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# The Hidden Heterogeneity of Inflation and Interest Rate Expectations: The Role of Preferences\*

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## Abstract

Using a new consumer survey dataset, we study the role of macroeconomic preferences for expectations and economic decisions. While household expectations are inversely related to preferences, households with the same inflation expectations can differently assess whether the level of expected inflation and of nominal interest rates is appropriate or too high/too low. This ‘hidden heterogeneity’ in expectations is correlated with sociodemographic characteristics and affects current and planned spending via the intertemporal elasticity of substitution. We also show that the variation in preferences can be explained with risk preferences. Overall, this adds a new dimension to the definition of anchored expectations.

**Keywords:** Macroeconomic expectations, monetary policy perceptions, inflation and interest rate preferences, risk preferences, survey microdata.

**JEL classification:** E31, E52, E58, D84.

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# 1 Introduction

There exists a large literature showing that inflation expectations are formed heterogeneously and highlighting the implications for consumption and saving decisions (Bachmann et al., 2015; Duca et al., 2018; Dräger and Nghiem, 2021) and, ultimately, for the transmission of monetary policy.<sup>1</sup> However, both the economic and the psychology literature stresses that when forming expectations agents also form preferences about the same variables.<sup>2</sup> While, for example, Dohmen et al. (2011) and Ericson and Laibson (2019) detail the role of risk or time preferences for financial investment choices, preferences about macroeconomic outcomes have so far been largely neglected as a source of heterogeneity. Consequently, little is known about the role of preferences on expected inflation or interest rates for the formation of macroeconomic expectations, for consumption and saving decisions, and, more generally, for the transmission of monetary policy shocks. To study this question, we employ individual data from the new Bundesbank Online Pilot Survey on Consumer Expectations (BOPSCE) and investigate various channels through which preferences affect macroeconomic decisions.

Preferences can affect the transmission of policy shocks in a variety of ways: (i) they could directly affect expectations,<sup>3</sup> (ii) they could be a product of various socio-demographic characteristics—e.g., savers and borrowers—and affect the transmission in a theory-consistent way, or (iii) they could represent an independent channel that could help explain heterogeneous effects of monetary policy over the distribution of consumers. To investigate the role of preferences on monetary policy, we employ data on preferences on future inflation and monetary policy (interest rates) and study the three channels identified above. Preferences about expectations are measured by asking consumers in a survey whether they think the expected level of inflation or interest rates is appropriate for the economy, or whether they think it is too high or too low. We show that these preferences influence the level of inflation and interest rate expectations and can explain heterogeneity in inflation expectations beyond macroeconomic conditions and socioeconomic characteristics. Remarkably, even consumers with the same level of inflation or interest rate expectations can have very different preferences about whether that is an appropriate level or not, and thereby about the right stance of monetary policy (what we dub ‘hidden heterogeneity’). Thus, consumers with the same inflation expectations can take different economic decisions after controlling for their characteristics and (part of) this heterogeneity can be explained by preferences regarding future inflation and interest rates. To show this, we study durable consumption and saving decisions: We find that preferences affect individual durable spending decisions even when controlling for the effect of the perceived real interest rate.<sup>4</sup> Furthermore, we evaluate whether these preferences are a ‘proxy’ for other consumer

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<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>In the social psychology literature—specifically in attribution theory—it has been long established how people form preferences and how they justify them. See, e.g., Jones and Nisbett (1972) and Tversky and Kahneman (1973).

<sup>3</sup>Theoretically, this can arise in ambiguity aversion models with Knightian uncertainty, e.g., Gilboa and Schmeidler (1989), Sargent and Hansen (2001), Epstein and Schneider (2003), Maccheroni et al. (2006), and Strzalecki (2011). Empirical evidence for this mechanism is provided in Michelacci and Paciello, 2020.

<sup>4</sup>The perceived real interest rate is defined as the difference between individual nominal interest rate expectations and individual inflation expectations.

characteristics that may importantly alter the consumption and saving decisions and thus alter the transmission of policy shocks: We explore the heterogeneity across homeowners and renters, where indeed preferences seem to affect durable spending decisions very differently. To study the ‘independent’ channel of preferences for monetary policy transmission that we observe in the direct effect of preferences on consumption and spending decisions, we evaluate the determinants of these preferences. The cross-sectional variation in preferences and the estimated effect on the intertemporal elasticity of substitution suggest that they may be related to consumers’ underlying risk preferences. Indeed, we show that individuals who state that inflation should be lower report significantly lower willingness to take risks. Conversely, individuals with higher reported willingness to take risks are more likely to state that inflation will be appropriate for the German economy or that it should be higher.

Our questions about preferences on future expected inflation and interest rates are included in the new BOPSC survey. Overall, the majority of German consumers surveyed in April-May 2019 by the Bundesbank 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.<sup>5</sup> We observe similar heterogeneity also for consumers’ preferences regarding the stance of monetary policy, i.e., future interest rates. Overall, on one hand, our results suggest that preferences about future inflation and interest rates are inversely related to their corresponding expectations, but on the other hand, differ substantially across demographic groups and even those consumers that have the same level of expectations can have very different preferences. Thus, preferences affect the transmission of shocks through all potential channels outlined above and not just through expectations, as highlighted in [Michelacci and Paciello \(2020\)](#). An immediate implication of this ‘hidden heterogeneity’ stemming out of preferences is a need to extend the definition of anchored inflation expectations beyond the condition that consumers’ inflation expectations are close to the official inflation target.

After establishing some basic relationships between expectations and preferences, we show that differences in preferences lead to some degree of 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 preferences of households besides 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 consumption Euler equation. Interestingly, the negative effect of perceived real 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

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<sup>5</sup>Strikingly, even among consumers who expect deflation in the next year, about 30% would still prefer lower inflation.

rates—and thus real interest rates—are already lower, as they have significantly higher durable goods spending and also a more negative elasticity with respect to real rates (intertemporal elasticity of substitution). The effect of preferences 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. This suggests that preferences could represent an independent channel that could help explain heterogeneous effects of monetary policy, as those with higher intertemporal elasticity of substitution will react more to changes in monetary policy.

One potential interpretation of this ‘independent’ effect is that consumers’ heterogeneous preferences origin in heterogeneous relative risk aversion, as the effects is showing through the intertemporal elasticity of substitution. In fact, inflation and interest rate preferences vary across socio-demographic characteristics in a similar way to patterns of risk aversion across demographic groups reported in the literature (Dohmen et al., 2011).<sup>6</sup> Similarly, the intertemporal elasticity of substitution has been shown to vary across certain demographic groups or with wealth (see, e.g., Blundell et al., 1994; Attanasio and Browning, 1995; Atkeson and Ogaki, 1996, Guvenen, 2006). Indeed, under CRRA preferences the intertemporal elasticity of substitution is the inverse of the coefficient of relative risk aversion.<sup>7</sup> To test for a relationship between individual consumers’ risk preferences and their inflation and interest rate preferences directly, we make use of further waves of the BOPSCE survey from 2020. We find that consumers who prefer lower inflation for the German economy report significantly lower willingness to take risks. This relation remains significant if we control for a large range of demographic characteristics and also if we restrict inflation expectations to lie between 1.5% and 2%.<sup>8</sup> In this range, there is also a significantly positive correlation between consumers’ willingness to take risks and the likelihood to state that the level of inflation will be appropriate for the economy. By contrast, we find no significant relation between consumers’ reported willingness to take risks and their interest rate preferences.

Preferences over inflation or interest rates have so far received only little attention in the literature on macroeconomic expectation formation. In an early survey conducted in the US, Germany, and Brazil, Shiller (1996) studies preferences and opinions regarding inflation. Concerns about inflation are often related to worries about a decline in the standard of living, and are connected to concerns regarding national prestige or trust in public institutions. Recently, Michelacci and Paciello (2020) study preferences regarding a potential trade-off between inflation and interest rates in the UK. The authors show that preferences are inversely linked to expectations and argue that this is consistent with expectation formation under Knightian uncertainty and thus provide empirical evidence for the mechanism outlined in ambiguity aversion models with Knightian uncertainty

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<sup>6</sup>Comparing responses from a large representative survey in Germany (German Socio-Economic Panel, SOEP) with those of an incentivized field experiment, Dohmen et al. (2011) report a high degree of heterogeneity in individual risk preferences. In particular, women tend to be more risk-averse than men and risk-aversion increases with age. Dwyer et al. (2002) find similar gender differences in risk preferences through the risk taking of mutual fund investors. In addition, time-variation of individual risk preferences may be related to negative or positive emotions, with fear or pessimism inducing stronger risk aversion (Kliger and Levy, 2003; Cohn et al., 2015; Guiso et al., 2018).

<sup>7</sup>Furthermore, under HARA preferences (Crossley and Low, 2011) as well as under reference-dependent preferences and loss aversion (Yogo, 2008) one can generate a time-varying intertemporal elasticity of consumption.

<sup>8</sup>However, when restricting inflation expectations, the positive correlation between risk and inflation preferences becomes insignificant when we include the larger set of demographic controls.

((Gilboa and Schmeidler, 1989; Sargent and Hansen, 2001; Epstein and Schneider, 2003; Maccheroni et al., 2006; Strzalecki, 2011)) They also find that changes in inflation expectations due to preferences affect consumption and saving decisions in a quantitatively similar way to the component of expected inflation that is not related to preferences. In contrast, we show that preferences in some cases have an affect on consumption/saving decision also after controlling for the effect through inflation and interest rate expectations.

More generally, our paper relates to the literature explaining the heterogeneity of macroeconomic expectations across socio-demographic 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. (2021) and D’Acunto et al. (2021) provide evidence that the gender differences in inflation expectations can be traced back 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).

Finally, our paper is related also to a growing literature evaluating the link between survey inflation expectations and household spending decisions. In an experiment with induced inflation expectations, Armantier et al. (2011) present evidence that participants in the experiment act on their beliefs regarding future inflation.<sup>9</sup> Assuming that consumers follow 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, 2019; Dräger and Nghiem, 2021).

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

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<sup>9</sup>There are several research articles that provide additional evidence that agents act upon their self-reported beliefs and expectations, e.g., Michelacci and Paciello (2020) or Coibion et al. (2020).

## 2 Data

Our research question is evaluated using a new survey dataset coming from the Bundesbank Online Pilot Survey on Consumer Expectations (BOPSCE), which was fielded on a representative sample of German households in three waves from April-June 2019. Overall, the first 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 main analysis, we use the first and second wave of the dataset and thus have about 1000 participants with responses in both waves.

The BOPSCE ran an additional four waves from April-July 2020, where we were able to repeat our main questions in wave 6 in June 2020 with 2021 participants. While there is no overlap between participants in the first three waves in 2019 and those in the second four waves in 2020, there is again a rotating panel dimension with about 1000 participants in consecutive waves in 2020.

The BOPSCE 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. As we are interested in preferences, we add the following questions to the core questionnaire.

First, following the question on point estimates for inflation 12 months ahead, we ask about preferences on expected inflation (variable names for the empirical analysis in brackets):

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 preferences on the expected level of nominal interest rates following 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*)

When we repeat these questions in wave 6 in June 2020, we additionally differentiate between preferences regarding respondents' *personal situation* or regarding the *German economy as a whole*. We thus ask a randomly chosen subset of respondents about both their personal and their economy-wide views on inflation or interest rates. This allows us to test whether respondents differ in

their preferences depending on whether they are explicitly asked to think about their own personal situation or the macroeconomic situation. In order to repeat our analysis about the joint effects of preferences on inflation and interest rates, we also ask a randomly chosen subset about their preferences on both variables, where we specify that consumers should think about the effect on the German economy.

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 ( $i_{savings}^e$ ) and the average mortgage rate ( $i_{mortgage}^e$ ). In order to avoid an effect from extreme outliers, inflation and interest rate expectations are truncated in the range between -5% and +25%.

Socio-demographic controls comprise a dummy variable for being male ( $d_{male}$ ), age, three income groups ( $inc_{low}$  – monthly net income below or equal 1.000 €,  $inc_{middle}$  – monthly net income between 1.000 € and 3.000 € and  $inc_{high}$  – monthly net income above 3.000 €), four education groups ( $edu_{haupt}$  – lowest highschool level in Germany (Hauptschule),  $edu_{real}$  – medium highschool level in Germany (Realschule),  $edu_{abi}$  – highest highschool level in Germany enabling to study at a university (Abitur),  $edu_{uni}$  – university degree), three work categories ( $d_{fulltime}$  – working full time,  $d_{parttime}$  – working part time,  $d_{noemploy}$  – no employment (voluntary or involuntary),  $d_{retired}$  – 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 ( $d_{east1989}$ ). In addition, we relate our measures of inflation and interest rate preferences to individual risk preferences ( $risk$ ). These are measured as answers to a question about the ‘willingness to take risks in general’, where respondents may answer on a scale from 0 (‘not willing to take any risks’) to 10 (‘very willing to take risks’).

Finally, we evaluate implications of preferences 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 represents 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 due to Preferences

Table 1 shows a cross-tabulation of consumers’ inflation and interest rate preferences. From this table, we observe that the majority of households surveyed in 2019 (43%) express that inflation



should be lower and interest rates should be higher. This would be consistent with a Taylor rule.<sup>10</sup> 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 respondents were surveyed. The views that inflation should be lower, at a time with very moderate price movements (in June 2019 the yearly CPI inflation was 1.6%), could be explained by the overall negative attitude towards inflation in Germany.

Table 1: Preferences on Expected inflation and Expected Interest Rate

Expected inflation	Expected interest rate			Total %
	higher better %	reasonable %	lower better %	
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

Note: Bundesbank Online Pilot Survey on Consumer Expectations, first and second wave.

Preferences about expected inflation and interest rates correlate with expectations, as shown in Table 2. Consumers preferring lower inflation are have significantly higher inflation expectations than those who think inflation will be appropriate. Similarly, those who would prefer higher inflation than expected give significantly lower inflation forecasts than the reference group. We find similar effects of interest rate preferences on expectations of future savings and mortgage rates. Interestingly, preferences correlate also with other macroeconomic expectations: Consumers preferring lower inflation have both lower inflation expectations and lower interest rate expectations than those who think inflation will be appropriate. At the same time, those preferring lower interest rates give both higher inflation and higher mortgage rate forecasts than the reference group. In line with the results in [Michelacci and Paciello \(2020\)](#), we thus find evidence that preferences affect expectations and thereby may affect the transmission of monetary policy as suggested in channel (i).

As a next step, we explore our variables of interest visually by plotting the preferences against the levels of the underlying expectations. Figure 1 plots preferences 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 in preferences. First, in Figure 1(a) we plot the share of people believing that inflation will be reasonable, should be higher or should

<sup>10</sup>For analysis of whether the expectations data is consistent with the Taylor rule see [Carvalho and Nechio \(2014\)](#) and [Dräger et al. \(2016\)](#).

Table 2: Macroeconomic Expectations and Preferences

	$\pi^e$	$i_{savings}^e$	$i_{mortgage}^e$
<i>inf_lowbetter</i>	0.543* (0.297)	-0.209 (0.204)	0.622** (0.296)
<i>inf_highbetter</i>	-0.657*** (0.249)	-0.639*** (0.219)	-0.914** (0.374)
<i>int_lowbetter</i>	1.473** (0.716)	0.377 (0.649)	2.693*** (0.828)
<i>int_highbetter</i>	0.291 (0.329)	-0.565* (0.313)	-0.221 (0.412)
Constant	3.554*** (0.697)	2.768*** (0.716)	6.661*** (0.974)
Demographic Controls	yes	yes	yes
N	865	865	865
Adj. $R^2$	0.051	0.079	0.100

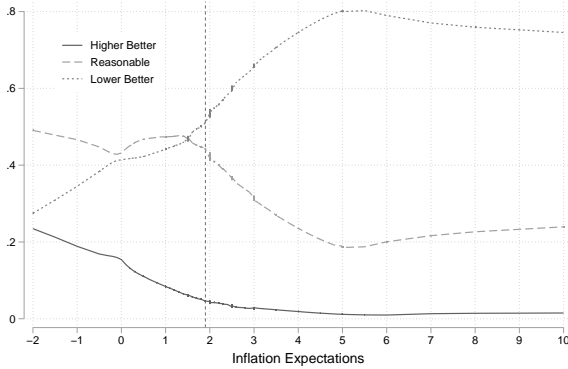
Note: Bundesbank Online Pilot Survey on Consumer Expectations, first and second wave April-May, 2019. OLS estimations with population weights. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

be lower against their own expected inflation rate in 12 months. This visualizes the heterogeneity of preferences of respondents sharing the same inflation point forecast. The vertical line at 1.9% inflation visualizes the official inflation target by the ECB to keep inflation close to, but under 2% over the medium term.

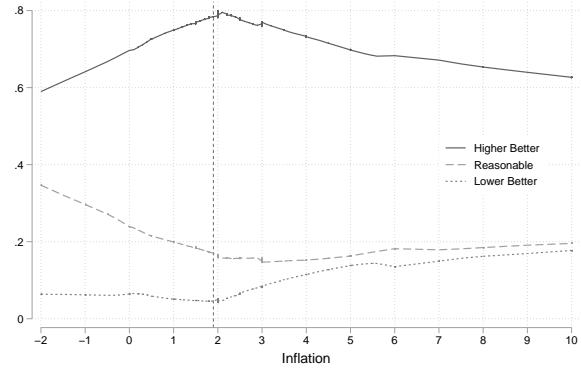
Even when considering inflation expectations that are in line with the ECB's target, we observe that only about 50% of the respondents believe that this expected level of inflation is appropriate. From the remaining 50%, most people believe that this level of inflation is too high. This reflects a substantial 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 preferences. 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. Strikingly, as we move to expected inflation levels below 1.9%, 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; they would prefer even lower inflation rates. This likely implies either a lack of understanding of the economic problems related to missing the inflation target from below or a preference for target inflation to be lower than its current level.

Figure 1(b) plots the preferences 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

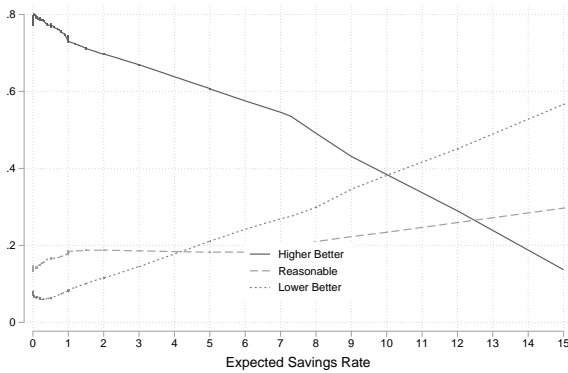
Figure 1: Preferences and Expectations: The Hidden Heterogeneity



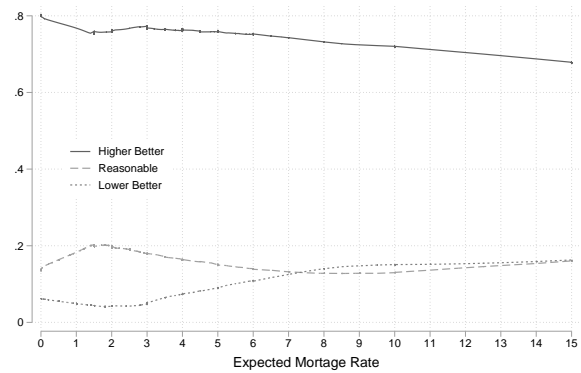
(a) Inflation Preferences and Inflation Expectations



(b) Interest Rate Preferences and Inflation Expectations



(c) Interest Preferences and Savings Rate Expectations



(d) Interest Preferences and Mortgage Rate Expectations

appropriate increases when inflation expectations are very low. In Figures 1(d) and 1(c), we replicate Figure 1(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 preferences 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. Hence, preferences in Germany seem more responsive to saving rates which may be due to the strong affinity of the German consumers to invest in fixed income vehicles.

To infer if respondents answer differently when asked specifically about their views on expected inflation and interest rates regarding *their personal situation* or regarding *the German economy* in total, we repeated our survey questions in the sixth wave of the Bundesbank Online Pilot Survey on Consumer Expectations in June 2020. In the sixth wave, we ask a randomly chosen subset of respondents explicitly about preferences regarding both their personal situation and the German economy. Note that even from a theoretical viewpoint it is not obvious that there should be a difference between my own assessment and what I believe regarding the economy as a whole. In

fact, in the social psychology literature, [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>11</sup> Tables [A.1](#) and [A.2](#) in the appendix summarize the answer shares of personal and economy-wide preferences regarding future inflation and interest rates and [Figure A.1](#) graphs the shares of preferences across the level of inflation and interest rate expectations in the sixth wave. In the case of inflation preferences, the majority of consumers give the same answers about their personal and their economy-wide preferences on future inflation. However, while 92.8% report that they would prefer higher interest rates personally, only 52.4% think that higher interest rates would be better for the German economy as a whole. This observation again might be linked to the large share of consumers owning a type of fixed interest income. Nevertheless, despite the dramatically different macroeconomic environment in mid-2020, we observe a similar degree of heterogeneity in preferences in 2020 as in 2019 for both inflation (personal and economy-wide) and interest rate (economy-wide) preferences. In that sense, we can be reasonably confident that our previous answers reflected respondents’ views regarding the German economy.

### 3.2 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 or are expected to be too high/too low. This ‘hidden heterogeneity’ due to preferences is present even for similar levels of inflation expectations. In this section, we assess whether preferences have implications for consumption and savings decisions beyond the effect of level expectations on inflation and nominal interest rates captured in the (perceived) real rate. We thus test whether preferences represent an independent channel that could help explain heterogeneous effects of monetary policy over the distribution of consumers (channel (iii)).

One nice feature of our dataset is that it asks for both the level of expenditures/saving in € in the past month and whether households intend to spend/save more/less/about the same over the next 12 months. In addition, the survey collects the € 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 detailed in this paper. We focus on the ‘channel’ through which preferences on inflation and interest rates affect consumption: Whether the effect is directly on the level or through the intertemporal elasticity of substitution.

Our analysis focuses on the second wave, which includes quantitative expectations of both inflation and nominal interest rates as well as interest rate preferences. As a subset of respondents participated in both the first and the second wave, models that embed inflation preferences include observations from both waves: We match individual answers about inflation preferences to their

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<sup>11</sup>They also report that people think that the behavior of others is trait dominated.

answers in the second wave and assume that preferences remain constant between both monthly waves.

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.<sup>12</sup> Our Euler equation-type estimation extended for preferences thus takes the following form (here the version for durable spending):

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

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,  $X_i^{preferences}$  is a vector of dummies for preferences on future inflation and interest rates and  $X_i^{controls}$  is a vector of demographic controls. From the Euler equation, we expect  $b_1 > 0$  and  $b_2 < 0$ , whereas the signs of the coefficients in the vector  $c$  are not clear ex ante.

We further estimate an Euler equation with preferences, where in addition to a level effect on spending choices, we also allow for an interaction effect on the estimated intertemporal elasticity of substitution. The estimation equation is then adjusted as follows:

$$c_i^{dur} = a_0 + b_1 \cdot c_i^{dur,e} + b_2 \cdot r_{savings,i}^e + c' \cdot X_i^{preferences} + b_3 \cdot c' \cdot r_{savings,i}^e \cdot X_i^{preferences} + d' \cdot X_i^{controls} + u_i \quad (2)$$

Table 3 shows the determinants of the log of spending on durable goods in the previous month. We find a significantly positive correlation of current and expected spending only in some models for the full sample. By contrast, 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 preferences 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. This shows that macroeconomic preferences may matter also for economic choices, in contrast to standard models of the Euler equation.

The fact that consumers who would prefer lower interest rates in the future seem to act as if real interest rates are already 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,

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<sup>12</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 3: Current Spending on Durables

	Current Spending (in log €; for the previous month)								
	Full sample			$1.5 \leq \pi^e \leq 2$					
$c_{dur,e}^e$	0.166 (0.103)	0.123 (0.110)	0.036 (0.075)	0.212** (0.103)	0.209** (0.103)	-0.029 (0.145)	-0.004 (0.120)	0.062 (0.145)	0.060 (0.144)
$r_{savings}^e$	-0.014 (0.022)	-0.012 (0.022)	0.002 (0.012)	-0.016 (0.021)	-0.030 (0.036)	-0.036 (0.024)	-0.036* (0.022)	-0.048* (0.026)	-0.047*** (0.018)
$d_{inf\_lowbetter}$		-0.083 (0.149)		-0.062 (0.145)	-0.075 (0.207)	-0.183 (0.219)		-0.227 (0.213)	0.014 (0.420)
$d_{inf\_highbetter}$		-0.263 (0.370)		-0.260 (0.347)	-0.298 (0.679)	-0.875* (0.459)		-0.842* (0.455)	-1.291 (1.030)
$d_{int\_lowbetter}$			0.181 (0.245)	0.681** (0.321)	0.656* (0.369)	0.593 (0.417)	1.045** (0.495)	0.250 (0.447)	0.250 (0.447)
$d_{int\_highbetter}$			0.146 (0.127)	-0.144 (0.171)	-0.091 (0.190)	0.115 (0.186)	-0.297 (0.209)	-0.286 (0.262)	-0.286 (0.262)
$r_{savings}^e * d_{inf\_highbetter}$					-0.026 (0.369)			-0.279 (0.579)	-0.279 (0.579)
$r_{savings}^e * d_{inf\_lowbetter}$					-0.005 (0.057)			0.230 (0.283)	0.230 (0.283)
$r_{savings}^e * d_{int\_highbetter}$					0.029 (0.046)			0.000 (0.130)	0.000 (0.130)
$r_{savings}^e * d_{int\_lowbetter}$					-0.010 (0.078)			-0.986*** (0.279)	-0.986*** (0.279)
Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	379	380	786	379	379	163	317	163	163
Adj. R <sup>2</sup>	0.022	0.015	0.040	0.041	0.032	0.076	0.079	0.123	0.125

Note: Bundesbank Online Pilot Survey on Consumer Expectations, second wave May 2019. OLS estimations on log truncated spending with population weights. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

it seems rational that they take spending decisions as if real rates *are* indeed lower. Overall, adding (interest rate) preferences to the model increases its explanatory power, 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 preferences on top of all the control variables is quite substantial.

For the range of inflation expectations in line with the ECB’s inflation objective, inflation and interest rate preferences matter more: 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.<sup>13</sup> This estimate suggests that those consumers who think that lower interest rates would be better are more affected by the changes in monetary policy and thus the preferences could be a source of heterogeneity of monetary policy effects. The effect of preferences on spending that we see via the intertemporal elasticity of substitution may go through risk attitudes. Indeed, under CRRA preferences the intertemporal elasticity of substitution is the inverse of the coefficient of relative risk aversion.<sup>14</sup>

Another 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 is consistent with the model by Santoro et al. (2014). Yogo (2008) shows that 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 intertemporal elasticities are large for those preferring lower interest rates relative to consumers with other preferences. 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>15</sup>

Next, we evaluate implications of the hidden heterogeneity in expectations on current savings. Results are reported in Table 4.<sup>16</sup> While we find strong positive effects of an increase in planned

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<sup>13</sup>We also estimate interaction effects of the perceived real rates with dummy variables for gender, age or education groups. We find no significant interaction effects of demographic characteristics on durable spending. There are some significant effects, mainly from the old age group, on non-durable consumption or saving, but they cannot explain the variation we find with respect to preferences. The results are available upon request.

<sup>14</sup>Furthermore, under HARA preferences (Crossley and Low, 2011) as well as under reference-dependent preferences and loss aversion (Yogo, 2008) one can generate a time-varying intertemporal elasticity of consumption.

<sup>15</sup>We further evaluate implications of inflation and interest rate preferences on spending on consumption goods and on housing. The results in Tables A.7-A.8 in the appendix show that preferences 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 preferences 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>16</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.

Table 4: Current Saving

	Current Saving (in log €; for the previous month)								
	Full sample			$1.5 \leq \pi^e \leq 2$					
$saving^e$	0.226*** (0.083)	0.219*** (0.082)	0.257*** (0.055)	0.216** (0.084)	0.208** (0.084)	0.330*** (0.116)	0.305*** (0.087)	0.331*** (0.117)	0.317*** (0.121)
$r_{savings}^e$	0.005 (0.012)	-0.001 (0.012)	-0.001 (0.008)	0.000 (0.012)	-0.013 (0.024)	-0.046 (0.063)	-0.035** (0.016)	-0.037 (0.065)	-0.198 (0.276)
$d_{inf\_lowbetter}$		-0.282*** (0.085)		-0.285*** (0.087)	-0.197* (0.106)	-0.195 (0.119)	-0.196* (0.119)	-0.221 (0.229)	
$d_{inf\_highbetter}$		0.094 (0.201)		0.089 (0.202)	0.226 (0.486)	-0.045 (0.327)	-0.058 (0.331)	-0.317 (0.669)	
$d_{int\_lowbetter}$			-0.017 (0.128)	-0.050 (0.160)	-0.092 (0.173)		-0.079 (0.232)	-0.075 (0.473)	
$d_{int\_highbetter}$			0.006 (0.077)	0.060 (0.106)	0.039 (0.126)		0.139 (0.120)	0.361 (0.435)	
$r_{sav}^e * d_{inf\_highbetter}$					0.088 (0.244)			-0.172 (0.454)	
$r_{sav}^e * d_{inf\_lowbetter}$					0.045 (0.028)			-0.013 (0.146)	
$r_{sav}^e * d_{int\_highbetter}$					-0.010 (0.033)			0.198 (0.284)	
$r_{sav}^e * d_{int\_lowbetter}$					-0.039 (0.032)			-0.168 (0.398)	
Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	609	610	1220	609	609	264	507	264	264
Adj. R <sup>2</sup>	0.145	0.163	0.142	0.162	0.163	0.236	0.171	0.232	0.223

Note: Bundesbank Online Pilot Survey on Consumer Expectations, second wave May 2019. OLS estimations on log truncated spending with population weights. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1



Table 5: Current Spending on Durables during the COVID-19 Crisis

	Current Spending (log € previous month)				
	Full sample				
$c^{dur,e}$	-0.151 (0.105)	-0.182 (0.124)	-0.260** (0.123)	-0.299** (0.151)	-0.297** (0.147)
$r_{savings}^e$	-0.020 (0.016)	0.007 (0.019)	-0.026 (0.017)	-0.004 (0.022)	0.054 (0.050)
$d_{inf\_lowbetter}$		0.073 (0.222)		0.236 (0.271)	-0.011 (0.377)
$d_{inf\_highbetter}$		0.160 (0.158)		0.083 (0.198)	0.019 (0.250)
$d_{int\_lowbetter}$			0.198 (0.278)	0.173 (0.372)	-0.191 (0.434)
$d_{int\_highbetter}$			0.078 (0.179)	0.188 (0.231)	0.170 (0.297)
$r_{sav}^e * d_{inf\_highbetter}$					-0.037 (0.048)
$r_{sav}^e * d_{inf\_lowbetter}$					-0.078 (0.054)
$r_{sav}^e * d_{int\_highbetter}$					-0.016 (0.047)
$r_{sav}^e * d_{int\_lowbetter}$					-0.062 (0.060)
Demographic Controls	Yes	Yes	Yes	Yes	Yes
N	581	431	422	278	278
Adj. R <sup>2</sup>	0.056	0.037	0.105	0.098	0.098

Note: Bundesbank Online Pilot Survey on Consumer Expectations, sixth wave June 2020. OLS estimations on log truncated spending with population weights. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

saving on the level of current savings, the real expected savings rate seems to have little impact on the € amount of savings. We find an effect from preferences 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.

Table 5 repeats the estimation of the Euler equation for durable spending with preferences for the sample collected during the COVID-19 pandemic in June 2020. Our results suggest that spending on durable goods changed considerably during the crisis, so that the theoretical Euler equation logic no longer works in the data: Whereas we find in Table 3 a positive correlation of current and future spending in some models for the full sample and a negative correlation with the perceived real rate in some models of the restricted sample, we now find a negative correlation of current

and future spending and no significant effect of the real rate.<sup>17</sup> Thus, during the economic crisis induced by the COVID-19 pandemic, consumers seem to postpone spending on durables, leading to lower current and higher future spending. At the same time, the real interest rate is no longer statistically relevant for current spending decisions. Similarly, inflation or interest preferences are also found not to affect current durable spending during the crisis.<sup>18,19</sup>

### 3.3 Heterogeneous Effects of Preferences between Homeowners and Renters

The previous section presented evidence that preferences regarding expected inflation and interest rates can affect durable spending and saving decision in the cross-section of consumers. This effect is in addition to the level effect of expectations (and a set of demographic controls), suggesting that preferences might represent an additional channel via which the transmission of monetary policy could be heterogeneous across consumers.

In this section, we check whether preferences have heterogeneous effects across different types of households. We thus test for channel (ii), i.e. whether preferences interact with socio-demographic characteristics in their effect on the transmission of policy shocks. Specifically, we focus on heterogeneity across households who own their house and households who rent. This is a potentially important division across households in particular for Germany, as Germany has one of the largest share of renters among OECD countries (53.6%)<sup>20</sup> 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>21</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 of durables. However, we do observe a marginally significant negative effect of their perceived real rate in the model with interaction terms, something that we found only for those households that have inflation expectations within the 1.5-2% range before. Moreover, homeowners' durable consumption is not correlated with preferences towards lower interest rates, but instead we find a negative effect

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<sup>17</sup>We only show results for the full sample in Table 5, but the results stay qualitatively the same if we restrict the sample to include only responses with  $1.5 \leq \pi^e \leq 2$ .

<sup>18</sup>Table 5 only includes preferences regarding the German economy, but the effects remain insignificant if we include preferences on future inflation and interest rates with respect to respondent's personal situation.

<sup>19</sup>We also evaluate spending patterns for current consumption, housing and saving during the COVID-19 crisis. Similarly to the results shown in Table 5, we find no effect of the perceived real rate (except for a negative effect in one model for housing expenditure) and either insignificant or negative correlations with future spending/saving. In particular, it seems that during the crisis consumers' current saving becomes independent of future savings plans, perhaps due to a need to use up precautionary savings. At the same time, our results suggest that expenditure for housing during the crisis is negatively correlated with future spending, suggesting that household plans to increase spending for housing may also be postponed during the crisis. Inflation and interest rate preferences also matter little in these models, except for some effects when we restrict inflation expectations to the range  $1.5 \leq \pi^e \leq 2$ . The results are available upon request.

<sup>20</sup>Source: OECD Affordable Housing Database 2018.

<sup>21</sup>Note, however, that mortgages in Germany are usually fixed-rate mortgages for longer periods.

from thinking that inflation should be lower. Regarding the interaction with the perceived real interest rate, we find that homeowners have a higher real interest rate sensitivity if they believe that lower interest rates would be better, while the interest rate 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. In that sense, the effect we find for homeowners would be theory-consistent. 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 preferences 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.

### 3.4 Determinants of Macroeconomic Preferences

So far we have shown that preferences have an effect through expectations on consumption and saving decisions as well as their own ‘independent’ effect and, thereby, affect the transmission of monetary policy shocks in different ways. But what determines preferences? In the previous sections, we show that preferences on future inflation and interest rates can be highly heterogeneous at the same level of expectations. In addition, the effect of preferences on the transmission to durable consumption is heterogeneous across household types. In this section, we aim to characterize this heterogeneity in preferences regarding a large set of socio-demographic characteristics. All models estimate the likelihood of choosing either category of thinking expected values are ‘too low,’ ‘appropriate’ or ‘too high’ using probit models with population weights. The estimation output tables report marginal effects evaluated at the sample mean.

Table 7 shows the role of demographic characteristics on the likelihood of responding that future inflation should be lower, will be appropriate or should be higher, respectively. In the first three columns, we report the effects for the full range of truncated quantitative inflation expectations. As in the previous section, we then put particular emphasis on the demographic drivers of preferences by respondents with relatively similar inflation expectations in the ‘inflation target zone,’ i.e., between 1.5% and 2%.<sup>22</sup>

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,

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<sup>22</sup>In Table A.3 in the appendix, we also show results for inflation expectations below and above the ‘inflation target zone,’ i.e., in the range  $-5 \leq \pi^e < 1.5$  and in the range  $2 < \pi^e \leq 25$ .

Table 6: Current Spending on Durables for Homeowners and Renters

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

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

have a university degree or own their home. The reverse is true for respondents who are out of the labor market. Interestingly, respondents 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 and less likely to view expected inflation as appropriate.<sup>23</sup> Table 2 above corroborates this result.

However, when we zoom in on respondents with fairly accurate inflation expectations in the ‘inflation target zone,’ the results in Table 7 suggest that for the majority of variables demographic heterogeneity in preferences is even more pronounced. This holds both in terms of significance and the size of the marginal effects, implying that the differences in inflation preferences across

<sup>23</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 \(2009\)](#).

Table 7: Preferences about Future Inflation

	Full sample			$1.5 \leq \pi^e \leq 2$		
	inf _lowbetter	inf _reason	inf _highbetter	inf _lowbetter	inf _reason	inf _highbetter
<i>d_male</i>	-0.084*** (0.027)	0.049* (0.027)	0.039*** (0.012)	-0.083** (0.042)	0.040 (0.042)	0.053*** (0.019)
<i>age</i>	-0.002 (0.001)	0.002 (0.001)	0.001 (0.001)	-0.003 (0.002)	0.001 (0.002)	0.002* (0.001)
<i>inc_middle</i>	-0.065 (0.081)	0.096 (0.083)	-0.024 (0.032)	-0.256* (0.139)	0.218 (0.140)	0.305*** (0.055)
<i>inc_high</i>	-0.143* (0.082)	0.178** (0.084)	-0.028 (0.033)	-0.323** (0.140)	0.278** (0.141)	0.310*** (0.056)
<i>d_east1989</i>	0.132*** (0.036)	-0.140*** (0.035)	0.006 (0.014)	0.198*** (0.051)	-0.187*** (0.052)	-0.017 (0.022)
<i>d_edu_real</i>	-0.048 (0.034)	0.040 (0.033)	0.010 (0.016)	-0.074 (0.051)	0.058 (0.052)	0.018 (0.020)
<i>d_edu_abi</i>	-0.075 (0.047)	0.062 (0.047)	0.015 (0.019)	-0.153** (0.068)	0.139** (0.068)	0.012 (0.025)
<i>d_edu_uni</i>	-0.197*** (0.039)	0.155*** (0.038)	0.039** (0.016)	-0.289*** (0.057)	0.268*** (0.057)	0.019 (0.021)
<i>d_parttime</i>	0.051 (0.046)	-0.042 (0.046)	-0.010 (0.019)	0.009 (0.078)	-0.004 (0.078)	-0.022 (0.033)
<i>d_noemploy</i>	0.121** (0.052)	-0.100* (0.052)	-0.025** (0.012)	0.052 (0.080)	-0.054 (0.081)	0.002 (0.013)
<i>d_retired</i>	-0.049 (0.058)	0.051 (0.058)	0.002 (0.014)	-0.029 (0.088)	0.049 (0.089)	-0.023 (0.019)
<i>d_ownhouse</i>	-0.046* (0.028)	0.050* (0.027)	-0.004 (0.011)	-0.037 (0.042)	0.062 (0.042)	-0.026* (0.016)
N	1515	1515	1515	669	669	669
$\chi^2$	100.097	82.074	32.355	69.038	59.393	874.729
Pseudo $R^2$	0.055	0.047	0.054	0.089	0.076	0.086

Note: Bundesbank Online Pilot Survey on Consumer Expectations, first wave. Average marginal effects for the likelihood of reporting that inflation should be lower/is reasonable/should be higher are reported from estimations with population weights. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 8: Preferences about Future Interest Rates

	Full sample			$1.5 \leq \pi^e \leq 2$		
	int _lowbetter	int _reason	int _highbetter	int _lowbetter	int _reason	int _highbetter
<i>d_male</i>	-0.018 (0.017)	0.026 (0.022)	-0.008 (0.026)	-0.015 (0.020)	0.015 (0.036)	0.001 (0.040)
<i>age</i>	-0.003*** (0.001)	0.000 (0.001)	0.003** (0.001)	-0.004*** (0.001)	0.001 (0.002)	0.003* (0.002)
<i>inc_middle</i>	-0.069 (0.045)	-0.014 (0.056)	0.114 (0.072)	0.381*** (0.079)	-0.185** (0.092)	0.134 (0.110)
<i>inc_high</i>	-0.095** (0.046)	0.002 (0.057)	0.122* (0.073)	0.378*** (0.080)	-0.159* (0.093)	0.107 (0.112)
<i>d_east1989</i>	0.004 (0.024)	-0.037 (0.028)	0.032 (0.035)	-0.015 (0.025)	-0.074 (0.047)	0.089* (0.051)
<i>d_edu_real</i>	-0.007 (0.020)	-0.029 (0.025)	0.032 (0.031)	-0.023 (0.026)	0.003 (0.040)	0.010 (0.046)
<i>d_edu_abi</i>	-0.086*** (0.032)	-0.092** (0.037)	0.168*** (0.044)	-0.086* (0.046)	-0.125** (0.061)	0.199*** (0.069)
<i>d_edu_uni</i>	-0.042* (0.025)	-0.056* (0.030)	0.090** (0.037)	-0.061* (0.033)	-0.055 (0.047)	0.102* (0.053)
<i>d_parttime</i>	-0.021 (0.027)	0.012 (0.034)	0.006 (0.043)	0.020 (0.032)	-0.028 (0.059)	0.008 (0.066)
<i>d_noemploy</i>	0.021 (0.028)	-0.020 (0.044)	-0.013 (0.048)	0.022 (0.035)	-0.087 (0.068)	0.050 (0.073)
<i>d_retired</i>	-0.025 (0.033)	-0.030 (0.047)	0.060 (0.053)	0.020 (0.039)	0.013 (0.074)	-0.028 (0.079)
<i>d_ownhouse</i>	-0.041** (0.017)	0.047** (0.022)	-0.001 (0.026)	-0.033* (0.018)	-0.006 (0.035)	0.047 (0.038)
N	1616	1616	1616	665	665	665
$\chi^2$	48.263	22.850	35.252	323.680	16.887	22.455
Pseudo $R^2$	0.087	0.019	0.026	0.165	0.031	0.042

Note: Bundesbank Online Pilot Survey on Consumer Expectations, second wave. Average marginal effects for the likelihood of reporting that interest rates should be lower/is reasonable/should be higher are reported from estimations with population weights. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

demographic groups are not driven by inflation forecast accuracy or level inflation expectations.<sup>24</sup> In line with the results shown in the previous section, this reiterates the notion that reporting level inflation expectations close to the official target does not necessarily imply that consumers agree this is an appropriate level of inflation. Since cross-sectional variation in inflation preferences cannot be fully explained by consumers' level expectations or their forecast accuracy, we conjecture that they might be reflecting other underlying preferences, such as risk preferences.

Next, in Table 8 we evaluate the heterogeneity in preferences 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 will be 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 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. Restricting the range of inflation forecasts to the 'inflation target zone,' the correlation of interest rate preferences with age, education, and owning a house remains, but consumers with higher incomes and more accurate expectations then prefer interest rates to be lower. We thus observe considerable demographic heterogeneity also with respect to preferences on future interest rates, and thus the future monetary policy stance, even when inflation expectations are close to the official target.

We argue that the observed demographic variation in interest rate expectations is also reminiscent of known variation in risk preferences: Women might be more likely to prefer lower inflation than men because they are typically more risk-averse (Dwyer et al., 2002; Dohmen et al., 2011). As older people tend to be more risk-averse (Dohmen et al., 2011), they are likely to save more in safe assets such as bonds or savings accounts, whose return increases when interest rates rise. Consumers with higher incomes on average are also able to save more than those with low incomes, which might explain why they prefer higher interest rates in the full sample. In addition, lower income consumers might be more likely to view expected inflation as too high because their disposable income is more vulnerable with respect to inflation and, thus, they are more risk-averse regarding inflation. Those with high incomes and relatively accurate inflation expectations are likely more financially literate and therefore could be expected to invest in stocks, rather than bonds or savings accounts.<sup>25</sup> In this case, their expected return is lowered when interest rates rise, which could explain why this group prefers lower interest rates. In fact, as shown in Table A.4 in the appendix, the correlation of interest rate preferences with income in the full sample is driven by those consumers with inflation expectations above 2%.

To investigate a potential relationship between inflation or interest rate preferences and individual risk preferences directly, we utilize additional survey waves of the BOPSCOE from 2020. The fifth wave in April 2020 includes a question about personal willingness to take risks (*risk*). This question is frequently used in surveys to measure individual risk preferences and has been shown to have

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<sup>24</sup>This result is corroborated in Table A.3 in the appendix, where we find fewer demographic variation in inflation preferences outside the 'inflation target zone'.

<sup>25</sup>The positive relationship between financial literacy and stock market participation is shown, for instance, in van Rooij et al. (2011).

Table 9: Preferences about Future Inflation and Risk Preferences

	Full sample			$1.5 \leq \pi^e \leq 2$		
	inf _lowbetter	inf _reason	inf _highbetter	inf _lowbetter	inf _reason	inf _highbetter
<i>risk</i> – no controls	-0.029** (0.013)	0.017 (0.014)	0.012 (0.009)	-0.047** (0.022)	0.048** (0.021)	-0.002 (0.012)
N	721	721	721	195	195	195
Pseudo $R^2$	0.013	0.004	0.004	0.055	0.037	0
<i>risk</i> – demographic controls (small)	-0.024* (0.013)	0.012 (0.014)	0.012 (0.010)	-0.040** (0.020)	0.044** (0.020)	-0.004 (0.012)
N	688	688	688	187	187	187
Pseudo $R^2$	0.035	0.024	0.018	0.146	0.123	0.135
<i>risk</i> – demographic controls (large)	-0.026** (0.012)	0.006 (0.012)	0.019* (0.011)	-0.019 (0.017)	0.016 (0.019)	0.004 (0.010)
N	623	623	623	167	167	167
Pseudo $R^2$	0.053	0.055	0.042	0.198	0.179	0.234

Note: Bundesbank Online Pilot Survey on Consumer Expectations, sixth wave. Average marginal effects for the likelihood of reporting that inflation rates should be lower/is reasonable/should be higher are reported from estimations with population weights. We report results for inflation preferences when respondents are asked to think about the German economy as a whole. Robust standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$



Table 10: Preferences about Future Interest Rates and Risk Preferences

	Full sample		$1.5 \leq \pi^e \leq 2$	
	int _lowbetter	int _highbetter	int _lowbetter	int _highbetter
<i>risk</i> – no controls	0.005 (0.005)	0.001 (0.013)	0.004 (0.003)	-0.035 (0.024)
N	719	719	186	186
Pseudo $R^2$	0.016	0	0.026	0.018
<i>risk</i> – demographic controls (small)	0.004 (0.005)	-0.004 (0.013)	0.004 (0.003)	-0.043* (0.024)
N	688	688	179	179
Pseudo $R^2$	0.082	0.013	0.244	0.056
<i>risk</i> – demographic controls (large)	0.004 (0.005)	0.009 (0.011)	–	–
N	611	611	–	–
Pseudo $R^2$	0.157	0.034	–	–

Note: Bundesbank Online Pilot Survey on Consumer Expectations, sixth wave. Average marginal effects for the likelihood of reporting that interest rates should be lower/is reasonable/should be higher are reported from estimations with population weights. We report results for interest preferences when respondents are asked to think about the German economy as a whole. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

good external validity regarding actual risky choices (Dohmen et al., 2011). Since we repeated our questions about inflation and interest rate preferences in the sixth wave from May 2020, we match respondents’ answers of those who participated in both wave 5 and 6 (again assuming that risk preferences remain constant from April to May 2020). Tables 9 and 10 summarize the results from regressing individual risk preferences on inflation and interest rate preferences, respectively.<sup>26</sup> Each column contains the correlation of risk and inflation/interest rate preferences for models without any control variables, with a smaller set of demographic control variables<sup>27</sup> and with the large set of demographic control variables used in Tables 7-8. In Table 9, we show that being more risk-loving significantly reduces the likelihood of preferring lower inflation even when we control for a large set of demographic variables. This effect stays significant (except in the model with a large set of demographics) when we restrict the range of inflation expectations to  $1.5 \leq \pi^e \leq 2$ . In that range, we also find that being more risk-loving is related to a higher likelihood of thinking inflation will be appropriate for the German economy. These results suggest that indeed individuals’ inflation preferences relate to risk preferences, where preferences for lower inflation are linked to a higher degree of risk-aversion. By contrast, we find no significant relationship between risk preferences and individuals’ interest rate preferences in Table 10.

Overall, our findings in Tables 7 and 8 together with the results from the previous sections suggest that agreement in level expectations on the inflation target is not sufficient as a definition of anchored inflation expectations. By contrast, the hidden heterogeneity in expectations reveals considerable disagreement with regard to the appropriateness of both future inflation and future interest rates at levels of seemingly anchored inflation expectations. In the case of inflation preferences, part of this heterogeneity in preferences seems to be related to variation in risk preferences. This implies that risk preferences may very directly affect the transmission of monetary policy shocks (in line with our proposed channels (ii) and (iii)) via their correlation with macroeconomic preferences and the ‘independent’ effect of macroeconomic preferences on spending and saving decisions.

## 4 Conclusion

In this paper, we investigate the role of preferences for forming expectations and macroeconomic decisions. We show that preferences towards future inflation and interest may differ substantially even when people have similar predictions regarding level of inflation and interest rates. They are inversely related to level expectations and have economic implications for consumption spending and saving decisions and, thereby, the transmission of monetary policy shocks. We document these insights using a new survey dataset from the Bundesbank Online Pilot Survey of Consumer

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<sup>26</sup>Tables 9 and 10 show the results for preferences regarding the German economy as a whole. We repeat the regressions with preferences regarding the personal situation and show the results in Tables A.5 and A.6 in the appendix. We find similar relationships between personal inflation/interest rate preferences and risk preferences, albeit only in the full sample. Note, however, that the sample sizes are smaller, which is why we cannot estimate the model with a large set of demographic controls for personal inflation preferences. For personal interest rate preferences, models when restricting the range of inflation expectations did not converge and there are not sufficient observations for estimating models on the likelihood of personally preferring lower interest rates.

<sup>27</sup>These include gender, age and income groups. We use this set of demographic control variables also in the estimations on spending choices in the next section.

Expectations, fielded on the German population in 2019 and 2020. The majority of consumers in our sample from 2019 thinks inflation should be lower and interest rates should be higher. Hence, these preferences negatively correlate with the related level expectations, where consumers preferring lower inflation or interest rates give higher forecasts, and *vice versa*. Remarkably, even consumers with similar expectations disagree substantially on whether their level expectations are appropriate. We dub this observation the ‘hidden heterogeneity’ in expectations.

We further demonstrate that the preferences about expected inflation and interest rates have implications for durable spending and saving decisions in addition to the effects from the level of perceived real rates and from demographic control variables. Heterogeneity in preferences may thus lead to heterogeneous transmission of monetary policy shocks across the population. For durable good spending, we find some evidence that preferences also affect the estimated intertemporal elasticity of substitution. This provides some indication that our measure of macroeconomic preferences relates to consumers’ risk preferences. We also demonstrate that these preferences affect durable goods spending of different groups of the population heterogeneously.

Moreover, we show that the observed ‘hidden heterogeneity’ stemming from inflation and interest rate preferences 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 preferences on future inflation. The observed variation in preferences is reminiscent of the variation in risk preferences observed in experimental studies (Dohmen et al., 2011). Indeed, we show that consumers with lower reported willingness to take risks are significantly more likely to prefer lower inflation for the German economy, while those with higher willingness to take risks and inflation expectations close to the ECB target are more likely to state inflation will be appropriate. However, we find no significant relation between reported risk and interest rate preferences. Studying the relationship between risk preferences and inflation or interest rate preferences in a more controlled environment will be an interesting avenue for future research.

More generally, we show that information about consumers’ macroeconomic preferences gives additional information regarding the anchoring of expectations and provides central banks with relevant insights about the effectiveness of the transmission channel of monetary policy. Thus, our results suggest that central banks do not only need to communicate their target level of inflation in order to anchor consumers’ expectations, but they also have to convince consumers that this is indeed an appropriate level of inflation for the economy. By addressing the issue of preferences in their communication, monetary policy could thus improve its efficacy.

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## 5 Appendix

### 5.1 Controlling for Differences in Preferences Regarding the Personal Situation and Regarding the German Economy

Table A.1: Preferences on Expected Inflation: Personal vs. Economy-Wide

<b>Expected inflation, personal preferences</b>	<b>Expected inflation, preferences regarding the German economy</b>			
	higher better %	reasonable %	lower better %	Total %
higher better %	9.2	2.0	1.2	12.5
reasonable %	4.3	41.4	3.5	49.2
lower better %	4.7	6.6	27.0	38.3
<b>Total %</b>	<b>18.2</b>	<b>50.0</b>	<b>31.8</b>	<b>100.0</b>

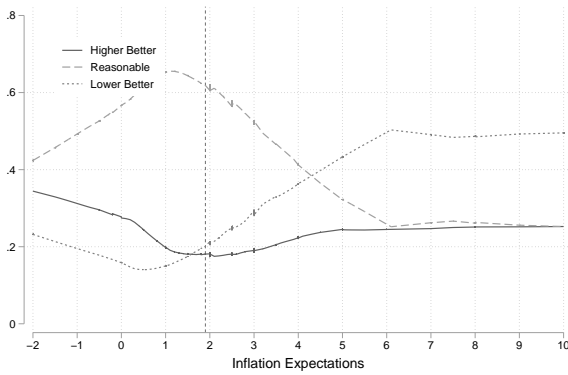
Note: Bundesbank Online Pilot Survey on Consumer Expectations, sixth wave.

Table A.2: Preferences on Expected Interest Rates: Personal vs. Economy-Wide

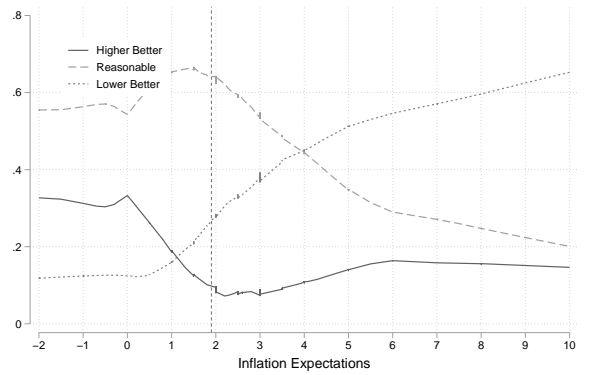
<b>Expected interest rate, personal preferences</b>	<b>Expected interest rates, preferences regarding the German economy</b>			
	higher better %	reasonable %	lower better %	Total %
higher better %	51.6	38.0	3.2	92.8
reasonable %	0.8	5.0	0.8	6.6
lower better %	0.0	0.0	0.6	0.6
<b>Total %</b>	<b>52.4</b>	<b>43.0</b>	<b>4.6</b>	<b>100.0</b>

Note: Bundesbank Online Pilot Survey on Consumer Expectations, sixth wave.

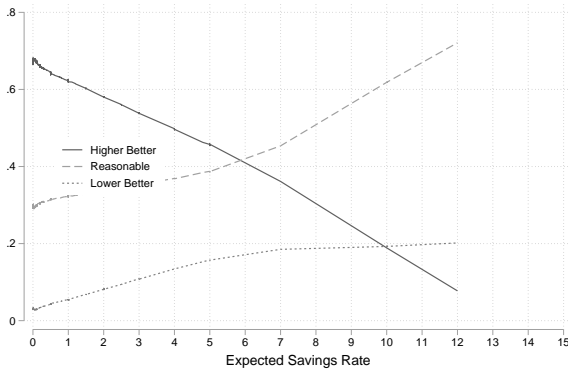
Figure A.1: The Hidden Heterogeneity: Personal vs. Economy-Wide Preferences



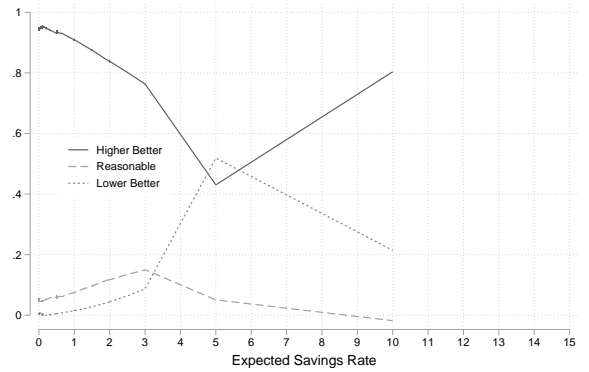
(a) Inflation Preferences Economy and Inflation Expectations



(b) Inflation Preferences Personal and Inflation Expectations



(c) Interest Preferences Economy and Savings Rate Expectations



(d) Interest Preferences Personal and Savings Rate Expectations



## 5.2 Further Results and Robustness Checks

Table A.3: Preferences about Future Inflation

	Full sample				$-5 \leq \pi^e < 1.5$				$1.5 \leq \pi^e \leq 2$				$2 < \pi^e \leq 25$			
	inf _lowbetter	inf _reason	inf _highbetter	inf _lowbetter	inf _reason	inf _highbetter	inf _lowbetter	inf _reason	inf _highbetter	inf _lowbetter	inf _reason	inf _highbetter	inf _lowbetter	inf _reason	inf _highbetter	
<i>d_male</i>	-0.084*** (0.027)	0.049* (0.027)	0.039*** (0.012)	-0.079 (0.067)	0.003 (0.069)	0.086** (0.038)	-0.083** (0.042)	0.040 (0.042)	0.053*** (0.019)	-0.038 (0.038)	0.032 (0.037)	0.007 (0.012)				
<i>age</i>	-0.002 (0.001)	0.002 (0.001)	0.001 (0.001)	-0.003 (0.003)	0.004 (0.003)	-0.001 (0.002)	-0.003 (0.002)	0.001 (0.002)	0.002* (0.001)	-0.002 (0.002)	0.002 (0.002)	0.001 (0.001)				
<i>inc_middle</i>	-0.065 (0.081)	0.096 (0.083)	-0.024 (0.032)	0.406** (0.179)	-0.241 (0.203)	-0.118 (0.097)	-0.256* (0.139)	0.218 (0.140)	0.305*** (0.055)	-0.082 (0.102)	0.109 (0.105)	-0.016 (0.025)				
<i>inc_high</i>	-0.143* (0.082)	0.178** (0.084)	-0.028 (0.033)	0.369** (0.182)	-0.187 (0.205)	-0.137 (0.098)	-0.323** (0.140)	0.278** (0.141)	0.310*** (0.056)	-0.154 (0.106)	0.193* (0.108)	-0.029 (0.026)				
<i>d_east1989</i>	0.132*** (0.036)	-0.140*** (0.035)	0.006 (0.014)	0.011 (0.090)	-0.070 (0.092)	0.058 (0.042)	0.198*** (0.051)	-0.187*** (0.052)	-0.017 (0.022)	0.101** (0.051)	-0.103** (0.050)	0.000 (0.015)				
<i>d_edu_real</i>	-0.048 (0.034)	0.040 (0.033)	0.010 (0.016)	0.077 (0.080)	-0.082 (0.081)	0.008 (0.053)	-0.074 (0.051)	0.058 (0.052)	0.018 (0.020)	-0.043 (0.048)	0.041 (0.046)	0.002 (0.016)				
<i>d_edu_abi</i>	-0.075 (0.047)	0.062 (0.047)	0.015 (0.019)	-0.085 (0.133)	0.086 (0.132)	0.018 (0.071)	-0.153** (0.068)	0.139** (0.068)	0.012 (0.025)	0.052 (0.067)	-0.073 (0.066)	0.019 (0.019)				
<i>d_edu_uni</i>	-0.197*** (0.039)	0.155*** (0.038)	0.039** (0.016)	-0.051 (0.092)	-0.031 (0.093)	0.080 (0.050)	-0.289*** (0.057)	0.268*** (0.057)	0.019 (0.021)	-0.079 (0.059)	0.040 (0.058)	0.035* (0.018)				
<i>d_parttime</i>	0.051 (0.046)	-0.042 (0.046)	-0.010 (0.019)	0.065 (0.116)	-0.033 (0.123)	-0.017 (0.067)	0.009 (0.078)	-0.004 (0.078)	-0.022 (0.033)	0.019 (0.060)	-0.020 (0.059)	0.004 (0.016)				
<i>d_noemploy</i>	0.121** (0.052)	-0.100* (0.052)	-0.025** (0.012)	0.152 (0.121)	-0.130 (0.129)	-0.041 (0.036)	0.052 (0.080)	-0.054 (0.081)	0.002 (0.013)	0.109* (0.065)	-0.091 (0.063)	-0.016 (0.011)				
<i>d_retired</i>	-0.049 (0.058)	0.051 (0.058)	0.002 (0.014)	0.091 (0.144)	-0.068 (0.149)	-0.029 (0.052)	-0.029 (0.088)	0.049 (0.089)	-0.023 (0.019)	-0.058 (0.074)	0.060 (0.071)	0.001 (0.015)				
<i>d_ownhouse</i>	-0.046* (0.028)	0.050* (0.027)	-0.004 (0.011)	-0.212*** (0.063)	0.171*** (0.066)	0.049 (0.037)	-0.037 (0.042)	0.062 (0.042)	-0.026* (0.016)	0.050 (0.040)	-0.041 (0.039)	-0.008 (0.011)				
N	1515	1515	1515	267	267	267	669	669	669	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: Bundesbank Online Pilot Survey on Consumer Expectations, first wave. Average marginal effects for the likelihood of reporting that inflation should be lower/is reasonable/should be higher are reported from estimations with population weights. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table A.4: Preferences about Future Interest Rates

	Full sample				$-5 \leq \pi^e < 1.5$				$1.5 \leq \pi^e \leq 2$				$2 < \pi^e \leq 25$			
	int _lowbetter	int _reason	int _highbetter	int _highbetter	int _lowbetter	int _reason	int _highbetter	int _highbetter	int _lowbetter	int _reason	int _highbetter	int _highbetter	int _lowbetter	int _reason	int _highbetter	int _highbetter
<i>d_male</i>	-0.018 (0.017)	0.026 (0.022)	-0.008 (0.026)	0.042 (0.039)	0.060 (0.060)	0.060 (0.060)	-0.103 (0.069)	-0.015 (0.020)	0.015 (0.036)	0.001 (0.040)	0.001 (0.040)	-0.019 (0.027)	0.012 (0.029)	0.012 (0.029)	0.010 (0.038)	
<i>age</i>	-0.003*** (0.001)	0.000 (0.001)	0.003** (0.001)	-0.002 (0.002)	0.001 (0.003)	0.001 (0.003)	0.002 (0.004)	-0.004*** (0.001)	0.001 (0.002)	0.003* (0.002)	0.003* (0.002)	-0.003* (0.001)	0.001 (0.001)	0.001 (0.001)	0.002 (0.002)	
<i>inc_middle</i>	-0.069 (0.045)	-0.014 (0.056)	0.114 (0.072)	0.061 (0.062)	1.244*** (0.190)	1.244*** (0.190)	-0.334** (0.166)	0.381*** (0.079)	-0.185** (0.092)	0.134 (0.110)	0.134 (0.110)	-0.138** (0.068)	0.030 (0.083)	0.030 (0.083)	0.170* (0.099)	
<i>inc_high</i>	-0.095** (0.046)	0.002 (0.057)	0.122* (0.073)	-0.061 (0.060)	1.331*** (0.204)	1.331*** (0.204)	-0.290* (0.168)	0.378*** (0.080)	-0.159* (0.093)	0.107 (0.112)	0.107 (0.112)	-0.155** (0.069)	0.031 (0.086)	0.031 (0.086)	0.182* (0.100)	
<i>d_east1989</i>	0.004 (0.024)	-0.037 (0.028)	0.032 (0.035)	0.013 (0.034)	0.135* (0.079)	0.135* (0.079)	-0.153* (0.088)	-0.015 (0.025)	-0.074 (0.047)	0.089* (0.051)	0.089* (0.051)	0.010 (0.039)	-0.046 (0.039)	-0.046 (0.039)	0.035 (0.052)	
<i>d_edu_real</i>	-0.007 (0.020)	-0.029 (0.025)	0.032 (0.031)	0.052 (0.051)	-0.031 (0.069)	-0.031 (0.069)	-0.014 (0.083)	-0.023 (0.026)	0.003 (0.040)	0.010 (0.046)	0.010 (0.046)	-0.008 (0.033)	-0.054 (0.035)	-0.054 (0.035)	0.055 (0.045)	
<i>d_edu_abi</i>	-0.086*** (0.032)	-0.092** (0.037)	0.168*** (0.044)	0.059 (0.052)	-0.119 (0.106)	-0.119 (0.106)	0.062 (0.115)	-0.086* (0.046)	-0.125** (0.061)	0.199*** (0.069)	0.199*** (0.069)	-0.133** (0.056)	-0.039 (0.050)	-0.039 (0.050)	0.151** (0.066)	
<i>d_edu_uni</i>	-0.042* (0.025)	-0.056* (0.030)	0.090** (0.037)	0.043 (0.056)	-0.099 (0.082)	-0.099 (0.082)	0.070 (0.096)	-0.061* (0.033)	-0.055 (0.047)	0.102* (0.053)	0.102* (0.053)	-0.026 (0.042)	-0.029 (0.041)	-0.029 (0.041)	0.046 (0.056)	
<i>d_parttime</i>	-0.021 (0.027)	0.012 (0.034)	0.006 (0.043)	0.014 (0.050)	-0.006 (0.094)	-0.006 (0.094)	-0.020 (0.109)	0.020 (0.032)	-0.028 (0.059)	0.008 (0.066)	0.008 (0.066)	-0.085* (0.048)	0.045 (0.045)	0.045 (0.045)	0.028 (0.064)	
<i>d_noemploy</i>	0.021 (0.028)	-0.020 (0.044)	-0.013 (0.048)	0.011 (0.058)	0.232 (0.150)	0.232 (0.150)	-0.237* (0.143)	0.022 (0.035)	-0.087 (0.068)	0.050 (0.073)	0.050 (0.073)	0.004 (0.048)	-0.009 (0.055)	-0.009 (0.055)	-0.004 (0.068)	
<i>d_retired</i>	-0.025 (0.033)	-0.030 (0.047)	0.060 (0.053)	-0.021 (0.072)	-0.224 (0.170)	-0.224 (0.170)	0.226 (0.171)	0.020 (0.039)	0.013 (0.074)	-0.028 (0.079)	-0.028 (0.079)	-0.040 (0.055)	-0.050 (0.059)	-0.050 (0.059)	0.093 (0.074)	
<i>d_ownhouse</i>	-0.041** (0.017)	0.047** (0.022)	-0.001 (0.026)	0.025 (0.038)	0.208*** (0.067)	0.208*** (0.067)	-0.214*** (0.071)	-0.033* (0.018)	-0.006 (0.035)	0.047 (0.038)	0.047 (0.038)	-0.063** (0.029)	0.056* (0.030)	0.056* (0.030)	0.009 (0.039)	
N	1616	1616	1616	211	211	211	211	665	665	665	665	740	740	740	740	
$\chi^2$	48.263	22.850	35.252	15.956	325.288	325.288	19.918	323.680	16.887	22.455	22.455	34.412	15.224	15.224	22.855	
Pseudo $R^2$	0.087	0.019	0.026	0.157	0.121	0.121	0.096	0.165	0.031	0.042	0.042	0.102	0.028	0.028	0.034	

Note: Bundesbank Online Pilot Survey on Consumer Expectations, second wave. Average marginal effects for the likelihood of reporting that interest rates should be lower/is reasonable/should be higher are reported from estimations with population weights. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table A.5: Personal Preferences about Future Inflation and Risk Preferences

	Full sample		$1.5 \leq \pi^e \leq 2$	
	inf _lowbetter	inf _highbetter	inf _lowbetter	inf _highbetter
<i>risk</i> – no controls	-0.051** (0.021)	0.057*** (0.020)	-0.008 (0.019)	0.016 (0.034)
N	229	229	71	71
Pseudo $R^2$	0.027	0.035	0.002	0.003
<i>risk</i> – demographic controls (small)	-0.040* (0.023)	0.052*** (0.020)	-0.012 (0.016)	0.002 (0.025)
N	220	220	69	31
Pseudo $R^2$	0.05	0.07	0.297	0.318
<i>risk</i> – demographic controls (large)	-0.049** (0.020)	0.040* (0.021)	-	-
N	201	201	-	-
Pseudo $R^2$	0.121	0.118	0.113	-

Note: Bundesbank Online Pilot Survey on Consumer Expectations, sixth wave. Average marginal effects for the likelihood of reporting that inflation rates should be lower/is reasonable/should be higher are reported from estimations with population weights. We report results for inflation preferences when respondents are asked to think about their personal situation. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table A.6: Personal Preferences about Future Interest Rates and Risk Preferences

	Full sample		
	int _lowbetter	int _reason	int _highbetter
<i>risk</i> – no controls	-	-0.004 (0.013)	-0.01 (0.019)
N		229	229
Pseudo $R^2$		0.002	0.008
<i>risk</i> – demographic controls (small)	-	0.002 (0.010)	-0.02 (0.016)
N		221	221
Pseudo $R^2$		0.178	0.174
<i>risk</i> – demographic controls (large)	-	0.004 (0.005)	-0.021* (0.012)
N		196	196
Pseudo $R^2$		0.123	0.196

Note: Bundesbank Online Pilot Survey on Consumer Expectations, sixth wave. Average marginal effects for the likelihood of reporting that inflation rates should be lower/is reasonable/should be higher are reported from estimations with population weights. We report results for interest rate preferences when respondents are asked to think about their personal situation. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table A.7: Current Spending on Consumption Goods

	Current Spending (in € for the previous month)							
	Full sample				$1.5 \leq \pi^e \leq 2$			
$c_t^{cons,e}$	0.001 (0.078)	0.065 (0.058)	0.014 (0.077)	0.007 (0.078)	0.035 (0.105)	0.083 (0.083)	0.038 (0.105)	0.036 (0.107)
$r_{savings}^e$	-0.016 (0.012)	-0.009 (0.008)	-0.014 (0.011)	-0.053 (0.035)	0.010 (0.014)	-0.037* (0.019)	0.010 (0.014)	0.006 (0.010)
$d_{inf\_lowbetter}$	-0.089 (0.065)		-0.101 (0.065)	-0.128* (0.076)	-0.079 (0.079)		-0.085 (0.079)	-0.185 (0.155)
$d_{inf\_highbetter}$	0.175* (0.103)		0.171* (0.104)	0.377*** (0.133)	-0.019 (0.134)		-0.018 (0.135)	0.049 (0.196)
$d_{int\_lowbetter}$		0.047 (0.098)	0.202 (0.127)	0.282** (0.142)		-0.018 (0.151)	0.104 (0.222)	-0.002 (0.211)
$d_{int\_highbetter}$		-0.032 (0.058)	0.117 (0.079)	0.212** (0.094)		-0.083 (0.074)	0.042 (0.094)	0.108 (0.100)
$r_{savings}^e * d_{inf\_highbetter}$				0.151* (0.081)				0.047 (0.161)
$r_{savings}^e * d_{inf\_lowbetter}$				-0.010 (0.017)				-0.069 (0.097)
$r_{savings}^e * d_{int\_highbetter}$				0.057** (0.028)				0.049 (0.035)
$r_{savings}^e * d_{int\_lowbetter}$				0.055* (0.030)				-0.135 (0.117)
Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	768	1561	767	767	329	639	328	328
Adj. $R^2$	0.104	0.133	0.107	0.116	0.126	0.146	0.121	0.114

Note: Bundesbank Online Pilot Survey on Consumer Expectations, second wave. OLS estimations on log truncated spending with population weights. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table A.8: Current Spending on Housing

	Current Spending (in € for the previous month)							
	Full sample				$1.5 \leq \pi^e \leq 2$			
$C_t^{house,e}$	0.086 (0.063)	0.043 (0.043)	0.091 (0.064)	0.096 (0.063)	0.093 (0.094)	0.093 (0.061)	0.097 (0.094)	0.098 (0.094)
$r_{savings}^e$	0.021** (0.011)	0.001 (0.007)	0.021** (0.010)	0.002 (0.018)	0.015 (0.014)	-0.035 (0.023)	0.009 (0.015)	0.007 (0.009)
$d_{inf\_lowbetter}$	0.183*** (0.061)		0.195*** (0.063)	0.187** (0.075)	0.225** (0.089)		0.224** (0.091)	0.208 (0.144)
$d_{inf\_highbetter}$	0.161 (0.118)		0.169 (0.115)	0.076 (0.209)	0.023 (0.166)		0.037 (0.161)	-0.163 (0.375)
$d_{int\_lowbetter}$		0.029 (0.085)	0.047 (0.136)	0.011 (0.134)		-0.168 (0.145)	-0.051 (0.189)	-0.125 (0.221)
$d_{int\_highbetter}$		-0.119** (0.052)	-0.101 (0.068)	-0.030 (0.084)		-0.202*** (0.070)	-0.170* (0.091)	-0.131 (0.115)
$r_{savings}^e * d_{inf\_highbetter}$				-0.059 (0.115)				-0.135 (0.205)
$r_{savings}^e * d_{inf\_lowbetter}$				-0.003 (0.023)				-0.010 (0.089)
$r_{savings}^e * d_{int\_highbetter}$				0.036 (0.022)				0.024 (0.054)
$r_{savings}^e * d_{int\_lowbetter}$				-0.000 (0.028)				-0.089 (0.158)
Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	736	1503	734	734	322	619	321	321
Adj. R <sup>2</sup>	0.112	0.067	0.121	0.124	0.122	0.069	0.123	0.113

Note: Bundesbank Online Pilot Survey on Consumer Expectations, second wave. OLS estimations on log truncated spending with population weights. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

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