005)	(0.009)	(0.005)	(0.008)
d inf highbetter	(0.065) 0.175*		(0.065)	(0.076) $(0.377***$	(0.079)		(0.079)	(0.155)	(0.022)		(0.022)	(0.036)		(0.036)
in the second	(0.103)		(0.104)	(0.133)	(0.134)		(0.135)	(0.196)	(0.043)		(0.042)	(0.049)		(0.049)
$d\_int\_lowbetter$		0.047	0.202	$0.282^{**}$		-0.018	0.104	-0.002		-0.046	-0.128***		-0.066	-0.048
d_int_highbetter		(0.098)-0.032	(0.127) 0.117	(0.142) $0.212^{**}$		(0.151) -0.083	(0.222) 0.042	(0.211) 0.108		(0.031) -0.013	(0.043) -0.030		(0.044) 0.009	(0.041) -0.015
)		(0.058)	(0.079)	(0.094)		(0.074)	(0.094)	(0.100)		(0.017)	(0.023)		(0.023)	(0.031)
$r_{savings}^{e} * d\_inf\_highbetter$				$0.151^{*}$				0.047					•	
2				(0.081)				(0.161)						
$r^e_{savings} * d\_inf\_lowbetter$				-0.010				-0.069						
$r^{e}_{sommand sommand somma$				0.057**				0.049						
0.000				(0.028)				(0.035)						
$r^e_{savings} * d\_int\_lowbetter$				$0.055^{*}$				-0.135						
				(0.030)				(0.117)						
Demographic Controls	$\mathbf{Yes}$	$\mathbf{Yes}$	Yes	Yes	$\mathbf{Y}_{\mathbf{es}}$	$\mathbf{Yes}$	Yes	Yes	$\mathbf{Yes}$	$\mathbf{Yes}$	Yes	Yes	$\mathbf{Y}_{\mathbf{es}}$	Yes
N Adi R <sup>2</sup>	768 0 104	1561 0 133	767 0 107	767 0 116	329 0 126	639 0 146	328 0 121	328 0 114	768	1561	767	329	639	328
v2	-	001.0	01.0	011.0		0110			24.801	41.321	30.865	22.625	17.584	22.985
Pseudo $R^2$									0.042	0.036	0.054	0.066	0.036	0.068
Note: Bundesbank Online	Pilot S	ILVEV OD	Consum	er Expec	tations.	second v	vave. O]	LS estim	ations o	n log trı	incated st	ending wi	th popula	ntion
weights Average margina	Pffects	for the l	ikelihood	l of hiohe	r snendi	no also f	rom esti	mations	with no	milation	, weights	Robust st	andard e	rors
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in parentneses. The p<0.0	1, *** p<	cu.uo, ~	p <u.1< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></u.1<>											

Table A.3: Current and Planned Spending on Consumption Goods

			200				~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	L v v	0					
		Curre Full s	nt Spendir ample	ıg (in € 1	for the pre	vious mon $1.5 \leq \pi^{\prime}$	$^{ m th}) \le 2$		Planned F1	Spendin Ill sample	g (prob.	to spend	more, next $1.5 \leq \pi^e \leq$	12 months)
$c_t^{house}$									0.028 (0.020)	$0.014 \\ (0.013)$	$\begin{array}{c c} 0.032 \\ (0.021) \end{array}$	0.037 (0.036)	0.029 (0.019)	0.039 (0.036)
$c_t^{house,e}$	0.086	0.043	0.091	0.096	0.093	0.093	0.097	0.098						
$r^e_{saninas}$	$(0.021^{**})$	(0.001 0.001	$0.021^{**}$	0.002	(0.034)	-0.035	0.009	0.007	-0.006	-0.001	-0.006	-0.008	$-0.018^{**}$	-0.007
d inf louhetter	(0.011) 0 183***	(0.007)	(0.010)	(0.018) 0.187**	(0.014) 0.995**	(0.023)	(0.015) 0.224**	(0.00)	(0.006)	(0.004)	(0.006)	(0.010)	(0.008)	(0.010)
d inf highbetter	(0.061)		(0.063)	(0.075)	(0.089)		(0.091)	(0.144)	(0.026)		(0.026) -0.026	(0.048) -0.106		(0.049) -0 109
	(0.118)		(0.115)	(0.209)	(0.166)		(0.161)	(0.375)	(0.066)		(0.066)	(0.091)		(0.092)
$d\_int\_lowbetter$		0.029	0.047	0.011		-0.168	-0.051	-0.125		-0.053	-0.086*		-0.088	-0.027
d imt hiahbetter		(0.085) -0.119**	(0.136)-0.101	(0.134) -0.030		(0.145) $0.202^{***}$	(0.189) -0.170*	(0.221)		(0.037) 0.019	(0.051) 0.029		(0.070)	(0.078) 0.024
		(0.052)	(0.068)	(0.084)		(0.070)	(0.091)	(0.115)		(0.024)	(0.033)		(0.037)	(0.053)
$r^e_{savings} * d\_inf\_highbetter \mid$			~	-0.059		~	~	-0.135						~
				(0.115)				(0.205)						
$r^e_{savings} * d\_inf\_lowbetter$				-0.003				-0.010						
r <sup>e</sup> . * d int highbetter				(0.023)				0.024						
savings				(0.022)				(0.054)						
$r^e_{savings} * d\_int\_lowbetter$				-0.000				-0.089						
				(0.028)				(0.158)						
Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	$\mathbf{Yes}$	Yes	Yes	Yes	$\mathbf{Yes}$
Z	736	1503	734	734	322	619	321	321	736	1503	734	322	619	321
Adj. R <sup>2</sup>	0.112	0.067	0.121	0.124	0.122	0.069	0.123	0.113		1		0 0 1 0		
χ <sub>z</sub>									11.971	35.100	19.448	12.590	32.253	13.231
Pseudo $R^2$									0.018	0.020	0.025	0.031	0.039	0.033
Note: Bundesbank Online	Pilot Sur	vey on C	onsumer ]	Expectat	ions, seco	nd wave.	OLS esti	mations	on log	runcate	d spendi	ng with	populatio	
weights. Average margina	l effects fo	or the like	elihood of	higher st	pending a	lso from e	stimation	as with 1	populati	on weigh	nts. Rob	ust stan	dard error	
in parentheses. *** p<0.0	1, ** p<0	0.05, * p<	$\leq 0.1$	)	)				•	)				

Table A.4: Current and Planned Spending on Housing

Figure A.1: Planned Spending on Durables – Interaction Effects of Real Interest Rate Expectations and Opinions



(c) Lower Interest Rates Would Be Better



## Figure A.2: Planned Saving – Interaction Effects of Real Interest Rate Expectations and Opinions

(c) Lower Interest Rates Would Be Better





(c) Lower Interest Rates Would Be Better



Figure A.4: Planned Spending on Housing – Interaction Effects of Real Interest Rate Expectations and Opinions

